

Race-conscious Student Support:
A Comparative Analysis of Organizational Resilience in Engineering Education

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ABSTRACT

One response to calls for broadening participation in engineering was the establishment of minority engineering programs (MEPs). Since their inception, MEPs have taken many forms with various functions and can be classified as engineering student support centers (ESSCs). Some ESSCs can be considered race-conscious, meaning they specifically focus on race/ethnicity in their support of engineering students. Prior literature points to race-conscious ESSCs as integral to the recruitment and retention of minoritized students in engineering. Despite their importance, race-conscious ESSCs have been met with various direct and indirect barriers threatening their organization's survival. To understand how race-conscious ESSCs have survived given consistent challenges, I conducted a multiple case study focused on exploring race-conscious ESSCs through the lens of organizational resilience. In this study, I interviewed founding and current directors, with a cumulation of 70+ years of experience, of three race-conscious ESSCs at large, public, predominately-white, R1 institutions.

The findings from this study provide insight into the types of events, actions, and outcomes that inform the forms and functions of race-conscious ESSCs. I identified six types of events and four types of developments that were salient in leaders' descriptions of their ESSC's history. When considering the relationship between events and developments, some event types only occurred in connection with one type of development while others were in connection with two or more types of developments. This study aims to be a historical documentation of race-conscious ESSCs and events they have endured to remain a resource to racially minoritized engineering students. Additionally, this study contributes to the holistic understanding of ESSCs by using Kantur and Íserí-Say's Integrated Framework of Organizational Resilience as a tool for identifying the factors that enable these organizations to be resilient amid disruption. Lastly, this study adds to efforts calling for policy-makers, researchers, and practitioners to be mindful of the tradeoffs being made by race-conscious ESSCs in the name of resiliency and the unintended consequences of these actions.

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GENERAL AUDIENCE ABSTRACT

Since the 1970s, there have been national calls to broaden participation in engineering. One response to these calls was the establishment of minority engineering programs (MEPs) to recruit and support Black engineering students. Over time, MEPs have changed and taken new forms that can be classified as engineering student support centers (ESSCs). Some of these organizations are race-conscious and focus on race/ethnicity in their support of engineering students. These crucial support systems for Black engineering students have encountered obstacles threatening their organization's survival. I conducted a multiple case study to understand how three race-conscious ESSCs have survived so long despite these challenges. After talking to current and founding directors of these organizations, I found six types of events and four types of developments that were salient in their descriptions of their ESSC's history. Directors most frequently discussed how funding changes and engaging with members of their communities had impact on both themselves as the director and the organization. This study contributes to our understanding of how race-conscious ESSCs remain a resource for racially minoritized engineering students. Additionally, this study calls on policymakers, researchers, and practitioners to be mindful of the tradeoffs being made by race-conscious ESSCs in order to survive and the unintended consequences of these actions.

Dedication

This work is dedicated to those without a road map, doing the best you can with what you have.

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Chapter 1: Introduction

1.1 Motivation

Race and racism drive the inner workings of the United States, resulting in racial inequity in the higher education system. This racial inequity shows up across science, technology, engineering, and mathematics (STEM) degree programs, where Black, Hispanic, and Native Americans only received 7.1%, 12.8%, and 0.3% of bachelor's degrees awarded to U.S. citizens and permanent residents during the 2018-2019 academic year (National Center for Education Statistics, 2020). These numbers highlight a lack of parity in STEM, given that Black, Hispanic, and Native Americans make up approximately 13.4%, 18.4%, and 1.3% of the population (United States Census Bureau, 2020). Since the 1970s, national calls to combat this lack of parity (i.e., broaden participation in STEM) have been made at every segment of the STEM pathway—from K-12 through the workforce (Holloman et al., 2018). However, systematic exclusion in STEM persists almost half a century later.

My dissertation will zoom in to focus on the exclusion of a specific racial group from one STEM field: Black people in engineering. In the year 2000, records of degree attainment show 5.6% of bachelor's degrees in engineering were awarded to Black students (Gibbons, 2009). Years later, in 2018, Black students earned only 4.2% of all engineering bachelor's degrees (Roy, 2019). Unfortunately, this trend of underrepresentation continues at the graduate level. In 2018, of the 43% of engineering graduate degrees earned by domestic students in the United States, Black people earned 4.8% and 4.2% of the master's and doctoral degrees (Roy, 2019). Degree attainment trends at the undergraduate and graduate level clearly demonstrate a lack of parity for Black people within engineering.

Across the U.S., institutions have made many attempts to combat this lack of parity in engineering as it relates to Black people, from outreach programs and interventions to policy changes. One policy action of note is affirmative action. In higher education, affirmative action policies were intended to grant people from marginalized communities (e.g., Black people) access to institutions from which they had been historically excluded (Chun & Evans, 2015). Providing access was only one piece of the puzzle, however: students also needed help succeeding academically. In the context of engineering education, this charge resulted in the establishment of minority engineering programs (MEPs).

MEPs are one of the original means of supporting Black students in undergraduate engineering programs. Since the inception of the MEP in 1973 at California State University-Northridge by Raymond B. Landis (Shehab et al., 2012), MEPs have taken many forms with various functions. MEPs have typically offered some variety of the following: recruitment activities, summer bridge programs, community building, academic support, and student personal/professional development (Morrison & Williams, 1993). Although MEPs offer a multitude of programs, activities, and services to students who

might otherwise not find the support they need to thrive in engineering, their work has, unfortunately, but not surprisingly, been met with objection and often faces roadblocks.

Over time, MEPs, and other efforts related to broadening participation in engineering (BPE), have been the target of both indirect and direct challenges that threaten their organizations' survival and/or mission. Direct challenges refer to socio, political, and/or economic challenges that *directly* impact MEPs. For example, MEPs are subject to budget cuts and must often fight for legitimacy among engineering faculty (Baber, 2015; Rincón & George-Jackson, 2016). Indirect challenges refer to socio, political, and/or economic challenges at either the institutional or college level that *indirectly* impact MEPs. For example, universities and colleges have been pressured to respond to national social justice movements (Black in engineering, 2020) and have faced legal suits claiming discrimination against white students (Black Issues, 1999). In 2004, the American Association for the Advancement of Science (AAAS) and the National Action Council for Minorities in Engineering (NACME) collaborated on a guidebook that documents how lawsuits against higher education institutions and academic programs have completely refined approaches to BPE (Malcom et al., 2004). If history is any indication, it is likely that these challenges, including those not yet mentioned, are not going away.

Considering these challenges, existing structures of MEPs have been adjusted, both reactively and proactively, and new roles have been created (American Council on Education, n.d.; Malcom et al., 2004). For example, MEPs now go by a variety of other names, such as multicultural engineering program or women and minority engineering program (Lee, 2015). We also see the establishment of college-level diversity directors and officers (e.g., Assistant Dean for Access and Inclusion, Associate Dean of Equity and Engagement) (American Council on Education, n.d.). While there is research that explores these organizations, offices, and roles and their corresponding interventions, what has been less documented is how MEPs—in their many iterations and stages—have maintained their longevity at institutions and in a society that actively works against them and their missions. It is essential to document this history because it will help us better understand MEPs, the issues they have been up against, and how they have navigated out of tough times. My dissertation addresses this gap.

1.2 Engineering Student Support Centers

For the purposes of this study, I will refer to all iterations of minority engineering programs, and engineering programs more broadly, as engineering student support centers (ESSCs). Some ESSCs, according to Lee, “provide underrepresented students with co-curricular support using student interventions in the form of programs, activities, and services” (2015, p. ii). Lee also notes that universities often house ESSCs to aid in the recruitment and retention of minoritized students. As a result of Lee’s work, he identified several classifications of ESSCs that have emerged since the 1970s, which I

will further discuss in Chapter 2. These ESSCs are traditionally led by a director and supported heavily by full-time staff, graduate assistants, and undergraduate student volunteers. ESSCs spread awareness of engineering, recruit students, and support them through their undergraduate careers, all while aiming to influence the demographic makeup of engineering across the nation. They facilitate a variety of interventions (i.e., programs, activities, and services) through their institutions (Lee & Matusovich, 2016). Some ESSCs have offices and dedicated spaces for students to fellowship, hold events, and access resources.

Based on Lee's classification of ESSCs and my decision to center Black people in engineering, my study will focus on race-conscious ESSCs: minority engineering programs (MEPs), women and minority engineering programs (WMEPs), and diversity in engineering programs (DEPs). I am focusing on MEPs and WMEPs because they both have a direct focus on race/ethnicity in their support of students, as opposed to women in engineering programs (WEPs) that focus primarily on gender. I also include DEPs due to their targeted efforts to address the needs of minoritized students, which include racially minoritized students. Because of this country's troubling history with race and racism, leaders of race-conscious ESSCs face an interesting conundrum: recruiting and retaining engineering students from minoritized and marginalized groups while maintaining a healthy relationship with the institution responsible for many of the issues these students encounter. My dissertation is motivated by the desire to understand how they do so.

1.3 Purpose & Research Questions

The purpose of this study is to understand how race-conscious ESSCs have developed over time in different institutional contexts. This focus is advantageous because race-conscious ESSCs exist to mitigate the impact of issues within and outside of their institutions yet rely on a healthy relationship with the institution to survive. Thus, I will explore the symbiotic relationship between race-conscious ESSCs and the institutions in which they are embedded. The overarching research question and sub-questions guiding my exploration are as follows: *How have race-conscious ESSCs developed over time given the continual threats to the organization's survival and race-conscious mission?* I will answer this question by addressing the following sub-questions:

RQ1. What events are salient in leaders' description of their ESSC's history?

RQ2. What developments are salient in leaders' description of their ESSC's history?

RQ3. How have events impacted the development of ESSCs over time?

To explore these research questions, I employed a multiple case study design with embedded units of analysis situated in organizational resilience as the theoretical foundation. I discuss both in the subsequent sections.

1.4 Introduction to Organizational Resilience and Evolvability

To explore the development (i.e., resilience and evolvability) of race-conscious ESSCs over time, I will use Kantur and Íserí-Say's (2012) Integrated Framework of Organizational Resilience. Kantur and Íserí-Say argued that the literature lacked a comprehensive theoretical model that focused on organizational resilience and thus created an integrated framework. Before discussing my reason for choosing this framework, I must first provide a bit of the history of organizational resilience. Afterward, I will explain how and why this framework will inform my study.

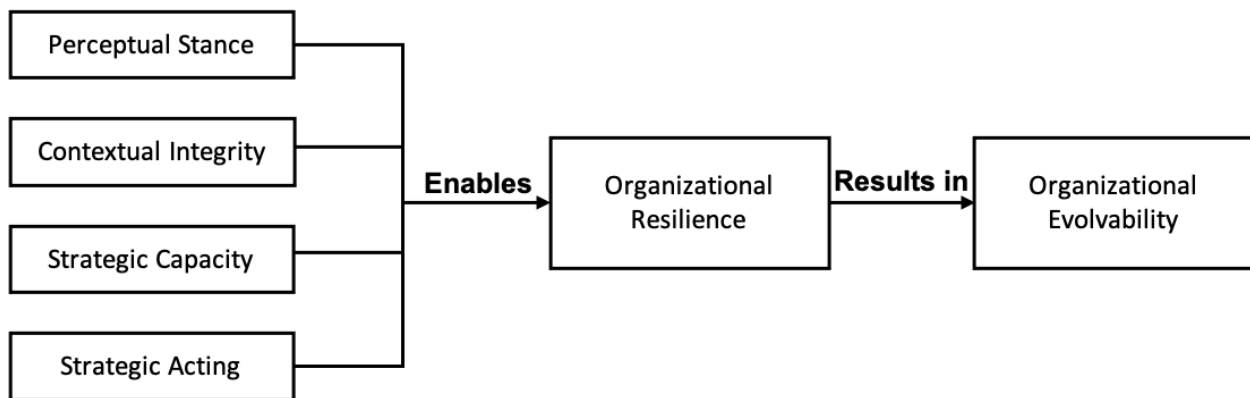
With origins in child psychology (Garmezy, 1970; Werner & Smith, 1977) and ecology (Holling, 1973; Holling & Gunderson, 2002), the concept of resilience has since been found useful in several other fields. In organization studies, resilience has primarily been found to be a vital characteristic for groups or organizations that encounter external forces, such as natural disasters, terrorist attacks, and uncertain environments (Sutcliffe & Vogus, 2003; Tierney, 2003; K. E. Weick & Sutcliffe, 2001; Karl E Weick, 1993). Scholars also see value in exploring the conceptualization of resilience for organizations that experience a multitude of risks in day-to-day operations, especially in the rapidly changing environment of business today (Mallak, 1998a). I argue that race-conscious ESSCs meet both criteria as they encounter external forces (e.g., attacks on affirmative action) and day-to-day risks (e.g., lack of faculty support) in operation.

This study aims to explore how race-conscious ESSCs have developed over time and the adverse and opportunistic conditions that impact the organization's resilience. I will examine the nature of their responses using Kantur and Íserí-Say's (2012) conceptual framework. Kantur and Íserí-Say perceive organizational resilience as a process rather than a static state and conclude that resilience is "the capability of organizations for turning adverse conditions into an organizational opportunity" (2012, p. 765). To construct a model, they reviewed existing literature on organizational resilience and identified four factors that contribute to a resilient organization as well as an outcome of evolvability.

According to Kantur and Íserí-Say, the following factors must be present for resilience to emerge: 1) perceptual stance, 2) contextual integrity, 3) strategic capacity, and 4) strategic acting (Figure 1). *Perceptual stance* is an organization's awareness of its reality, which includes its strengths and weaknesses. While the organization is aware of its shortcomings, it must also be optimistic about its ability to overcome them and future obstacles. This understanding and awareness need to be held by everyone within the organization. There must be a sense of community that helps unite all in the face of adversity. *Contextual integrity* takes a deeper dive to the individual level and captures the need for individual employees to be empowered and resilient within the organization. Contextual integrity speaks to the importance of open and honest communication within the organization. This compatible interaction, combined with a supportive and caring environment, is necessary for managing anxiety

during tough times. *Strategic capacity* illuminates the need for adequate preparation and foresight—particularly as it relates to resource availability, employee capability/knowledge, and plans to manage unforeseen events. Lastly, *strategic acting* is the necessary companion to strategic capacity. Strategic acting captures the need for employees to be able to act upon the plans, utilize the resources, and tap into knowledge about strategic plans but in a creative, flexible, and proactive manner. Ultimately, the organization must embody perceptual stance, contextual integrity, strategic capacity, and strategic acting in order to foster resilience.

Figure 1. *Kantur and Íserí-Say’s (2012) Integrative Framework of Organizational Resilience guiding this study*



Kantur and Íserí-Say subsequently propose a conceptualization of *organizational resilience* that includes four dimensions: 1) robustness, 2) redundancy, 3) resourcefulness, and 4) rapidity. Together these 4 incorporate the physical and social dimensions of organizational resilience (Tierney, 2003). Kantur and Íserí-Say (2012) note that these dimensions represent characteristics of an organization that is resilient, which is separate from the factors that must be present within the organization to enable resiliency. This distinction further emphasizes the difference between the four factors previously mentioned that contribute to resiliency and the characteristics of an organization that model resiliency.

The final part of Kantur and Íserí-Say’s framework of organizational resilience is *organizational evolvability*. The authors define this process as an absorption of the changes that result from the chaos that transforms into “better sensing capabilities with a wiser outlook” (2012, p. 770). Organizational evolvability means that the outcome of a resilient organization going through disruption is improvement in overall function because of identifying an organizational opportunity and thus being better prepared in the future.

Organizational resilience has been found to be a useful concept for exploration in a multitude of contexts. Barasa, Mbau, and Gilson (2018) conducted a systematic review of literature on organizational

resilience and noted that of the 34 papers to meet their selection criteria, the sectors or systems of interest included the health system, government agencies, small businesses, water management, and hospitality, just to name a few. Three studies included the education sector; however, it was not their primary interest. Thus, a theoretical contribution of my work will be bringing in organizational resilience as a lens to think about race-conscious ESSCs into the education research space. This contribution will help us understand the ways in which organizational resilience plays out for these unique sub-organizations within higher education in new ways.

Given that this framework has not been applied in this context before, I used Kantur and Íserí-Say's framework of organizational resilience as a sensitizing concept as opposed to leaning on Kantur and Íserí-Say's framework for the "right answer" of what organizational resilience should look like for ESSCs. Sensitizing concepts provide a general sense of reference and guidance in research (Blumer, 1954). Stated differently, "sensitizing concepts draw attention to important features of social interaction and provide guidelines for research in specific settings" (Bowen, 2006, p. 14). Sensitizing concepts can be useful in identifying the research problem, laying the foundation for analysis, or examining codes to develop thematic categories (Bowen, 2006; Charmaz, 2003). Bowen (2006) states that sensitizing concepts are often used in research where the researcher's goal is to discover, understand, and interpret what is happening in the research context, much like my study aimed to do.

Kantur and Íserí-Say's four factors that enable resilience informed my data sources, including protocol and the types of information, experiences, and tactics to probe for during interviews. Kantur and Íserí-Say's framework also provided a starting point for me to begin conceptualizing organizational resilience for race-conscious ESSCs.

1.5 Overview of Research Design

To better understand the symbiotic relationship between race-conscious ESSCs and their institutions, I employed a multiple case study approach. The case study methodology affords researchers opportunities to explore a phenomenon, individuals, or organizations in context using a variety of data sources (Baxter & Jack, 2008; Creswell, 2013a). As previously discussed, race-conscious ESSCs have been targets of both direct and indirect disruptions and, as a result, existing structures of MEPs have been adjusted, and new roles have been created (American Council on Education, n.d.; Malcom et al., 2004).

Using a multiple case study approach, I explored various structures of race-conscious ESSCs, their contexts, and their development over time. My dissertation includes three cases, each bounded as one of three race-conscious ESSCs (MEP, DEP, WMEP) at a particular institution. Data sources include interviews with ESSC leaders, ESSC websites, and artifacts. Using a multiple case study approach

allowed for exploration within and across cases (Creswell, 2013b), resulting in the identification of differences and similarities between my cases and their development over time.

1.6 Outcome of Study

My dissertation resulted in a summary of the various kinds of events and developments that ESSC leaders have experienced through the decades. Given the uniqueness of each context, this study did not result in within-case reports; however, the complexities of the conditions they have faced did result in rich cross-case analysis.

These outcomes produce a deeper understanding of how three race-conscious ESSCs have developed over time. Results provide more insight about the various choices directors made in the face of adverse, as well as opportunistic, conditions. More specifically, my analysis resulted in the identification of six event types and four development types that were salient in directors' description of their ESSC's history. I also found that some event types have impact in more than one developmental area. These findings begin to tell the story of how race-conscious ESSCs have shifted in form and function over time.

Lastly, the results of my dissertation aid current and future leaders of race-conscious organizations in strategic planning, enabling them to better identify and navigate adverse and opportunistic conditions. Additionally, these results motivate race-conscious ESSC leaders, specifically, in thinking about how decisions made for survival can impact the students they support. University leaders will also gain an understanding of how they are enhancing or disrupting the work that race-conscious ESSCs try to enact on their campuses.

1.7 Significance of Study

My findings advance our understanding of how race-conscious ESSCs have developed over time from the perspective of the directors that have guided them. While much research has been conducted to explore the interventions and outreach events facilitated by ESSCs, the literature lacks a comprehensive understanding of how race-conscious ESSCs have survived over the decades, given the direct and indirect challenges that these organizations and their leaders continue to face. It is important to understand how these organizations strategize, change, and shift over time because we can better leverage these attributes if we better understand what contributes to the adaptability of these organizations. We need to understand the systematic ways in which these organizations have navigated within large, predominantly- and historically-white institutions and colleges of engineering. Leaders of race-conscious ESSCs are likely to navigate similar conditions for decades to come. Additionally, there is intrinsic value in contributing to the documentation of the often-underappreciated labor put in by race-conscious ESSC leaders, their staff, and student volunteers.

1.8 Summary

Black people continue to be minoritized in engineering education at both the undergraduate and graduate levels. Since the 1970s, universities have invested in a variety of ESSCs with a focus on support for racially minoritized students. Over time, scholars have explored the structures, programs, activities, and services provided by these organizations. What has been less understood is how race-conscious ESSCs have continued to exist in sociopolitical contexts that often challenge their existence. My study addresses this gap by exploring how race-conscious ESSCs have developed over time, the challenges and opportunistic conditions they have faced, and the strategies and tactics used to overcome. Using a multiple case study approach coupled with Kantur and Íserí-Say's integrated framework of organizational resilience, I illuminate the realities that race-conscious ESSCs, their leaders, and support staff have and continue to endure. Results from this work will aid future race-conscious ESSC leaders in strategic planning for navigating adverse conditions and capitalizing on opportunistic conditions.

Chapter 2: Literature Review

“You do not wipe away the scars of centuries by saying: Now you are free to go where you want, and do as you desire... You do not take a person who, for years, has been hobbled by chains and liberate him, bring him to the starting line of a race and then say, ‘You are free to compete with all the others,’ and still justly believe that you have been completely fair... We seek... not just equality as a right and a theory but equality as a fact and equality as a result.” – President Johnson, 1965 (Nixon, 1971)

2.1 Introduction

Over the years, MEPs and WEPs have made several structural and language shifts, resulting in the five types of ESSCs that we see today. Structural shifts have included creating, expanding, reducing, discontinuing, and combining initiatives. For example, initiatives have been created because of solicitations from leading funding agencies, such as the National Science Foundation (NSF). NSF grants and programs have funded and inspired ESSC offerings and impacted to whom they are available. The S-STEM program, which provides scholarships specifically for STEM undergraduates with low-income backgrounds, is an example of such a solicitation (*NSF Scholarships in Science, Technology, Engineering, and Mathematics Program (S-STEM)*, n.d.). Similarly, the expansion, reduction, or discontinuation of initiatives are often influenced by the availability of support and resources, namely funds. These funds and their sources will be further discussed in *Section 2.3.5 Funding Issues*.

Language shifts have included the renaming of programs, the reframing of messaging and advertising, and the broadening of mission statements. For example, following U.S. Supreme Court landmark rulings in 2003, colleges and universities across the nation began to rethink any race-based programming offered to students. As a result, some ESSCs underwent name changes to remove words such as “minority” from their titles and altered any race-exclusive eligibility criteria for awards, scholarships, recruitment, orientation, academic-enrichment programs (Malcom et al., 2004; The Chronicle, 2004 as cited in Schmidt, 2006; Shehab et al., 2012). Name changes have also been accompanied by changes in mission statements and the messaging surrounding which students will be served (Shehab et al., 2012). Shehab and colleagues investigated similar changes to an MEP at the University of Oklahoma and found that these changes had negative impacts on the original students that the MEP sought to serve (e.g., Black, Latinx, Asian American, and Native American).

Together, structural and language shifts have resulted in the ESSCs of today. However, prior research has not fully addressed what challenges and opportunities drive and result from such decisions over time. In Chapter 2, I will describe the history of ESSCs and discuss our current understanding of how ESSCs function. I will specifically focus on the conditions that shape race-conscious ESSCs and

influence their existence by situating their work within the context of higher education. This context enables me to document the history, challenges, opportunities, and responses to conditions over time. I will then discuss Kantur and Íserí-Say's integrated framework of organizational resilience by first describing their conceptualization of organizational resilience and the associated outcome of evolvability. Lastly, I will discuss the four factors that enable said resilience and conclude with an overview of applications of organizational resilience relevant to my study.

2.2 Overview of ESSCs and their Environments

To understand race-conscious engineering student support centers, it is important to first understand the larger environment in which they are situated. To do so, I will start with an overview of the relationship between race, higher education, and STEM as it relates to the need for and shape of race-conscious ESSCs. Next, I will discuss the origins of ESSCs and the history of the original race-conscious ESSC (MEPs). Lastly, I will highlight what we know holistically about ESSCs.

