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**College Transition:  
Voices of First-Generation Minority STEM Students**

A DISSERTATION

Submitted to the Faculty of  
Montclair State University in partial fulfillment  
of the requirements  
for the degree of Doctor of Philosophy

by

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Montclair State University

Upper Montclair, NJ

May 2021

Dissertation Chair: Dr. Muninder K. Ahluwalia

MONTCLAIR STATE UNIVERSITY

THE GRADUATE SCHOOL

DISSERTATION APPROVAL

We hereby approve the Dissertation

COLLEGE TRANSITION:

VOICES OF FIRST-GENERATION MINORITY STEM STUDENTS

of

Grazia Gangitano

Candidate for the Degree:

Doctor of Philosophy

Graduate Program: Counselor Education

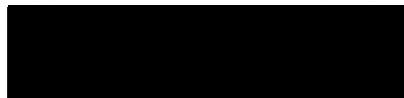
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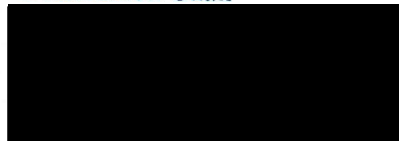


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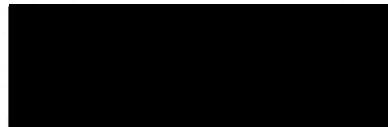
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**ABSTRACT**

College Transition:

Voices of First-Generation Minority STEM Students

By Grazia Gangitano

The Science, Technology, Engineering, and Mathematics (STEM) college transition experience for first-generation minority students can be arduous. Despite advancements with inclusivity in higher education institutions in the U.S., first-generation college students of color from low-income households (FGML) find their first-year college transition difficult to navigate. Higher education institutions were created and still are in some ways encapsulated in white, Christian, male ideals (Alenuma-Nimoh, 2016). Therefore, when FGML start their college transition they can feel out of place and can struggle with the academic adjustment in their pursuit of a STEM degree (Bowman & Sharon, 2016; Dika & D'Amico, 2016; Goonewardene, Offutt, Whitling, & Woodhouse, 2016). The goal of this dissertation study was to understand the STEM college transition for FGML. Participants identifying as FGML were recruited to discuss their STEM college experience. Grounded in Critical Race Theory (Crenshaw, Gotanda, Peller, & Thomas, 1995; Haskins & Singh, 2015), this phenomenological, qualitative study included an in-depth, semi-structured interview. A cross section of 10 participants with varying genders, racial compositions, and ethnicities engaged in this study. Findings suggest that the construct of the STEM college transition is not confined to FGML, however FGML have a unique STEM college transition experience. Participants identified being FGML resulted in a distinct understanding of how STEM college culture with its systemic barriers affected their academic success.

Implications for counselor education, higher education and future research were provided.

*Keywords:* first-generation students, minority students, STEM, higher education

## ACKNOWLEDGMENT

I am not always the best with words but I will try to convey my appreciation to my partner, family, friends, peers, colleagues, and mentors y in this short acknowledgement.

My parents: you are the primary reason I am writing this section today. You are amazing and have instilled all your best in me. Thank you for loving me unconditionally, pushing me to persevere no matter what. My partner and best friend: this herculean task would have been impossible without your unwavering love and support. Thank you for literally making me the best version of myself. My sister, who helped to edit every chapter and go back and forth with me on writing those most clear and concise sentences possible.

Dr. Muninder Kaur Ahluwalia, my dissertation chair and mentor. You have been with me from the start. You somehow knew that I would be here, even when I did not. Thank you for all the calls, text messages, office visits, meetings (in-person and via phone and video conference), feedback and edits, and interventions. I promise, I will pay it forward. Dr. W. Matthew Shurts: thank you for always playing devil's advocate and pushing my thought process further every time we met. You always made time for me, even when you were not yet on my committee. Dr. Leslie Kooyman: thank you for always listening to me and taking my calls even when you were on vacation in the summer, and helping me to see the broader picture of things in my study and in life.

To my doctoral student family: from the doctoral lounges to cafes to every conference we attended together, to all the video writing conference sessions, thank you for all the laughs and love. Perhaps most important, thank you for always pushing me to write and do work. I could not have gotten through this journey with you each and every one of you. All my love to you: future Drs. Sherlene Ayala, Maria Marte, Raman Mohabir, Saluime Walo, Joey Feola, Triana

Martinez, and Stephanie DiVincenzo and Dr. Nicole Christian, Dr. Candice Crawford, and Dr. Tyce Nadrich, you all led the way for me and empowered me.

Finally, to all my friends that knew me before my doctoral pursuits: thank you for keeping me grounded and not getting upset when I had to sacrifice traveling to finish this journey. Dr. Sarah Vandermark, what can I say, you put me on this journey with your modeling, guidance and dedication. I owe this all to you. My wonderful OAA staff, you all rock and you helped me accomplish this with your support and help in recruiting for my study, I will be eternally grateful! You all remind me of who I am and where I came from. To anyone I did not mention, know that I appreciate you.

**DEDICATION**

This dissertation is dedicated to all first-generation college students and to my loving parents who came to this country hoping to build a new prosperous life and raise a family. Through their perseverance in life, they modeled for me what it took to achieve your goals and dreams, and so I dedicate this and my life, to you both, Mommy and Pops.



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College Transition: Voices from First-Generation STEM Minority Students

**Chapter 1: Introduction**

Seventy-seven percent of first-year college students in the United States (U.S.) are first-generation students of color (NCES, 2012). Although first-generation college students of color are increasing in numbers within U.S. institutions of higher education, they are not graduating at rates similar to their continuing-generation counterparts (Pell, 2011). Eleven percent of first-generation college students from low-income households will graduate from a four-year university (Pell, 2011). If the number of first-generation students is growing within U.S. universities and they are not graduating, it can have debilitating effects on the U.S. economy and workforce (Markowitz, 2017). Universities must learn from first-generation college students of color from low-income households how they are experiencing academia and then take what they learn and create change within institutions that would assist in graduating more first-generation students of color. Inclusive and equitable opportunities for first generation college students of color from low-income households will allow students to be academically, personally, and professionally successful. It is essential that colleges as rigorous as those focused in Science, Technology, Engineering, and Mathematics (STEM) studies provide an inclusive environment that affords first-generation students of color opportunities to succeed academically. In the past decade the U.S. has shown a need for an increase in diverse professionals in STEM fields (NCES, 2016). First-generation students of color from low-income households can become financially sound by becoming involved in a STEM profession, and so increasing numbers of first-generation students of color from low-income households who choose STEM majors.

First-generation students of color from low-income households who attend STEM universities graduate at lower rates than their continuing-generation, White, middle-class peers (Allen, Muragishi, Smith & Thoman, 2015). According to the Pell Grant Report (2011), only

eleven percent of first-generation college students from low-income households will graduate within a six-year period. First-generation students of color from low-income households are growing exponentially within STEM university enrollment (Goonewardene, Offutt, Whitling, & Woodhouse, 2016). Although the number of first-generation students of color is growing within STEM universities, research indicates White students' graduation rates are rising, while students of color, specifically Black students, have plateaued in the past decade (Camera, 2016). Currently, only about thirty-one percent of students of color graduate within a six-year period at four-year public institutions, where the national average of all students is about 60% (Camera, 2016). The graduation and retention rates of some FGML may see a decline with the global pandemic of COVID-19, as many had to adjust abruptly to online learning, while being quarantined in their homes (Chapman, 2020; Hall, 2020). Therefore, as a nation, we need to learn more about our first-generation students of color from low-income households who attend STEM universities, then assess current practices within institutions, and finally have universities make the appropriate changes that will allow first-generation students to grow academically and graduate.

In this chapter, I will briefly review the literature related to the experiences of first-generation college students of color from low-income households. Throughout the study, I will use the acronym FGML (First-generation minority students from low-income households) to refer to the population of study. In this chapter, I will outline the statement of the problem, research question, the significance of the study, theoretical backings, and definition of the terms within the study.

### **Statement of the Problem**

Many FGML will encounter obstacles to their academic success at a STEM university. Universities in the U.S., like many other social systems, were not originally created for FGML

but for the majority population. Therefore, universities must review their foundations, culture, policies, and procedures as well as the needs of FGML to assess what the population needs in order to graduate with a STEM degree. Gayles and Ampaw (2014) found that the structure and environment set by an institution and those that work within it can have a positive or negative effect on minority students' transition to college and their graduation rates. Graduating more FGML students in STEM degree programs will allow for an increase in our minorities in STEM fields in the U.S.

Taking it back to when FGML receive their acceptance letter into college, we will see them experience a range of emotions (Van der Zanden, Denessen, Cillessen, & Meijer, 2019). They may feel pride and joy because they will be the first in their families to go to college (Van der Zanden, et al., 2019). They may experience excitement as they realize they are entering a new phase of their life that can ultimately lead them to a professional position and a better financial standing (Christe, 2013). Along with the positive emotions and strengths that first-generation students of color from low-income households may hold, they also have feelings of anxiety and fear (Christe, 2013; Van der Zanden, 2019). They are entering a world very different than their families have ever been exposed to (Stephens, Fryberg, Markus, Johnson, & Covarrubias, 2012). Anxiety may increase as they transition into a new environment that challenges them personally and academically, with no roadmap to help navigate unknown hurdles they will encounter. Some of the anxiety and fear can be brought upon by the challenges first-generation students of color face as a racial minority trying to thrive within a white social system with limited social capital. Challenges for FGML may relate to their intersecting identities, including race and social class. Intersecting 'isms' of racism and classism could be one reason why FGML are four times more likely to leave college without a degree than their

peers (Engle & Tinto, 2008). The dropout rate of FGML increases within STEM focused universities (Christe, 2013).

The transition to college is difficult for any first-year college student, but for FGML, it can be magnified by racial and financial barriers. One such barrier is to work in order to either assist the family financially and/or pay for college tuition and books (Christe, 2013). About seventy-five percent of first-generation college students anticipated needing to work while in college, including work during their transition to college (College Board, 2012). Having to work while trying to obtain a college degree can cause conflicts with time and the ability to study and complete assignments, in turn affecting students' academic success (Christe, 2013).

Along with some of the above barriers mentioned, FGML from this past academic year 2019-2020, not only had to transition as first time freshmen to a new college environment in the fall term, but then they had to quickly adapt to online learning in the spring term due to the Global Pandemic (Hall, 2020). In March 2020, the Global Pandemic called for everyone to be quarantined in their homes in order to stop the spread of an unknown virus, COVID-19 (Carlton, 2002; Frankfurt, 2020; Hall, 2020). Being quarantined meant that universities had to quickly move all in-person classes to online classes and be able to share and meet with students through email, phone, and video-conferencing systems (Young, 2020). However, some FGML students relied on the computing facilities at the institution itself in order to complete many assignments. Therefore, being quarantined at home made it difficult for some FGML to get online, which set them back academically, as they were not able to hand in assignments in time or attend all virtual classes (Chapman, 2020).

Along with the stress and anxiety of the global pandemic, the nation's continued state of socio-political unrest escalated by continued racially motivated violence, has led to increased

angst in FGML and their families (Flaherty, 2020). Some FGML want to know what their higher education institutions are doing about the racism in their own universities and more specifically what actual systemic changes will occur to combat racial injustices that have been displayed throughout the past century but also in the present cases seen in police violence against Black Americans, such as George Floyd (Anderson, 2020). Although many college presidents sent statements to their college communities responding to the racial injustices seen across the nation, FGML are now looking to see action steps taken by institutions to create systemic change in higher education (McKenzie, 2020).

Therefore, with multiple barriers based on the current socio-political structure, their intersecting identities and the transition to a new college environment that was not necessarily created for their particular needs to reach academic success, FGML transitioning for the first time to a STEM university are put at a disadvantage. The literature shares the barriers that these students encounter and has assessed what parts of the university aid or hurt the academic success of FGML. However, there is a gap in the literature on learning from FGML themselves how they experience the college transition to a STEM program and university, especially during a Global Pandemic. Continued discussion on the constraints to academic success during the college transition process for FGML will occur within Chapter 2. Due to the challenges faced by FGML and low graduation rates of this growing population, an in-depth look into the experiences of FGML is essential.

### **Research Question**

In this dissertation, the following research question will guide my study: How do first-generation students of color from low-income households, who do not qualify for state or federally funded programming, experience the college transition within a STEM university?