2.2.1 Race, Higher Education, and STEM

Despite constant calls for diversity in STEM over the decades, parity has yet to be achieved due to many factors, such as students' lack of interest in STEM fields, inadequate preparation among high school graduates for STEM majors, and students leaving STEM majors or dropping out altogether (Museus et al., 2015). While these factors are important and warrant attention, there are systemic impediments to progress that should not be overlooked. These impediments include chilly climates (Lichtenstein et al., 2014); historical prejudice, unequal distribution of opportunities, and isolating environments for marginalized students in STEM programs (Baber, 2015); unsupportive institutional policies and negative classroom environments (Lichtenstein et al., 2014); absence of role models and mentors at every segment of the STEM pathway (Kachchaf et al., 2015; Mondisa, 2015); and lack of financial aid (Chubin et al., 2005; Georges, 1999). To directly combat inequities in education, policymakers have passed various policies in hopes of addressing such impediments and "leveling the playing field."

Three of the most racially progressive policies of 20th-century higher education, according to Museus and colleagues (Museus et al., 2015), included: 1) the Morrill Land Grant Acts of 1862 and 1890; 2) the Servicemen's Readjustment Act, or the G.I. Bill; and 3) affirmative action. The 1862 Morrill Act provided federal funding for the establishment of land-grant colleges, while the 1890 Morrill Act provided funding for the establishment of separate land-grant colleges for Black students (Thelin, 2011). The G.I. Bill was established to provide educational benefits to World War II veterans (Museus et al., 2015; Thelin, 2011). Lastly, affirmative action, arguably the most controversial of the three, was originally established to end racial discrimination in federal employment. During the presidency of

President Lyndon Johnson, affirmative action was applied to higher education, intending to aid racial integration at public and private colleges and universities (Brown, 1999).

Despite presumed well intentions, each of these policies has showcased the pervasive nature of racism in higher education, making it clear that efforts to combat inequity do not, and will not, go without opposition. For example, given the racially segregated time in history that the G.I. Bill was established, Black veterans were often disbarred from receiving any of their benefits, including earning a college degree (Herbold, 1994). Additionally, legal attacks on affirmative on the basis of discrimination against white people, especially white men, demonstrate the pervasive nature of racism in the United States, even in the face of attempts to right centuries worth of oppression (Black Issues, 1999; Malcom et al., 2004; Orfield et al., 2007; Shehab et al., 2012; Willis, 1997). These policies and the backlash they received provide the foundation for efforts to address underrepresentation within higher education and establish the boundaries that inform how Black students are supported in engineering, i.e., race-conscious ESSCs.

I will further explore the various factors that impact race-conscious ESSCs in the remaining sections. I will introduce ESSCs, followed by an exploration into the shifts, challenges, and opportunities faced specifically by race-conscious ESSCs.

2.2.2 The Origin of ESSCs

The language of ESSC is contemporary. Historically, when talking about efforts to support underrepresented engineering students, scholars and practitioners have referred to minority engineering programs and women in engineering programs, or MEPs and WEPs. Since the early 1970s, the representation of both white women and racial minorities in STEM has been a nationally prioritized topic (Fox et al., 2009; Holloman et al., 2018; Lee, 2015). Over time, additional approaches to supporting students emerged, which Lee (2015) began collectively referring to as ESSCs. Today, we see a variety of ESSCs with a variety of focuses, including: MEPs—“focused on race/ethnicity (as demonstrated by the federal guidelines) with less focus on gender while aiming to address the factors for underrepresentation of certain populations in engineering, specifically domestic students that are African-American, Hispanic, and Native American”; WEPs —“focused on gender parity and underrepresentation in engineering with some focus on addressing the unique issues for women of color”; WMEPs—“includes an MEP and WEP separately but under common administration”; DEPs —“focuses on engineering students in general and attempts to identify and address the unique needs of underrepresented populations in an effort to broaden participation and improve diversity”; and GEPs —“focuses on engineering students in general without a specific focus on broadening participation or diversity” (2015, p. 34). These five classifications of ESSCs provide a common language to discuss the variation of engineering student support seen today.

Situated in the classifications and definitions provided by Lee and led by my decision to center Black people in engineering, my study will focus on the race-conscious ESSCs: minority engineering

programs, women and minority engineering programs, and diversity in engineering programs. As I continue to discuss the history of ESSCs, I will primarily be referring to MEPs as these are the organizations that laid the groundwork for the other two programs of interest.

2.2.3 History of the MEP

In 1973, the first MEP was founded at California State University-Northridge by Raymond B. Landis (Morrison & Williams, 1993). Landis states that he modeled this MEP after his own experiences as a student (i.e., a white male student) at the Massachusetts Institute of Technology (MIT), where he joined a fraternity that was invested in his success to keep their fraternity house affordable and remain in good standing on campus. As a result of Landis' fraternity's commitment to his success, he took classes and studied with other first-year students with whom he lived. They all received support from upper-class students in the house, including tutoring and access to notes, tests, and homework from the courses they were enrolled (Landis, 2007). These aspects of building strong peer groups, mentoring and tutoring from upper-class students, and test banks are all common features of ESSCs today (Lee & Matusovich, 2016; Morrison & Williams, 1993).

Leonard, Percy, Shehab, and Walden (2013) constructed a model for minority student social networks of institutional bodies enabling the accumulation of social capital. Of those institutional bodies, MEPs were identified for a few different reasons, including the valuable tutoring services that they offered. In addition to offering tutoring services during the academic year, MEPs also included tutorial services during summer bridge programs. Summer tutoring not only aids in academic understanding during the summer but also provides an opportunity to meet older students in STEM and get comfortable with asking for and seeking help when needed (Lam et al., 2004).

MEPs were the first ESSCs to show up on college campuses, and we now see four other types of ESSCs providing support for students, some with targeted populations in mind and others without. Since its inception in the '70s, race-conscious ESSCs have taken many forms and now provide a variety of activities, programs, and services for Black students in engineering. Tutoring, mentoring, and test banks are among these offerings like those offered at the first MEP at California State University-Northridge.

2.2.4 A Holistic Understanding of ESSCs

Much research has been conducted regarding the individual programs, services, and activities that ESSCs provide, namely mentoring and tutoring services (Cook, 2015; Good et al., 2000; Lasser & Snelsire, 1996; Leonard et al., 2013). For example, Lasser and Snelsire (1996) highlight the numerous advantages to proactive mentoring—including the sharing of taken-for-granted information, such as how to calculate GPAs, withdrawal dates, and the importance of talking to professors as a freshman. Cook (2015) explored successful mentor/mentee relationships experienced by Black STEM students to

understand what practices and behavior enable them for success. Students identified the familial aspect of the relationship as the most important to them. While mentoring and tutoring are only two of a wide variety of offerings hosted by race-conscious ESSCs, they speak to the many avenues of support being offered. Directors, staff, and volunteers understand that there is no one-size-fits-all approach to supporting students.

Although not exhaustive, researchers are also seeking to understand MEPs holistically. For example, in 1993, the National Advisory Council on Minorities in Engineering (NACME) conducted a study to understand the variety of services and structures that were in place at institutions doing relatively well at graduating marginalized students at the undergraduate level. This study resulted in a theoretical MEP model that:

includes pre-enrollment activities (recruitment, admissions, summer bridge programs, and transitional services), matriculation services (community building, academic support, student personal/professional development), and a set of characteristics that define the institutional environment in which the programs function (institutional commitment, fiscal resources, staffing, office space, faculty involvement, and reporting lines). (Morrison & Williams, 1993, p. 3)

This study provides an overview of what an MEP could look like at any institution and emphasizes the role that institutional support plays in student success.

Hackett and Martin's (1998) study examined the role of faculty support. Their study of "Faculty Support for Minority Engineering Programs" sought to explore the degree to which (on a scale of 1, should not exist to 10, critical) engineering faculty saw "value and appropriateness" of MEPs as they were structured at various schools across the country at the time. Overall, they found that faculty tended to generally endorse MEPs with an average score of 6.51. However, there was a considerable amount of variability with a standard deviation of 3.13, as faculty were more supportive of financial and academic assistance over clustering types of activities (Hackett and Martin, 1998). Hackett and Martin's work showcase that while a variety of offerings at an MEP are great, faculty support is needed but not always received.

Shehab, Murphy, and Foor (2012) examined the unintended consequences of redesigning the MEP at the University of Oklahoma following economic and political forces, such as affirmative action. The MEP originally sought to support students from racially underrepresented backgrounds in engineering (e.g., African American, Hispanic American, Asian American, and Native American undergraduate students). Changes to the MEP included a broadened mission to include first-generation students as well as changes in physical spaces and staff. Shehab and colleagues (2012) found that these changes resulted in the Black students feeling like the university was not genuine in their claims to care about marginalized students, they lost their safe place, and they lost a maternal figure (i.e., the previous

Assistant Director). Shehab and colleagues demonstrate the reality of simply having an MEP at an institution does not inherently mean that it will provide students with the support and care that they need and desire. The design, structure, and mission of an MEP all have impact on the students it aims to support.

When considering ESSCs more broadly, Lee and Matusovich (2016) explored how the systems of support offered by ESSCs are intended to combat the barriers to participation in engineering for undergraduate students. This exploration resulted in the development of the model of co-curricular support (MCCS), which can be used to create and evaluate student support systems and interventions. Ultimately, the model showcases the comprehensive assistance students need to be supported and succeed in an undergraduate degree program (Lee & Matusovich, 2016).

Lee and colleagues (2018) also conducted a study to gain insight into the decision-making of practitioners working in ESSCs. They wanted to understand the concepts that impact how support is offered to the students they served. As a result, they found four major themes that inform the decision-making of practitioners working in ESSCs. These themes consist of beliefs that ESSC practitioners have about 1) the institutional context given who their students are (context), 2) their students' agency or motivation to pursue engineering (agency), 3) the range of things that happen to students and the things they choose to engage in throughout their undergraduate journey (process), and 4) students likelihood of remaining in engineering as a result of experiences over time (impact) (Lee et al., 2018). Lee and colleagues demonstrate that there are various considerations that can inform the decision-making of ESSC leaders, their responses to events, and their evaluation of their services.

Another exploration into ESSCs broadly sought to understand what catalysts and resources lead to the establishment of various STEM intervention programs (SIPs) in the United States (George et al., 2019). George, Castro, and Rincon (2019) used institutional isomorphism to explore how organizations become increasingly homogenous through their interactions with each other and third parties. More specifically, there are three ways that isomorphism occurs: 1) coercive isomorphism, which occurs in response to external pressures; 2) mimetic isomorphism, which is copying what is perceived to be successful at another organization; and 3) normative isomorphism, which is the process of conforming to norms typically established through the process of professionalization (DiMaggio and Powell 1983 as cited in George, Castro, and Rincon, 2019). Stated simply, some STEM intervention programs, or ESSCs and their corresponding efforts, were created because other institutions had them and/or an institution felt obligated. Given this reality, George and colleagues encourage purposeful and informed program development to see improvement in opportunities for students to get into STEM and subsequently succeed.

In summary, scholars have noted some of the ways that the form and function of MEPs have shifted and adjusted over time (Schmidt, 2006; Shehab et al., 2012). Lee (2015) provides a new language for classifying the various types of engineering student support seen today, including race-conscious efforts (e.g., MEP, DEP, WMEP). Researchers have also studied a variety of the programs, activities, and services that ESSCs offer. The gap in the literature that my dissertation addresses is the story of how race-conscious ESSCs have maintained their longevity at large predominately- and historically-White institutions while being situated in a society that actively works against their existence and their original missions.

In the next section, I will explore six challenges and their corresponding opportunities that race-conscious engineering student support centers have faced and continue to face. Afterward, I will discuss the theoretical lens informing my study.

2.3 Challenges & Opportunities Faced by Race-conscious ESSCs

MEPs, along with many other race-conscious efforts, have been met with a variety of challenges and barriers that I consider contributors to the stagnation seen today regarding BPE goals. The clearest illustration of these barriers is found in Baber (2015), where he provides an overview of limiters often encountered by those engaging in diversity work. These limiters include the reality that efforts are supported only when they do not interfere with the institution's priorities and norms and the pervasiveness of the myth of meritocracy that rationalizes why spaces are demographically and environmentally the way they are. Together these limiters provide the foundation for the six interrelated challenges that I posit as having a significant impact on race-conscious ESSCs. These challenges include 1) the myth of meritocracy, 2) diversity as a buzzword, 3) the fight for legitimacy, 4) lack of faculty support, 5) funding issues, and 6) attacks on Affirmative Action policies. With each challenge, there are also opportunities that can be utilized to make the most of unfortunate situations and turn issues into an opportunity for change. I will discuss the duality of this reality as I review each challenge.

2.3.1 The Myth of Meritocracy

The word "meritocracy" was introduced to the world in 1958 through a book where Michael Young defines meritocracy as a disapproving term describing a society that develops based on the intelligence and education of its people (Liu, 2011). The word has since evolved into a concept that is aspirational, especially in the United States (Liu, 2011). Scholars have found major implications of the myth of meritocracy regarding the inequities in the U.S. healthcare system, the reproduction of social class structure, and the U.S. higher education system (Kwate & Meyer, 2010; Lardier et al., 2019; Liu, 2011; Meroe, 2014). For example, McNamee and Miller (2004) argue that the myth of meritocracy is harmful because it discounts the causes of inequality in the United States and leads to unwarranted

advancement of the rich and condemnation of the poor. They also note that higher education in the U.S. “is not governed by strict principles of meritocracy, but instead, reflects, legitimizes, and reproduces class inequalities” (McNamee and Miller (2004) as cited in Liu, 2011, p. 393).

The myth of meritocracy is a core value of STEM (Baber, 2015; Long & Fox, 1995; Merton, 1973; Rohde et al., 2020), and often results in the equating of a students’ deviation away from engineering to a lack of ability (Baber, 2015). This unproductive perspective ignores the very real structural and systematic inequalities in our education system and society overall (Bell, 1980; Delgado & Stefancic, 2001 as cited in Baber, 2015). The meritocratic mindset and ignorance about systemic inequities are counterproductive to the mission of race-conscious student support in engineering because it invalidates the need for race-conscious student support. If an institution believes that Black students are not graduating with engineering degrees because they simply lack the ability, there would be no reason—other than impression management perhaps—to invest in race-conscious ESSCs. Full acknowledgment of institutional racism and systematic barriers informing the outcomes documented along the STEM pathway could lead to honest and informed decisions about the way to transformative progress in BPE. I explore how interview participants describe the influence of the myth of meritocracy and the ways in which it relates to how they frame the purpose and necessity of their efforts.

2.3.2 Diversity as a Buzzword

Over the years, the meaning of the word “diversity” in STEM has changed and can now mean a variety of things to different people. In the 1970s, calls for diversity were about increasing the representation of people from minority groups that had been historically discriminated against (National Research Council, 1977). Over time, the motivations for diversity became more about economic productivity and global competitiveness (Congress & Commissions on the Advancement of Women and Minorities in Science, Engineering, 2001; National Research Council, 1991). Through this shift, diversity was still about racial/ethnic minority groups and women. However, at some point, another shift occurred in which diversity began to include the diversity of thought, experiences, and ideas (National Engineering Education Research Colloquies, 2006). Baber (2015) describes diversity as a “rhetorical commodity, used to buffer institutions from directly addressing the roots of inequality in STEM education” (p. 265). In a case study of diversity’s articulation process at a particular institution, Thomas coins the *diversity regime*, which “consists of a set of meanings and practices that works to institutionalize a benign commitment to diversity, and in doing so obscures, entrenches, and even intensifies existing racial inequality by failing to make fundamental changes in how power, resources, and opportunities are distributed” (2018, p. 145). In other words, “diversity” has become a buzzword that can mean so many different things and has effectively become meaningless, resulting in little to no transformative or lasting change.

As a result of diversity becoming a buzzword, there have been futile attempts at improving student experiences. With no authentic consideration of student experiences, graduation rates of minoritized students continue to stagnate. With no realized change in graduate rates, race-conscious ESSCs become undervalued and overlooked. If the goal is to simply increase the number of Black students in engineering, then the work will stop at outreach, recruitment, and admissions. A purely numerical goal does not account for the harmful experiences that students have along their entire engineering education journey. Subsequently, ESSCs run into issues of funding because investors and university administrators do not always recognize that getting students into engineering programs is only one part of a much larger picture. Understanding the role of “diversity” on campuses will help contextualize how the ESSCs in my study see their mission in relation to the university they are embedded within.

2.3.3 The Fight for Legitimacy

The fight for legitimacy refers to the struggle related to the extent to which the actions and existence of a social entity are valued and considered valid by stakeholders (Wilcox, 2007). Wilcox (2007) highlights that legitimacy is imperative to an entity's ability to enact agency and transformative action. When exploring the literature, scholars point to the necessity of legitimacy and the consequence of the lack thereof for ESSCs. After interviewing administrators from 48 different STEM intervention programs, Rincon and George-Jackson (2016) found that MEPs are constantly fighting to be viewed as legitimate and “worthy” investments on campus. This legitimacy “validates the purpose of [STEM intervention programs] as necessary entities within the university and directly affects the long-term stability and financial support [STEM intervention programs] receive from their college, departments, and the university” (Rincon and George-Jackson, 2016, p. 441). Without legitimacy, programs, activities, and services provided by race-conscious ESSCs run the risk of not gaining or losing their long-term sustainability and viability on campus (Bailey et al., 2004 as cited in Rincon & George-Jackson, 2016).

As a result, I see two opportunities concerning legitimacy: 1) non-performative, institutionalized commitment to diversity, equity, and inclusion so that all race-conscious efforts are inherently viewed as legitimate; and 2) upon legitimized status, this institutionalized respect can mitigate the impact of the other challenges that impact race-conscious efforts. My study explores the extent to which these opportunities are ever realized.

2.3.4 Lack of Faculty Support

Yet another impediment to the work of race-conscious ESSCs is poor faculty support, buy-in, and participation. Scholars have noted the ways in which service work (i.e., volunteering at an ESSC) is undervalued and holds less value in promotion and tenure for faculty (Misra et al., 2011; O’Brien-Knotts,

2019). This reality creates a cyclical relationship between race-conscious ESSCs' lack of legitimacy on campus and lackluster faculty support. Lack of faculty support is unfortunate for both ESSCs and students, given that student engagement with faculty has been revealed to be an important factor impacting—positively and negatively—the success of underrepresented students of color in STEM (Museus et al., 2011). One way for faculty members to engage with students is through involvement in ESSCs.

In a study applying an interest-convergence framework to BPE-related progress, Baber (2015) finds that faculty members committed to involvement in diversity programs are often few in number and are also often faculty from underrepresented groups. It is important to be mindful of the limited number of faculty of color in STEM and the reality that they are often subject to this additional load or “cultural tax” whereby they may feel internally or externally obligated to contribute to diversity-related service (Diggs et al., 2009; Padilla, 1994). Additionally, “identity taxation” impacts women faculty by expecting them to do more service among other obligations (Hirshfielda & Joseph, 2012). Cultural and identity taxation impact time available for faculty to work on research and their road to tenure and full professorship (Hammond, 2002; Misra et al., 2011; O'Brien-Knotts, 2019).

On the other hand, diversity program administrators in Baber's study reported that faculty who get involved—even if after a bit of hesitancy—eventually evolve into advocates for the program and aid in the recruitment of other faculty (Baber, 2015). According to George, Erin, and Rincon (2019), connections with faculty who contribute to the scholarship of students from racially and ethnically underrepresented groups have also been identified as a key resource for STEM intervention programs (George et al., 2019). George and colleagues (2019) sought to understand the origins of STEM intervention programs at ten universities across the nation. Faculty members were instrumental in the development of 28% of the programs of interest in the study. George and colleagues identify faculty members as institutional agents who have the power to create change based on their attitudes and actions (Stanton-Salazar, 2010 as cited in George et al., 2019).

Together these findings demonstrate the importance of faculty involvement in ESSCs and the power of faculty members regarding the existence of ESSCs. My dissertation speaks to the importance of faculty involvement in race-conscious ESSCs.

2.3.5 Funding Issues

As with most university efforts, financial support is crucial to the success of race-conscious ESSCs, and the lack thereof presents challenges, especially for ESSCs that are supporting hundreds of students annually. A commonly accepted principle in organizational studies is one informed by the seminal work of Pfeffer and Salancik (1978), which states that to understand an organization, you must also understand the context of that behavior or the “ecology of the organization.” This principle is central

to the theory of resource dependency, which is all about understanding the extent to which one organization is dependent on another to provide a vital resource, such as funding. Dependency on external sources for funding is where funding practices and funding sources become important for organizations, such as ESSCs, when we know that the availability of funds has major implications on the programs, activities, and services organizations can provide (George et al., 2019). As a result, practitioners must always be aware of changes in funding structures. For example, observed changes at the federal level and among private corporations/foundations demonstrate declines in internal funding and increases in external funding of STEM intervention programs (George et al., 2019).

When looking at internal funding practices for ESSC programs, there is often misalignment between funding priorities within the institution and the nation's constant call for engineers from marginalized groups (Rincon and George-Jackson, 2016). This misalignment could take the form of ESSCs encountering budget cuts, pressure from higher-ups to minimize costs while maintaining or improving performance, and inconsistency in funding sources (Baber, 2015; Rincon and George-Jackson, 2016). These issues can impact staffing—which is essential to the success of any MEP or intervention—and cause effective programming to be taken away, which impedes potential progress. In fact, Lee (2015) notes that the university resources afforded to the ESSC might have a more significant impact on its programs, activities, and services than how it is classified (Lee, 2015). Table 1, recreated from Lee (2015), depicts nine funding sources mapped onto 6 ESSCs, including descriptions of the resources acquired from the source. It demonstrates the variety and inconsistency between ESSCs and how they are resourced. For example, DEP1, WEP2, and DEP4 all receive financial resources from the colleges they are housed within; MEP2 only receives administrative support from their college, while MEP3 does not receive any resources from their college. The resource descriptions demonstrate that the contextual environment from one ESSC to another has major implications on funding. While variety in funding sources may allow for variety in what programs, activities, and services are offered, the inconsistency of said funds can pose a challenge for ESSCs.

Table 1. Resource Descriptions for six ESSCs and their sources (Lee, 2015)

Sources	DEP1	WEP2	MEP2	WEP3	MEP3	DEP4
College	Financial	Financial	Administrative Support (i.e., Dean/College)	-	-	Financial
University	Units such as Student Affairs and Residential Life; Physical space & Housing	Units such as MEP3; Physical space & Housing	Units such as WEP2 and the academic success center; Physical space	Units such as MEP3; General support; Physical space & Housing	Units such as WEP3; Physical space & structures that allow experimentation and innovation	Other colleges and units within the university; Physical space & Housing
Faculty	Volunteering	Volunteering	-	Advising	-	Volunteering
Students	Student leaders; Graduate teaching assistants	Student leaders	Student leaders	Student leaders and volunteers	Student leaders	Student leaders and volunteers
Local Community	-	Churches, schools, fraternities, sororities, etc.	-	-	-	-
Corporations	Financial	Financial	Financial	Financial; Partnerships	Financial; Partnerships	Financial; Partnerships
Donors	-	-	Financial	-	-	-
Departments	-	-	-	Partnerships	-	-
Government	-	-	-	-	-	Grants

2.3.6 Attacks on Affirmative Action Policies

Another major challenge that race-conscious ESSCs face is legal suits, often related to affirmative action. Following the Supreme Court ruling in the 1978 *Bakke* case, which upheld the use of race in admissions, the Supreme Court issued clear language endorsing the use of race as one of many factors in the admissions process (Orfield et al., 2007). They claimed that the promotion of student body diversity is a compelling interest when necessary to achieve a school’s educational mission (Malcom et al., 2004). This ruling served as the foundation for justifying the use of race of university admissions for a quarter-century—that is until the two Supreme Court decisions cases against the University of Michigan in *Grutter v. Bollinger* and *Gatz v. Bollinger*. In *Grutter*, the courts upheld the use of race in the law school’s admissions considerations if it is a part of a holistic review of each applicant; however, in *Gratz*, the courts rejected the undergraduate program in the College of Literature, Science, and the Arts from granting points based on race and ethnicity (American Association for Access Equity and Diversity,

2019). Unlike the clear language to follow the *Bakke* ruling, *Grutter* and *Gratz* were followed up with persistent ambiguity and confusion, especially for race-conscious efforts established in financial aid decision-making, outreach efforts, and minority-exclusive activities hosted by universities (Malcom et al., 2004). While *Bakke*, *Grutter*, and *Gratz* are all landmark decisions that directly impacted universities across the nation, a few affirmative action-related cases had a more direct impact on race-conscious ESSCs.

In 1996, the case of *Hopwood v University of Texas* resulted in the University of Texas no longer being able to use race as a factor in admissions—a ruling that was eventually enacted in Louisiana, Mississippi, and Texas (Rodriguez, 1996 as cited in Shehab, Murphy, and Foor, 2012). This law's restrictions impacted admissions, financial aid, scholarships, and recruitment. “In other words, programs and scholarships serving minorities and underserved populations were on notice that continued support and funding would require rethinking of mission and goals” (Shehab, Murphy, and Foor, 2012, p. 241). Here we have an account of MEPs being forced to re-strategize if they were to continue serving their populations of interest. This cause for re-strategizing demonstrates that even when attacks on affirmative action are not on ESSCs specifically, they are still impacted.

In 1997, Robert Willis wrote about the impact of affirmative action on minority engineering programs, stating two negative impacts: 1) states where MEPs relied on public funding will see increased efforts to eliminate that funding and 2) there will be efforts to dismantle and revise MEPs (Willis, 1997). Willis (1997) concludes with an argument for the continuation of affirmative action policies in higher education. He argues that despite attempts to use affirmative action to stir up racial resentment, affirmative action is needed until no one must meet higher standards than others and there is equal opportunity. Willis understood the potential damage to MEPs if affirmative action policies were to be eliminated.

In 1999, a white male undergraduate student claimed that a state merit scholarship discriminated against white people and sued the Oklahoma State Board of Regents (Black Issues, 1999). In response, the scholarship program became race and gender-neutral out of fear of it being completely taken away, ultimately resulting in fewer Black students being awarded the scholarship. These events impacted the enrollment of Black students at Oklahoma University and the ability of an MEP to provide financial resources to students due to a decline in the number of scholarships available (Black Issues, 1999).

To comply with the ambiguous guidelines surrounding affirmative action and avoid legal action, the American Association for the Advancement of Science (AAAS) and the National Action Council for Minorities in Engineering (NACME) composed a guidebook with practical advice for STEM educators with commitments to BPE (Malcom et al., 2004). Race-conscious ESSCs that have existed pre-and-post the publication of this guidebook have likely referred to it for guidance.

2.3.7 Summary of Challenges & Opportunities Faced by Race-conscious ESSCs

The myth of meritocracy, diversity as a buzzword, the fight for legitimacy, lack of faculty support, funding issues, and attacks on affirmative action have all shown up in the literature as challenges and potential opportunities for race-conscious ESSCs. If national postsecondary education policy firmly reflected the prioritization of the advancement of Black people, given the institutional and structural barriers embedded in the U.S. education system, race-conscious ESSCs would be able to provide their services without fear of legal consequences. Unfortunately, this is not the case, and race-conscious ESSCs must respond to and anticipate both external and internal factors (i.e., be resilient).

In the next section, I discuss organizational resilience literature, what it is and is not, and why I have chosen to use Kantur and Íserí-Say's Integrated Framework of Organizational Resilience in my study.

2.4 Organizational Resilience

Thus far, I have outlined the various environmental aspects, challenges, and opportunities that impact race-conscious ESSCs. Over time, leaders of these organizations have implemented strategies and tactics to navigate their ever-changing environments. However, these strategies, tactics, and enabling factors have not been adequately captured in the literature, nor has the application of organizational resilience been applied in this context. To address this gap and explore how race-conscious ESSCs have developed over time, I employ Kantur and Íserí-Say's (2012) Integrated Framework of Organizational Resilience to study three race-conscious ESSCs in their institutional context. In the following sections, I will discuss the literature's current framing of organizational resilience as a concept, Kantur and Íserí-Say's framework (Figure 22), and relevant applications of organizational resilience.

2.4.1 Overview of Organizational Resilience

With origins in child psychology (Garmezy, 1970; Werner & Smith, 1977) and ecology (Holling, 1973; Holling & Gunderson, 2002), the concept of resilience has since been found useful in several fields. In organization studies, resilience primarily comes up as an important characteristic for groups or organizations that encounter external forces, such as natural disasters, terrorist attacks, and uncertain environments (Sutcliffe & Vogus, 2003; Tierney, 2003; K. E. Weick & Sutcliffe, 2001; Karl E Weick, 1993). Scholars also consider the day-to-day, unpredictable, and constantly changing business environments as contexts where resilience also proves necessary (Duchek, 2014; Deníz Kantur & Íserí-Say, 2012; Mallak, 1998a; Witmer & Mellinger, 2016). Given the constantly changing environments race-conscious ESSCs are located within (described above), I argue that organizational resilience may prove to be a useful lens to explore the development of ESSCs over time.

To apply this lens, I had to first identify a conceptualization that made sense for this context given that existing literature offers multiple, inconsistent understandings of organizational resilience. In my searches, I found literature that posits three perspectives from which these various definitions are derived (Duchek, 2014; Lengnick-Hall et al., 2011). One perspective looks at organizational resilience as an ability to rebound from adverse conditions and return back to equilibrium (Home & Orr, 1997; Horne, 1997; Mallak, 1998b; Sutcliffe & Vogus, 2003). Lengnick-Hall and colleagues (2011) liken this perspective to that held in physical science as it relates to the resilience of materials and their ability to bounce back to original shapes following manipulation. The second perspective goes a step further and considers an organization's ability to develop new capabilities and create new opportunities (Lengnick-Hall & Beck, 2003, 2005; Karl E. Weick, 1988). From this perspective, resilience must incorporate retroactive evaluation and transformative activities (Duchek, 2014; Lengnick-Hall et al., 2011). And the third perspective, as noted by Duchek (2014), goes one step further and includes the notion of anticipation or intentionally planning for surprises (Lovins & Lovins, 1982). This perspective of resilience considers the proactive steps that an organization can take to ensure its survival in the face of adversity (Kanigel, 2001; Longstaff, 2005).

In my dissertation, I adopt both the second and third perspectives. Given the longevity of race-conscious ESSCs, I posited that they have demonstrated actions that reflect perspective two (e.g., various external funding sources) and perspective three (e.g., preemptively altering ESSC programs and services). These perspectives also align with Kantur and Íserí-Say's (2012) views as they advance a conceptualization of organizational resilience that captures appropriate post-event responses, creative renewal capacities, and pre-event readiness. In the context of my study, I was interested in exploring how organizational resilience manifests in the context of race-conscious ESSCs within higher education. When considering the various conceptualizations of organizational resilience, Kantur and Íserí-Say's Integrated Framework of Organizational Resilience provides a comprehensive understanding of organizational resilience—meaning it captures and synthesizes the broad literature landscape of organizational resilience. Kantur and Íserí-Say acknowledge the disjointed nature of the resilience literature and propose this integrated framework following a literature review. Their literature review revealed that factors often associated as components of organizational resilience are factors that contribute to the emergence of organizational resilience.

The remainder of this chapter will explore Kantur and Íserí-Say's framework and applications of organizational resilience in the literature.

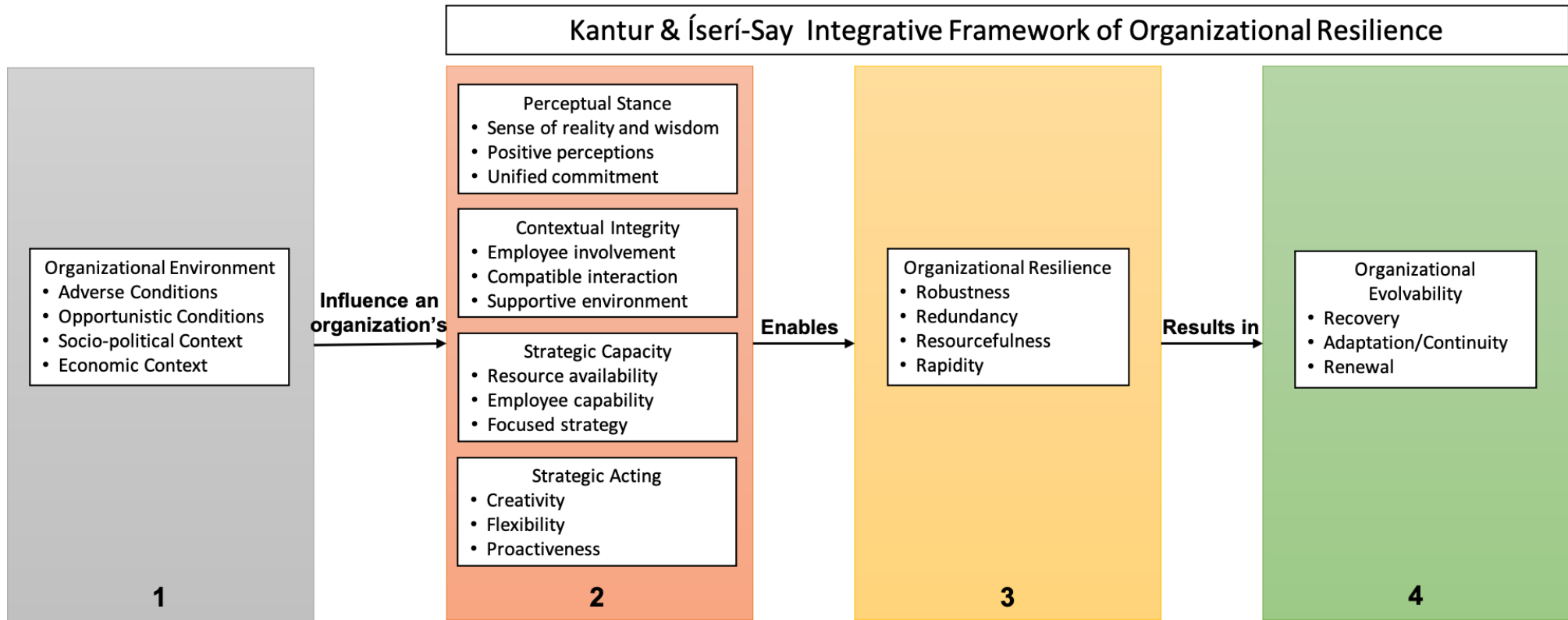
2.4.2 Understanding Kantur and Íserí-Say's Integrated Framework of Organizational Resilience

Kantur and Íserí-Say (2012) argue that the literature lacks a comprehensive theoretical model that focuses on organizational resilience. To construct a model, they first reviewed existing literature on

organizational resilience. This process resulted in a framework consisting of three parts (Figure 2). The first part includes four factors that contribute to a resilient organization—1) perceptual stance, 2) contextual integrity, 3) strategic capacity, and 4) strategic acting (Figure 2, Box 2). The next part includes a conceptualization of organizational resilience (Figure 2, Box 3). The final part includes evolvability, which is the outcome of resiliency (Figure 2, Box 4). Kantur and Íserí-Say perceive organizational resilience as a process rather than a static state and conclude that resilience is “the capability of organizations for turning adverse conditions into an organizational opportunity” (2012, p. 765).

Although frameworks have been proposed since (Limnios et al., 2014; Tengblad & Oudhuis, 2018), I chose to use this framework of organizational resilience, namely because of the usefulness of capturing the dynamic nature of the process. Kantur and Íserí-Say’s framework captures the process of organizational resilience by including the dimensions of organizational resilience, enabling factors that must be present in the organization, and the outcome of evolvability with associated attributes. Each of these components proved useful in understanding the development of race-conscious ESSCs and is further discussed below.

Figure 2. Kantur & Íseri-Say (2012) framework of org resilience in the context of this study



Organizational Resilience. Although there is no consensus on the conceptualization and measurement of resilience, scholars provide various explanations of the concept. I will now discuss a few conceptualizations of organizational resilience that have been posited in the literature, followed by the conceptualization that Kantur and Íserí-Say (2012) argue is most accurate.

Horne and Orr (1997) discuss organizational resilience as a “whole-system response” that requires the collective actions of the people in the organization. They go on to state that resilience is a fundamental quality of organizations and systems as a whole to respond productively to adverse conditions without experiencing extended periods of regressive behavior (Home & Orr, 1997). Horne and Orr speak to a perspective of organizational resilience that only considers an organization's ability to return to equilibrium and prevent destruction following a chaotic event.

Lengnick-Hall and Beck (2003, 2005) propose a conceptualize that looks beyond restoration and develops new capabilities as a result of lessons learned from a disturbance to the system. They posit that there are three dimensions of organizational resilience: 1) cognitive resilience, 2) behavioral resilience, 3) contextual resilience. Cognitive resilience is an organization's ability to notice and formulate responses to disruptions that go beyond restoration and look for opportunities to develop new skills (Lengnick-Hall & Beck, 2005). Behavioral resilience allows an organization to use its resources and take action to realize resiliency, while contextual resilience provides the setting for using cognitive and behavioral resilience (Lengnick-Hall & Beck, 2005).

Kantur and Íserí-Say (2012) argue that cognitive resilience, behavioral resilience, and contextual resilience are instead sources of resilience and not dimensions of it.

For example, continuous communication enables organizational members to share information and be informed about each other's activities and therefore act appropriately in times of crisis.

While the existence of non-stop conversation contributes as a source to resilience in the organizational environment, it is not the conversation itself that makes an organization resilient.

(Deníz Kantur & Íserí-Say, 2012, p. 770)

Based on their literature review, Kantur and Íserí-Say (2012) argue for a conceptualization of organizational resilience that includes four components: 1) robustness, 2) redundancy, 3) resourcefulness and 4) rapidity (Tierney, 2003). Table 2 outlines these four components, which include both physical and social aspects of resiliency and the corresponding definitions from Tierney (2003). Kantur and Íserí-Say (2012) position these components as characteristics of an organization that is resilient and not as the sources of resilience within the organization. This framing is useful for my study because Kantur and Íserí-Say provide language for me to distinguish between characteristics of resiliency exhibited by race-conscious ESSCs and sources that enable said organizations to be resilient.

Table 2. The four aspects of organizational resilience as defined by Tierney (2003)

Aspects of Resilience	Definition
Robustness	“the ability of elements, systems, and other units of analysis to withstand stresses and demands without suffering damage, degradation or loss of function” (p.2)
Redundancy	“the extent to which elements, systems, or other units of analysis exist that meet functional requirements in the event of disruption, degradation, or loss of functionality of primary systems” (p.2)
Resourcefulness	“the capacity to identify problems, establish priorities, and mobilize resources to avoid or cope with damage or disruption; the ability to apply human and material resources to meet priorities and achieve goals” (p.2)
Rapidity	“the capacity to meet priorities and achieve goals in a timely manner” (p.2)

Organizational Evolvability. Not only is organizational resilience needed in times of disruption, but it is also required to move forward and ultimately achieve organizational evolvability. Kantur and Íserí-Say define the process of evolvability as an absorption of the changes that result from disruptions to the system that transforms into “better sensing capabilities with a wiser outlook” (2012, p. 770). In other words, the outcome of a resilient organization going through disruption is improvement in overall function and awareness to adversity and thus better preparedness in the future.

The process of evolving includes three steps: 1) recovery, 2) adaptation, and 3) renewal. Before evolving, an organization must first recover. Recovery can be described as an organization’s ability to go back to its pre-crisis condition at a minimum. Following recovery is an adaptation to the new environmental conditions, which facilitates continuity and continuation of organizational function. Cameron (1984) states that adaptation refers to a process whereby modifications are made in the organization to adjust to changes in the external environment. Last in the evolution process is organization renewal, the process by which the organization becomes different from its pre-crisis condition. While evolution is a possible outcome of resilience, it is not always guaranteed. The purpose of my dissertation is to better understand the resilience and evolvability of race-conscious ESSCs given the variety in structures that we see today compared to the original MEP model.

Sources of Resilience in Organizations. Kantur and Íserí-Say’s framework of organizational resilience, Figure 2, consists of four characteristics that influence an organization’s ability to be resilient: 1) perceptual stance, 2) contextual integrity, 3) strategic capacity, and 4) strategic acting. These characteristics impact organizational resilience, which ultimately produces organizational evolvability. In the following sections, I will review each of the four characteristics that influence resilience and their corresponding sub-components Figure 2, Box 2).

Perceptual Stance. Kantur and Íserí-Say’s perceptual stance is the foundation for any organizational action that impacts resilience. Perceptual stance consists of three sub-components, which include 1) a sense of reality and wisdom, 2) positive perceptions, and 3) unified commitment.

A sense of reality is about alignment between reality and the widely accepted sense of self within an organization. The organization must have a realistic understanding of its strengths and weaknesses. An organization’s ability to perceive the reality of its self-image in its totality is imperative to its ability to capitalize on its strengths and prepare to compensate for its weaknesses.

Alignment between an organization’s sense of self and reality requires wisdom, positive perceptions, unified commitment, and a willingness to accept vulnerabilities and limitations (Hind et al., 1996). Balance is key; “while [a] certain level of pessimism is required for a sense of reality (Coutu, 2002), optimism and hope (Flack, 1988) are essential for constructive perceptions” (Kantur and Íserí-Say, 2012, p. 766). Groopman (2004) refers to this balance of optimism, or positive perceptions, as being a “hopeful system,” stating that this hope is firstly grounded in a realistic appraisal of one’s challenges and capabilities (as cited in Vogus & Sutcliffe, 2007).

Given the importance of alignment between an organization’s sense of self and reality, it is important to note that when facing adverse conditions, an organization’s integrity can be disrupted (Deniz Kantur & Íserí-Say, 2012). A unified commitment from everyone in the organization is needed to fuse divergent perceptions of the organization (Horne, 1997). This widely accepted perceptual stance enables organizational resilience.

For race-conscious ESSCs to achieve alignment between their sense of self and reality, everyone—from directors to staff to student mentors—should have an honest perception of the organization. Ultimately, the organization as a whole must share the aforementioned perspectives of reality, wisdom, and optimism in order to foster resilience.

Contextual Integrity. Contextual integrity is composed of employee involvement, compatible interaction, and a supportive environment.

Employee involvement and empowerment should be seen as tools for facilitating organizational adaptation in changing environments (Kantur and Íserí-Say, 2012; Doe, 1994). Adaptation is needed in times of crisis and stressful situations (Kantur and Íserí-Say, 2012). Employees who feel empowered in their positions are likely to adapt and generate more creative solutions needed in times of unexpected events (Mallak, 1999).

Compatible interaction is about the quality of communication between employees. Respectful communication and interaction among employees contribute to the relational and social reserves of an organization which is also important for recovering from crises.

Lastly, an organization must also foster a supportive organizational environment. Supportive environments make it that much easier for employees to manage anxiety and ambiguity in the thick of a disruption. I am interested in understanding what contextual integrity looks like for race-conscious ESSCs, depending on the structure of the organization and the size of the disruption that challenges the organization.

Strategic Capacity. Strategic capacity is all about the availability of resources, the capabilities of employees, and the necessity of a focused strategy—each of which contributes to an organization’s preparedness for disasters (Kantur and Íserí-Say, 2012).

The resources needed for resilience are expected to be different from those needed in day-to-day operations, given that the circumstances of chaos and disruptions are different from those of day-to-day operations (Mallak, 1998a). These resources include structures and procedures within the organization, financial resources, and, as previously mentioned, relational resources (Doe, 1994; Mallak, 1998a). To use these resources, organizations must consider: Are the resources needed during a time of need available to employees? Organizations must also consider: Are employees equipped to appropriately and effectively utilize available resources? A resource’s availability is only as good as an employee’s ability to use them.

A focused strategy is needed for an organization to appropriately manage uncertainty and combat anxiety during chaotic times (Conner, 1993). Although strategy requires planning ahead, contingencies are important to help adjust as needed in real-time. Pre-event preparedness is key to organizational resilience. Given the variety of “employees” in race-conscious ESSCs (e.g., faculty, staff, students), I am interested in understanding how communication is handled in a way that does or does not ensure that all employees are aware of strategic plans and resources.

Strategic Acting. Strategic acting is a complementary characteristic to strategic capacity in that it enables employees to enact appropriate behaviors necessary for putting strategies into real organizational actions (Wilson & Jarzabkowski, 2004). Strategic acting is all about creativity, flexibility, and proactiveness.

First, creativity is needed in times of chaos, making improvisers great assets because they are used to being innovative, thinking on the spot, and making use of their available resources (Coutu, 2002; Karl E Weick, 1993). Second, flexibility is required for strategic action. Flexible employees make room to work with ever-evolving situations and circumstances. In addition to believing in the organization’s ability to change, employees must also increase their tolerance and ability to enact strategic action during chaotic situations. Thus, employees’ perception of change is crucial. Lastly, proactiveness in this context speaks

to an organization's ability to lead as opposed to following their competitor's decision-making, especially in turns of leading change. Proactiveness is the catalyst by which organizations can begin to predict and prepare for the future, which is the ideal outcome of resilience, not just surviving but evolving for the better.

Documents such as *Priming the Pump: Strategies for Increasing the Achievement of Underrepresented Minority Undergraduates* (Gándara & Maxwell-Jolly, 1999) and *Standing Our Ground: A Guidebook for STEM Educators in the Post-Michigan Era* (Malcom et al., 2004) demonstrates that race-conscious student support leaders have been thinking strategically and planning for what it means to do their work given the lack of parity in engineering and attacks on affirmative action.

2.4.3 Application of Organizational Resilience in Literature

It is important to understand trends regarding the prior application of organizational resilience to contextualize the contribution of my dissertation. The concept of organizational resilience can be applied in many different contexts, given the array of units that can be classified as an "organization." For example, Barasa, Mbau, and Gilson (2018) conducted a systematic literature review on organizational resilience and noted that, of the 34 papers to meet their selection criteria, some of the sectors or systems of interest included the health system, government agencies, small businesses, water management, and hospitality. Three articles from New Zealand included the education sector (Mcmanus et al., 2007, 2008; Stephenson et al., 2010). Although these three studies included the education sector, it was not the primary interest of the study, and they were all in contexts outside of the United States.

While organizational resilience has been adopted in many contexts and fields, most of the literature is conceptual. More specifically, in a literature review conducted by Bhamra and colleagues (2011), of the 74 papers included, the majority of studies focused on theory building. For example, Garmezy and Masten (1986), Mallak (1998b), Vogus and Sutcliffe (2007), and Lengnick-Hall and colleagues are only a few among the papers that theorized about organizational resilience.

There is also a subset of literature regarding the operationalization and measurement scale of organizational resilience (Deniz Kantur & Iseri-Say, 2015). Over time scholars have made various attempts to measure resilience within the organizational literature and have yet to reach a consensus for accurately measuring the concept (Deniz Kantur & Íseri-Say, 2012). In 1998, Mallak used six dimensions—goal-directed solution-seeking, avoidance, critical understanding, role dependence, source reliance, and resource access—to develop a scale for measuring organizational resilience (Mallak, 1998a). Mallak's scale was later validated and deemed reliable following work by Somers (2009). Tierney's (2003) four dimensions of resilience (captured in Kantur and Íseri-Say's framework) were adopted by Wicker, Filo, and Cuskelly to develop 21 items to measure organizational resilience in sports clubs

(Wicker & Cuskelly, 2013). Attempts to measure organizational resilience have taken many forms in the literature.