### **Significance of the Study**

STEM universities tend to be uniquely focused on the academic success of their students, without considering all influencers within the college environment both in and out of the classroom (Goonewardene et al., 2016). They sometimes fail to recognize how intersecting factors, such as classism and racism, influence the academic success of students and specifically for FGML (Van der Zanden et al., 2019). In order to assist STEM universities with understanding the experiences and needs of FGML, an in-depth study on the experiences of FGML during the college transition process is essential. Therefore, in this dissertation study, I will seek to understand how FGML experiences the transition to a STEM university. The hope is that the information gained can be used to not only review current STEM university culture and process but to also have future transformation occur that can lead to a rise in graduation rates of FGML.

A positive college transition can assist students in beginning their college career on an upward trajectory towards degree completion (Christe, 2013; Tinto, 1975). However, a negative experience with the college transition could lead first-generation students of color from low-income households to drop-out, leaving them, at times, in debt and without a college degree (Christe, 2013). In order to explore the factors that affect students' experience with the college transition, I will engage in a qualitative study of FGML who are not part of state or federally funded programs, such as the Educational Opportunity Program (EOP). New Jersey state funded programs such as the Educational Opportunity Fund Program (EOF) and federally funded programs such as TRIO (Trio is comprised of the Student Support Services Program, Upward Bound, and Ronald E. McNair program) are used to assist with remediation and to support the academic success of students from low-income households. TRIO programs were created to assist with closing the achievement gap (Byrd & MacDonald, 2005). Also, in New Jersey, EOF

programs across the state design 6 week summer bridge programs to supply intensive short-term academic tools intended to assist students with long-term academic success (Bir & Myrick, 2015). Through my experience in higher education, bridge programs depend on both state funding and the support of the institution hosting the program. In some instances the students are able to receive both remedial and college credits, that will not cost the student any money. This dissertation study can ultimately lead to information that could assist FGML who may have not been selected for any state or federally funded programs on their campuses.

### **Theoretical Lens**

The theoretical frame for this dissertation study utilizes critical race theory and critical multiculturalism which will assist in understanding how issues of power, privilege and oppression shape individuals' and communities' experiences. Both critical race theory and critical multiculturalism are utilized within the study due to the fact that because FGML experience oppression within U.S. university systems and both theories assist in unveiling the truths about racism and classism and the need for action. Critical race theory and critical multiculturalism are briefly discussed here, with greater discussion in Chapter 2.

### **Critical Race Theory**

Critical Race Theory (CRT) is aimed at examining the existence of discrimination within social and political structures and its impact on oppressed groups of people based on their intersecting identities (Rocco, Bernier, & Bowman, 2014). The university is a social and political structure that can be oppressive to FGML. Tenets of CRT include permanence of racism, experiential knowledge, interest, intersectionality, whiteness as property, critique of liberalism, and commitment to social justice (Critical Race Theory, 2015). CRT scholars argue that traditions and social practices must be regularly assessed and open to the need for changes to be made for the betterment of society as a whole, including the right for underrepresented groups of

people to have the same access (Rocco et al., 2014). It is my hope that through this dissertation study, I will unveil the social practices within STEM universities that may need to be changed in order to assist in the academic success of FGML.

### **Critical Multiculturalism**

Critical multiculturalism began during the Civil Rights Movement and Women's Rights Movement with the fight to stop oppressive practices within educational institutions (Alenuma-Nimoh, 2016). During the 1980s, James Bank spoke on the need for all aspects of the educational systems within our nation to be reviewed and put through transformation in order to reach educational equity, essentially pushing for social change (Alenuma-Nimoh, 2016). In order to reach transformation within educational systems, system administrators must begin to listen to underrepresented students and raise questions on the way the educational system operates. University officials can begin raising questions when they acknowledge their own privilege and power within the U.S.'s educational system (Alenuma-Nimoh, 2016; Tatum, 1997). Once universities officials understand their own privilege and power, they will be able to realize the importance of giving less privileged students space to share their opinions on the university system and its operations (Alenuma-Nimoh, 2016; Tatum, 1997). However, once students feel comfortable enough to share their needs within the system, critical multiculturalism states that university administration must act to meet those needs or risk losing valuable students (Alenuma-Nimoh, 2016). Critical multiculturalism will allow for the notion of transformation as we gain knowledge on the experiences of FGML during the college transition process at a STEM university.

### **First Generation Students of Color from Low-Income Households**

There is a lack of research on first-generation STEM students of color from low-income households (Balemian & Feng, 2013). Therefore, I will review the literature as it pertains to

each identity and context relevant to this dissertation study, including first-generation college students, students from low-income households, students of color, and STEM culture. My goal is to integrate these areas to better understand the college transition for first-generation students of color from low-income households.

### **First-generation College Students**

First-generation college students face unique challenges and needs when compared to continuing-generation college students (Maietta, 2016). Many first-generation students are unaware of their options, the resources available to them, and may have misconceptions about the college process (Tate, et al., 2015a). First-generation college students who are often from underrepresented backgrounds may lack confidence in their ability to succeed, and face racial and classist barriers at a systemic level (Tate, et al., 2015b). Also, the family unit is exceptionally important to most first-generation college students regardless of race (Tate et al., 2015b). Families of first-generation students may require additional detailed explanations of the college transition process due to their lack of social and cultural capital (Tate et al., 2015b). Although a vast majority of research demonstrates the unique challenges of first-generation college students, there are also many strengths this population brings to the college transition process (Tate et al., 2015a), including resiliency and determination in making themselves and their families proud of their achievements (Maietta, 2016).

### **College Students of Color**

Racial tensions still continue on college campuses today and some students of color continually fight to bring awareness to racial issues on their campuses (Johnston-Guerrero, 2017). Race has historically been and currently is a point of contention across the nation, and college students of color are constantly faced with varying forms of racism and oppression (Denson, 2009). Since 77% of first-generation students are students of color, it is important to

understand their college transition process because the U.S. would like to see a diversified workforce in the STEM fields and in order for this to occur universities need to understand the needs and roadblocks for FGML and in turn use that information to assist in their academic success (NCES, *The Condition of Education*, 2012).

### **Students from Low-Income Households**

Students from low-income households who are college bound are less versed in college entrance requirements, financial aid regulations, college preparatory curriculum, and are unable to afford to pay the full college tuition (Cox, 2016). As a result, students from low-income households may need assistance in achieving academic success in the midst of facing classism and other barriers placed ahead of them (ASHE, 2015). Many students from low-income households come from communities and regions that do not receive strong enough funding for their primary and secondary public schools (Tate et al, 2015a). When public schools are not equitably funded, the education the students receive is compromised. Therefore, some of the students from low-income households, upon entering college, experience academic struggles in their courses due to inadequate preparation in their secondary schools.

### **STEM Culture**

STEM education is a growing area of focus for the U.S. government, as they emphasize the importance of increasing the number of professionals in the STEM fields (NCES, 2016). Since, the government has highlighted the high demand for STEM professionals, many first-generation students of color from low-income households see STEM majors as a way to move forward to a financially viable future. However, public school districts often fail to provide an adequate science and math curriculum that would aid first-generation college students of color from low-income households in their quest for academic success at the postsecondary level (Riggs, Callahan, & Bray, 2018). Due to the academic rigors and systemic barriers, such as

financial and academic barriers, associated with STEM majors and fields, some first-generation college students of color from low-income households can falter academically during their first year in college (Tomasko et al., 2016).

### **State and Federally Funded Programming**

Colleges require placement testing in order to determine the level of remediation or advancement that a student may need. First-generation college students of color from low-income households are generally underprepared academically and require remediation (Van der Zanden, Denessen, Cillessen, & Meijer, 2019). New Jersey State funded programs such as the Educational Opportunity Fund (EOF), the Educational Opportunity Program (EOP), and federally funded programs, such as TRIO, are used to assist with remediation and support the academic success of some first-generation students of color from low-income households. TRIO programs were created to assist with closing the achievement gap (Byrd & MacDonald, 2005). EOF programs across the state of New Jersey, design six-week summer bridge programs to supply intensive short-term academic tools intended to assist students with long-term academic success (Bir & Myrick, 2015). However, these programs can only assist a small number of first-generation students of color from low-income households. In clarification, in this study, we will only be looking at those who do not qualify for programming created by the institution with financial backing from the state or federal government. Some of the participants in this study may have loans and grants awarded, but for purposes of this study, participants must not be a part of any state or federally funded programming. Therefore, how are other first-generation students obtaining guidance and resources to be successful on campus?

### **Chapter Summary**

FGML in STEM majors are amongst the underserved by universities and they are graduating at much lower rates than continuing-generation students (Markowitz, 2017). This

chapter revealed the overall focus of the study, specifically outlining the importance of the study and the desire to learn about the experiences of FGML during the college transition process.

Furthering knowledge on the experience of the college transition process for FGML in STEM majors will allow for universities to perhaps take action to improve the services and culture they provide FGML.

### **Organization of Dissertation**

This dissertation study will comprise five chapters. The second chapter will include a greater discussion of the theoretical lens and an in-depth literature review on all components of the research question. I will discuss research on first-generation college students, students of color, students from low-income households and the intersection of all three. I will review the culture within STEM institutions as well as further information on state and federally funded programming for students in financial need. In chapter 3, I will outline the methodology for the proposed study, detailing data collection, data analysis, and trustworthiness within the study. Chapter 4 will include the results of the study. The dissertation will conclude with Chapter 5, where I will discuss the findings of the study and any future implications.

### **Definition of Terms**

In this dissertation, it is imperative for me to define how I will use terms that sometimes have varying definitions. These terms include first-generation college students, continuing-generation college students, low-income households, college students of color, STEM universities, state and federally funded programs, and college transition.

#### **First-Generation College Students**

First-generation college students are students whose immediate family members have not attended a four-year institution and therefore, have not obtained a college degree (Petty, 2014).

First-generation college students can be defined in different ways. Two common definitions

include 1) students whose parents' attended college in the U.S. but did not graduate or 2) students whose parents' never went past a high school education within the US (Ward, Siegel, & Davenport, 2012). For the purpose of this dissertation study, I define first-generation students as those whose immediate family members have not attended a four-year institution and have not obtained a college degree (Petty, 2014). The reason for choosing Petty's (2014) definition is because of the study's focus on first-generation students of color who will be transitioning into college as a world unknown to them and their families.

### **Continuing-Generation College Students**

Continuing-generation college students are students whose immediate family members attended a four-year institution (Allan, Garriot, & Keene, 2016).

### **College Students of Color**

College students of color are those students who are racial and ethnic minorities. For the purposes of this study, I include all racial and ethnic minority groups, not just those who are underrepresented in academia (i.e., Latino, Blacks, and Native Americans). For example, in this study, I will include students who identify as Asian/Asian-American.

### **Low-Income Households**

Low-income households are defined as families/households who earn less than twice the federal poverty line; which for a family of four with two children would be \$45,622 (Population Reference Bureau, 2013).

### **STEM Universities**

STEM universities are higher education institutions in the U.S. that focus on science, technology, engineering, and mathematics (Allan, Garriot, & Keene, 2016).



**State and Federally Funded Programs**

State and federally funded programs are created by the state or U.S. federal government in order to assist a specific population of students with college retention and degree completion. An example would be the Educational Opportunity Program (EOP) in New York, New Jersey, and California, which was created for students from underserved neighborhoods, low-income households, and with varying degrees of academic excellence (National Conference of State Legislatures, 2016). Students do not have to be from racial or ethnic minority groups to be a part of these programs. For the purpose of this study, loans are not inclusive in the definition of state and federally funded programming.

**College Transition**

The college transition process will be defined as the change and/or movement from high school to college. This movement includes the ways in which students' social and academic lives go through quick changes and the impact of these changes throughout their first year, such as residing on campus and being away from friends, parents, and/or guardians for the first time (Engle & Tinto, 2008). For commuter students, the change can occur with the way they must travel to college, they may need to use public transportation for the first time or buy a car (Engle & Tinto, 2008). These are just some examples of the changes that happen when students leave high schools to attend colleges that can be geographically located in another portion of the state, in a neighboring state, or a state across the country.

## **Chapter 2: Literature Review**

In Chapter 1, I discussed the growing population of first-generation racial and ethnic minority students from low-income households (FGML) within Science, Technology, Engineering, and Mathematics (STEM) higher education and the need to learn how FGML experience the college transition into a STEM institution. I also emphasized that FGML have lower graduation rates than continuing-generation students and that this study is taking place during a Global Pandemic and during a time of civil unrest with increased violence against Black Americans. In this chapter, I outline the theoretical framework for this dissertation study, an integration of Critical Race Theory and the Critical Multicultural Model. Due to the limited literature on the specific experiences of FGML who attend a STEM institution and their transition to college, this chapter will review areas of literature related to FGML including (1) the college transition process for students; (2) the institutional factors affecting the college transition for students of color; and (3) students' intersectionality and personal factors affecting their transition.

### **Theoretical Framework**

The theoretical framework for this study lies at the intersection of Critical Race Theory (CRT) and the Critical Multiculturalism Model (CMM). This theory and model describe the oppression that FGML may experience in transitioning into higher education (Banks, 2002; Crenshaw, 2017).

#### **Critical Race Theory**

CRT is a theoretical framework within the social sciences that examines society as it relates to race and power (Crenshaw, 2017). Thus, CRT examines much more than racism at the individual level; rather, it views racism at systemic levels (Bonilla-Silva, 2015). CRT emerged from a multicultural review of the judiciary system within the U.S. by Derrick Albert Bell Jr.,

and it was later expanded into other social systems within the U.S., including higher education (Rocco, Bernier, & Bowman, 2014). CRT comprises several tenets (Rocco, Bernier, & Bowman, 2014). In this dissertation study, I focus on the tenets as they relate to higher education.

**CRT tenets.** There are six CRT tenets that pertain to higher education and to the current study in particular. These tenets are a) intersectionality b) permanence of racism, c) whiteness as property, d) critique of liberalism, e) commitment to social justice, and f) experiential knowledge (ASHE, 2015).

In 1989, Kimberlè Crenshaw, who studied CRT as applied to higher education, outlined the *intersectionality* tenet of CRT. Intersectionality reflects the interconnected nature of race, gender, and other marginalized identities that can create overlapping areas of discrimination (Crenshaw, 2017). FGML experiences are shaped by their multiple marginalized identities and can experience discrimination differently based on their combination of identities (Gillborn, 2015). For example, a female first-generation student of color may experience racism differently than a male first-generation student of color. Higher education personnel need to be aware of the intersectionality of identities and the challenges these intersections can have on FGML while in college. Not only can racism affect a student's mental and emotional health, but it can also affect their academic success (Crenshaw, 2017; Gillborn, 2015).

The *permanence of racism* tenet explains how racism can appear in all facets of a person of color's life, from the systems they are a part of in the U.S to their own psyche (Haskins & Singh, 2015). More specifically, I will be focusing on the higher education system and how the permanence of racism tenet addresses how well-intentioned administrators may put policies in place that seem to promote diversity but ultimately perpetuate racism and create unease in the

psyche of underrepresented students (Hiraldo, 2010). For example, an institution might want staff to run Black History Month events to celebrate diversity, but when asked for funding to run the event, they may be given a minimal budget compared to other events. Therefore, although the institution might want to demonstrate that it is invested in diversity and equity for all races by hiring staff of diverse backgrounds and having different multicultural events, resources are not always allocated equitably. Students can see when this happens, and in turn, may internalize that as a lack of effort by the university to fully implement events that celebrate their cultural and/or ethnic identity (Haskins & Singh, 2015; Hiraldo, 2010). When students feel the university does not adequately acknowledge them and their minority cultures it can lower the mental health of students, as well as negatively affect their academic progress and may increase their desire to drop-out (House, Neal, & Kolb, 2019; Stebleton, Soria, & Huesman, 2014). Students may then feel unwelcome and less connected to the institution (Haskins & Singh, 2015). Therefore, the tenet of permanence of racism is relevant to research on minority students and higher education.

The higher education system makes it evident that white individuals hold authority over how a university operates, and one way the system does this is by hiring white individuals in leadership positions. The hiring of white individuals in leadership positions describe the tenet of *whiteness as property*, which elucidates how white individuals who are historically in positions of power take ownership and authority of all things within a given social system, such as higher education in the U.S. (Johnston-Guerrero, 2016). For example, in its American College Presidents study, the American Council on Education (ACE) found that less than one-fifth of college presidents in the U.S. were from a racial or ethnic minority group (ACE, 2017). White power is seen not only in the example of college presidents within the U.S., but also within the power given to the academic affairs division over the student affairs division (Rocco, Bernier, &

Bowman, 2014). Many Student Affairs divisions are predominantly occupied by people of color, whereas the Academic Affairs divisions tend to be dominated by white individuals (Harris & Patton, 2017; Patton, McEwen, Rendon, & Howard-Hamilton, 2007). The division of higher education into student and academic affairs, and its corresponding differential of power, can perpetuate a more oppressive environment for student affairs professionals and students as compared to academic affairs professionals (Harris & Patton, 2017; Jenkins, 2016). Student affairs is a compilation of offices within an institution that handle student support services, which include but are not limited to counseling and multicultural affairs (Harris & Patton, 2017; Hurtado, Milem, Clayton-Pederson, & Allen, 1998; Jenkins, 2016). Academic affairs are overseen by the Provost of an institution and encompass all academic areas of the institution, such as curriculum creation, updates, and changes (Jenkins, 2016; Patton, 2017). The way in which the division within higher education can possibly perpetuate further oppression for student affairs professionals is in the lack of requesting their perspective on matters, such as curriculum, that affect the students they work with in multiple ways, as they can see who the university values and give power too (Patton, McEwen, Rendon, & Howard-Hamilton, 2007).

Academic affairs divisions within higher education hold much power and this is also the case for STEM institutions (Patton, 2017). STEM institutions are research institutions; thus, faculty members, who in higher education organizational charts fall under academic affairs, are hired to instruct courses in subject matters in which they are experts and conduct their research. Therefore, since they are experts in their respective subject matter, they create and approve the curriculum within that subject matter program.

People of color who build careers in the student affairs division of higher education often have little power in comparison to their academic affairs colleagues, which can negatively affect

their and their students' overall wellness and professional growth (Harris & Patton, 2017; Hurtado et al., 1998; Jenkins, 2016; Patton, 2017). Many times, those working in student affairs must be available to work longer hours to accommodate both administrators and the student population's availability (Harris & Patton, 2017; Hurtado et al., 1998; Jenkins, 2016; Patton, 2017). Student affairs professionals working in multicultural or diversity offices, can at times have a minimal budget to carry out important campus-wide events (Patton, 2017). Therefore, they must work harder, and at times longer, to improvise to make events successful for students. This may leave little time for their own professional development activities or self-care (Patton, 2017). Without up-to-date professional development and enough of a budget to engage students of color, students can begin to feel unwelcome in an environment that does not acknowledge them and their culture or race (Jenkins, 2016). In contrast, the predominantly white academic affairs personnel often can work more flexible schedules and have ownership over curriculum and other major university decisions, while also being able to attend professional development opportunities; this is an example of the tenet of whiteness of property, as the tenet is described as white people taking ownership of things within a social system (Harris & Patton, 2017; Hurtado et al., 1998; Jenkins, 2016; Patton, 2017).

The tenet of *critique of liberalism* describes how color-blindness, which is the notion that one does not see or judge others based on race or the color of someone's skin, and self-proclaimed equality in the U.S. both mask racist and unfair policies that may be in place in institutions of higher education (Hiraldo, 2010). For example, the federal government will not provide financial aid to students whose parents are not legal citizens of the U.S., which prevents undocumented students who were born in the U.S. from obtaining aid (Byrd, Lunie, Marie, & Sanders, 2019). Although the example references legal citizenship, this is also a racial issue, as

the majority of undocumented students in the U.S. are students of color. Therefore, the leaders of U.S. systems portray the nation as one of freedom for all and one that does not judge others by the color of their skin, but the policies that are set forth by the same leaders have made it difficult for students of color not born in this country to succeed financially and academically (Hirald, 2010). Critiques of liberalism suggest that self-proclaimed equality in the U.S. can hide racist policies, such as those in place for undocumented individuals, who are often persons of color.

CRT scholars refer to the tenet of *commitment to social justice* as highlighting the need for traditions and social practices to be regularly assessed and open to changes for the betterment of society as a whole, including the right of underrepresented groups to have the same access to resources as their privileged counterparts (Rocco, Bernier, & Bowman, 2014). Commitment to social justice is particularly important for individuals with intersecting marginalized identities; thus, this study may shed light on systemic struggles students face in their transition to a STEM institution. Applying CRT to understand the experiences of FGML can help us uncover how higher education institutions, by historically and continuously serving privileged, traditional, continuing-generation college students, often overlook FGML and their needs within the college (Hirald, 2010; Patton et al, 2007). Therefore, in order to support FGML, higher education institutions need to make that commitment to social justice, by learning more about the needs of FGML and investing in revised institutional policies and procedures that meet FGML needs.

The CRT tenet of *experiential knowledge* states that oppressed people, such as FGML, have a unique perception and way of functioning within an institution (Delgado & Stefancic, 2001). CRT researchers have argued that higher education institutions need to make a paradigm shift from analyzing solely the academic progress of individual students to viewing these students from political, racial, and environmental standpoints to increase nation-wide graduation

rates of FGML (Crenshaw, 2017; Hernandez, 2016). Therefore, there is a need for underrepresented groups, including FGML, to share their experiences so university personnel can gain an understanding of them. To further review the higher education system and how it affects minority students' experience, I will discuss the Critical Multiculturalism Model.

### **Critical Multiculturalism**

The Critical Multicultural Model (CMM) highlights inequities in society with the goal of a more equitable reallocation of power within society (Banks, 2002). The model describes how many professionals in the U.S. educational sector have used the term "multiculturalism" loosely to cover a wide range of curricular and programmatic ideals. An example would be when a presentation on diversity within a single, three-credit course of a 120-credit degree program can be framed as providing multicultural education in the university curriculum (May & Sleeter, 2010). Since the term "multiculturalism" has been used so often, in the research reviewed, many researchers of color reported feeling as though it no longer had the powerful effect of describing the understanding and learning of multiple cultures; rather multiculturalism felt like a *fad term* at times, used either knowingly or unknowingly to cover up persisting racist policies and procedures (May & Sleeter, 2010). Many higher education professionals do not grasp fully the true meaning of multiculturalism as an incorporation of different cultural ideals within all aspects of the higher education system (May & Sleeter, 2010).

To counteract the trend of using the term "multiculturalism" in a superficial way, researchers who felt strongly about multiculturalism within education combined ideas from anti-racist education, CRT, and critical pedagogy to form CMM (May & Sleeter, 2010). Their purpose in developing CMM was to highlight the inequities in society and redistribute them equally. CMM's ideals were developed from multicultural education research conducted by James Banks from the late 1980s to the early 2000s. Banks (2002) suggested the educational



system within the U.S. must be observed closely for racist practices, specifically by looking at how administrators work with a growing population of underrepresented students.

CMM suggests that higher education institutions need to go through a transformation that can only happen when the system, and administrators within it, genuinely listen to underrepresented students (Alenuma-Nimoh, 2016) to help uncover oppressive practices (Acuff, 2018; May & Sleeter, 2010). An example of a covert oppressive practice at the university level is having review/study sessions only during the day and thus excluding students who have other obligations during the day, such as work or taking care of family/children. When oppressive practices are brought to the forefront, administrators can begin to understand the power differentials within the education system and gain clarity on who is or is not benefitting (Acuff, 2018; May & Sleeter, 2010). Therefore, CMM highlights racism embedded within higher education (Acuff, 2018; May & Sleeter, 2010).

Both CRT and CMM provide a theoretical framework for this dissertation study, as the ideals and tenets of the theory and model can provide a lens from which to view systemic policies and procedures that can affect the college transition for FGML. The next section includes a review of the available literature on the FGML's perceptions of their college transition.

### **Review of the Literature**

The number of FGML within higher education continues to increase, yet little is known about how they experience the college transition. The purpose of this literature review is to highlight the findings on the college transition experience among FGML and their lower graduation rates compared to their continuing-generation counterparts from higher socio-economic backgrounds (Maietta, 2014).

The initial literature search for this study focused on undergraduate college students of color from low-income households attending STEM institutions and who are not a part of any federally funded program. The search did not yield many articles. Therefore, studies that focused on college students of color regardless of whether they receive federal funding (many of the articles on low-income students of color focused on those students of color who were a part of federally funded programs on campus) and college experiences of students of color were included. The studies assisted in understanding the experience of underrepresented students entering into a higher education institution. The literature review focuses on (1) college transition, (2) institutional factors that affect students of color experiences with college transition, and (3) intersectionality and personal factors of students of color that affect college transition. Since this dissertation study encompasses the experiences of college transition of FGML, I first discuss college transition.

### **College Transition**

To better understand college students and their transition, I will briefly review the literature on life transitions. Using Karen Schlossberg's Transition Theory, which emerged from her work in 1995 with Waters and Goodman, I will review the transition process people go through when facing new life events, such as entering college for the first time. Schlossberg's Transition Theory explains that people come into new events and situations with varying previous life experiences that make each person's transition experience unique. Along with having different experiences before a life change or transition, Schlossberg believed that people go through three phases within the transition process, specifically, moving in, moving through, and moving out. Moving in is the time when a person is first entering a new transition, such as starting a college. Moving through refers to the time when they are in the new setting, working through issues, such as getting accustomed to policies within the college. Moving out describes

when a person is preparing to leave one setting for another, perhaps having to look for a job after completing college. Within each of those phases, people will find coping mechanisms to deal with the transition, which Schlossberg termed as the Four S's: situation, support, self, and strategies. The Four S's can determine the resources people gain, the deficits that people experience, and their perception of the transition.