Within the context of my study, I was not trying to measure resilience as much as I trying to identify what resiliency looks like for race-conscious ESSCs and how they achieve resiliency. Thus, a theoretical contribution of my work is that I am bringing in organizational resilience as a lens to think about race-conscious ESSCs. My application of organizational resilience will ensure that the specific higher education context in the U.S. is not overlooked, aiding in understanding the ways in which organizational resilience plays out for these unique sub-organizations within U.S. higher education.

2.5 Summary

My literature review details the origins and history of ESSCs and the various factors that the literature has identified as impacting the existence of ESSCs and the subsequent programs, activities, and services available to students. The myth of meritocracy, diversity as a buzzword, the fight for legitimacy, lack of faculty support, funding issues, and attacks on affirmative action have all shown up as challenges and potential strategic opportunities for race-conscious ESSCs. Given the current structures of ESSCs and related literature, we are beginning to understand how challenges and opportunities have impacted the shifts ESSCs have made thus far.

I used organizational resilience as a starting point for understanding the resilience and evolution of race-conscious ESSCs over time. Through my study, I continue to make sense of the race-conscious ESSC structures that we see today. I explore how external factors impact the ways in which race-conscious ESSCs continue to exist and support Black students. Results from this work contribute to scholarship about the holistic nature of race-conscious ESSCs and make theoretical contributions to the organizational theory literature concerning organizational resilience in U.S. higher education.

Chapter 3: Research Design

3.1 Introduction

The purpose of this study is to understand how race-conscious engineering student support centers (ESSCs) have developed over time in various institutional contexts. The following is the overarching research question of my study: *How have race-conscious ESSCs developed over time given the continual threats to the organization's survival and race-conscious mission?* I answer this question by addressing the following sub-questions:

RQ1. What events are salient in leaders' description of their ESSC's history?

RQ2. What developments are salient in leaders' description of their ESSC's history?

RQ3. How have events impacted the development of ESSCs over time?

To achieve this purpose, I employed a qualitative, multiple case study approach. A case study is an "in-depth study or examination of a distinct, single instance of a class of phenomena such as an event, an individual, a group, an activity, or a community" (Case & Light, 2011, p. 191). This methodology lends itself to exploring "how" questions and highlights the importance of the contextual conditions of each case (Baxter & Jack, 2008). In this chapter, I will discuss case selection, data sources, data analysis, and research quality. But, first, I will describe my positionality and its impact on this research.

3.2 Positionality

Positionality is a crucial dimension of research that engineering education researchers often overlook and underreport (Hampton et al., 2021). England (1994) teaches that research is a process shaped by the researcher and participants and thus shaped by our biases. Scholars often expect participants to shape the research and under acknowledge their own bias, identity, and socialization in the research process. Exploring my positionality as the researcher is an opportunity to make explicit my relationship to my study's social and political context. My relationship with the sociopolitical context of this study is essential because my stance directly impacts how I came study this topic, my approach to the research process, and how I interpret what I find.

Secules and colleagues (2021) provide a guide to aid in this discussion, where they describe dimensions of positionality or six fundamental aspects of research that are impacted by positionality: 1) research questions, 2) epistemology, 3) ontology, 4) methodology, 5) researcher-as-instrument, and 6) communication. For each dimension, Secules and colleagues offer reflection prompts that help researchers reflect on their impact on their research, Table 3. I have used these questions as a guide to reflect on my positionality in relation to this study.

Table 3. Dimensions of positionality and reflection prompts (Secules et al., 2021)

Dimension of positionality	Reflection prompts
Research questions	How does your positionality impact what research you choose to do?
Epistemology	How does your positionality impact how you know what you know?
Ontology	How does your positionality impact what you can observe as researchers?
Methodology	How does your positionality impact how you make methodological choices?
Researcher-as-instrument	How does your positionality impact how you relate to research participants?
Communication	How does your positionality impact how you represent yourself in writing and other communication?

My research interests and questions stem directly from my experiences as an undergraduate engineering student at a predominately-white institution. As a Black girl who grew up in predominately-Black primary, middle, and high schools, I embarked on the journey of majoring in engineering, a discipline I knew nothing about. Luckily, there was a race-conscious engineering program to support me along the way—Programs for Educational Enrichment and Retention (PEER), which was Clemson’s MEP directed at the time by Sue Lasser. I was heavily involved in the PEER office. The PEER office provided tutoring, mentors, test banks, and a place for Black and Latinx students to come when they needed to take their masks off and be themselves. Mrs. Sue encouraged me to participate in introductory research programs, join the honors college, and explore engineering education. The PEER office introduced me to the necessity of programs like it for minoritized students and illuminated that injustice in the world is not accidental but the result of external forces and systemic issues.

Over time, I became aware of the uphill battle that directors of race-conscious ESSCs face and sometimes lose. It is puzzling to realize that these offices exist to serve students, which universities claim to care about, yet they must fight to survive and secure resources. Some lose funding, which limits the programs that they can offer. Some gain funding, but only if they expand whom they serve. This realization led me to my research study. I wondered how these decisions affect Black engineering students. I wondered what we can learn from the decisions, strategies, and situations of the past to improve the support of Black engineering students in the future.

As a Black woman conducting this study, I must note how my identities may influence my engagement with participants. Being a Black woman increases the likelihood that Black women participants in this research study will reveal particular kinds of information due to some set of shared identities. A lot of race-conscious ESSC directors are Black or identify as women, if not Black women; therefore, there is an increased chance in a shared culture. I am more likely to observe and recognize voice inflections, facial expressions, and other nonverbal cues. Additionally, participants are likely to be

more comfortable disclosing and talking about racialized issues and other oppressive structures in STEM. This reality increases the richness of the data I acquire and my analysis of it.

My upbringing in the southern U.S. and my newfound access to scholars beyond my immediate network inform my epistemology. While growing up, I learned a specific set of truths. These truths varied from understanding how my race, gender, and age control what power I do and do not have access to, how loud I can and cannot be, and how enduring pain and struggle is the only way forward or upward. Participating in the gifted and talented program, I saw myself as different and, in some cases, the “better Black,” the “respectable Black.” I no longer carry those badges with pride. That shift is primarily due to my journey through graduate school and using social media. Through social media, I have found other Black people, mostly women and/or fem presenting, who understand what it means to grow up in the south and unpack all that comes with it while still honoring home. Additionally, these people help me make sense of the nonsense I now find around me in higher education that constantly makes me question if my ways of being or thinking are valid. I know what I know because I am continually negotiating information and filtering it through various lenses that shed light on truth. I believe in highlighting and prioritizing shared experiences, especially those shared amongst the marginalized and those fighting alongside them. Furthermore, I am mindful of the role that power and privilege play in many of my observations. I am aware that power drives what decisions people make and who gets to make them.

At the beginning of my graduate journey, I often worried that my colleagues would not take me seriously as a Black woman studying Black people. Now, there is a constant tension between code-switching and being myself in all spaces. I would love to say that I no longer find it necessary to alter which version of me enters a room or submits to a journal, but that is not true. I am still navigating what it looks like not to seek validation in who I am and what I study and thus how I present my research. However, I hope that through honest reflection in my positionality statement and transparency in analysis, I establish trust with my audience and research participants to do this research justice.

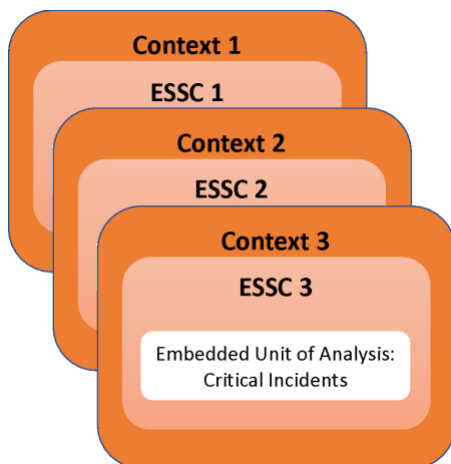
In the following section, I will discuss how I view alignment between multi-case study design and my research questions. Additionally, I will discuss my procedures for data collection and analysis, quality measures, and my research study limitations.

3.3 Multiple Case Study Design with Embedded Units of Analysis

I am using multiple case study as the methodology guiding my design choices. Case study lends itself to exploring a case within a particular environment as opposed to other methods that distill the data from the relevant context. In general, case study methodology is suitable for research that aims to answer questions about “how” or “why” a social phenomenon works and when those questions require in-depth or thick descriptions of the social phenomenon (Yin, 2014b). The social phenomenon that this study

sought to investigate was the resilience of race-conscious ESSCs. To this end, I used embedded units of analysis, summarized in Figure 3. I used purposeful sampling and maximum variation to determine my case selections (Kathwohl, 2009).

Figure 3. Multiple case study design of this study with embedded units of analysis



The overarching question guiding this study is as follows: *How have race-conscious ESSCs developed over time given the continual threats to the organization's survival and race-conscious mission?* This question is exploratory and seeks to understand the resiliency of race-conscious ESSCs since their earliest developments in the 1970s. A multiple case study allowed for exploration of race-conscious ESSCs within their specific contexts bounded by their time of inception and the 2021/2022 academic year when data was collected. The lack of holistic understanding of race-conscious ESSCs points to a necessity for understanding contextual factors at play. I designed the subsequent questions guiding this study to uncover events and maturation that has resulted in the models of race-conscious ESSCs that we see today.

RQ1. What events are salient in leaders' description of their ESSC's history?

RQ2. What developments are salient in leaders' description of their ESSC's history?

RQ3. How have events impacted the development of ESSCs over time?

Based on the literature discussed in Chapter 2, ESSCs have evolved into various forms and taken on multiple functions; thus, a multiple case study approach enables me to capture this variety and explore contextual influences on this reality.

In case study research, the unit of analysis refers to the case, or cases, under exploration. For this study, I chose three cases where each is a different ESSC. I chose to include three cases to capture ESSCs that resemble the three general ways that race-conscious ESSCs exist today. Additionally, I was cautious

of overcommitting to too many cases to preserve the research quality and to achieve resonance and credibility.

I have also chosen to use subunits or embedded units of analysis: critical incidents. Critical incidents, in the context of my study, refer to the observable events that ESSC leaders deem as significant to their organizations' operations over time. Additionally, an incident was deemed critical if the effects of the incident were clear during analysis. Thus, each research question concerns the student support center, the critical incidents, and the impact of the critical incidents on the center, which could be captured in the storytelling about events that happened over time. I used artifacts, publicly available information online, and the leaders of these organizations as the data sources to understand how the ESSCs have been operating. I interviewed 1-2 participants from each ESSC, allowing for interviews with current directors and founding directors of each ESSC, depending if there had been a change in leadership and on my accessibility to directors.

Multiple case study designs typically produce individual case study reports with varying degrees of case anonymity. Yin (2014a) notes that the ideal option is to disclose the identities of both cases and participants as permitted by ethical review boards. However, the cases in my study are particularly unique. Therefore, to reduce harmful subsequent actions on participants, I used a compromise suggested by Yin whereby I avoided composing single-case reports.

I will discuss the research process in detail in the following sections.

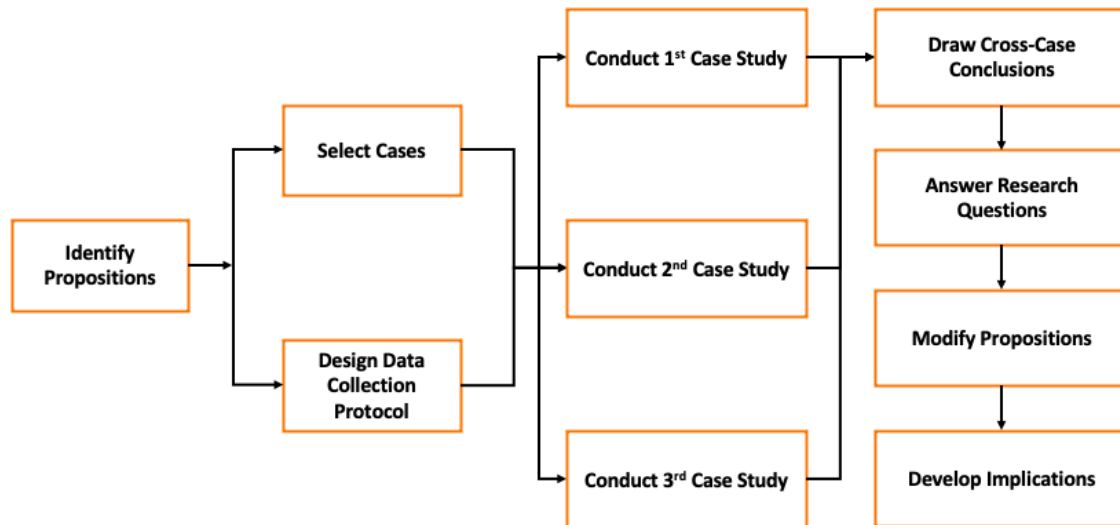
3.4 Research Process

Prior to case selection, I identified propositions. According to Yin (2014), propositions help guide data collection, scope the study, and form the foundation for a conceptual framework (Miles & Huberman, 1994; Stake, 1995). In a qualitative study, propositions are the equivalent of hypotheses in quantitative experimental studies, as they are both about making educated guesses about possible outcomes of the study (Yin, 2014). A list of propositions that helped guide the design of this study are:

1. Race-conscious engineering student support centers, particularly MEPs established in the 1970's and 80's, were created with the intention of supporting historically minoritized racial/ethnic groups in engineering (e.g., African-Americans, Latinx, Native American).
2. As socio-political relations in the United States fluctuate, directors of race-conscious ESSCs engage with direct opposition, which threatens their organization's survival and mission.
3. To combat opposition, directors shift and adapt their organizations to a) be more palatable and b) operate within the confines of new discrimination laws.

Figure 4 illustrates the use of these propositions in the overall research process. These propositions informed my decisions on case selection, bounding of cases, as well as identification of a proper interview protocol to help address my research questions.

Figure 4. Multiple case study research process



After identifying proposition and selecting cases, each case underwent the same data collection process. I recruited participants from each case and interviewed them about events that occurred during their time as ESSC director. I also collected artifacts such as progress reports, conference papers, journal articles, university and locally written articles from directors and publicly available information online.

I analyzed data in two-phases, where in Phase 1 I identified critical incidents, and in Phase 2, I analyzed each critical incident. I addressed my research questions, updated my propositions, and developed implications from my results. The remainder of this section will discuss participant recruitment and provide details about data collection.

3.4.1 Case Selection and Participant Recruitment

This study includes race-conscious engineering student support centers as cases. As noted in Chapter 2: Literature Review, the language of ESSCs is contemporary. Historically, when talking about efforts to support underrepresented engineering students, scholars and practitioners have referred to minority engineering programs and women in engineering programs, or MEPs and WEPs. Over time, additional approaches to supporting students emerged, which Lee (2015) began collectively referring to as engineering student support centers or ESSCs. I further discuss these classifications in *Section 2.2.2 The Origin of ESSCs*. Based on Lee’s classification of ESSCs and my decision to center the experiences of Black people in engineering, my study focuses on race-conscious ESSCs. Therefore, I included ESSCs

that most closely resemble minority engineering programs (MEPs), women and minority engineering programs (WMEPs), and diversity in engineering programs (DEPs).

I selected three cases for my study using purposeful sampling (Krathwohl, 2009). I based this decision on my desire to 1) capture as much variation in race-conscious ESSC characteristics as is feasible, 2) optimize information power, and 3) acknowledge accessibility. To select the specific cases, I compiled a list of known race-conscious ESSCs in the United States, considered what I already knew about race-conscious engineering student support and resilience, and then began reaching out to potential participants.

Case Variation. To begin, I identified ESSCs via publicly available information on university websites and insights from committee members and sorted them based on type (i.e., MEP, WMEP, DEP). I sorted by type so that I could select one of each and strive for maximum variation. To this end, I prioritized the ESSCs in each type based on prior literature and personal contact.

Next, I considered three case attributes: 1) Did the center originate as an MEP? 2) Is the current director the founding director? 3) Has the target population shifted to include more than racially minoritized students? I answered these questions based on website information and committee knowledge. As previously stated, variation across these case attributes will lead to rich data.

I considered my argument that race-conscious ESSCs are resilient because they encounter external forces (e.g., attacks on affirmative action) and day-to-day risks (e.g., lack of faculty support) in operation (Mallak, 1998a; Sutcliffe & Vogus, 2003; Tierney, 2003; K. E. Weick & Sutcliffe, 2001; Karl E Weick, 1993). When considering the historical external forces like attacks on affirmative action, I was particularly interested in MEPs that existed before landmark cases and continue to exist today, regardless of its current structure, so long as they still have a focus of race/ethnicity. Stated differently, I sought out cases that originated as MEPs and continue to exist as an MEP or as some version of a race-conscious ESSC (i.e., DEP, WMEP).

I also considered ESSCs that both were and were not operated by the founding director. I wanted to capture the realities of those who led these organizations through major external forces (e.g., attacks on affirmative action) and those who are working through current sociopolitical landscapes (e.g., anti-diversity messaging during Trump administration, resource limitations during COVID-19 pandemic). I presumed that founding directors of MEPs would offer a uniquely rich perspective about navigating the race-conscious student support landscape since they experienced being a director before prior to the widespread attacks on their efforts. I presumed that current directors would have more likely experienced managing a center during a disruption, such as affirmative action suits, and could therefore offer an equally enriching but different perspective.

Additionally, I considered variation across mission changes to illuminate the significance of context when doing race-conscious work. Literature suggests that external forces typically impose name and mission changes upon MEPs, and I was interested in how leaders perceive and respond to those pushes.

Information Power. Malterud, Siersma, and Guassora (2015) note smaller sample sizes are appropriate when sufficient information power can be obtained. Sufficient information power in this instance refers to the ability to obtain rich data and reach saturation with limited data sources so long as certain study criteria are met. In other words, “when the study aim is narrow, if the combination of participants is highly specific for the study aim, if it is supported by established theory, if the interview dialogue is strong, and if the analysis includes longitudinal in-depth exploration of narratives or discourse details” (Malterud et al., 2015, p. 4). Given my narrow study aim, my use of a supporting theoretical framework, the concentrated number of experts with extensive experience directing race-conscious ESSCs, and my desire to capture a historical understanding of these organizations, I argue that my study is an appropriate candidate for using a smaller number of cases.

Acknowledging Access. Lastly, I selected the cases for my study based on access and case familiarity. Given the specificity of questions I wanted directors to share about their centers, I selected cases where I or committee members already had established rapport. This motivation for case selection increased the likelihood that ESSC leaders agreed to participate in my study and strengthened the interview dialogue, leading to rich, in-depth analysis.

I reached out to potential participants based on my prioritized list. More specifically, I reached out to the current and founding directors of each case via email, following IRB approval, notifying each of my study purpose, their eligibility, and requesting their participation. I continued this process until I had secured participants from three cases. As a result of this process, I included three ESSCs located at large, public, predominately-white, R1 institutions. Though their institution types are similar, the cases are geographically dispersed and resemble one type of race-conscious ESSC. Table 4 summarizes the results of my case selection process.

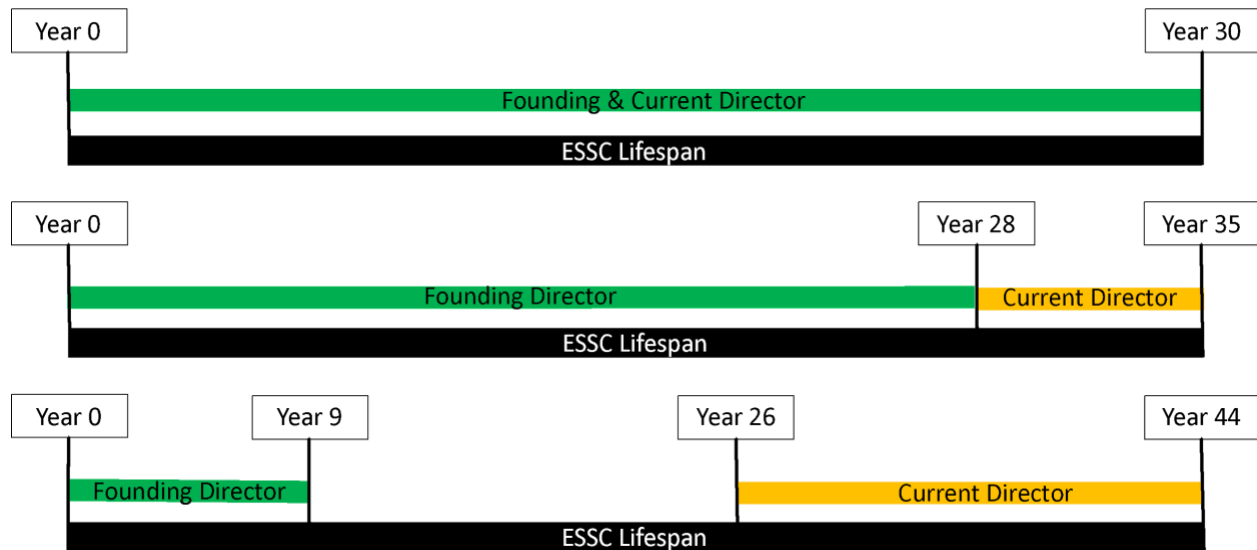
Table 4. Variation across case selections

ESSC Type	Did the center originate as an MEP?	Is the current director the founding director?	Has the organization changed in mission?
DEP	Yes	Yes	Yes
WMEP	Yes	No	Yes
MEP	Yes	No	No

3.4.2 Data Collection

Following the identification of the three cases and agreement to participate from the associated directors, each case underwent a similar data collection process. Each case includes two interviews – one with the current director and one with the founding director. (When the current director was also the founding director, two interviews were held with the same participant.) Prior to interviews, each participant completed a survey to collect information regarding their name, pronouns, their director status (i.e., current or past), length of time as director, and their organization’s name and type. This information was used to improve the start of each interview by acknowledging each participant as they desired to be addressed and to understand how each case would be bounded in time, Figure 5.

Figure 5. Case bounding for each ESSC selected to be used in my research study

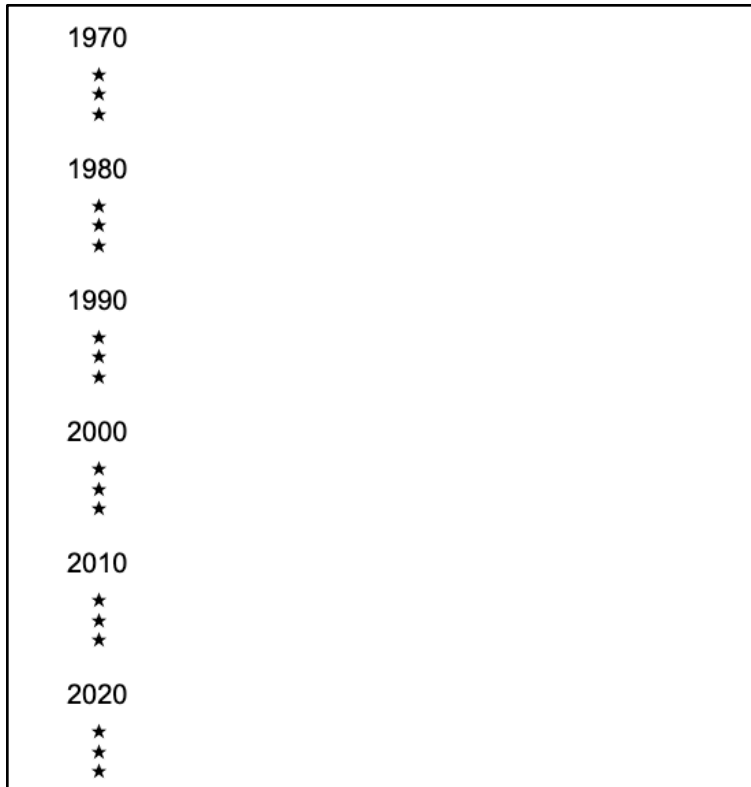


At the beginning of each interview, I reminded each participant of the unique nature of this study given that there are so few race-conscious ESSCs nation-wide and the associated risk of identification. Each participant acknowledged the risk and consented to participation in my research study. I then began the interview inquiring about their background and motivations for becoming directors of race-conscious ESSCs.

Next, I asked about their ESSC, including who it aimed to serve, how they met that mission, and if it had changed over time. Following these conversations, I began an activity to develop a timeline of the ESSC that would lead to my identification of critical incidents that have shaped it over time. I prompted each activity with the following, “I will now share a link with you that is the outline of a timeline that I would like to build with you about your ESSC’s history. I would like for us to fill it with important events that have had lasting effects on your ESSC.” I shared a link with participants that displayed a vertical

timeline, Figure 6, organized by decades, and started with the founding of their ESSC. I used publicly available information via their organization’s website to identify the start of the ESSC. I then asked each participant to tell me about important events that had either positive or negative impacts on their ESSC during their time as director and how they responded to each event.

Figure 6. Example of vertical timeline used to guide the activity in each interview



The remainder of the interview was used to glean additional information about the events they mentioned, including motivating factors for decisions they made and the resulting impact of the event. I also asked follow-up questions about the findings from my literature review in Section 2.3 Challenges & Opportunities Faced by Race-conscious ESSCs. For example, if a director who occupied the role during major Affirmative Action landmark decisions had not mentioned the events at that point in the interview, I would ask, “Have you ever worried about the attacks on Affirmative Action? Have those attacks had any impact on your ESSC?” Lastly, I asked if there were any additional events that have impacted their organization that we hadn’t discussed. The entirety of the interview protocol can be found in the Appendix.

For the case with only one participant – the founding director is the current director – both interviews were conducted with the same person, and the interview process was split in two. Due to time limitations, I used the first interview to work through the timeline activity and discuss important events

that impacted the ESSC. In the second interview I asked additional follow-up questions about the previously mentioned events, the findings from my literature review, and if there were any additional events that we had not yet discussed. This case essentially acted as my pilot case given that I realized how much time was needed to work through the entire protocol and enhanced my ability to ask appropriate follow-up questions to have sufficient event details.

At the conclusion of the interview, I thanked each participant for their participation and asked them to complete a demographic survey and if they had any documents that they wished to share that would help illuminate my understanding any of the events discussed during the interview. The additional data sources such as progress reports, conference papers, journal articles, university and locally-written articles that were shared by directors, or that I sourced online, were used to verify event details, and provide additional context about events and the ESSC itself.

The remainder of this chapter will discuss my analysis process, measures of quality, limitations, and provide a chapter summary.

3.5 Data Analysis

I used a three-phased process during data analysis. Phases 1 and 2 were primarily within-case processes whereby Phase 1 consisted of identifying critical incidents and Phase 2 consisted of coding and categorizing each critical incident. Phase 3 consisted of identifying patterns and trends across cases.

My within-case data analysis process (Figure 7) was conducted in two iterative phases. Phase 1 began with cleaning each interview transcript. While cleaning transcripts, I kept a key where I recorded the different funding agencies, engineering departments, and other key stakeholders that might appear within and across cases. Next, I began identifying events that directors chose to talk about as important to their ESSC's history. For this part of the process, I used process coding. This type of coding involves using gerunds (or “-ing” words) to document action taking place in the data (Miles et al., 2014). For example, one participant stated the following:

The [Intervention Program 1] grant was a game-changer. What that did, that was a \$2 million grant that what we proposed was we said we had peer mentoring, we had a summer bridge program, we had a living learning community. Summer bridge was for Black and Hispanic. Living learning was for women. The peer mentoring, we had the three populations, Black, Hispanic, and women. And that if they gave us enough money, we could open these programs to all students.

So what that did was two things. It obviously funded [ESSC] for five years. We were getting almost \$200,000, \$300,000 for five years – a year for five years. It also allowed

us to bring the programs back into the light because, as long as we have something for everyone, we can parse it off however we want. But we created [Intervention Program 2] and kept the other three mentoring programs. We created [Intervention Program 3] for the men, the comparable community, and we opened the summer bridge program to anybody that wanted to come. That was huge.

I coded this excerpt as, “Applying for and acquiring huge grant to run programming”. At this point in the coding process, I focused on capturing the action taken by the directors, or in some cases the action happening to the directors or the ESSCs. For example, in another case, a participant stated,

[Another ESSC Director], I want to go back to her. She mentored me because she used to say, “now, [Prior Director] can sit at that university all day, and not go nowhere, and not get anything, and she’s going to get help. You sit your hips there, you’re going to be left in the dust.” She is a no-nonsense type of person. She would call you on the phone, and email you, and be like why you not at WEPAN? Why you not at CoNECD? I was like, “well [Prior Director] said” – she goes, “do you look like [Prior Director]?” I’d be like crap. So, I had to go a different route. It sends chills through me. I used to think that is a mean woman. Now I can just stand face to face. I saw her. She came to something here. She hugged me and I hugged her. She’s like girl, I’m so proud of you. I just felt like, man, you know what, I really have changed. It was because of her mentorship and her pushing me.

I coded this excerpt as, “Being told by Black mentor that lack of engagement with ESSC community is not optional for Black directors”. Although the director of interest is not taking any explicit action in the excerpt, I wanted to capture this moment that she experienced that impacted her approach to leadership.

I then went back through each transcript to group any events that were different parts to the same story to ensure that the remaining events were unique stories or situations. At this stage, I also consulted available artifacts from each case. Primarily, articles were used to identify additional information about the events identified in the transcripts. For example, articles about awarded grants were used to understand who awarded a grant or how the ESSC used it. Additionally, press releases about changes in organizational structure within the university when they hired new DEI administrators were also used to contextualize the changes that directors mentioned during interviews. Next, I identified which of the events contained enough contextual information to be further coded and analyzed. These events were termed critical incidents and captured in an excel spreadsheet.

As a result of this coding approach, there may be events not captured in my final analysis. This outcome does not imply that the event was unimportant to a case but that I did not have enough

information to determine why it was important or how it influenced the ESSC's development. With my theory and enabling factors in mind, I knew it was also important to have as many details as possible about each event to have a robust discussion about resiliency for these organizations in Chapter 5. Additionally, I took this coding approach to limit the number of inferences I had to make based on developments that were briefly mentioned or hinted at without being explicitly stated. At the end of this phase, I had 61 critical incidents across all three cases: 18 for Case 1, 20 for Case 2, and 23 for Case 3.

In Phase 2, it became further apparent which events identified in Phase 1 contained enough details to be termed critical incidents. During this phase, I used Excel to code each critical incident across two categories, Event and Development. Because I was unable to have follow-up interviews with each participant, I also used the organization's website and artifacts to fill-in context, verify information, and support my identification of events as critical. Reviewing additional data sources and completing the Excel spreadsheet helped me identify if an event contained enough information for me to classify it as a critical incident. Therefore, if I were unable to code across either category—Event or Development—in the Excel spreadsheet I would not classify the event identified in Phase 1 as a critical incident.

For the Event Category, I added columns in my spreadsheet to code each critical incident based on three sub-categories—the *type* of event observed; the *descriptive attribute*, which indicated if the event was positive, negative, synergetic, etc.; and the *action direction*. The *action direction* captured the agentic move initiated by the director whether proactive (Proactive) or reactive (Reactive) or if the event was something that happened to the ESSC or to director and had a resulting impact on the ESSC (Received). I will use the excerpt provided above to demonstrate how I used these coding categories. For example, in the excerpt about acquiring a grant, the director stated,

The [Intervention Program 1] grant was a game-changer. What that did, that was a \$2 million grant that what we proposed was we said we had peer mentoring, we had a summer bridge program, we had a living learning community. Summer bridge was for Black and Hispanic. Living learning was for women. The peer mentoring, we had the three populations, Black, Hispanic, and women. And that if they gave us enough money, we could open these programs to all students.

So what that did was two things. It obviously funded [ESSC] for five years. We were getting almost \$200,000, \$300,000 for five years – a year for five years. It also allowed us to bring the programs back into the light because, as long as we have something for everyone, we can parse it off however we want. But we created [Intervention Program 2] and kept the other three mentoring programs. We created [Intervention Program 3]

for the men, the comparable community, and we opened the summer bridge program to anybody that wanted to come. That was huge.

For this excerpt, I coded the event *type* as a Funding Shift, the *descriptive attribute* as Additive, and the *action direction* as Proactive. This event is about adding funding to the organization's resources and was a proactive move by the director to apply for it. As opposed to the excerpt where another director stated,

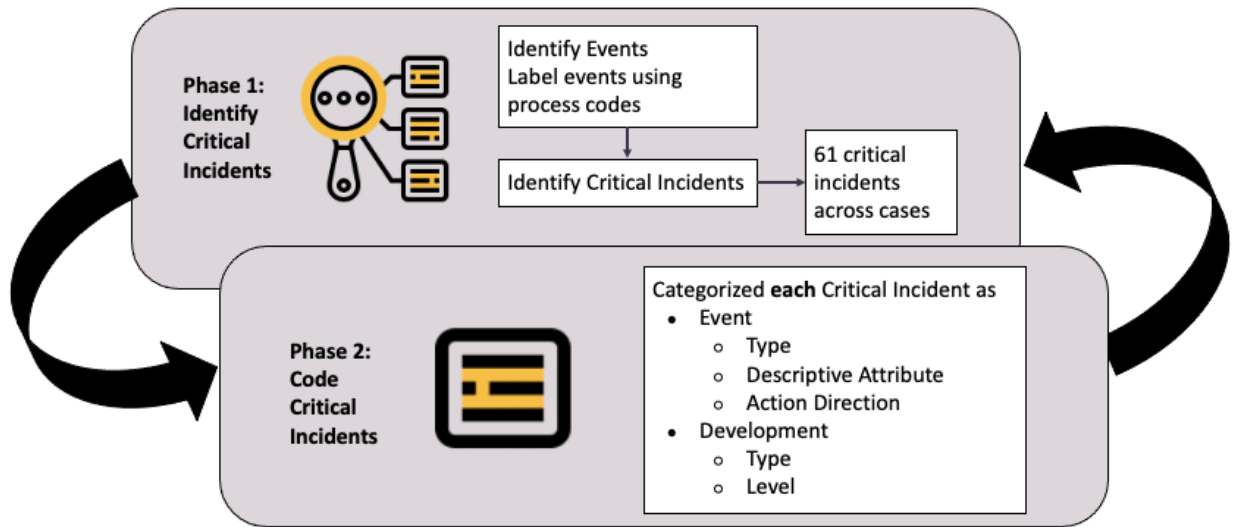
[Another ESSC Director], I want to go back to her. She mentored me because she used to say, "now, [Prior Director] can sit at that university all day, and not go nowhere, and not get anything, and she's going to get help. You sit your hips there, you're going to be left in the dust." She is a no-nonsense type of person. She would call you on the phone, and email you, and be like why you not at WEPAN? Why you not at CoNECD? I was like, "well [Prior Director] said" – she goes, "do you look like [Prior Director]?" I'd be like crap. So, I had to go a different route. It sends chills through me. I used to think that is a mean woman. Now I can just stand face to face. I saw her. She came to something here. She hugged me and I hugged her. She's like girl, I'm so proud of you. I just felt like, man, you know what, I really have changed. It was because of her mentorship and her pushing me.

I coded the event *type* as a Community Engagement, the *descriptive attribute* as Informative, and the *action direction* as Received. This event is about engaging with another ESSC director and learning about how to navigate as a race-conscious ESSC director. In this example, she is talking about mentorship that she received as opposed to mentorship that she sought out, and thus I used the Received code.

The event *type* sub-category captured the variety among the events that were impactful for each of my cases. Similarly, with the *descriptive attribute* sub-category I wanted to capture the different ways that these events were affecting my cases. This sub-category as well as the *action direction* sub-category helped identify patterns and make sense of my data. I will describe the variety in my codes further in Chapter 4 and meaningful contributions of my meaning-making process in Chapter 5.

For the Development Category, I added columns to code based on the *type* of development that had occurred, and at which *level* (i.e., organization or director) the development occurred. The development *type* sub-category captured the variety among the developments that I captured across cases. I will further describe this variety in Chapter 4. While coding it became apparent that not all of the developments were happening solely to the ESSC. Thus, the development *level* code helped differentiated when the development was happening to the director, to the ESSC, or to both. I discuss the significance of this differentiation in Chapter 5.

Figure 7. Within-case analysis two-phased process



During Phase 3, I used the resulting matrices from Phase 2, pivot tables, and Sankey diagrams to identify patterns across cases. These types of data displays help organize data into an accessible, compact form to make it easier to draw and verify conclusions (Miles et al., 2014). Since I am most concerned with patterns across cases, I will only be reporting on critical incidents that appeared in at least two cases.

3.7 Measures of Quality

According to Walther and colleagues (2013), the interdisciplinary nature of engineering education has brought about many conversations concerning research methods and how to judge the quality of said research. These conversations can be less congruent when discussing qualitative approaches considering most researchers' traditional quantitative engineering backgrounds in the field (Borrego, 2007). Researchers typically measure quantitative methods based on their validity and reliability, two terms that do not easily translate to qualitative methods. However, scholars have developed metrics to measure the quality of qualitative research, often with overlap (Leydens et al., 2004; Tracy, 2010; Walther et al., 2013). To streamline my discussion on quality, I will be using Tracy's (2010) Eight "Big-Tent" criteria. Tracy notes that quality qualitative methodological research is marked by 1) worthy topic, 2) rich rigor, 3) sincerity, 4) credibility, 5) resonance, 6) significant contribution, 7) ethics, and 8) meaningful coherence.

3.7.1 Worthy Topic

Broadening participation in engineering and increasing diversity, equity, and inclusion in engineering have been topics of national discourse for decades. In 2020, conversations in the academy were fueled by racial and class disparities illuminated by the CoVID-19 pandemic and the reigniting of

the Black Lives Matter (BLM) movement in the aftermath of the murders of countless Black lives, such as Breonna Taylor, Tony McDade, and George Floyd. The well-being and treatment of Black lives in engineering and the academy became national topics of discussion yet again, leaving universities feeling pressured to respond. The purpose of my study is to explore the resiliency of one of the university's first responses to similar discourse back in the '70s, student support programs. Understanding how race-conscious ESSCs have developed over time in different institutional contexts, despite direct and indirect forces endangering these organizations, is both *relevant* and *timely*. What is *interesting* about this topic is that race-conscious ESSCs exist to mitigate the impact of issues within and outside of their institutions yet rely on a healthy relationship with the institution to survive, making this research study *worthwhile*.

3.7.2 Rich Rigor

Rigor has been a contended topic in engineering education due to its positivist, quantitative origins. Riley (2017) argues that rigor reproduces inequalities by serving three goals: 1) disciplining those who seek to engineers into accepting the overall taxing and demanding nature of engineering, 2) demarcating boundaries around what is and is not 'real' engineering, and 3) demonstrating white male heterosexual privilege through language and cultural norms. Tracy (2010) conceptualizes rigorous qualitative research as marked by a rich complexity of abundance, noting that the research demonstrates sound theoretical and methodological choices. My study exhibits this form of rigor by following acceptable theoretical and multi-case study methodological practices (Creswell, 2013; Miles et al., 2014; Stake, 2006; Yin, 2014) and striving for high information power (Malterud et al., 2015).

3.7.3 Sincerity

I engaged self-reflexivity, vulnerability, honesty, transparency, and data auditing to achieve sincerity. The use of Secules and colleagues' (2021) dimensions of positionality in *Section 3.2 Positionality* demonstrates my *self-reflexivity* through vulnerable and honest considerations about how I impact my research. Additionally, self-reflexivity is an ongoing process that starts before the study and continues through data collection, analysis, and presentation. I used memos to log and prompt continuous self-reflection. To be *honest* and *transparent* about my methods, Chapter 3: Research Design documents all methodological decisions with clear connections to my research study purpose and research questions. Additionally, I note all resulting limitations in Section 3.8 Limitations.

3.7.4 Credibility

To achieve credibility, I firstly offer readers a clear purpose statement and intent of my research study. Additionally, I gathered artifacts from participants which added additional data sources to verify the history and resiliency of my cases. Lastly, I engaged in peer debriefing, or reviewing the research

process with other researchers as a means of *triangulation* to increase the credibility of my study (Creswell, 2013; Leydens et al., 2004).

3.7.5 Resonance

Tracy (2010) refers to resonance as the researcher's ability to meaningfully impact an audience through aesthetic writing, naturalistic generalizations, and transferable findings. I balanced the use of a familiar reporting structure, including rich cross-case reporting, with participant anonymity to achieve aesthetic merit. Additionally, I aimed for transferable findings, as opposed to generalizable findings sought in quantitative work. To this end, I have offered a clear rationale for purposeful sampling in Section 3.4.1 Case Selection and Participant Recruitment.

3.7.6 Significant Contribution

My research study offers three significant contributions. 1) This study introduces organizational resilience to the race-conscious engineering student support literature. This use of organizational resilience contributes to ongoing conversations about race and organizational theory typically found in broader higher education discourse. 2) This study also contributes to the holistic understanding of ESSCs. Most literature about ESSCs focuses on the interventions, services, and programs they offer and less on the overall workings of the organizations. 3) Lastly, this study provides historical documentation of ESSCs and events they have endured to remain a resource to Black engineering students. This documentation will result in insights for future leaders of race-conscious organizations and inspire scholars to continue documenting the value of race-conscious ESSCs.

3.7.7 Ethics

Firstly, this study has been approved through the Institutional Review Board (IRB) of Virginia Tech. I obtained this approval before conducting my study. The IRB-issued approval for this project is IRB 21-541. In addition to complying with all IRB safeguards, I carefully reflected on the exiting ethics of this study. Exiting ethics refers to the ethical considerations that go beyond data collection and into sharing study results (Tracy, 2010). Tracy emphasizes the duty of the researcher to consider how best to avoid unjust or unintended consequences. Given the uniqueness of my cases, I continuously reflected on this while engaging the entire research process. This ethical consideration informed my decision to only report cross-case analyses, increased the chances of protecting the livelihoods of all participants, and increased the richness of dialogue during interviews.

3.7.8 Meaningful Coherence

Through intentional alignment between my purpose, research questions, and methods, I have produced research that achieves its stated purpose and makes meaningful connections to the literature.

Through the guidance of my committee and peer debriefing process, I have produced findings and implications that are honest, relevant, and useful to the field.

3.8 Limitations

As with all forms of research, this multiple case study comes with limitations. The first limitation being the number of cases included in this study. Choosing a small number of cases decreases the likelihood that findings from this study are transferable to other contexts. However, despite Yin's (2014) recommendation for 6-10 cases in a multiple case study design, I used three to account for feasibility when managing multiple data sources and timeliness to complete the analysis in accordance with the dissertation schedule. I selected cases that were most accessible and familiar to me to aid my ability to collect and make sense of data. Additionally, I considered information power, my ability to obtain rich data and reach saturation with limited data sources, during the case selection process. By optimizing information power, I justifiably used less cases than what is typically recommended.

Another limitation of this study includes my sampling decision. Even though I was intentional in my selection of participants, my data is limited by only including the perspectives of directors as opposed to also including ESSC students, staff, or university administrators. My participants may have limited understanding of some critical incidents, and the critical incidents could be interpreted differently by other ESSC stakeholders. These stakeholders could also illuminate additional critical incidents not mentioned by ESSC directors. I will discuss implications and recommendations for future researchers as it relates to this limitation in Chapter 5.

Lastly, there is the limitation of my bias as a researcher. My bias is important to acknowledge as I am also an instrument in this research process, and my bias has implications for this study namely, what cases are used and how I interpret my findings. I have made every effort to be transparent about my researcher positionality and my relation to the topic of race-conscious ESSCs. I have also provided in-depth descriptions of my research methods and process for interpreting the data I collected.

3.9 Summary

In summary, the purpose of this study is to understand how race-conscious ESSCs have developed over time in different institutional contexts. To address this purpose, I used a multiple case study approach whereby three race-conscious ESSCs, each representing a case, were purposefully selected to understand the evolution of race-conscious ESSCs. I used an embedded unit of analysis, critical incidents, to capture the important events that have impacted each ESSC over time. I conducted interviews with current and founding directors and analyzed them alongside relevant artifacts to understand the developments that have taken place across all three ESSCs. Using matrices and pivot tables, I identified categories and patterns to address my research questions. I have acknowledged my

positionality as a researcher by answering a series of questions that investigated my impact on my research. Lastly, I have discussed the measures of quality used to judge the merit of my work, the limitations associated with this study, and how I combated said limitations.

Chapter 4: Results

4.1 Introduction

In this chapter, I present the results from my multi-case study. As a reminder, the overarching research questions I aimed to address was: *How have race-conscious ESSCs developed over time given the continual threats to the organization's survival and race-conscious mission?* I answer this question by addressing the following sub-questions:

RQ1. What events are salient in leaders' description of their ESSC's history?

RQ2. What developments are salient in leaders' description of their ESSC's history?

RQ3. How have events impacted the development of ESSCs over time?

The remainder of this chapter will answer each sub-question. First, I provide the types of salient events that directors presented as central to their organization's evolution. Then, I describe the various developments that occurred within and to the ESSC as a result of the salient events. Finally, I describe the relationship between the types of salient events that occurred, and the types of developments created.

In a continued effort to protect participant anonymity, quotes will only note if the participant is a current or founding director and will not be accompanied by pseudonyms so that connections are not easily made between the events and developments described. For the case where the current director is the founding director, I will note that the participant is a current director for all quotes about events and developments that occurred after the organization's name change. Due to the nature of my results, answers to RQ1 and RQ2 will demonstrate the variety of salient events and developments across cases with case examples in tables. To answer RQ3, I will use a Sankey diagram and embedded quotes from cases. More information about Sankey diagrams will be provided in Section 4.4.

4.2 Salient Events

In this section, I describe findings for RQ1: What events are salient in leaders' description of their ESSC's history? The findings for RQ1 demonstrate that six types of events were captured across ESSCs. The six types of events that occurred across cases were: 1) funding shifts, 2) community engagements, 3) rebranding choices, 4) program creations, 5) hiring decisions, and 6) college restructuring. An occurrence within a case was only captured if an observable development accompanied the event. Each event type was identified across at least two cases, as seen in Table 5.

Table 5. Development type prevalence across cases

Event Type	Case 1	Case 2	Case 3	Total
Community Engagements	2	11	8	21
Funding Shifts	11	5	4	20
Program Creations	1	1	6	8
Hiring Decisions	1	2	3	6
Rebranding Choices	2	1	1	4
College Restructurings	1	0	1	2
Total	18	20	23	61

I will elaborate on each event type in the following sections, discussing the events in the order of their prevalence. In each subsequent section, I will define each event type, provide of an overview of the variety of events within each type, and then use one quote from each case to demonstrate an occurrence within the data.

4.2.1 Community Engagements

The Community Engagement event type refers to important interactions that director have with various ESSC stakeholders, i.e., interactions had a resulting impact on the director or the ESSC. ESSC stakeholders included other student support professionals, College of Engineering (CoE) administrators, engineering faculty, and ESSC students. These interactions occurred with ESSC stakeholders outside of and within their university, Table 6.

Engagements in the external student support professional community included attending meetings, workshops, and conferences associated with the National Science Foundation (NSF), the Collaborative Network for Engineering and Computing Diversity (CoNECD), the Women in Engineering Proactive Network (WEPAN), and the National Association of Multicultural Engineering Program Advocates (NAMEPA). These engagements often facilitated directors receiving mentorship from other directors and offering their mentorship to new directors. Directors discussed navigating relationships within their respective CoE. This navigation included building relationships with faculty, being mentored by their deans, dealing with unpleasant interactions with engineering faculty, acquiring DEI colleagues at the college level, and being added to their CoE’s executive committee. Additionally, directors discussed relationship building with students and facilitating relationship building across student groups.