Entering college is a life transition, and some researchers used the Schlossberg Transition theory as a framework to explore this transition. Workman (2015) utilized Schlossberg's theory in his phenomenological study on the college transition experience of students who did not declare their major and career path. Through his semi-structured interviews, conducted with 12 minority undergraduate students from a mid-sized, mid-western university, he uncovered themes, which fit perfectly with Schlossberg's Four S's. Workman (2015) found that every student's experience fit with Schlossberg's Four S's: situation, support, self, and strategies, in the sense that each student was able to detail the support they needed in order to make a clear decision on their major and career path. The support most students needed was from their parents and peers. Another college transition study that employed the use of Schlossberg's transition theory was completed by Leary (2018). Leary (2018) conducted a phenomenological, post-positivist study, where she interviewed six previously-incarcerated first-generation, underrepresented, low-income students at Wheaton College in Wheaton, Illinois. She found that their transition experiences were aligned with Schlossberg's Transition theory, as they encountered situations that forced them to find support systems (both academic and social) that they needed in order to grow and set their own paths for academic success. Eight themes emerged: Participants had 1) Family-orientation, 2) A perception of time issues/restraints, 3) Job issues/restraints, 4) Financial concerns, 5) Perception of institutional support, 6) Faculty interaction, 7) Perception of lack of

follow up from institution when student was not attending, and 8) A lack of understanding of what is expected when a person attends college (unknown expectations).

Based on Schlossberg's (1995) model and the two studies reviewed, students who are in the "moving in" phase will try to make sense of their new situation. Students then will begin to look for support systems to assist them in their social, academic, and financial transition (Byrd, 2017). Many students first enter higher education institutions in need of "environments that provide academic, social, and financial support that are accessible to students [and these] are the environments in which students are more likely to be successful learners" (Tinto, 2006, p. 9). Higher education institutions need to understand the needs of the incoming student population and provide them with the tools necessary to successfully transition and graduate (Feller & DeCrane, 2016; Tolliver, Kacirek, & Miller, 2019). Most first-year students do not know pertinent information that may help them in their academic success, and they tend to not yet have the skills to advocate for themselves or to ask for help when needed (Feller & DeCrane, 2016; Tolliver et al., 2019). Therefore, it is the responsibility of higher education institutions to provide academic environments that will promote clear communication, openness, and in the end a clear path to achieving academic success and graduation.

U.S higher education institutions this spring 2020, also had the added pressure of assisting students during yet another transition, an abrupt one to online learning from home 100% of the time (Chapman, 2020). In March 2020, the Global Pandemic threw all U.S. higher education institutions into the online learning arena, with professors, both tech-savvy and not, to have to turn all their lesson plans virtual (Li & Lalani, 2020). Some institutions were able to do this successfully and others were not, and in the end students who had the most barriers ahead of them prior to the Global Pandemic, like some FGML, were the ones that did not fare well. They

were put up against an unplanned for transition and had to process the change and act in a very short amount of time, in order to be academically successful (Young, 2020). Students had to find online tutoring quickly, if they were even set up by the institutions in time for students to access them and get the help they needed prior to final exams, projects, and papers (Chapman, 2020; Li & Lalani, 2020).

Along with a Global Pandemic, civil unrest due to recurring violent crimes against Black Americans created fear and anger in many college students, including some FGML (Anderson, 2020). Racism has existed in the U.S. for centuries, but with many at home due to the Global Pandemic, all were tuned into their social media and the media was able to capture the violent crimes that have been occurring to Black Americans (Anderson, 2020). The death of George Floyd by police killing, is ever imprinted in the minds of Americans (Flaherty, 2020). The Learning Network in accordance with The New York Times interviewed teenagers and college students in the spring of 2020 and many reported feeling fear and anger that our nation had not progressed enough to value the life and liberty of all citizens. The fear in college students sprung from the heightened feeling that a violent crime can happen to them or their families (Anderson, 2020). Others did have hope that protests could help bring about change and help our nation reach equity and justice for all (The Learning Network, 2020). Therefore, FGML students in transition to college this past academic year had to not only to get adjusted to college but also to the quarantine life and online learning, while also working through all the emotions that came due to the violent racial injustices and slow movement of our nation's systems to create equity and justice. Due to all the simultaneous events, college students needed support more than ever in order to ensure a successful college transition.

Academic and social support systems have to be in place for students to create an effective academic environment (Feller & DeCrane, 2016). The staff and faculty “who shape systems and student retention over time” (p. 29) must be made aware of the necessity to assist students in transition as much as possible (Feller & DeCrane, 2016). Flynn (2013) used Tinto’s (2006) academic and social integration paradigm model to examine the effectiveness of support systems available to first-year college students. In his quantitative study, Flynn (2013) used data from the National Center for Education Statistics’ (NCES) 2004-2009 Beginning Postsecondary Students Longitudinal Study (BPS) to investigate the academic and social engagement on baccalaureate degree attainment within six years. The BPS was a thorough institutional and student self-report survey that addressed persistence and degree attainment. Over 16,000 students from varying races and ethnic backgrounds who started 4-year higher education institutions (both private and public) in 2003 were surveyed. Using various regression analyses, Flynn found that students were more likely to attain a degree if they had either academic or social engagement within the institution not only in their first year, but also throughout their academic degree program. This study with its focus on FGML and understanding their college transition within the first year may also uncover the need for academic and social engagement. Therefore, this study supports the idea that universities may have a need to review whether and how their faculty, staff, and administration are meeting the needs of FGML or at least what part they play in student engagement and ensure university officials are creating spaces where students can readily access and engage in academic, financial, and/or social supports (Tinto, 2006; Tinto, 2010). A review of institutional factors affecting the transition for students of color as they pertain to this study is presented in the following section, with a particular focus on STEM institutions.

### **Institutional Factors**

The studies reviewed herein have focused on institutional factors that may or may not help students of color transition to college. The literature review addresses the following areas that frequently emerge as key in student success: STEM institutional climate, faculty mentoring, and experiences inside and outside the classroom. Since there is a gap in the literature on the college transition of first-generation STEM students with multiple marginalized identities, studies that considered at least some of the identities represented in the FGML population were reviewed. The following studies focused particularly on influences on the college transition of first-generation students of color, including STEM university climate, faculty mentoring, and academic experiences inside and outside the classroom.

**STEM university climate.** STEM institutions have a unique culture of emphasizing the need for academic excellence above all, essentially due to their research institution status, which can simultaneously push some students towards excellence while creating a stressful environment for other students who are also trying to juggle family needs, work, a global pandemic, and have to deal with institutional oppression (Gayles & Ampaw, 2014). This can also be difficult for first-generation students who have little or no social capital (Sinanan, 2016). Social capital is a person's network of people who can assist them in thriving in a community (Sinanan, 2016). Parents, guardians, and/or siblings who have attended college are forms of social capital for their child/student, as they already have some idea of what to expect in college and can share their knowledge (Maietta, 2014; Sinanan, 2016; Tolliver et al., 2019). FGML do not have that same social capital, and it will affect the way they experience the transition to college, which includes the way they feel within the institution. Therefore, it may be beneficial to understand the literature on institutional climate to acquire the actual information on how climate can affect the way in which FGML experience the college transition.

A growing body of research has explored how institutions sometimes unintentionally drive minority students to turn away from their own cultural background and assimilate to the university culture (Gayles & Ampaw, 2014; Rendon, Jalomo, & Nora, 2000; Tierney, 2000). For example, researchers have found that institutions have a plethora of decisions that students have to make within certain deadlines; many racial and ethnic minority students are used to making decision with their families, emphasizing cultural values and ideals, while university culture promotes independent values (Gayles & Ampaw, 2014; Jury, Smeding, Stephens, Nelson, Aelenei, & Daron, 2017; Rendon, Jalomo, & Nora, 2000; Tierney, 2000). Therefore, students have to take on an abundance of college information on their own, since their families and friends do not know the inner workings of college policies, and so they try to adhere to the deadlines of the institution, even when it may be something they would usually like to take their time with and get more information on or learn more about, therefore they are then, in a way, constrained to assimilate to the institutional culture and climate (Jury et al., 2017; Rendon, Jalomo, & Nora, 2000; Tierney, 2000). Institutional climate in higher education in the U.S. has “tremendous effects on student perceptions and outcomes, especially those from culturally-diverse backgrounds” (Sinanan, 2016, p. 155). If a STEM institution has a welcoming climate and understands the needs of its students, students may feel comfortable, make connections on campus, and do well both academically and socially. However, an institutional climate that is not supportive can have negative effects on students’ perceptions of their academic abilities and academic outcomes (Sinanan, 2016; Tierney, 1999). If an institution creates a less welcoming environment for its students, students may simply go to class and straight home or try to find connections off campus, with the resulting reduced time on campus possibly leading to dropping out and/or doing poorly academically (Sinanan, 2016; Tierney, 1999). More specifically, the



institutional climate of STEM institutions affects students' interactions with faculty as well as other experiences inside and outside the classroom. If faculty members are motivated to assist students from all academic levels within their classes and take initiative to mentor students and understand or try to understand their student's experiences within the institution, students may thrive (Sinanan, 2016). However, if faculty feel as though they do not have time to assist students who may be struggling or who do not have time to take on mentees, students can become discouraged and may not be able to be successful within an institution (Sinanan, 2016).

STEM institutions, like all other higher education institutions in spring 2020, had to change their entire learning structure to be entirely online due to the global pandemic (Hall, 2020). The pandemic has revealed the strengths and weaknesses of U.S. higher education institutions (Chapman 2020 & Li & Lalani, 2020). Some institutions, like STEM institutions, were able to get their professors onboard with setting up virtual classrooms faster than other institutions, however, they lacked the ability to communicate consistently and clearly to all students on the services they had in place for them, such as being able to borrow desktops, webcams, and laptops, if needed (Chapman, 2020; Young, 2020). A break in communication can create a different climate within an institution, especially in the perceptions of the students, such as FGML (Gayles & Ampaw, 2014). Because climate matters, the following section covers the climate differences between STEM institutions and non-STEM institutions.

***Institutional differences.*** STEM institutions differ from non-STEM institutions, such as liberal arts institutions, in that STEM institutions are often research-intensive institutions (Christe, 2013). Non-STEM institutions typically have university-wide missions that state that engaging students socially will assist in the students' own personal growth, where STEM institutions have been known to inadvertently miss mentioning the importance of social growth

in their mission statements (Christe, 2013). Non-STEM institutions focus on helping students grow holistically, incorporating personal and professional growth along with academic success, and sometimes adding community service by the student as integral in their overall growth (Gayle & Ampaw, 2014). STEM institutions value research productivity of faculty members and their academic accomplishments, such as publications, as they bring more notoriety and financial gain to the institution; therefore, because the university evaluates faculty members on their research, some faculty members are more concerned about engaging in their research and obtaining grants than about teaching and mentoring (Gayle & Ampaw, 2014; National Academies Press, 2016). Although some non-STEM institutions are also research-focused institutions, they may still make it a point to review their faculty on their teaching and mentorship as well as research. In turn, faculty members of non-STEM institutions make sure to provide the best teaching they can to students, which includes staying abreast of new teaching techniques and learning styles of students (Gayle & Ampaw, 2014). Due to a heavy focus on research at STEM institutions, many first-year students, and especially those from underrepresented populations, may need to adapt to becoming self-learners in order to be successful (Gayle & Ampaw, 2014; National Academies Press, 2016).

Underrepresented student populations, especially those that are first-generation and do not have the social capital to assist them, are learning the inner workings of the social system of a university, which can be difficult for them when they also have to engage in self-learning and working through microaggressions (Gayle & Ampaw, 2014). Self-learning may be new to students who relied on teachers to provide them all their learning materials and guidance in high school (Christe, 2013; Maietta, 2014). STEM institutions have faculty members who are experts in their fields. However, there are some faculty in all STEM institutions who do not have the

formal training or skill in adapting their teaching to varying learning styles in the classroom, which can create a barrier for some students transitioning from high school (Christe, 2013; Whittaker & Montgomery, 2014). Ultimately, STEM institutions carry increased learning curves in understanding the higher education system and how it functions for all students, but especially students of color (Christe, 2013; Whittaker & Montgomery, 2014).