Table 6. Examples of events coded as Community Engagement from different cases

Example	Summary
<p><i>And [Colleague] was the one that told me about NAMEPA and that I needed to go to the national conference. And I met a lot of people there, and then I went to the regional and met more local people. But that's where a lot of the knowledge about the position and what people were doing in different schools, that's where all that came from was interacting with them.</i></p>	<p>Founding director talked about being a part of an NSF coalition and the experiences engaging with other members.</p>
<p><i>She would call me on the phone, and email me, and be like why you not at WEPAN? Why you not at CoNECD? I was like, well [Previous Director] said – she goes, do you look like [Previous Director]? I'd be like crap. So, I had to go a different route.</i></p>	<p>Current director spoke about her initial lack of community engagement until receiving mentorship from a fellow Black woman director.</p>
<p><i>So, this is the deans and department head committee. Decision level. So, all the department heads. All the directors for centers. This was the first time that the MEP was put onto that committee as well. In the beginning it was very necessary to work directly with the departments to help them understand the scope of what we were doing.</i></p>	<p>A current director also talked about being added to their CoE's executive committee.</p>

4.2.2 Funding Shifts

The Funding Shift event type captures events that focused on the coming and going of financial resources. Directors across all cases discussed various money related events that had a resulting impact on their ESSC. As Directors of ESSCs, participants were responsible for fundraising and managing the funding needed to support their organizations. This management was executed in a variety of ways including accepting, seeking, and losing funds from their CoE, faculty connections, federal and state funding agencies, corporations, and philanthropists.

Directors actively sought financial support within and outside of their universities and were not opposed to accepting opportunities when presented with them, Table 7. Funding shifts included obtaining grants that they applied for and various partnerships they engaged in to obtain financial resources. Due to the infrastructure of these organizations, directors were often responsible for the availability of funds needed to support the services offered to students. Two directors spoke of instances where financial opportunities were only available within their university when they took the initiative to pursue them. Funding shifts also included the loss of or reduction in funds at various points in time. Negative funding shifts like this included losing financial engagement from corporations, losing state-level funding, and

outgrowing the budget available for programming. Even during unstable funding shifts, directors found a way to adjust.

Table 7. Examples of events coded as Funding Shifts from different cases

Example	Summary
<i>I actually wrote the proposal that got funded for the next 5 years at AISES to get that Bridge program. That was the hardest thing I did in my life. Run a Bridge program and write that proposal at the same time. I literally slept on the conference table one night. [laughter]</i>	Current director spoke about the process of grant writing while in transition from being a program coordinator within a different organization.
<i>The department head at that time was talking to me, and he was like, “This ain’t my bailiwick. This is what you do. So how about I give you the money and you do it?” And so that’s how we started the [STEM Intervention Program].</i>	Founding director talked about a financial opportunity presented by an engineering faculty member within the university.
<i>When [Previous Director] left, they told her that they were not going to give any more money. She retired. And then they came back and gave me \$75,000 for a couple of years. And then funding went completely away. That’s why you don’t see [Intervention Program A] anymore. You see [Intervention Program B].</i>	Current director discussed managing fluctuating funding from a national funding agency.

4.2.3 Program Creations

The Program Creation event type refers to the addition of programs, activities, or services offered to students. These events also include the creation of the ESSC itself, Table 8. Each founding director discussed their process for determining the initial infrastructure of their respective ESSC. Directors used research and benchmarking practices to understand what others across the nation were already doing. Additionally, directors talked about the value of understanding the circumstances of the students within her own institution. In addition to student needs driving program creation, interactions with members of the CoE also came up as a driver for determining what programs would be available to students.

Table 8. Examples of events coded as Program Creations from different cases

Example	Summary
<i>I had to have something that first year. So, I decided I was going to do peer mentoring. That was going to be one of the things that I was going to do</i>	Founding director talked about the first program they implemented for students.
<i>[Engineering Faculty/ESSC Co-Founder] was concerned that the [Black] students who came weren’t doing well. There was no academic reason why they shouldn’t be doing well. So, he said to me, you know, “Can you figure out what’s</i>	Founding director talked about being prompted to create the ESSC and using research backed best practices and student interviews to know which programs to implement.

<i>wrong? And we'll start a program." ... So, I was reading about mentoring, I was reading about intrusive counseling... And the other thing I did was interview upper-class black students at the time... You can't get better evidence than that, right? So that's why I designed [ESSC] the way I did.</i>	
<i>Because everybody has to enroll before they leave for the semester. They got to know what the next step is. And our first-generation students, they don't know that. We created processes within the office. We created enrollment mentors.</i>	A current director expressed the usefulness of having this awareness when creating new programming.

4.2.4 Hiring Decisions

The Hiring Decisions event type refers to the hiring and loss of essential ESSC personnel, Table 9. Personnel referenced included directors and support staff that were integral to the operations of the ESSC. Directors discussed the various ways that they were hired and reason why they stepped down from the position. They also discussed the importance of hiring staff to provide support services.

Table 9. Examples of events coded as Hiring Decisions from different case.

Example	Summary
<i>Because they were seeking someone who had experience with Bridge programs. So, as I finished my degree, but along the way I was also with the [university organization] as an assistant for some of the Bridge programs that they had... Then I actually ran the program at the [university org].</i>	Current director talked about being hired as a new director because of experience with Bridge programs.
<i>I served as its director until I retired. At that point I served as counselor under [ESSC Director] for I guess another four years, I think, and then fully retired after we stopped being faculty and residents.</i>	Founding director discussed stepping down as ESSC director.
<i>I hired my first Assistant Director. So, until that time, it was me, my admin, who really was much more than an admin. She did the books. She did my calendar. She did my travel. She was everything. And I was allowed to hire an Assistant Director because I had also become the [College Admin Role #1], so I had these two jobs now. And that is when things really started I think growing, because you can't do anything unless you have the bodies to do it.</i>	Founding director spoke about the importance of hiring support staff.

4.2.5 Rebranding Choices

The Rebranding Choices event type refers to decisions made to change the way the ESSC was marketed. This event type captured changes made to the name of the ESSC, who the ESSC serves, and

the physical that the ESSC occupies, Table 10. Rebranding choices made by directors were often made in anticipation of potential barriers.

Table 10. Examples of events coded as Rebranding Choices from different cases

Example	Summary
<i>That was when we changed our name, and that was because there were people literally trolling websites and looking for the word minority so that they could report it to the Office of Civil Rights as being something illegal.</i>	Founding director talked about their proactive decision to change the name of their ESSC.
<i>We moved in 1997/1998. I don't even know where [Assoc. Dean for Business Admin] got the money, but they took money and built this suite that we have here. And so that was, again, a game-changer.</i>	Founding director talking about acquiring a newly built space to house the ESSC.
<i>Now it was grown where my office partners with the women in engineering program as well. It has also grown to where we are connecting to our international students a bit more, although our multicultural domestic students are our focus for the program.</i>	Current director spoke about the broadening of the student populations that the ESSC serves.

4.2.6 College Restructuring

The College Restructuring event type captured changes happening with the respective CoE's organizational infrastructure; changes that had impact on the resources and connections the directors gained or lost because of the change, Table 11. Changes in infrastructure included reorganizing where the ESSC was placed on the organizational chart and, therefore, to whom the director reported. Another change included the addition of an administrative position within the CoE and therefore changing the resources to which the director had access.

Table 11. Examples of events coded as College Restructuring from different cases

Example	Summary
<i>When I started, I was directly underneath the dean ... As the college has grown, I was put under the senior associate team. And then our diversity structure grew to have an assistant. It grew along with the university. The university has an assistant dean or higher-level position in every college for diversity, equity, and inclusion. As we got that, then I was put under that position. It's evolved. It had been, at the beginning, very, very close to the dean.</i>	Current director discussed changes to who they reported to as the college re-structured over time.
<i>We were undergrad and pre-college up until I became the [College Admin Role]. This is a brand-new position. When I got the job, two</i>	Current director talked about acquiring a new administrative role within the College of Engineering.

<i>people moved into my office, and they worked with grad students.</i>	
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4.3 Salient Developments

In this section, I describe findings to RQ2: What developments are salient in leaders’ description of their ESSC’s history? The findings for RQ2 reveal four types of developments that were salient in leaders’ description of their ESSC’s history. I considered developments to be outcomes and changes that occurred as a result of a prior event, engagement, or stimulant. The four types of developments identified across cases were: 1) Organizational Structure, 2) Financial Infrastructure, 3) Director Disposition, and 4) Professional Development. Two of the developments, Organizational Structure and Financial Infrastructure, occurred at the organization level and the other two developments, Director Disposition and Professional Development, occurred at the director level, having both direct and indirect impact on the ESSC. These developments were invoked by an array of catalysts and this relationship will be explored in the following section in response to RQ3. In this section I will only focus on the different types of developments.

4.3.1 Organizational Structure

Developments coded under Organizational Structure refer to changes in the infrastructure of the organization, including how it functioned and how it was perceived by stakeholders. Changes in infrastructure included the addition of new programs, changes in the leadership and staffing of the ESSC, altering the ESSC’s physical space, changes to the name of the ESSC, gaining access to new resources, and changes to who the ESSC served, Table 12.

The structural development that came up the most across cases was the development of new programs and services. Directors discussed creating mentoring programs, bridge programs, living learning communities, tutoring services, and scholarship programs. Each of these programs contributed to their ability to support their students and address unmet needs. Another example of a structural development was changes in the physical space of the ESSC, which included moving to larger spaces to allow for more staffing and spaces to offer services. Another director discussed making changes in the physical space of the ESSC with the hopes of appealing to financially contributing stakeholders. Structural developments also included changes in the access granted to the ESSC. Some directors acquired additional positions within the university in addition to their position within their ESSC, these changes accompanied access to DEI resources and important ESSC stakeholders.

Table 12. Examples of developments coded as Organizational Structure from different cases

Example	Summary
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<p><i>That was just 1 of like 5 programs that we started back in 2005...That was for everybody. That wasn't just for multicultural. But what it did was it gave a platform for our women and our multicultural director to also be involved and connected.</i></p>	<p>Current director discussed how creating college-level programming benefited the racially minoritized students within their ESSC.</p>
<p><i>So what this coalition decided to do was they wanted everybody else to also run a bridge program. Fine with me. So they gave us money to put together a bridge program, and that's where [Intervention Program 2] came from.</i></p>	<p>Founding director discussed the origin of the ESSC's bridge program.</p>
<p><i>[ESSC] Director added to the engineering executive committee. So, this is the deans and department head committee. Decision level. So, all the department heads. All the directors for centers... In the beginning it was very necessary to work directly with the departments to help them understand the scope of what we were doing.</i></p>	<p>Current director talked about gaining access to important ESSC stakeholders.</p>

4.3.2 Financial Infrastructure

The Financial Infrastructure development type accounts for the various changes in the financial systems that support each ESSC. Each ESSC's financial infrastructure is a combination of different funding sources such as federal and state level grants, financial opportunities through the university's Development Office, financial support from the CoE, corporate partnerships, and philanthropic donors, Table 13.

Federal- and state-level grants were often talked about across cases, specifically the start and end point of the grant. One director also discussed a bump in philanthropic funding following an increase in conversations about diversity, equity, and inclusion which she noted occurred during the Trump administration. Other changes in financial infrastructure included losing industry engagement following the 2008 recession, financial opportunities presented by and requested from the Development Office and receiving funding from program alums working in industry.

Table 13. Examples of developments coded as Financial Infrastructure from different cases

Example	Summary
<p><i>We have had [URM Funding Agency] scholars from the beginning. [URM Funding Agency]’s been out there as long as a lot of the MEPs. We’ve had [URM Funding Agency] scholars. We still have [URM Funding Agency] scholars.</i></p>	<p>Current director talked about the consistency of funding from one a national funding agency.</p>
<p><i>While this NSF money is being spent on these programs, I’m still collecting money. I’m still writing proposals. I am still asking people for money, and that money is going right into the bank – right into the bank. All the overhead money from these grants goes right into the bank. In 2010 I think it was – 2011, somewhere right around there – when the NSF money went away, that’s all of a sudden we don’t have \$300,000 a year that you had. I had enough of a safety net to keep things going. But money is a big deal.</i></p>	<p>Current director discussed how she prepared reserve funds to prepare for the ending of grants.</p>
<p><i>I was just so fortunate that [CoE Dean] came into my life. I’ve been knowing him for a long time, and I would have to say that when he put me in this position, I said to him I can’t be poor. He says, I’m not going to put you over there without any funding. He definitely has made sure that my mentors are paid. The funding that we get for our mentoring program, it comes from the college. Then he gives me a certain amount of monies to run the organization. It’s not like a little bit of money. He gives me money on top of the monies that the corporate people give.</i></p>	<p>Current director discussed the various ways that their dean supports their office.</p>

4.3.3 Director Disposition

The Director Disposition development type refers to changes in how a director approached their role as director of a race-conscious ESSC. Each director spoke about developments to their disposition, Table 14. Changes in disposition were unique to each director and their ESSC environments and, at times, overtly influenced by some set of personal identifying markers. Changes in disposition included changes in how they would engage in relationship building with students and faculty, how they prioritize relationship building, how they approached fundraising, how they considered their race and credentialing, and how they rationalized the use of inclusive programming language.

Table 14. Examples of developments coded as Director Disposition from different cases

Example	Summary
<p><i>Professional development wise. All these engineers are being hired out. As soon as they get in a position, they are managers. They're in charge of people. And if they do not understand that people have different priorities from different communities, then they don't understand how to interact with them.</i></p>	<p>Current director discussed the importance of using inclusive language and creating programming for all, aside from legal repercussions.</p>
<p><i>So, I just think that sometimes our faculty members are very arrogant because they're in STEM. They just think you're a little airhead, I guess. I don't know. I'm just being honest. The short answer is no, I don't know what it is. I don't know if it's because I'm African-American. I don't if it's I don't have PhD in engineering. I don't know what... But I am just so blessed in what I do, I don't have time. It's too much work to be done. I had to get over it. I may not have it, but I know I'm a practitioner. And I know I know what I'm doing.</i></p>	<p>Current director discussed adjusting her mindset after unfavorable interactions with engineering education faculty.</p>
<p><i>Then at one point, literally we had discussions about whether we could continue the program at all. I firmly believe the mentors should be paid and that there should be some kind of fun money for the teams to do something, but we could not sustain it. We were looking around going, "What can we do?" And we literally talked about not having the peer mentoring program at all. It was the students that came back with a plan that said, "OK, this is what we think will work. This is how long it needs to last. This is what we think the kids should be paid." And I mean literally a tenth of the cost. And that's the reason we still have the program. But there is nothing that comes across my desk that says we have money if you want to apply for it that I don't apply for.</i></p>	<p>Founding director discussed developing what I am considering a "hustler's mentality" regarding the constant need to seek program funding.</p>

4.3.4 Professional Development

The Professional Development development type refers to the skillsets that directors acquired via on-the-job training. These developments can be thought of as the skill developments needed for any director, regardless of ESSC environment. Most directors spoke about the role of engaging in NAMEPA's professional community on their professional development. Directors discussed their engagement with NAMEPA as a way to learn about different services they could offer students and how to obtain the necessary financial resources, Table 15. Another director discussed learning about language adjustments that needed to be made to abide by discrimination laws by attending NAMEPA conferences.

Understanding and abiding by discrimination laws is very important for any director. Directors also mentioned skills gained regarding how to respond when accused of discrimination, how to advocate for support from industry partners, how to engage ESSC students as ambassadors, and how to build relationships with faculty.

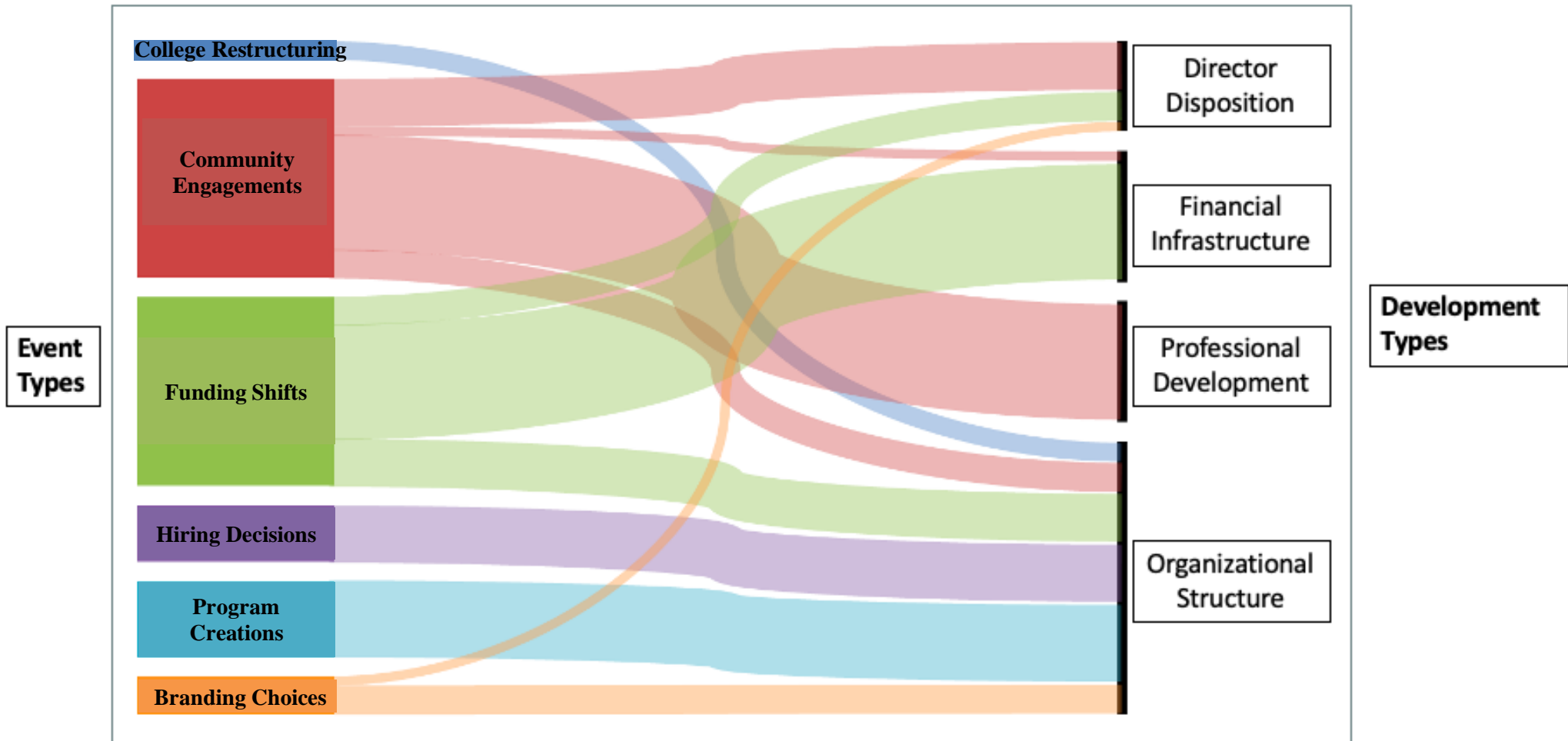
Table 15. Examples of developments coded as Professional Development from different cases

Example	Summary
<i>I do remember distinctly meeting people there who were part of NAMEPA, that was one; sitting on a bench next to a young woman who was at UCLA at the time, I think, and asking her the same question I'd been asking everybody else, "I just started doing this. What are the priorities? What are the things I need to focus on first?" And they told me.</i>	Founding director discussed learning about different services they could offer students.
<i>That's what I do now as being director all these years. I share my proposals and my budgets with other MEPs that are seeking ideas. That's how I started. I figure we need to support each other, and be able to support our professional development as MEP Directors.</i>	Current director spoke about her experience learning from NAMEPA members and paying it forward.
<i>So, then I was told to make sure that everything I say, everything, not just my summer programs, but all my information, if you ever see me do a presentation, if you ever see my staff do a presentation, we always have to voice and write that we're open to everyone.</i>	Current director discussed a learning a lesson about how to promote her ESSC to abide by discrimination laws.

4.4 Impact of Events on Developments

In this section, I describe findings to RQ3: How have events impacted the development of ESSCs over time? The findings for RQ3 reveal that there were some singular-focus event types that only impacted one development type, and some multiple-focus event types that impacted more than one development type. To explain this finding, I will use a Sankey diagram. Traditionally, Sankey diagrams have been used to depict energy flow and its distribution to various sources using arrows where the width of the arrows represents the amount of energy flow (Schmidt, 2008). In this study, the Sankey diagram will depict the connections between events and developments as identified in my data. Although not the focus of analysis, I want to mention that the width of each flow is representative of the number of critical incidents that demonstrate each type of connection.

Figure 8. Sankey diagram depicting the dynamic ways that event types impacted development types



As shown in Figure 8, each event type was connected to at least one developmental area, and for some, only one developmental area (singular-focus events). The singular-focus event types that appeared to only impact one area were Program Creations, Hiring Decision, and College Restructuring. All event types impacted Organizational Structure —impacting who is available to run the programs, what programs can be offered, and the legitimacy of the organization. As a reminder, these relationships were determined based on the content of each participant’s interviews. Therefore, it is likely that these event types had an impact in other developmental areas as well, but they were not mentioned in the interview or were not observable during analysis.

On the other hand, some event types were connected to more than one developmental area (multiple-focus events). The multiple-focus event types were Rebranding Choices, Community Engagements, and Funding Shifts. Rebranding Choices connected to two development types, Funding Shifts connected to three development types, and Community Engagements connected to all four. Each multiple-focus event type impacted the ESSC at the organization and director level. The remainder of this section will discuss the different ways that Rebranding Choices, Community Engagements, and Funding Shifts impacted different development types.

4.4.1 The Impact of Rebranding Choices

Changes in the branding of the ESSC impacted 1) Organizational Structure and 2) Director Disposition. Rebranding Choices such as changes to the organization’s name, mission, advertisement, or physical environment were all decisions about the organization’s branding that had an impact in two of four developmental areas.

First, Rebranding Choices impacted Organizational Structure. For example, a founding director of one case discussed the process of changing their organization’s name.

The first thing that comes to mind is the debacle that took place in the early 2000s with the Supreme Court decision and the rollback of minority programs, and people being targeted, and everybody swearing up and down it was discrimination against white boys, and all that kind of stuff. That was pivotal. That was when we changed our name, and that was because there were people literally trolling websites and looking for the word minority so that they could report it to the Office of Civil Rights as being something illegal. (Founding Director)

Changing the organization’s name was a proactive choice made by the director that had a direct impact on a structural component of the organization. The name of an organization is as important as other structural components such as its vision or mission.

Second, Rebranding Choices also impacted Director Disposition. For example, a current director of another case discussed the impact of changing the physical environment of the ESSC on her approach to managing her ESSC.

Even as I talk to you, I can feel how I feel sometimes. And how I felt, and how I've had to be an advocate for myself. And I had to watch everything. The way I talked. The way I looked. The way I handled myself. And I feel like she didn't have to do that. I remember having a fight with the students because I wanted to change the furniture and make it look more professional.

They were all like, why are you going to do that? This is our home. I didn't care who got mad at me. I had to get tougher skin. I didn't care who liked me because I felt like eventually, they're going to get out here, and they're going to see it ain't like what you think it's like. We're just in a little space. And you like, "oh the furniture, I like it torn up." No. I need industry to give to me. Since I have transitioned, I brought so much money in. I've changed the face of the way it looks. I made some people that were there when she was here – they may feel a little different. But that's life. Things change. Hopefully, they change for the better. I'm proud to say yes, it doesn't look like [it used to]. But we're in a new day. I'm very, very proud about that. (Current Director)

This example illustrates a director having tension with current students about changes she were making to the interior of the ESSC. As a result, she adopted a different mentality that helped her focus on her role and bring the ESSC to a state that she is ultimately proud of.