Many STEM institutions within the U.S. can be categorized as predominantly white institutions (PWIs) (Tomasko et al., 2016). As such, these institutions can be fraught with racism, which can in turn negatively affect the mental state and academic success of their underrepresented student populations (Sinanan, 2016; Tierney, 1999; Tomasko et al., 2016). PWIs have policies and procedures that may benefit the majority population rather than meeting the needs of their underrepresented student populations. Underrepresented students have shared that they look to their professors for guidance in the world of academia and so the coming section will review how faculty mentoring can play a role in the mental state and academic success of underrepresented student populations, specifically in PWIs (Tomasko et al., 2016).

***Faculty mentoring.*** Most of the literature on college students of color transitioning to PWIs emphasizes the need for a high volume of faculty interaction, specifically between faculty mentors and college students of color (Johnston-Guerrero, 2016; Sinanan, 2016). College students of color who have a faculty mentor are more likely to be successful in their transition and degree attainment (McCoy, Winkle-Wagner, & Luedke, 2015). Although faculty mentorship can help students of color transition to college, it can also be a negative experience if done poorly (McCoy, Winkle-Wagner, & Luedke, 2015). For example, negative experiences can occur if the mentor cannot understand the experience of the student, such as when white faculty

are mentoring students of color and they do not understand and/or acknowledge the racism that these students face while in college (Johnston-Guerrero, 2016; Sinanan, 2016).

The presence of positive faculty role models can enhance the college transition experience (Johnston-Guerrero, 2016; McCoy, Winkle-Wagner, & Luedke, 2015; Sinanan, 2016). Sinanan (2016) referenced numerous studies on faculty mentorship and the importance of mentoring African American college students at PWIs. She discussed how African American faculty mentors serve as the key role models for African American students and elaborated on how African American faculty mentorship of new African American college students within PWIs has been found to assist students in navigating their new academic community (Sinanan, 2016). Also, she described that having mentors who are of similar backgrounds and races can help increase students' academic self-efficacy and help them succeed within PWIs. Faculty mentoring also can contribute to the success of underrepresented student populations because it can provide them with social capital (McCoy et al. 2015; Sinanan, 2016; Whittaker & Montgomery, 2014). However, according to the National Center for Education Statistics (NCES), in 2016, only 3% of the U.S.'s full-time faculty at post-secondary institutions were black or Latino(a). Due to the low number of faculty of color in U.S. colleges, it becomes difficult to have enough mentors of color for students of color, leaving some students of color, at times, potentially experiencing a more difficult college transition (Sinanan, 2016; Whittaker & Montgomery, 2014). Even when students of color can connect with student services staff (often of color), their success is not as high as when they can connect with faculty in their program of study (Sinanan, 2016; Whittaker & Montgomery, 2014).

McCoy, Winkle-Wagner, and Luedke (2015) completed a qualitative, multi-site case study on the perceptions of white faculty members' experience with mentoring students of color

in STEM disciplines. The study was conducted at two institutions, a large research-based PWI and a historically black college, both in the mid-Atlantic region. Eight white faculty members, five from the large research-based PWI and three from the historically black college, were interviewed on their campuses. Two themes emerged in their findings: 1) white faculty members at both institutions treated students of color the same as their white students, never wanting to be perceived as racist or biased, and 2) their students of color were “not their top students,” a statement that was evidence of a potential bias (p. 232). McCoy and colleagues (2015) found that when white faculty members ignored a student’s cultural and/or ethnic background, it inhibited the trust of students of color in the mentoring relationship, as the students of color in the study reported feeling as though they did not matter. Yet another important factor in successful transitions of students of color within STEM disciplines and institutions is the need to be exposed to other academic experiences outside of faculty mentoring.

*Academic experiences.* Academic experiences, such as the type of instruction in a classroom or study groups, can affect students’ college transition and academic success (Astin, 1993; Gayles & Ampaw, 2014; Pascarella & Terenzini, 2005). Although other researchers have discussed how underrepresented students fare with academics (e.g., Astin, 1993; Pascarella & Terenzini, 2005; Maietta, 2014), Gayles and Ampaw (2014) are among the few researchers who focused their study solely on the effects of academic experiences on student STEM degree attainment. They completed a quantitative study to review the degree attainment of women studying in STEM majors (which included those students majoring in social sciences, such as Psychology) at four-year institutions. They used a sample of 1,488 students, both male and female of varying races and under the age of 30, who responded to the National Center for

Educational Statistics (NCES) Integrated Postsecondary Education Data System (IPEDS) 2001 Fall Enrollment and Staff survey.

Gayles and Ampaw (2014) were particularly interested in learning about the association between different markers, which they called academic experiences and indicators of women and their academic performance. Academic experiences included interactions with faculty, academic advisors, and study groups, and an indicator was college grade point average. The results of their logistic regression analyses suggested that both positive and negative interactions with faculty were the highest predictors of the degree attainment and if interactions with faculty were not positive, students faltered in their degree progression (Gayles & Ampaw, 2014). They also found that African American and Hispanic students were less likely to complete their degree within six years compared to white students, portrayed by a large effect size of 0.84 and 0.82. The results also suggested that students who completed high school science courses successfully (i.e., passing with grades of A and B) fared better in completing their STEM degree, as did students whose parents went to college. Parental income also played a factor, with students whose parents had a household income between \$25,001 and \$50,000, regardless of race or gender, showing a decreased likelihood of completing a STEM degree in six years compared to those with household incomes of above \$50,001. Overall, Gayles and Ampaw (2014) found certain academic factors that may hinder or support college transition and success for underrepresented student populations. However, a limitation of the study was that it did not capture students' perspectives about the issues affecting their transition and academic success.

*Instruction.* Instruction in the classroom is another academic component of STEM university climate. Courses in calculus, physics, and chemistry are often requirements in the first semester for students in STEM degree programs (Allan, Garriot, & Keene, 2016; Alzen,

Langdon, & Otero, 2018; Tomasko et al., 2016). Succeeding in these courses can be a difficult task for some first-generation underrepresented students just entering college (Allan, Garriot, & Keene, 2016; Christie, 2013; Maietta, 2016; Riggs, 2014; Tomasko et al., 2016).

Underrepresented students from low-income households who are also from underfunded high schools are traditionally not strong in science and math courses (Tomasko et al., 2016).

Therefore, these students, who were not afforded the same opportunities as their counterparts in well-funded communities, feel adrift in their college coursework, and at times, incapable of succeeding (Riggs, 2014; Tomasko et al., 2016).

Most continuing-generation students who attend STEM institutions have higher SAT scores and are more likely to have completed Advanced Placement (AP) courses while in high school when compared to first-generation college students (Tomasko, et al., 2016). Additionally, many students also take college courses at their local community colleges during high school to get a head start on their college STEM curriculum (Goonewardene, Offutt, Whitling, & Woodhouse, 2016). STEM faculty expect that all their students will be well-versed in math and science and be self-guided learners (Christie, 2013; Maietta, 2016). Students are not always as ready for math and science courses as some faculty would believe.

Reviewing the literature on different models of instruction will help to understand how to better aid underrepresented students with varying academic skill level. Alzen, Langdon, and Otero (2018) investigated the relationship between a specific instructional model and failure rates in introductory STEM courses. They discussed that introductory STEM courses have historically high failure rates compared to humanities courses as well as upper-level STEM courses. They further illustrated the effectiveness of the use of the Learning Assistant Model (LA) of instruction. They used data from the administrative records of 16 cohorts of first-time

freshmen from each fall term between 2001 and 2016 at the University of Colorado in Boulder. Specifically, 23,074 out of 32,071 undergraduate students of varying races who were enrolled in Physics I/II, Chemistry I/II, and/or Calculus I/II used the Learning Assistant Model in one of their STEM courses. Alzen et al. (2018) suggested that LA embraces diversity and creates a learning environment in which all types of students can learn. The results suggested that the instructional methods of LA significantly decreased the failure rate in entry-level or gateway STEM courses. Therefore, the authors concluded that faculty can design the best ways in which to teach and assist students.

Whittaker and Montgomery (2013) emphasized the need for faculty engagement, empowerment, and accountability, as they found that faculty in the classroom can play a vital role in the success of underrepresented students in STEM institutions. For example, students from under-resourced communities may find it more difficult to pay for AP exams. Thus, these students often are not exempt from entry-level college courses as their more well-resourced continuing-generation peers might be (Goonewardene, Offutt, Whitling, & Woodhouse, 2016; Tomasko, et al., 2016). Moreover, some students test into remedial math courses when given a university math placement test (Gayle & Ampaw, 2014). The majority of students in remedial math courses are minority, first-generation college students (Gayle & Ampaw, 2014). Being placed into remedial math courses has been found to have a negative effect on the students' college transition experience and degree attainment (McCoy et al. 2015; Sinanan, 2016; Whittaker & Montgomery, 2014). Faculty teaching remedial courses are unwilling to go back and teach information the students should already know and move quickly to core subject content rather than surveying the class to see whether more time is needed to cover some preliminary topics (Christe, 2013; Goonewardene, Offutt, Whitling, & Woodhouse, 2016).



Therefore, these students' confidence in college level science and math courses dwindled (Christe, 2013; Goonewardene, Offutt, Whitling, & Woodhouse, 2016). Students who struggle academically begin to think they are not smart enough, which decreases their self-confidence, and they then begin to question whether college is appropriate for them (Gayle & Ampaw, 2014). However, research suggests that if the educational system is held accountable for the academic success of their underrepresented student populations and provides a welcoming multicultural institutional climate, then students, through systemic changes such as changes in instructional style, could begin to feel more confident and remain in college (McCoy et al. 2015; Sinanan, 2016; Whittaker & Montgomery, 2014).

In order to successfully retain and graduate students, institutions could review their faculty's classroom climate and instruction. Museus (2011) completed a qualitative case study to determine institutional factors that have assisted three PWIs in successfully retaining and graduating the largest number of racial and ethnic minority students as compared to other PWIs. He completed 65 in-person semi-structured interviews with white and minority administrators, staff, faculty, and racial and ethnic minority students. He found that the PWIs had strong networking values, a commitment to targeted support, a belief in humanizing the educational experience, and an institutional responsibility to have racial and ethnic minority students reach academic success. Strong networking values were seen through efficient and clear communication and collaboration amongst university offices and programs that allowed students to build their social capital. Commitment to targeted support reflected the need for cultural programs to merge with tutoring services or encompass mentorship and tutoring. An example of how the institutions humanized the educational experience included joking with students to make their day better or asking them simply how their day was going before starting a class. The

institutions in the Museus' study also took proactive responsibility to help their students. For example, if a student's GPA fell below a certain point, students were called by advisors and other staff and asked what assistance they may need, from financial aid to tutoring to counseling.

These findings suggest that underrepresented students who are new to a university and may not have cultural or social capital to assist them in their academic success may benefit from the institution providing academic experiences that foster an equitable learning environment.

However, it is not only the encounters in the classroom that affect the college transition experience of underrepresented students but also those experiences that take place outside the classroom (or the lack of experiences outside the classroom) that can affect their transition.

*Experiences outside the classroom.* Experiences outside the classroom but within the college setting can affect underrepresented populations' transition and are formed partly by the institution's culture (Graham, 2013). Studies regarding experiences outside the classroom and specifically the effects of students feeling both included, excluded, and isolated from these experiences will be discussed. It is important for FGML to experience positive connections outside the classroom in order to thrive and be successful (Graham, 2013). Hurd, Albright, Wittrup, Negrete, and Billingsley (2017) reviewed the effect of appraisal support from natural mentors for first-year underrepresented students at PWIs. The researchers defined natural mentors as non-parental adults who are a part of the student's social network and defined appraisal support as natural mentors providing the student with positive guidance, motivation, and share evaluative feedback regarding their academic and social performance. In the researcher's quantitative study, they had 340 first-year underrepresented students (ethnic, cultural, and racial minorities) from a PWI in the southeast U.S. complete four surveys regarding their natural mentors throughout their first academic year (2013-2014) along with a series of

inventories assessing their self-worth, anxiety, extraversion, and depression. Hurd and colleagues (2017) found underrepresented students with multiple natural mentors who provided appraisal support had a more positive self-worth and were able to have a positive experience in college to combat the barrage of biases and disconnection they initially felt at their PWI.

Gayles and Ampaw (2014) also explored the biases and disconnection that minority students at PWIs can feel outside the classroom. The researchers reviewed the effect of college students' social experiences on STEM degree attainment, with a focus on gender differences. The researchers defined social experiences as educational activities and peer relations outside of the classroom, such as being a part of a research team. The findings of the study suggested that women took longer to complete a bachelor's degree within a STEM major compared to their male counterparts. In addition, social experiences influenced degree attainment differently for men and women. They found that women needed to attend full-time in order to graduate at the same rate as men, where men could still reach degree attainment if they went part time. Also, researchers found that when women had consistent faculty interaction outside the classroom, such as joining research study teams, they had higher rates of degree completion than men with similar experiences. Women who did not have regular contact with faculty outside the classroom described feelings of exclusion and isolation from social experiences while studying in a STEM discipline (Gayles & Ampaw, 2014). Feelings of exclusion and isolation are not just felt by women, but also by other underrepresented students in STEM disciplines.