4.4.2 The Impact of Funding Shifts

Funding-related event types had an impact in three developmental areas: 1) Organizational Structure, 2) Financial Infrastructure, and 3) Director Disposition. What became very apparent while talking to directors across cases was the fundraising aspect of their role. Through various funding events, directors developed skills that strengthened their ability to navigate the financial component of each case that was largely not institutionalized.

First, I will discuss the ways that Funding Shifts impacted the Financial Infrastructure of the cases. Directors spoke about the many financial sources that were contributing to their programs available to students and how those resources could be here one minute and gone the next. For example,

They are always engaged in terms of they want to come to the career fair. They want to speak at the NSBE meeting. They want to interact with the students in some way, shape, or form. The money dried up. Right around the crash, like 2008. I mean, it just dried

up. Because there used to be – and some of it was I'd have to write proposals to the different companies, to that program, to this program, etc. But there were Google grants that were not much, maybe 5 grand, 10 grand. There were other organizations giving money. The defense industries had historically never really stopped, but they give one check to [University] and it gets parsed out. And we might get 5,000 or 15,000 or whatever. So that kind of engagement, as I said, never stopped. The money dried up. The money now – what's interesting is we're still not getting a whole lot of corporate money. (Current Director)

This ebb and flow of resources illuminate an unstable and inconsistent financial infrastructure found across cases that requires a constant awareness of financial constraints, timelines, and renewal capabilities.

Second, Funding Shifts impacted the Organizational Structure of my cases, namely what services were and were not available to students.

The [Intervention Program 3] grant was a game-changer. That was a \$2 million grant where we said we had peer mentoring, we had a summer bridge program, we had a living learning community. Summer bridge was for Black and Hispanic. Living learning was for women. The peer mentoring, we had the three populations, Black, Hispanic, and women. And that if they gave us enough money, we could open these programs to all students.

So what that did was two things. It obviously funded [the ESSC] for five years. We were getting almost \$200,000, \$300,000 a year for five years. It also allowed us to bring the programs back into the light because, as long as we have something for everyone, we can parse it off however we want. But we created [Intervention Program 4] and kept the other three mentoring programs. We created [Intervention Program 5] for the men, the comparable community, and we opened the summer bridge program to anybody that wanted to come. That was huge.

Here a director sought out funds that would open their ESSC up to all engineering students in an effort to both keep some of their previous program structures and not raise any alarm bells for those seeking out programs that were “discriminating against white boys.”

Third, Funding Shifts also impacted Director Disposition. For example, the current director of one case discussed the impact of watching programs disappear due to a lack of funding.

It was because [U.S. State 1] had prohibited Black students from achieving post-secondary degrees. They didn't enroll them in schools. The OCR, Office of Civil Rights, said, "You've got to do something to fix this to help this along." So that's where their bridge program came from. It was university-wide for Black students. And the money came from the state. So one of the things I did, I remember – I forgot about this one. I actually went to [Director of Academic Success Program] whose office was running it, and I was like, "Do you think the state has any money that I could get?" She said, "Well, you can try." So what ended up happening – she actually helped me. We wrote a grant to the state, and we ended up getting – we got enough money to run a bridge program and keep it free to the students. That was about \$60,000 a year. And we got that up until they said that the state had done enough, and they stopped funding the money. Now at that point, the university stepped in one summer for [University Bridge Program], and then [University Bridge Program] was gone. And our bridge program is still here. Now yes, we charge for it, OK. But we try to use the standard university model in-state/out-of-state. Them's that have pay. Them's that have not pay considerably less. (Current Director)

As a result of this experience, this director decided that participation fees were necessary for program success as opposed to having a free program that was reliant on inconsistent funding.

4.4.3 The Impact of Community Engagements

Community Engagement events led to four types of developments: 1) Organizational Structure, 2) Financial Infrastructure, 3) Director Disposition, and 4) Professional Development. Community Engagement events demonstrated how interacting with the broader ESSC ecosystem both internally and externally had implications across all four development areas.

First, Community Engagements impacted Organizational Structure. For example, a current director discussed the impact of being questioned about assessment and evaluation data.

This is going to tell you how white privilege was, or is, or whatever you want to say. [Previous Director] never collected any data. When I got into the program, they were like where's your data? Where's your impact? We're a Research I institution. Where's your data? I'm like I just got here, freak. People were just killing me. You need to have assessment. I made it my business to try to do pre- and post-assessment. To try to do quantitative and qualitative – I can't say research because I'm not necessarily a researcher, or whatever you want to say. One thing that [CoE Dean] did do, was he

hired a PhD in Industrial Engineering. She's over our data analytics and so forth. She helped me put forth assessment for our mentoring programs, and our outreach programs. She helped me devise pushes that we always give, and questions that we ask of students. Now I can tell you that we do, and I produce an annual report that gives all those findings of what we do on a yearly basis. (Current Director)

This director, a Black woman, talked about the ways that stakeholders engaged her about assessment data as compared to her predecessor, a white woman. Ultimately, this engagement, along with support from her COE's dean, led to the creation of a role that focused on this very task.

Community Engagements also impacted Financial Infrastructure. In the example below, a current director described her process for connecting with undergraduate student affinity groups to institutionalize funding.

I had to actually build bridges between the student groups as well, because they had all formed where they would have their own end-of-the-year celebration completely separate from each other, not knowing what was going on. AISES, NSBE, SHPE. My office sponsored the end-of-year joint event. What that also allowed us to do, allowed me to do, was fundraising as a group. For our big sponsors to the college, and those, what I did was I went beyond hey, you guys should write a letter to get some money. I went to the foundation and said, can we write them into the overall College of Engineering grant proposal, so that these 3 organizations, and our women organization, get money no matter what? They don't have to write letters. (Current Director)

This director identified an opportunity to financially support her students and understood the importance of community building to build resource capacity.

Additionally, Community Engagements impacted Director Disposition. Below, is an example of a current director from another case describing the effects of positive relationship building with students.

And then also, building rapport with my students. I think that people were used to [Previous Director] being there...But anyway, to make a long story short, I think that when she left, and then all the people that were her fanfare left. Then I began to build relationships with the new students. It just began to be that no, I'm not in the trenches. I don't get to talk to them one-on-one. But I think that it's known. She's keeping this thing going. Now I have students that will represent us. Say, "man, [Current Director] has made a difference. Your team has made a difference." For people to hear students

say that, and for us to get on one accord, and they not be against me and fighting against me because I want to change the face, not knowing I didn't want to change it either. But I was pretty much forced to. I think that it all began to come together.

This director discussed the impact of interactions with students on their approach to managing the organization. Once student interactions started to reflect more positively after a contentious transition, the director was able to reevaluate the type of relationship she would have with students and accept that it was effective.

Lastly, Community Engagements impacted Professional Development. For example, the founding director of another case discussed the impact of meeting other student support professionals.

They had PI meetings, and I met all kinds of people at these PI meetings. One of them I remember distinctly, [Colleague]. I think they're still at Tennessee Tech, and I met them again when I went to this [Coalition] conference. So that's when I found out that what their job was was really minority engineering programs of some sort. And [Colleague] was the one that told me about NAMEPA and that I needed to go to [their conferences]...So I think I did go to the annual conference. It was right around Super Bowl weekend at that time. It was like January/February time frame. And I met a lot of people there, and then I went to the regional and met more local people. But that's where a lot of the knowledge about the position and what people were doing in different schools, that's where all that came from was interacting with them. (Founding Director)

Here we have a director discussing the network building and attainment of information resources that influenced her skillsets as a director early in her career.

4.5 Summary

This study was designed to answer the following overarching research question: *How have race-conscious ESSCs developed over time given the continual threats to the organization's survival and race-conscious mission?* The results in this chapter indicate that six types of events and four types of developments were salient in leaders' descriptions of their ESSC's history. I will summarize the answers to the study sub-questions below.

RQ1 asks what events are salient in leaders' description of their ESSC's history? Six event types—College Restructuring, Community Engagement, Funding Shift, Hiring Decision, Program Creation, and Rebranding Choice—were identified as critical incidents. Of the 61 critical incidents, Community Engagements (21) and Funding Shifts (20) represent two-thirds of them. Although I cannot

say that this finding is representative of all events that have taken place over the history of the ESSCs in my study, it is worth noting that these are the types of events most told by directors when recalling their organization's history during their tenure.

RQ2 asks what developments are salient in leaders' description of their ESSC's history? Events led to one of four types of developments, two of which occurred at the organization level (i.e., Organizational Structure and Financial Infrastructure), and two of which occurred at the director level (i.e., Director Disposition and Professional Development). Due to the primary data source of interviews with ESSC directors, it makes sense that the telling of an ESSC's history involved the learnings and perspective shifts that those directors underwent as their decision-making has direct impact on the operations of the organization, and ultimately its resiliency.

RQ3 asks how have events impacted the development of ESSCs over time? When considering the relationship between events and developments, findings revealed single- and multiple-focus event types. Some event types only occurred in connection with one type of development (i.e., Program Creations, Hiring Decision, and College Restructuring) while others were in connection with two or more types of developments (i.e., Rebranding Choices, Community Engagements, and Funding Shifts). The event types that represent most of the critical incidents (Community Engagements and Funding Shifts) had impact in the most developmental area; with Community Engagements impacting all four development types.

As a reminder, the salient events and developments previously described are a reflection of the data collected across cases and the analysis approach described in Chapter 3. These findings are not intended to be a complete retelling of critical incidents across all three cases, nor am I suggesting that the connections presented between events and developments are the only connections that exist. The events, developments, and connections presented above are those that were clearly observable in my data.

The findings presented here describe the ways in which the race-conscious ESSCs included in this study have shifted and changed over time. In Chapter 5 I will discuss these changes from the perspective of organizational resilience and highlight the implications of these changes for Black engineering students.

Chapter 5: Discussion

5.1 Introduction

The purpose of this multiple case study was to understand how race-conscious engineering student support centers (ESSCs) have developed over time in various institutional contexts. Subsequently, the overarching research question of my study was: *How have race-conscious ESSCs developed over time given the continual threats to the organization's survival and race-conscious mission?* To answer this question, this study aimed to answer the following sub-questions:

RQ1. What events are salient in leaders' description of their ESSC's history?

RQ2. What developments are salient in leaders' description of their ESSC's history?

RQ3. How have events impacted the development of ESSCs over time?

In response, I found six salient event types and four salient types of development that have had an impact on race-conscious ESSCs over time. These findings are representative of the data collected and data analysis described in Chapter 3, whereby events and developments were only captured if both were clearly observable in the data. The absence of salient event types, developments, or connections between the two is only a product of my data and not of the full reality of my cases. Some event types were singular-focus and were discussed as having impacted one type of development, whereas others were multiple-focus and discussed as having impacted more than one development type. These findings build on existing literature that explores race-conscious student support centers holistically as opposed to the individual services that they offer. In the remainder of this chapter, I will compare existing literature with study findings around the challenges and opportunities that ESSCs encounter and discuss resulting implications.

First, I must discuss the centrality of directors to the cases in this study. This realization shaped my approach to data analysis and further meaning-making. Second, I will discuss what I am calling "the hustle for survival" displayed by directors across cases. This discussion will include a comparison between existing literature and the findings from my study. Third, I will review the aspects of the cases that enabled the operation of each race-conscious ESSC. Fourth, I will focus on the degree that my cases displayed characteristics of resiliency, according to my theoretical framework. Lastly, I will discuss the consequences of resilience/implications and future work.

5.2 Director Centrality

The findings from my study highlight how difficult it is to differentiate between the director and the ESSC. Although this could be a result of only talking to directors, I believe it is a finding worth acknowledging and exploring in current and future work. Prior literature exploring ESSC's holistically has often discussed the external factors that impact the form and function of these organizations. As

discussed in Section 2.2.4, literature has focused on what aspects of ESSCs differed from one institution to another such as the array of programs offered and how those differences impacted student success (Hackett and Martin, 1998; George, Castro, and Rincon, 2019; Morrison & Williams, 1993; Shehab, Murphy, and Foor, 2012). These studies highlight institutional support and isomorphism as sources of influence on these similarities and differences across ESSCs. Based on this tendency to focus on the external factors, I assumed that, aside from managing with the day-to-day operations of their ESSC, directors would be constantly responding to disruptions; and these disruptions would be drivers for the new forms and functions of ESSCs seen today.

My dissertation advances our understanding of ESSCs by fore fronting the importance of the director's agency to the resilience of the organization. One study that began to explore this agency is by Lee and colleagues (2018) where they explored the decision-making of practitioners working in ESSCs. However, this study focused on the beliefs held by practitioners that influenced their choices about what services were offered to their students. Although I considered Director Disposition and how they orient themselves as directors, findings from my study also highlight the additional ways that directors display agency. Following my analysis, I became more aware of the agency that directors possess and the decisions they make preemptively, sometimes in anticipation of barriers. Within the 61 critical incidents identified across cases, the directors were acting proactively in 24 of them and they were acting reactively to a stimulant in 23 of them. There were also instances where the ESSC, or by proxy the director, experienced an event happening to them, such as during College Restructuring events. Each agentic move displayed by the directors and interactions that they experienced had an impact on the ESSC.

Given the centrality of the director, my dissertation highlights the extent to which threats and opportunities available to the directors were thus threats and opportunities to the ESSCs themselves. For example, their ability to build relationships with stakeholders has direct consequences for the ESSC's legitimacy and survival. This aligns with prior literature that states that healthy relationships with stakeholders (i.e., students and faculty) is important for ESSCs (Hackett and Martin, 1998; Shehab, Murphy, Foor, 2012). My study expands literature by highlighting the importance of their accumulation of other roles within the university, especially administrative roles within the College of Engineering, which has an impact on resources available to the ESSC. These topics have yet to be discussed in relation to ESSCs. However, this finding does align with prior work outside of engineering education about how employees change their jobs and expand their roles (e.g., Berg, Dutton, and Wrzesniewski, 2008; Sieber, 1974).

Additionally, this finding aligns with the prior work of Heimovics and Herman (1990), which demonstrate the centrality of the chief executive leadership in nonprofit organizations despite the assumption of the board of directors being at the top of the hierarchy of authority. Based on further

scholarship by Heimovics, Herman, and colleagues there appears to be a connection between race-conscious ESSCs and nonprofit organizations. However, additional research is needed to further explore similarities between these types of organizations.

5.3 The Hustle for Survival

Findings from my study illuminated challenges and opportunities encountered by directors of race-conscious ESSCs that all contribute to what I am calling the *hustle for survival*. Recalling the opportunities and challenges identified in Section 2.3 (i.e., the myth of meritocracy, diversity as a buzzword, the fight for legitimacy, lack of faculty support, funding issues, and attacks on Affirmative Action policies), I identified instances of each across cases, sometimes in tandem with each other. These opportunities and challenges were positioned as both threats to the cases' survival and to their original race-conscious mission. In the following sub-sections, I will discuss the ways in which they occurred.

5.3.1 Funding

I found inconsistent funding structures to be one threat to the survival of the race-conscious ESSCs in my study. By inconsistent, I am referring to the varied infrastructures across cases and the fluctuation of funding within a case. This finding aligns with a study by Rincon and George-Jackson (2016) surveying the funding structures of 48 ESSCs, race-conscious ESSCs included, where they found that, “many programs struggled with changes in funding over time, inadequate staffing and service delivery, and long-term program sustainability” (p. 429). In my study, this fluctuation in funding was present in the interviews of all but one participant, who did not discuss any concerns or pursuits of funding for the organization. She associated this lack of events to the presence of an engineering faculty member whom she termed the “Founding Father” of her ESSC. He managed the financial infrastructure of the organization and once he left, she continued to rely on the framework that he set in place. Unlike the remaining directors in my study, she had no funding shifts or financial developments to recall. As a result, she was able to focus more of her time on interpersonal relationship building with students.

Each case in my study received recurring financial support from their College of Engineering, though this support looked differently across all three cases; there did not seem to be standard practice. This finding aligns with prior literature that reveals university funding as a financial source and that funding from the university is inconsistent across ESSCs (Baber, 2015; Lee, 2015; Morrison and Williams, 1993; Rincon and George-Jackson, 2016). My findings also add to the conversations about funding from the university, noting that within my cases funding attainment was dependent upon the director's 1) relationship with their administrators (e.g., Deans, Associate Deans), 2) awareness of what funding was available, and 3) comfort making the ask. However, with these factors at play, directors had

the potential to gain access to resources and legitimization via a commitment from their administrators to support their organization.

Consistent with prior literature, directors across cases also discussed the necessity of obtaining funding from external sources and the reality of that funding fluctuating over time (Baber, 2015; Rincon and George-Jackson, 2016). These external sources of funding were constantly being obtained, but they were non-recurring in nature and came with restrictions for how the money could be used. The former is concerning when grant-funded programs tend to fade away when funds run out (Rincon and George-Jackson, 2016). The latter raises questions about the power that funding agencies have over what programs are offered and for how long, and therefore what students are supported and how. The relationship between grant obtainment and programs offered was not clear throughout the cases in this study. Said differently, it was unclear to what degree directors were seeking grants to meet current student needs as opposed to creating opportunities for student groups based on the funding solicitation.

5.3.2 Legitimacy & Faculty Support

For directors of race-conscious ESSCs, legitimacy aids their ability to have long-term sustainability and viability on campus (Bailey et al., 2004). Findings from my study highlighted the ways that directors used *branding* and *relationship building* to secure their organizations' legitimacy on campus.

Prior research would suggest that branding decisions matter and have been made to secure legitimacy. For example, Shehab and colleagues (2012) discussed the connection between branding changes and the local political and economic context (i.e., attacks on Affirmative Action). I would argue that compliance with legal guidelines is directly linked to organizational legitimacy. My findings contribute to this conversation, establishing a link between branding and funding obtainment. For example, in one case, a director stated her choice to change the interior of the ESSC's physical space was due to their desire to obtain funding from industry. She discussed an awareness for industry representatives coming into their space and making value judgements about the organization and its' worthiness for receiving their support. Outside of engineering education literature, scholars have made connections between external factors and legitimacy. For example, Zelditch (2001, as cited by Wilcox, 2007) notes that, "It is people who make legitimacy, but they make it out of resources not of their own choosing" (p. 51). It is understandable why branding decisions, such as the organization's name, had a direct impact on sustainability and viability on campus for some of my cases. Not only did the directors have to be concerned about what one might call "minority program hunters" searching for their organizations, they also had to also think about perceptions of stakeholders (i.e., faculty) on campus. In this context, "minority program hunters" were individuals who intentionally sought to end race-exclusive programs at universities across the country, like the efforts of the Center for Equal Opportunity members

(Schmidt, 2006). The Center for Equal Opportunity is a conservative group that aims to promote colorblind equal opportunity, believing that the United States is not a racist and discriminatory country (Center for Equal Opportunity, n.d.).

Regarding relationship building, directors across all cases discussed building relationships with the students within their organization and its importance to program sustainability. The results from my study aligned with prior work by scholars that highlight the impact of relationships between students and ESSC leaders on student success and feelings of belonging (Guiffrida, 2005; Shehab, Murphy, Foor, 2012). Although directors across all cases also discussed the importance of relationship building outside of their ESSC, two cases had directors talked about their explicit goals of developing relationships with engineering faculty and administrators as a means of gaining program support. Based on prior literature (Baber, 2015; George, Erin, and Rincon, 2019), I anticipated my dissertation speaking to the importance of faculty involvement in race-conscious ESSCs. However, I thought it would pertain to the participatory hours that directors needed faculty to put in to facilitate programs. Although this kind of involvement was mentioned, it was not emphasized in the way connections to faculty were emphasized when discussing funding opportunities or buy-in for college-level initiatives that directors wanted to implement to support their minoritized students. Wilcox (2007) notes that legitimacy depends on the relationships between those seeking legitimacy, and their constituents, and also on relationships within and amongst relevant institutions and their associated values.

5.3.3 Affirmative Action & Meritocracy

The myth of meritocracy and attacks on affirmative action have been demonstrated as threats to race-conscious ESSCs' survival and race-conscious missions (Baber, 2015; Black Issues, 1999; Malcom, Chubin, and Jesse, 2004; Willis, 1997). A belief in a meritocratic STEM field is at the crux of arguments against Affirmative Action policies, and it came up as issues across two of three cases in this study. The one case where the Affirmative Action Supreme Court cases and post-ruling accusations of discrimination did not come up was the case where a name change took place outside of my participants' tenure. This prior literature about the impact of attacks on Affirmative Action and a belief in meritocracy on race-conscious ESSCs aligns with findings from my study. For example, directors of two cases were active during prominent Supreme Court rulings, one of which spoke of proactively making the decision to change their organizations name to avoid any legal repercussions. She specifically recalled institutions being targeted by "minority program hunters" and making the decision to first take down the ESSC's website to make them less accessible to those searching for minority programs online. Changing the organization's name was a choice made when the director was ready to resurface and continue operations as normal. However, the impact of these aspects is not guaranteed across ESSCs. The other director present during these rulings, for instance, did not recall any events affecting her ESSC. This is the same

director that had a Founding Father and I wonder to what degree he was able to shield the organization from any disruptions.

Another director discussed dealing with discrimination accusations from engineering faculty within and outside of their university. As a result, she developed advertisement language that emphasized that her programs are “open to all”. This finding aligns with prior literature about how color-blind language functions in higher education. Malcolm, Chubin, and Jesse (2004) highlight how color-blind language operates in conjunction with race-neutral alternative approaches to enhancing diversity without solely focusing on race. Further research has suggested that race neutral alternatives are not particularly effective at recruiting or retaining minoritized students in STEM (Kane, 2003), and yet organizations that were originally created to support the representation of Black people in STEM are now held to legal standards that make it very hard to remain committed to this mission.

5.3.4 Diversity Rhetoric

When I began this study, I anticipated the influence of “diversity” as a buzzword on campus and emphasis on progress via increased graduation and retention rates to come up across cases. I wanted to explore how directors across cases would describe the role of “diversity” on their campuses, particularly in how they framed the purpose of their organizations and further demonstrated how they had to fight for legitimacy. However, instead of this focus on diversity, I found the directors to have leaned into the current framing of “inclusion” on campuses. I found that each current director often spoke about their programs being “open to all” and therefore they branded their organization as such while maintaining an emphasis on their support for racially minoritized students, usually through targeted recruitment and support of undergraduate engineering racial affinity groups (e.g., NSBE, SHPE, AISES). This use of language aligns with prior literature such as that by Schmidt (2006), who highlights a language shift in higher education from “minority” to “diversity”. Schmidt noted that this change in language marked the ending of race-exclusive programs in higher education during a time when, those who I refer to as “minority program hunters”, were actively seeking race-neutral programs nation-wide.

My findings contribute to this conversation by highlighting how these shifts are necessary for survival. On the surface, this shift from “diversity” to “inclusion” seems important and necessary. However, while this shift is the next iteration of color-blind language, I do not intend to place blame on directors for the changes they have made to their organizations’ branding and operations. In two of three cases, directors made comments alluding to them not wanting to change the branding of their organizations but doing so to avoid legal repercussions or to gain industry funds; in other words, to survive. It is not uncommon for DEI practitioners to receive training and resources recommending that they adopt such practices to maintain operational programs (American Association for the Advancement of Science, n.d.; Malcom, Chubin, and Jesse, 2004). In the third case, however, a director went beyond

the legal ramifications and talked about the significance in needing to offer professional development opportunities to all engineers who will be working as future managers in diverse working environments. This shift to an “open to all” mindset from a place of student need is different from a shift made for organization survival. This director also spoke about several racialized events that occurred on campus that precluded university wide programming supported by the ESSC director. I hope that results from my study can help race-conscious ESSC leaders consider the implications of what may seem like a harmless mindset.

5.4 Enabling Factors of Resilience

As demonstrated from the findings in this study, there are a variety of factors that have influenced the existence of race-conscious ESSCs. I will now use Kantur and Íserí-Say’s Integrated Framework of Organizational Resilience as a tool to further discuss the resiliency of the race-conscious ESSCs in this study. My study expands the current understanding of race-conscious ESSCs by bring in this framework of organizational resilience to the engineering education landscape.