*Exclusion and Isolation.* Feeling excluded from experiences on campus and outside the classroom can have some negative effects on a students' transition to college (Johnson, 2012). Johnson (2012) focused her research on the experiences of women of color who were in STEM disciplines. In her study, women of color in STEM majors expressed that their white female

counterparts excluded them from group work and from networking functions outside the classroom. Women of color, in turn, lost out on learning about and accessing various professional growth opportunities (e.g., research opportunities and internships), which can be essential in STEM career fields. Johnson (2012) also discussed that when women of color who are already subject to racial or gender microaggressions within an institution begin to feel excluded, they also tend to lose motivation and focus on their academic success and growth.

Zeligman, Prescod, and Green (2015) noted that the women in their phenomenological study felt excluded from the academic support activities. The authors interviewed five female graduate students of color in their first semester at a PWI. Along with feeling excluded, women of color in the study also discussed their desire to connect with and receive mentorship from a faculty member of color. The participants described their need for a mentorship style that would help them feel included in the STEM community. The women students expressed that feeling included in the academic department helps them better interact with the faculty and learn more (Zeligman et al., 2015). On the contrary, women of color who felt excluded from experiences outside the classroom found it difficult to feel connected to the department and institution and became less devoted to their pursuit of a STEM degree (Gayles & Ampaw, 2013; Graham, 2013; Johnson, 2007; Johnson, 2011; Malone & Barabino, 2009; Tierney, 1999). As a result, some of these students can feel disconnected from their department and institution and begin to isolate themselves further from professionally helpful experiences such as creating their own study group or engaging in a research project. They may search for connections outside the institution and department, which may keep them from being academically connected and possibly hinder their success.

Underrepresented students of color who begin to experience racial microaggressions on campus may isolate themselves to keep themselves safe (Gayles & Ampaw, 2013; Graham, 2013; Johnson, 2012; Johnson, 2011; Johnson, 2007; Malone & Barabino, 2009; Tierney, 1999). Isolation, caused by an unwelcoming institutional environment, can lead to missed opportunities for academic and professional growth and a lack of motivation and drive to excel (Alenuma-Nimoh, 2016; Gayles & Ampaw, 2013; Graham, 2013; Johnson, 2012; Johnson, 2011; Johnson, 2007; Malone & Barabino, 2009; Tierney, 1999).

Researchers in the U.S. found that the educational system, from its inception, focused on assisting dominant groups (i.e., White, Christian, heterosexual, male students) and perhaps unknowingly, implemented and retained policies that fit the majority needs rather than those of the growing underrepresented student populations (Alenuma-Nimoh, 2016; Gayles & Ampaw, 2013; Graham, 2013; Johnson, 2012; Johnson, 2011; Johnson, 2007; Malone & Barabino, 2009; Tierney, 1999). Some underrepresented students who isolate themselves tend to miss out on positive connections and therefore, they may be more likely to obtain poor grades and possibly drop out (Gayles & Ampaw, 2013; Graham, 2013; Johnson, 2012; Johnson, 2011; Johnson, 2007; Malone & Barabino, 2009; Tierney, 1999). Compounding barriers may hinder underrepresented students who are not only racial minorities on campus, but also have other minority identities, such as being the first in their families to go to college and coming from low socioeconomic backgrounds (Gayles & Ampaw, 2013; Graham, 2013; Johnson, 2012; Johnson, 2011; Johnson, 2007; Malone & Barabino, 2009; Tierney, 1999).

### **Intersectionality**

First-generation students of color come from varied racial and ethnic identities, as well as diverse gender, social classes, sexual, and religious orientations (Christe, 2013; Maietta, 2014). When pursuing their STEM degrees, some first-generation students who are also a part of

another marginalized population may have an additional layer of barriers (Goonewardene et al., 2016; Pyne & Means, 2013; Rocco, et al., 2014; Stephen et al., 2012). The barriers that come along with being a first-generation college student are multiplied for students of color, with racism and microaggressions embedded within educational systems (Dika & D'Amico, 2016; Pyne & Means, 2013; Tate et al., 2015). The intersection of minority identities and corresponding oppression related to race, legal status within the U.S., and class can negatively affect the academic performance of students (Rocco, et al., 2014; Stephen et al., 2012; Pyne & Means, 2013; Goonewardene et al., 2016).

**College students of color.** Throughout U.S. history, college students of color experience oppression within the educational system (Rocco, et al., 2014; Stephen et al., 2012; Pyne & Means, 2013; Goonewardene et al., 2016). Johnston-Guerrero (2016) utilized a constructivist grounded theory methodology and included CRT as a framework to investigate how first-generation college students of color define and view race. The researcher interviewed 31 undergraduate college students of color from two U.S. public research institutions on the west coast about their thoughts on race and its manifestation at their institution. The study yielded inconsistent findings. Many students of color in the study shared their experiences with racial microaggressions in the classroom, such as the assumption that when they speak, they speak for everyone who is of the same race. They also found that black students understood the racism that occurs daily within their institution, while others, mainly Asian-American students, noticed that they experienced lesser levels of racial microaggressions compared to their black and Latino(a) peers. Another finding the researchers uncovered was that Asian students sometimes minimized their own experiences with microaggressions due to the much more overt oppression they witnessed toward black students.

Sinanan (2016) found that black students who transitioned to college described the academic setting “as a foreign place with a different language (academic) and expectations than high school” (p. 155). The author also suggested that all students transitioning to college have to develop brand new skill sets, such as networking and communicating with professors. Not only are these skills foreign to some students of color, but students of color also are dealing with “acculturative stressors, [and] the psychological impact of adaptation to a new culture [that] involves a lack of having a sense of belonging and lack of a strong support system” (p. 158). Therefore, as Sinanan (2016) suggested, developing a strong support system within a university is important for black students to thrive academically, particularly in institutions they perceive as unwelcoming.

To relay the importance of social support for college students of color within an institution, I will describe a study by McCoy, Winkle-Wagner, and Luedke (2015), who explored the effects of white faculty mentoring students of color. They found that a white faculty member’s mentoring style could affect the students’ growth positively or negatively and could exacerbate racial inequalities (McCoy et al., 2015). The authors stressed that positive student-faculty relationships could help mitigate some of the institutional racism (McCoy et al., 2015). In addition, McCoy and colleagues (2015) found few students of color in STEM fields and suggested that faculty within STEM disciplines should be “participating in institutionally sponsored programs focused on culturally sensitive mentoring practices” (p. 237). When white faculty do not acknowledge race, students can feel as though they are not valued within the university setting and that their relationship with the white faculty members is undervalued. Not only are college students of color being taught and possibly mentored by white faculty (i.e., experience a power difference because of race), but they, like other students, also have to

confront the additional power differential between professor and student. However, the researchers found that “social support [including academic mentoring] for a student of color is a strong predictor of academic persistence” (p. 226). Therefore, students of color need socially conscious faculty who acknowledge and support them to help them succeed in a STEM educational system that is often unknowingly set up for them to fail (Gayles & Ampaw, 2013; Johnson, 2011; McCoy et al., 2015).

Those with power (i.e., high socioeconomic status, white, and male) succeed at much higher rates compared to underrepresented populations (Alenumah-Nimoh, 2016; Banks, 2002; Gayles & Ampaw, 2013; Johnson, 2011; Johnston-Guerrero, 2016). White male students succeed academically not only because they have much more financial and social capital as compared to students of color, but also because they have no racial barriers to their educational pursuits (Alenumah-Nimoh, 2016; Gayles & Ampaw, 2013; Johnson, 2011). First-generation students of color not only have to learn to navigate college on their own, but they need to endure racial biases which may negatively affect their self-confidence and self-efficacy and in turn, harm their academic performance (Stephen et al., 2012).

**Undocumented students.** Another underrepresented identity that some first-generation college students may hold is having an undocumented student status. Undocumented students have limited resources since they are not legal residents (e.g., no federal funding for college) (Gildersleeve et al., 2010; Kantamnemi, Shada, Conley, Hellweg, Tate & Wang, 2016; Perez, Cortes, Ramos, & Coronado, 2010). Cisneros (2019) completed a narrative inquiry study with 31 undocumented, Latin American, queer students to understand their lived experiences in the context of a larger social system of higher education. In this study, participants discussed the need to conceal their immigration status from everyone in college as a means of survival. They



did not want anyone to know their status because of the fear that their families would be torn apart or that they may experience discrimination. Some first-generation undocumented students have a continuous fear that they will be forced to go back to their country of origin (Cisneros, 2019; Gildersleeve et al., 2010; Kantamnemi et al., 2016; Perez, Cortes, Ramos, & Coronado, 2010). The fear of deportation along with the emotional exhaustion they may have from encountering racial microaggressions can negatively impact their ability to concentrate on their studies (Gildersleeve et al., 2010; Perez, Cortes, Ramos, & Coronado, 2010; Kantamnemi et al., 2016). The undocumented students in Cisneros' (2019) study mentioned the need to connect with others on campus to build a community where they can feel safe to lessen the emotional exhaustion that came not only from fear of others uncovering their immigration status, but also from the biases that they encounter. Additional barriers some undocumented students and other underrepresented students encounter include biases based on their social class.

**Social class.** There is minimal research on social class and first-generation minority students within STEM universities, therefore, I will review a study and some of the statistics and information shared by the U.S. government on students who come from low-income households. According to the Pell Institute (2011), low-income households are those with annual family income at or below \$25,000. Most first-generation students come from low-income households, which is an additional barrier they need to overcome (Allan, Garriott & Keene, 2016; Goonewardene et al., 2016; Stephen et al., 2012). Coming from a low-income household does affect the overall academic progress of college students because it limits the access to resources such as private tutors and updated textbooks (Goonewardene et al., 2016; Stephen et al., 2012). First-generation college students from low-income households are generally underprepared academically and may require remediation (Byrd & MacDonald, 2005). First-generation

students can hold many marginalized identities, and each one adds another layer of potential biases and challenges that can hinder the academic success of these students at institutions of higher education.

Internal and external stakeholders assess colleges and universities based on the retention, progression, and graduation of their students (Tinto & Pusser, 2015). Over the past few decades, college access has improved for students of color and first-generation students from low-income households (Pynes & Mean, 2013). However, persistence, retention, and graduation rates continue to be problematic (Pynes & Mean, 2013). Students from low-income households who are college-bound are less familiar with college entrance requirements and financial aid, less likely to have access to college preparatory curriculum, and less likely to be able to pay for college (Cox, 2016). As a result, students from low-income households may need assistance in achieving academic success amid systemic barriers (ASHE, 2015). Some students can obtain financial aid and private loans to pay for school, but then they may not have enough money to buy books and food, leading them to fall behind in classes (Allan, Garriott, & Keene, 2016; Cox, 2016; Goonewardene et al., 2016; Stephen et al., 2012). Students from low-income households must deal with many financial factors that can complicate their transition from high school, where, for example, school and books came without a cost (Stephen et al., 2012).

### **State and Federally Funded Programming**

Given the difficulty that first-generation minority students from low-income households encounter, federal and state programs have been created to assist students with access to academic, financial, and social supports. However, some of the first-generation students may not meet certain requirements for these programs. The National Conference of State Legislatures (2016) produced a webpage on college preparatory programs and in New Jersey, the government was able to fund the Educational Opportunity Fund Program (EOF) and three additional

programs, which are, Upward Bound, Talent Search, and Student Support Service, the three programs are referred to as TRIO. Both EOF and TRIO are used to assist with remediation by supporting the academic success of first-generation students from low-income households. EOF is a 6-week summer bridge program to provide intensive short-term academic tools intended to assist students with long-term academic success (Bir & Myrick, 2015). The nature of the bridge program depends on both state funding and the support of the institution hosting the program and, as a result, some first-generation college students from low-income households may not be invited to attend (Byrd & MacDonald, 2005) and thus may need to find resources themselves.

### **Conclusion**

First-generation undergraduate college students of color from low-income households face barriers in their transition to college. Numerous researchers have described the needs and interventions that can be used to assist in the successful transition and academic success of underrepresented students, but not necessarily within a STEM university and with their multiple intersecting minority identities. Additionally, limited research has been conducted specifically on the STEM college transition experience for the unique, albeit growing, population of FGML.

CRT and CMM, as the theoretical framework and model for this dissertation, help to frame the entire study from the literature review to the results and implications. Being better aware of FGML and how the student is framed will allow for more appropriate assistance for these students, if needed. Therefore, in this study, with the theoretical frame of CRT and CMM, I hope to understand the college transition experience of first-generation undergraduate students of color from low-income households who are not part of state or federally funded programming. Understanding the students' experiences, especially during a global pandemic, from the students

themselves will better inform the higher education field about the needs of FGML. In the next chapter, I outline the methodology of this study.

### **Chapter 3: Methodology**

Chapter 2 discussed the literature surrounding first-generation college students, students of color, and students from low-income households. Unfortunately, previous research did not provide adequate, first hand experiences of first-generation college students of color from low-income households (FGML) who are transitioning into a STEM university. Therefore, when considering the research question that is focused on the experience of FGML, a qualitative research methodology would assist in gaining the information desired. Qualitative researchers explore experiences and phenomena rather than prove or disprove predefined hypotheses as is required in quantitative study (Tuval-Mashiach, 2016). Qualitative research is known to be creative, unique, and pluralistic, in that it allows the researcher to create a singular process that best fits the particular research question (Josselson, Leiblich, & McAdams, 2003). Therefore, based on my research question, a qualitative approach for this dissertation study is fitting, as it will allow me to explore the experiences of a particular population. There are multiple approaches that researchers can utilize to explore experience and/or phenomena. I am choosing to employ a phenomenological approach as it will allow for an in-depth study into the experience of a phenomena shared by a certain population (Merriam, 2009). The purpose of this qualitative, phenomenological study is to better understand how FGML (particularly those who study within a STEM institution) experience the college transition process.

Researchers are acting agents within their studies, whether in qualitative or quantitative studies. However, within a qualitative study, the researcher is in constant interaction with participants (Merriam, 2009). The researcher can change the course of an interview or portray bias that can affect a participant's responses, whereas in a quantitative study, the researcher is more so gaining basic information and analyzing numerical data (Merriam, 2009). Due to the researcher playing a vital role in the data collection of a qualitative study, I will present my

relationship to the study through my researcher stance. The researcher stance allows the researcher to situate where they fit in their study and how their background may influence the findings of the study (Merriam, 2009). Additionally, a researcher stance is needed in order to shape the study for the reader and future researchers, allowing interested parties to understand the lens from which the researcher is operating. A detailed research stance will be followed by a discussion on the proposed methodological approach, data collection procedures, and data analysis of this study. Lastly, I will address the concept of trustworthiness, which refers to the process of establishing thoroughness in a study.

### **Researcher Stance**

As a first-generation college student born to immigrant parents from Sicily, I identify with some of the positive and challenging attributes associated with being a first-generation student transitioning to college now. One of the challenges that presented itself early in my college journey was the need to complete college applications on my own, since my family did not have experience with such applications, nor the language capabilities. I grew up in a white, middle-class household that valued education highly, but I had to navigate the college transition process on my own. However, with strong mentorship and familial support of my pursuit of higher education, I was able to complete my undergraduate Psychology degree, and I was able to continue my education by pursuing a master's degree in Community Counseling.

Throughout my master's program, I interned at a college counseling center and immediately knew I wanted to continue working in a university setting with college students. A geographical move, as well as finding my niche within higher education, led me to shift from community counseling to college advising at a STEM university with students from varying cultural backgrounds. Throughout my time working as an administrator at a STEM university, I began to notice the large number of first-generation college students of color from low-income

households who were not receiving any programming or financing to support their academic progress or promote their success. I pursued a doctoral degree in Counselor Education to better understand first-generation STEM students of color from low-income households, address their needs, and find innovative ways to support them. In the summer of 2016, a colleague and I began the First Fellows program, which provides mentorship for first-generation college students. First Fellows has enabled me to gain a deeper understanding of first-generation STEM students of color from low-income households' transition to college with the goal of creating programming that could increase their retention and graduation rates.

In my position at a STEM university, I work closely with undergraduate students, and I have become a strong student advocate on campus. I am a student advocate, not solely because I have some similarities in background to FGML and can relate to some of their struggles, but also because I understand the systemic barriers that are placed within a STEM institution. These barriers include policies and procedures that are not clearly explained or outlined to students. These systemic barriers constantly fill me with fury as they are both oppressive, unneeded, and only slow the academic progress of our students, especially FGML. One such policy that can be a barrier for FGML is the need for students to have to meet in person with an advisor to declare a major. Many of our FGML have family obligations and/or work on top of time they need to be in classes. Therefore, it leaves minimal time for them to study, let alone try to find time to meet with someone to complete a form, that could easily be set up online for students and advisors to complete. Many times, students are taking a day off work just to meet with an advisor for five minutes to get a form signed or some students do not end up declaring until it is too late and missing viable academic and career opportunities.

Due to the global pandemic, students now were faced with a few other barriers, such as how to get forms signed. I had to contact the Office of the Registrar two weeks after the stay-at-home order was in place in the U.S., to see if the forms could be made in an editable format online so that students and advisors alike could complete these forms. The global pandemic also left many FGML students without resources they were utilizing on campus daily, such as computers, printers, and internet access. Therefore, some did school work using their smartphones, until they learned they could borrow desktops with webcams from the institution, but this took some time for them to learn and for the equipment to arrive at the university and the student. Also, students who came from difficult family environments, now had to try to manage those family environments daily while also trying to concentrate on school work. Along with students' concerns with the global pandemic, students also were worried about their own safety with increased violent crimes on Black Americans. The university held a community conversation on Black Lives Matter, and unfortunately racist students also came on and spoke ill of their fellow black students, and faculty, staff, and students responded with hurt and disappointment of the ignorance on their own college campus. Therefore, the FGML participant-students in this study, will most likely have much information to share regarding their college transition experience this past academic year in the midst of a global pandemic and socio-political unrest.

I chose to work within a university in order to assist students with their academic progress and career goals. When I quickly realized, through my studies and more specifically, Critical Race Theory, that the education system creates additional challenges with its oppressive policies and procedures, I knew I wanted to shed light on this systemic oppression in order to



better aid FGML. I chose to begin my life's passion with a study detailing the college transition experience for FGML.

My background, both as a first-generation college student and working within the same STEM university that my participants attend, can possibly further impact my own bias, thoughts, and feelings. I realize that first-generation college students come with their own individual experiences, but a part of me may be seeking my own validation, because I would like to believe that other first-generation college students struggled in their college transition process, as I did. Also, I may be seeking validation of my own beliefs regarding the oppressive nature of the STEM university I work for. I want to believe that others see the oppression that I have witnessed and experienced. Although, I realize everyone perceives experiences differently, I do not want to feel alone in my thoughts. Therefore, instead of perpetuating oppression by believing my own experience is the accurate and only experience of a first-generation college student at a STEM university and making assumptions on what first-generation college students may need in order to be academically successful, I will uncover from current, first-generation college students of color from low-income households, how they experience college transition. In the next section I will detail the phenomenological research design I will employ for this study.

### **Research Design**

As described in the previous chapter, researchers have not studied the lived experience of FGML at a STEM institution. When an immeasurable variable of a group or population needs to be studied, such as the college transition experience, a qualitative, exploratory approach may be warranted (Creswell & Poth, 2017). Therefore, phenomenology, as a qualitative exploratory approach, was appropriately chosen for this study. Phenomenological studies look at how participants make meaning of their lived experiences (Yuksel & Yildirim,

2015). Phenomenology is especially relevant when the research question reflects an in-depth study into participants' lived experience (Heppner, Wampold, Owen, Thompson, & Wang, 2016). In this research inquiry, I seek to understand first-generation college students of color experiences with the college transition process. The intent of the study is to learn from FGML what their college transition experience is like at a STEM university.

To share further knowledge on phenomenology, I will continue to describe the core purpose of this qualitative approach, along with two of its major concepts and how they relate to this dissertation study. Denzin and Lincoln (2011) describe the phenomenological design as emphasizing discovery, description, and meaning. In a phenomenological study, a researcher focuses on obtaining all the information they can from the lived experiences of participants and the meaning making the participants have of the phenomena (Creswell & Poth 2017). Denzin and Lincoln (2011) describe the information gathered on the lived experience as well as the meaning making participants have of the phenomena as creating depth in the study. Depth, in turn, helps to obtain trustworthiness in the study (Denzin and Lincoln, 2011), which I will discuss later on in the chapter. Phenomenological researchers must gather the detailed descriptions of the shared lived-experience of all their participants and discover the meaning participants make in regards to the phenomenon (Denzin & Lincoln, 2011).

While compiling the detailed descriptions needed within phenomenology, essence and bracketing are the two major concepts within the qualitative approach that must be considered. In phenomenology, essence is the meaning of the phenomenon in the study which all participants share and experience (Merriam, 2015; Osborne, 1994). Essence further involves understanding the meaning individuals place on the phenomenon, in order to find a deeper, universal meaning (Osborne, 1994). For example, in this study the essence of the college

transition process for first-generation student participants will be explored. Moustakas (1994) explained the main components of phenomenology to be what the individuals/participants are experiencing and how it is experienced. Therefore, in this dissertation study, how the FGML experience the transition to college and what all student participants similarly experience, will be the essence and what I will uncover.

An additional core concept within a phenomenological study is bracketing (Merriam, 2015). Bracketing describes the need for researchers following a phenomenological approach to set aside their biases and judgements so they can reveal clear information from the data analysis (Merriam, 2015). Researchers must set aside their judgements in order to truly record and review the lived experience of their participants (George & O'Neill, 2011). As mentioned earlier, I will need to bracket my own views of being a first-generation college student so as to not overshadow what the participants may be relating to me within the interviews. The bracketing strategies I will utilize are to keep a reflective journal throughout the study and take field notes during my interviews, which I will describe more thoroughly in the coming sections. My phenomenological approach to this study will dictate the ways in which I will collect my data, analyze it, and decipher how to achieve trustworthiness.

### **Data Collection**

Data collection within phenomenological studies usually involves interviews with participants, which will be recorded and transcribed verbatim (Creswell, 2007). Therefore, for this dissertation study, I will be conducting one interview with participants virtually through Zoom in locked, private meeting rooms. Prior to the start of the study, I will be completing an Internal Review Board (IRB) application, which will include how I plan to work within all ethical parameters, such as protection of confidential data. I will store the recordings and

transcriptions in my password locked and encrypted within a personal computer, which I only have access to and the recordings will only be stored by following institutional policy. If a student becomes distressed throughout the study, he or she may leave the study and I will provide them with the necessary resources on campus to assist with the distress. IRB approval will be obtained prior to beginning my data collection.

In the coming section, I will discuss the participant recruitment process, the interview, critical friends, reflective journaling and field notes, as well as the procedure I will take to complete the phenomenological study after IRB approval.

### **Participant Recruitment**

Participants must meet the following criteria to be in the study: 1) completed their first year in college, 2) first-generation students, 3) students of color, 4) from low-income households, and 5) a resident of the U.S. I will recruit 10 participants, as a feasible number of students needed to understand their meaning making of the phenomena fully and with depth, which is important in a qualitative, phenomenological study as described by Merriam (2015). The study will include interviews with first-year, first-generation college students of color from low-income households in a STEM university in the Northeastern U.S. Also, participants will be of any race (Black, Latinx (o/a), Asian, Native American, Bi-racial, and/or Multi-racial) with the exception of White/Caucasian, and can be of any gender.

I will be using purposeful, convenient, and snowball sampling techniques to find participants for the study. Purposeful sampling includes seeking a specific group or people, as I am recruiting FGML (Merriam, 2015). Convenience sampling is identifying participants who are from a location you have access too, the STEM institution in this study (Emerson, 2015; Gay, Mills & Airasian, 2011). Snowball sampling is a referral process by which participants assist in the recruitment of other participants (Emerson, 2015). The process involves students relaying

information about the study to their peers, in the hopes that their peers may also be interested in participating in the study (Emerson, 2015). The reason snowball sampling will be effective in this study is because traditionally college students feel more comfortable with and listen to their peers, more so than they do administrators in the university. Being more comfortable, more students may inquire about the study and possibly welcome being a part of it, thus enriching the pool of participants.

As an administrator within the university, I consider myself an observer-participant. An observer-participant is a researcher who works within or is familiar with the setting in which the study takes place (Emerson, 2015). I will be interviewing the students, while also working for the system in which the phenomenon being studied is taking place.