As a reminder, Kantur and Íserí-Say (2012) consider four enabling factors (Figure 2) that impact an organizations ability to be resilient and ideally result in organizational evolvability. To begin this conversation, I will focus on the four enabling factions – 1) perceptual stance, 2) contextual integrity, 3) strategic capacity, and 4) strategic acting – and explore the extent to which these factors were present across cases.

5.4.1 Perceptual Stance

Perceptual stance is about an organization’s alignment between sense of self and reality, which requires wisdom, positive perceptions, and a unified commitment to the organization’s mission (Hind et al., 1996). The ability to identify weaknesses in an organization is necessary for resiliency and a by-product of having an accurate sense of self.

Findings from my study would suggest that much of the perceptual orienting comes from the director of these organizations. As previously discussed, directors play an intricate role in managing ESSCs, thus their ability to accurately assess their organization for strengths and weaknesses has major implications. They largely manage parts of the organization that keeps it functional while other organization members (e.g., associate directors, program directors, student employees, volunteers) handle the day-to-day operations of student support. Directors in my cases displayed alignment between sense of self and reality via their attention to their financial infrastructure, awareness of relationships that needed mending, and decisions to adjust the organization’s branding. All these decisions and high levels of awareness were needed for their organizations to continue to exist.

Kantur and Íserí-Say (2012) also underscore the importance of a unified commitment throughout the entire organization to aid the rehabilitation of the organization following a disruption. This commitment was displayed explicitly in one case where a director discussed almost losing a peer mentoring service due to a lack of funding. These students presented a solution resulting in reduced pay in order to keep the program going. I would argue that this type of solution was due to the both the students' awareness of the issue, their desire to rectify it, and their commitment to the organization's mission. This is example demonstrates the how an organization can address disruptions when perceptual stance is present within an organization.

5.4.2 Contextual Integrity

Contextual integrity includes three sub-components—1) employee involvement, 2) compatible interaction, and 3) supportive environment—that came up in different ways across cases from directors' interactions with stakeholders within and outside of the organization.

According to prior literature, employees that are involved and feel empowered are key to adaptation and generating creative solutions during times of change (Doe, 1994; Kantur and Íserí-Say, 2012; Mallak, 1999). My dissertation aligns with these findings. Directors across cases mentioned the importance of support staff, such as program and associate directors, in the management of the case's support programs. While directors did not linger on these individuals' involvement, it was put forth as though they are trusted to handle the day-to-day operations of these programs and were thus deeply involved in the organization. In addition to having a commitment to the organization, I would argue that the students who suggested receiving a reduced pay to champion the continuation of a program, also felt buy-in to the organization via involvement. This example also aligns with literature on the importance of employee involvement and resiliency.

The next sub-component, compatible interaction, is about the quality of the communication within an organization as an influence on an organizations ability to handle a disruption (Weick, 1993). Findings from my study align with this. For example, a director discussed high tensions with students during their transition in as director because she wanted to change the interior of the organization. Unfortunately, the students did not know that this change was being undertaken to address the financial infrastructure of the organization. Ultimately, the changes were made, and funding was secured, but the director's relationship with those students was tense. While student interviews were not a part of this study, prior literature does suggest that a lack of multidirectional, culturally competent communication can have unintended consequences on students (Shehab, Murphy, Foor, 2012). My results further support this conclusion.

In Kantur and Íseri-Say's (2012) conceptualization of a supportive organizational environment, it is primarily concerned with the creation of a safe and supportive environment within the organization. Findings from my study expand on this conversation by emphasizing the need of a supportive external environment, which makes sense since these are sub-units of a larger institution. When thinking about the threat of inconsistent funding, establishing legitimacy, or maintaining a unified commitment within the organization, much of this support was gained or maintained through relationship building internally (intra-organizational social capital) and externally (inter-organizational social capital). Kantur and Íseri-Say's (2012) framework focuses on the internal or intra-organizational social capital. Inter-organizational social capital is associated with securing financial investments, catalyzing the flow of information amongst networks, and building a positive reputation (Florin et al., 2003; Galaskiewicz, Bielefeld, and Dowell, 2006; Kapucu and Demiroz, 2015; Tung, 2012).

5.4.3 Strategic Capacity

Findings from the cases in my study also show evidence of strategic capacity, which is composed of three sub-components—1) resource availability, 2) employee capability, and 3) focused strategy. Resource availability and employee capability are what one might call two-sides of the same coin, whereby resource availability is about the access that employees have to resources such as information, emotions, and finances (Mallak, 1998a), and employee capability is about the connection between resource availability and the awareness that employees have of these resources, including knowing what competences and connections that are had by others (Doe, 1994; Horne, 1997; Mallak, 1998b).

The director of one case specifically talked about her journey through emotional development that aided her ability to transition in as a successful director. Directors across cases talked about institutionalizing financial resources, developing financial reserves, and being on a continuous hunt for more financial resources to ensure availability of operational funding. Mallak (1998b) also discussed the importance of diversifying sources to essential resources, which is consistent with implications of resource dependency theory which is about the dependence of an organization on critical resources and how that dependence influences the actions of the organization (Pfeffer & Salancik, 1978). Heimovics, Herman, and Jurkiewicz (1993) further connect the centrality of executive leadership and resource dependence in nonprofit organizations, finding that effective executive leaders work “entrepreneurially” to find essential resources for their organization. Directors across cases also identified and accessed informational resources through networks such as NAMEPA and CoNECD and the legal teams at their institutions. What is less clear in this study is the awareness that other organizational members (e.g., support staff and volunteers) must be able to identify and access these resources. This aligns with prior work by Mallak (1998a) that highlights the importance of information and multiple sources of information on resilient behavior. Given the independence afforded to other organizational members this

awareness and access is presumed at the programmatic-level, but it is unclear to what extent, especially during organization-level disruptions.

Having a focused strategy during times of disruption are necessary for an organization's ability to be resilient (Conner, 1993). Conner notes that this includes having a clear vision and an organized approach to managing uncertainty. Each of the cases in this study have some combination of visible missions and objections for the organization though, they are serving dual purposes by demonstrating that they are both "open to all" while maintaining some focus on students from minoritized groups. I also compare the disposition of directors across cases to this aspect of having an organized approach to managing uncertainty. These dispositions were often discussed following an indirect or direct change in the organization. This further aligns with Kantur and Íserí-Say's (2012) focus on the importance of having a focused strategy and its influence on thinking critically during a disruption.

5.4.4 Strategic Acting

Strategic acting is the factor that enables employees to engage in appropriate organizational actions (Wilson & Jazabkowski, 2004) and is comprised of three sub-components—1) creativity, 2) flexibility, and 3) proactiveness. Directors across cases often evoked the sub-components of strategic acting in tandem with one another. For example, the founding director from one case discussed closing their ESSC's website and changing the organization's name demonstrating their ability to think on the spot, work within evolving circumstances, and be proactive. The current director of another case discussed being flexible about her prioritization of relationship building as she encountered barriers and proactively seeking out relationships with faculty to legitimize her organization and her place within it. The current director of a different case talked about her creative and proactive decision to build connections with and across engineering undergraduate affinity groups to institutionalize funding for these organizations. As demonstrated in these examples from the cases, strategic acting—or the ability to engage in creative, flexible, and proactive actions—is dependent upon the available strategic capacity (Kantur and Íserí-Say, 2012; Wilson & Jazabkowski, 2004). Together these enabling factors work with the preconditional enabling factors – perceptual stance and contextual integrity – to increase an organizations likelihood of being resilient.

5.5 The Resilience of Race-Conscious ESSCs

Lastly, I will now focus on the degree that my cases displayed characteristics of resiliency and evolvability. Kantur and Íserí-Say (2012) put forth the conceptualization of resilience offered by the Multidisciplinary Center for Earthquake Engineering Research (Tierney, 2003) suggesting that resiliency is demonstrated in the following organizational characteristics: robustness, redundancy, resourcefulness,

and rapidity. Since Tierney’s (2003) approach is from the disaster and resilience field, Table 16 captures the definition of these characteristics in the context of my cases.

Rapidity considers the capacity to meet priorities and achieve goals in a timely manner. Unfortunately, I cannot speak to this characteristic because this study did not capture the extent to which time factored into how decisions were being made.

Table 16. Definitions of resilient organization characteristics based on the Multidisciplinary Center for Earthquake Engineering Research (Tierney, 2003)

Resilient Organizational Characteristics	Definition
Robustness	the ability of the organization to withstand stresses and demands without suffering damage, degradation, or loss of programs
Redundancy	the extent to which the organizations can meet functional requirements in the event of disruption, degradation, or loss of operational function
Resourcefulness	the capacity to identify problems, establish priorities, and apply human, informational, and material resources to avoid or cope with disruption
Rapidity	the capacity to meet priorities and achieve goals in a timely manner

5.5.1. Robustness

Robustness considers the ability of the organization to withstand stresses and demands without suffering damage, degradation, or loss of programs. The robustness of my cases is an interesting characteristic to discuss because one could consider the shifting away from the solely race-conscious focus and branding of “open to all” as damage or loss to these organization’s original mission, when considering that these organizations served as safe spaces for minoritized students to come together (Gandara and Maxwell-Jolly, 1999). Additionally, on the programmatic level, directors also discussed losing programs because of funding running out, further evidence for an argument against robustness. However, when considering the reality that if these programs did not exist at all, students from minoritized groups, specifically Black students, would have little to no institutionalized engineering-specific and culturally relevant support. Additionally, when considering the legal parameters and financial burdens that influenced these shifts away from their race-specific missions, it is worth noting that leaders across cases figured out how to shift the organization to withstand these stressors. Further research is needed to conceptualize what robustness means for these unique organizations.

5.5.2. Redundancy

Redundancy considers the extent to which the organization can meet its functional goals in the event of disruption or loss of operational function. The functional goals of interest in this study would be

the cases' ability to support Black undergraduate engineering students. Founding and current directors across cases discussed the various ways that they continue to keep their organization operational to meet this very goal. The effectiveness of this goal attainment from the student perspective in the face of shifting organizational forms and functions is less clear. Additionally, the centrality of directors to the resiliency of these organizations brings redundancy into question. Across all cases in this study, it appeared as though all current directors were mostly, if not solely, responsible for the organization level functioning of the ESSCs. Revisiting the finding that threats and opportunities to the ESSCs were sometimes threats and opportunities available to the directors, an ESSC's abrupt loss of a current director could degrade the operational function of an ESSC and its' ability to meet functional goals.

5.5.3. Resourcefulness

Resourcefulness considers the capacity to identify problems, develop a plan forward, and mobilize resources to avoid or cope with disruptions. Directors, current and founding, across all three cases demonstrated their resourcefulness in the face of disruption. Founding directors utilized networks, research, and benchmarking to identify how to build each case from the ground up. Founding and current directors discussed the various ways that they identified, secured, and institutionalized financial resources for each case. One director discussed the creative that she uses these funds while recognizing the guidelines that govern how these funds can and cannot be spent.

5.6 Implications

In this section, I will discuss how race-conscious ESSCs have evolved based on the conceptualization by Kantur and Íserí-Say (2012). Then I will discuss the implications of my study for policy, practice, and research.

5.6.1 The Evolution of Race-conscious ESSCs

The evolution of the race-conscious ESSCs in my study has taken place over more than three decades and my findings demonstrate how small incremental changes over time can have major implications. Organizational evolution is an ideal outcome of organizational resilience whereby the organization that exists after a disruption is stronger and better prepared for future disruptions (Kantur and Íserí-Say, 2012). Organizational evolvability is a process that, at a minimum, starts with recovery—where an organization goes back to its pre-crisis condition. Next, the organization adapts and makes modifications to continue operational function. Ideally, the organization renews and becomes a distinct new entity from its pre-crisis condition.

One implication that was less visible in my study was the impact of this evolution on Black students. After acknowledging the absence of Black students in my findings, I revisited my participant interview transcripts. I found that all founding directors began their stories mentioning Black engineering

students within their respective universities because their organizations were initially designed to support them, sometimes in addition to Latinx and Native American students. Directors would discuss the creation of programs that were intended to support these students through peer mentoring, targeted recruitment, and tutoring programs. They also discussed the time and energy they spent learning about how best to support Black students, building relationships with these students, and at times learning from these students. As each interview progressed with founding directors, or interviews began with current directors, there was less and less focus on Black students specifically. Directors would shift to discussing programs created to support a broader demographic of students as the organization began serving a broader demographic of students and how they may continue targeted recruitment to ensure Black students were aware that these programs were available to them. For one current director, mention of Black students would sometimes accompany discussions of conflict with students that seemingly resolved once a new cohort of students was present within the organization. Two current directors also alluded to less personal relationship development with their students due in part to the sheer number of students they were servicing and due to their attention being needed to manage the overall organization. Future research is needed to more explicitly understand how this growth and evolution of race-conscious ESSCs have impacted Black students in engineering.

As I consider the trend of race-conscious ESSCs becoming less race-focused over time as they evolve, there seem to be a few pathways forward – two that are more probable and a third option that may be less likely but not impossible. For one, I imagine a pathway where all race-conscious ESSCs eventually evolve to have missions that include the support of all students who fall under the “diversity” umbrella. In this scenario, well-intentioned directors who value diversity, equity, and inclusion continue to make tradeoffs for the sake of survival without realizing how this form of resilience may be stripping away safe spaces and other unintended consequences for Black students.

Alternatively, I imagine a pathway where directors push back against pressure from university administrators, policymakers, or funding agencies to become organizations with very broad missions to increase “diversity.” I imagine these directors arguing that these changes compromise their desire to support Black students in engineering. This is more likely to result in these directors being replaced with someone who will continue to shift the organization down the less race-focused path. Critical scholars would argue, and I would agree, that the only real way to see change within oppressive systems would be to abolish the structures and rebuild, which brings me to my third pathway. However, given the national investment in STEM, I do not foresee this as the most likely outcome, although it is not impossible.

I am in favor of this third pathway. I believe there is a need to create and preserve safe spaces for Black students in engineering, especially at large PWIs where the overall campus culture can be antagonizing. My desire to rebuild is not because I do not see a need for all marginalized students to be

supported but because the current approach seems to be more about taking from Black students in order to give to others who are often White. It is possible that a desire to be resilient is preventing the birth of something that could be even more impactful for Black students in engineering. I understand that the current rationale is that tradeoffs are necessary for survival, but I do not know that full consideration has been made for where to draw the line. At what point do these organizations cross the line of being co-opted to the point of irrelevance? In all honesty, I am not sure that I have the answer, but I do hope that this study pushes directors and administrators to be critical of their decision-making moving forward.

I will now discuss the implications of this reality for policy, practice, and research.

5.6.2 Implications for Policy and Practice

Based on my findings and discussion, each case revealed a series of tradeoffs that had to be made to be a resilient race-conscious organization within white systems. I will now discuss the implications of these findings for policy and practice.

Firstly, policy-makers and university administrators must accept that higher education is not devoid of the sociopolitical context of the United States nor the regional influences where these organizations are located. Malcom, Chubin, and Jesse (2004) echo these sentiments noting that some stakeholders, “would rather act as if higher education is context-free, color-blind, and ‘race-neutral’ with academic preparation and opportunity distributed more or less equally” (p.41-42).

Secondly, findings from this study highlighted the importance of administrative support for each case. University administrators at all levels need to be fully committed to the necessary support of racially minoritized students in STEM and they need to tangibly demonstrate this commitment with material resources. Informational resources and emotional support are great additions to this support, but without sustained and institutionalized support, these intangible sources of support will fall flat.

Thirdly, with the reality of legal parameters that currently exist in 2022 and the upcoming Supreme Court cases against Affirmative Action, student support professionals need to ensure that they are familiar with legal constraints that impact the operations of their organizations. It is also recommended that trainings and resources continue to be facilitated by organizations such as the American Association for the Advancement of Science (AAAS), the National Action Council for Minorities in Engineering (NACME), and the Civil Rights Project (CRP) at Harvard University (Cavagnini, 2021; Malcom, Chubin, and Jesse, 2004; Orfield, Marin, Flores, and Garces, 2007).

Fourthly, findings from this study also suggest the importance of ESSC leaders establishing and maintaining external social capital via connections with other ESSC professionals, university administrators, and faculty. Malcom, Chubin, and Jesse (2004) echo this recommendation noting the malignant nature of opposition to race-conscious work and the need for community and capacity building.

Kapucu and Demiroz (2015) also emphasize the importance of social capital in the success of small nonprofits, which closely resemble ESSCs.

Lastly, a major finding of this study was the centrality of directors to the resilience of my cases. This finding reflects a need for leaders of ESSCs to constantly ask themselves these two questions, 1) Could somebody else in my group make this decision? and 2) Is it necessary for me to approve this form or action? (Mallak, 1998b). Constantly considering these questions forces leaders to consider the redundancy built into their organization which is an essential characteristic of a resilient organization. Ensuring redundancy in this way helps protect the organization in the event of an abrupt change in leadership.

5.6.3 Implications for Research

As previously stated, one limitation of this multiple case study was the use of three cases as opposed to the recommended 4-10 cases (Stake, 2006; Yin, 2014). Future work would benefit from exploring the development of more race-conscious ESSCs. Achieving this recommended sample range could increase the transferability of result findings. It would also be worthwhile to examine whether similar developments have occurred across more race-conscious ESSCs, particularly those that began as MEPs. On the other hand, engineering education scholars would also benefit from single case study designs. Single case approaches are useful for exploring critical cases that can be used to validate theory propositions, for exploring unusual cases such as ESSCs that continue to use “minority” in their organization name, and for exploring common cases where the goal is to capture the everyday conditions of a case (Yin, 2014).

Another limitation of this study was the limited perspectives captured by only interviewing directors of each ESSC. Future scholars should consider designing studies that include conducting interviews with students who engage with an ESSC during different phases of its transitions. For example, talking to Black students who were present for transitions between directors or the elimination of culturally specific programming vs. students who engaged with the ESSC after these changes had taken place may warrant rich findings about the impact of these changes on the students these organizations were created to serve. Additionally, talking to other stakeholders, such as undergraduate and graduate student employees, staff, or administrators, may also reveal additional critical incidents or offer different perspectives about how these events are experienced and managed by other members of the organization. These insights would further improve the quality of advice and guidance to those seeking to support Black students in engineering. It is possible that guidance is being offered without fully considering the negative impacts on the students these organizations were created to support. Although studies like Shehab (2012) exist, scholarship that is explicitly designed to understand the impact of the evolution of race-conscious ESSCs on Black students is needed.

Findings from this study illuminate a need for more research to explore the framing of race-conscious ESSCs as small nonprofit organizations. Literature about the necessity of social capital and the centrality of executives in nonprofit organizations closely resemble findings from this study. Though the centrality of directors to race-conscious ESSCs may be heavily influenced by my decision to only interview directors, it would be useful to continue to explore the nonprofit literature, how scholars conceptualize change management for these organizations, and to further this exploration of longevity for race-conscious ESSCs.

Considering the tradeoffs that race-conscious ESSCs make for the sake of resiliency within systems founded in white-supremacy, research that explicitly combines critical race theory and organizational theory is needed to fully understand the impact of these decisions on Black engineering students. Although race-conscious ESSCs exist to support students through the higher education system that currently exists, findings from this research can help policy-makers and practitioners provide evidence for the utility of these organizations for racially minoritized students during the constant fight against opposition. “The need for research and evidence that makes the case for change is compounded when the political leadership of the region, state or nation does not support it.” (Malcom, Chubin, and Jesse, 2004, p. 41). Furthering research on the theory of racialized organizations will also help build arguments against a context-free or color-blind higher education system and the unproductive institutionalization of race-neutrality (Ray, 2019).

Future work should also explore the inner-workings of leadership transitions within race-conscious ESSCs at both the organization and student level. In this study, directors discussed the importance of relationship building within and outside of the organization. One director discussed having negative interactions with students due to changes she wanted to make to the physical space. Prior research has noted how these types of changes can negatively impact the students these organizations serve (Shehab, Murphy, and Foor, 2012). Literature on organizational resilience also points to the importance of employee involvement and empowerment for organizational resilience. I wonder, how important this aspect really is for organizations such as race-conscious ESSCs where student turn-over is relatively high and a goal of the organization (i.e., student graduation).

5.7 Conclusion

In conclusion, the purpose of this study was to understand how race-conscious ESSCs have developed over time in different institutional contexts. I conducted a multiple case study, where each case was a race-conscious ESSC, with embedded units of analysis, critical incidents. In this study, critical incidents refer to the observable events that ESSC leaders identified as significant to their organizations’

operations. Semi-structured interviews with current and founding directors were analyzed alongside relevant artifacts to understand the developments that have taken place across cases.

The findings from this study provide insight into the types of events, actions, and outcomes that inform the forms and functions of race-conscious ESSCs. I identified six types of events and four types of developments that were salient in leaders' descriptions of their ESSC's history. When considering the relationship between events and developments, events led to one of four types of developments and some event types only occurred in connection with one type of development while others were in connection with two or more types of developments.

An important contribution of this study is the importance of director centrality to the resilience of these types of organizations and the utility of nonprofit organizational theory literature for making sense of this reality for race-conscious ESSCs.

Additionally, this study contributes to the use of an organizational resilience to understand the longevity of organizations created to support the degree attainment of Black, Latinx, and Native American undergraduate engineering students. Kantur and Íserí-Say's Integrated Framework of Organizational Resilience served as a tool for identifying the factors that enable organizations to be resilient amid disruption.

Lastly, I have furthered our understanding of the tradeoffs that have been made by race-conscious ESSCs in the name of resiliency and the unintended consequences of these actions. Leaders of race-conscious organizations can use this information to better understand the effects of their managerial actions on the students they aim to support. This study offers implications for policy makers who are ultimately responsible for the guidelines that leaders of race-conscious ESSCs must abide by. This study also offers implications for researchers to further understand this sub-unit of higher education institutions that is likely to endure another national disruption via the ongoing Supreme Court rulings regarding Affirmative Action, discrimination, and admissions.

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Appendix A

Interview protocol

Interview Preamble

At the beginning of the session the interviewer will:

- Introduce myself to the participant, thank them for taking the time to participate, review the purpose of the interview
- “The purpose of this interview is to understand the history of race-conscious engineering student support centers. The information in this study will be used to formally document the evolution of these student support centers, such as [ESSC] and inform the decision-making of future race-conscious engineering student support center leaders.”
- Review [information sheet](#). Ask the participant if they have any questions about the information sheet.
- Ask the participant if they have any additional questions before we begin.
- Ask the participant for permission to start the audio recording.

Interview Questions

BACKGROUND:

Can you tell me a little bit about yourself and your current/former role in [ESSC]?

TARGET POPULATION:

Can you tell me about [ESSC], who it aims to serve, and how?

CRITICAL INCIDENTS:

Activity: Develop a timeline

“I will now share a link with you that is the outline of a timeline that I would like to build with you about your ESSC’s history. I would like for us to fill it with important events that have had lasting effects on your ESSC.”

“Can you tell me about critical events that have had either positive or negative impacts on your ESSC?”

How did you respond to these events, and why?

Follow-up questions based on my literature review:

During your time as a director, has ____ impacted [ESSC]? If so, how?

Lack of faculty support

Funding

Myth of meritocracy

“Diversity” as a buzzword

Fight for legitimacy

Attacks on affirmative action

How did you respond to these events, and why?

Are there any additional events that have impacted your organization?

How did you respond to these events, and why?

ADDITIONAL INFORMATION:

Is there anything else you want to discuss that we haven't already covered?

Are there any artifacts (e.g. pictures, documents, articles, blogs) you would recommend I review? If they are not public, would you mind sharing a copy?

CONCLUSION

Any questions for me?

Thank you again for taking the time to speak with me today.