In order to obtain my sample, and working within considerations of comfortability for my potential participants in mind, I plan to have a colleague of mine within the university share information about the study and ask for volunteers through sharing of a flyer that details information about the study (Appendix A). This plan was chosen to increase potential participants' comfort in deciding whether or not to participate in the study. The plan is set not to exert power over potential participants to join the study due to the role I occupy within the institution and the power that comes with it. My colleague will be addressing first-generation college students during a session of new student orientation and can share the flyer then. Additionally, I will ask her to send an email that explains the study (See Appendix B) and once students reach out to me I will utilize the Screening Questionnaire (See Appendix C) to have students' self-identify if they are a part of a low-income household, if they are the first in their families to go to college, and if they are not international students. Potential participants that are interested in being a part of the study, will be reviewed according to inclusion criteria, which

include being 18 years of age or older, being a first-generation college student, beginning a STEM undergraduate degree program, who is not a part of federally funded programs on campus, who self-identifies as a person of color as well as low-income, and who can be available for one in-person interview. The assessment of these seven criteria, as well as collecting further demographic information through the Screening Questionnaire will occur for all potential participants. Any student who does not meet the inclusion criteria will not be permitted within the study.

The rationale for each of the inclusion criteria are unique to the goals of the study and ethics of research. Participants will need to be 18 years of age or older in order to be able to provide consent to participate in the study. Participants' ages will be confirmed using the Screening Questionnaire. It is also important to note that there may be students of varying ages over 18 years and developmental differences between participants which will be noted and discussed. I will review the detailed definition of first-generation, as it pertains to this study, so participants can understand and confirm they are indeed first-generation, within the Screening Questionnaire. Also, this focus will study the particular college transition experience of those entering into STEM majors, therefore, the Screening Questionnaire will help confirm the participants' major. The reason for excluding those students who are a part of state and federally funded programs on campus is because they are receiving additional aid to assist them in the college success, and this study will focus on those who do not. Additional aid in state and federally funded programs includes financial assistant, tutoring, and mentoring. I would like to focus on those students who are not receiving any aid to see how they experience the transition sans social, cultural, and financial capital. Also, this study focuses on the experience for students of color from low income households, so both university data and the Screening Questionnaire

will help confirm which participants self-identify as a person of color and which are also from low-income households. We will also need participants to be available for an in-person interview, and so this was confirmed with potential participants through the Screening Questionnaire. After screening is complete, participants, who met all seven inclusion criteria will be contacted regarding the opportunity to participate in the study and the interview will be scheduled.

**Procedure.** The interview will take place at a time and day that is convenient for the participant/student to attend virtually through a private, locked meeting room using Zoom. At the beginning of the interview, I will provide them with a digital copy of the Consent Form (see Appendix D), which I will give them time to review and give them time to make any inquiries they may have about the study and/or the interview. The consent form details that the participant is acknowledging they will be part of the study and that they understand they can choose to not be a part of the study at any point in the process (Jacob & Furgerson, 2012). If the participant decides to continue on with the study, they will digitally sign the consent form and email it back to me. After the participants consent by signing the form, I will remind the participant/student that the interview is being digitally recorded in a private room and that the recording will only be heard and kept by me and my dissertation advisor. The recordings will be transcribed verbatim through a digital transcription service and I will explain what a transcription is, as not all students may know. The recordings will be stored on an encrypted, password locked, personal computer and each recording will be password protected, where only I know the passcode. The recording will be saved for three years, as required by the IRB, and then destroyed.

**Interview.** A semi-structured interview is an in-depth, one on one discussion with the researcher preparing questions organized to guide the conversation (Creswell, 2007). The

interview provides a time where the researcher can gain an abundance of information about the participant, their lived experience, and the meaning they make out of their lived experience. Within the interview, the researcher can not only guide the discussion through thought out questions, but they will also be able to note the verbal and nonverbal cues given by the participant (Creswell, 2007). Within the phenomenological study, 2 broad questions are essentially being asked of the participants (1) What have you experienced in terms of the phenomenon, and (2) What contexts or situations have affected your experience with the phenomenon (Creswell, 2007). I will conduct one 60-90 minute interview with all participants and then provide them with the transcriptions of the interview for their review and verification of accuracy. Being able to have a 60-90 minute interview with all participants, will allow me to gain the depth needed in a phenomenological study. The interview will be used to learn more about the participant through a series of semi-structured questions to guide the interview toward the participants' lived experiences. I will send the transcription to the student participants to review for accuracy, serving as member checking. An Interview Protocol (See Appendix E) has been created in order to assist in guiding the interview. The interview protocol provides some structure and organization to the interview process, while also allowing flexibility to follow where the participants take me (Jacob & Furgerson, 2012). In the protocol, I detail the exact information I would like to share with the participant/student, including an introduction to the study and their right to opt out at any time. Along with this introduction for the student, the interview protocol also includes a few background information questions I will pose to the students, followed by 10 questions with follow-up or probing questions for each to guide the interview.



At the start of the interview, I will let participants know that I will be taking notes (field and reflective notes) using pen and paper throughout the interview but that no identifying markers will be written down. I will explain that the notes are not an evaluation of their interview but rather to help me stay focused within the session and remember some main points. Immediately after the interview, I will also make reflective notes on the interview session and any thoughts and feelings that may have come up for me. If thoughts and feelings come up hours or days later, I will add to my reflective notes for that interview session with dates and times.

**Field and reflective notes.** Both during and following the interview, I will take field notes on responses the participants share with me, as well as any nonverbal reactions the participants have. Field notes are important for documenting contextual information from the interviews (Phillippi & Lauderdale, 2017). The field notes will be helpful in supplementing the transcriptions of the interviews. I also will take reflective notes on my thoughts, feelings, and actions before, during, and after each interview. Reflective journaling and note-taking allow for the researcher to view or understand any bias that may be occurring (Denzin & Lincoln, 2011). Along with my own journaling, I will look to consult with a critical friend.

**Critical friend.** A critical friend provides both support and critique to a researcher (Storey & Wang, 2017). Utilizing a critical friend during the dissertation study will assist me in uncovering possible thoughts, feelings, and biases that I may not be able to see on my own and/or that may be crucial to the study (Denzin & Lincoln, 2011). A critical friend can also assist in providing alternative perspectives to the data and provide some further questions for the researcher to consider (Storey & Wang, 2017). Therefore, I will have a minimum of one critical friend with whom I will connect with on a regular basis. When communicating with my critical

friend, I will share my reflective notes as well as my data analysis. The feedback the critical friend will provide me will benefit in creating a robust study that has considered varying perspectives. The further usage of my field and reflective notes as well as getting the aid of a critical friend will be described in the upcoming data analysis section.

### **Data Analysis**

Moustakas (1994) outlined epoch, phenomenological reduction, imaginative variation, and synthesis as the steps needed in data analysis within a phenomenological study. Epoch describes bracketing the researchers' own biases and worldviews to separate it from the data. As described earlier this will be done through my own field notes and reflective note-taking as well as checking in with a critical friend.

Phenomenological reduction assists the researcher in beginning to understand the "what" of the experience (Moustakas, 1994). Researchers will begin the phenomenological reduction process by horizontalizing the data. Horizontalization is the process of finding and reviewing significant quotes and points within interviews (Moustakas, 1994). Also, in horizontalization, the belief is that quotes and other important points within an interview are all of equal importance and meaning to the participant, and thus important to finding the essence of the phenomena (Creswell, 2007). Horizontalization allows for the grouping of data that will eventually form the themes within the study (Smith, Flower, & Larkin, 2009). I will begin to delve into phenomenological reduction by utilizing horizontalization and open coding. Open coding is the process of breaking down data to units that can be compared for similarities or differences (Saldana, 2016). Once data units are compared for similarities and differences and coded as such, I will look to categorize the units through the "lumping" process. Lumping is the process by which researchers can get to the root of categorizing a phenomenon (Saldana, 2016). After lumping, codes will be maintained in a codebook. A codebook is used as a database which

stores codes and their definitions (Saldana, 2016). My codebook will be maintained in Microsoft Word. The process of adding and reviewing codes and data will continue until all data has been reviewed and redundant data is removed.

The next step in the process of data analysis for a phenomenological study would be imaginative variation. Imaginative variation contextualizes the data and describes the “how” of the data, by placing the data within settings and contexts (Moustakas, 1994). Imaginative variation highlights the world in which the phenomenon resides, thus allowing researchers and others to view the participant and world together (Moustakas, 1994). Phenomenological research emphasizes that the individual and the world are connected (Moustakas, 1994). Imaginative variation will most likely occur during my second round of coding, as I will have a focus on the context of the related experiences of participants. Open coding will continue until themes and sub-themes become clearer.

Synthesis is the final step in data analysis within a phenomenological study. Synthesis involves combining the “what” and “how” of the phenomena so that the essence of the experience emerges (Moustakas, 1994). During synthesis, codes and themes will be evaluated for accuracy. I will look to lay out the codes and themes within a table to be able to visually review them for accuracy. The table will assist in organizing and summarizing the themes and quotes that support those themes (Smith et al., 2009). I will review the table and all steps within data analysis with a critical friend as well, as the critical friend may be able to make note of themes arising that I may be missing. Through data analysis and the assistance of reflective notes/journaling and a critical friend, I will be able to establish the themes to present. Themes will help to clearly outline the essence of the college transition experience for FGML.

### Trustworthiness

In this section, I will discuss how I will ensure trustworthiness in my study.

Trustworthiness is the process of establishing rigor within a qualitative research design (Amankwaa, 2016). The components of trustworthiness within a qualitative study are credibility/confirmability, transferability, and dependability (Guba & Lincoln, 1982). The use of a critical friend, member checks, and reflexive journaling are ways in which to establish credibility in the study (Merriam, 2009). A critical friend, as described earlier, is someone a researcher can discuss aspects of the study with, as they pertain to their personal thoughts and feelings, as well as discussions on how the study may be coming along (Merriam, 2009). A critical friend can help to clarify any holes or any biases that may be occurring throughout the study (Amankwaa, 2016). As a qualitative researcher, in order to openly articulate my own biases and/or the direction in which the study seems to be heading, I will enlist the assistance of a critical friend who I will meet with every two weeks or contact as issues or blocks may come up for me. In the study I will also utilize the member check technique after the interview by having participants/students review my findings within the data through email and see if they agree with what I may be stating (Heppner, Wampold, Owen, Thompson, & Wang, 2016). As I mentioned earlier, I will keep a reflective journal in order to keep track of my thought processes and biases throughout all parts of the study. In addition, I will use my entries in the researcher journal as points of discussion with my critical friend. Therefore, with the use of member-checking combined with my discussions with my dissertation advisor, I will be able to write a final report without placing unneeded liability on the participants.

Along with the credibility of the study, I would also like to show transferability. Erikson (1986) felt that there is what he coined a *concrete universal* in qualitative research which allows

for what is completed in one phenomenon can be replicated in a similar phenomenon. Transferability suggests that another researcher will be able to take what has already been learned through previous research studies, and begin to create interventions for that specific phenomena or group that was studied (Lincoln & Guba, 1985). I will utilize thick description in order to increase the potential for transferability (Korstjen & Moser, 2018). Thick description is describing not just the behavior but also the context in which the phenomenon occurs so that it becomes more meaningful to the reader (Korstjen & Moser, 2018). The context, in which the phenomenon occurs will be described and noted in multiple areas, including the participant recruitment process, interview protocol, and the transcriptions of interviews. Therefore, findings from my study will allow for transferability into other studies whose participants are first-generation students of color from low-income households. I will also keep a log of all interviews completed with time/day/location and duration of the interview. Along with a log for interviews completed, the interview protocol and the codebook will also be available to assist future researchers in being able to see exactly what was done, when and how; portraying dependability, as well, in the study (Smith et al., 2009). Dependability is important to trustworthiness as it solidifies the study's findings are consistent and repeatable.

### **Chapter Summary**

This chapter includes a description of the methods I will utilize in this qualitative, phenomenological study. Methods, procedures for recruitment and data collection, and data analysis were thoroughly reviewed in this chapter, along with a descriptive section on the research design employed. I also outlined how I would establish trustworthiness in the study, which included member checking and work with a critical friend. The results of the data analyses are detailed in the next chapter.

## Chapter 4: Results

In the previous chapter, I reviewed the qualitative methodology for my study, my researcher stance, data analysis, and how I kept trustworthiness within the study. In this chapter, I will provide the thematic findings from the data analysis of all 10 participant interviews.

### Overview

Currently, there is limited existing research on the Science, Technology, Engineering, and Mathematics (STEM) first-year college transition for first-generation college students of color from low-income households (FGML). First-generation minority college students are a growing population in U.S. higher education institutions (Maietta, 2014). However, there is a lack of research on how students themselves experience the STEM college transition. Learning about their experience can aid in building a more just and equitable STEM higher education system in the U.S. As such, the purpose of this study is to expand the literature on the current experiences of FGML. The guiding research question for this phenomenological study was: How do first-generation college students of color from low-income households experience the college transition to a STEM institution?

### Participants

In this study, one interview was conducted with each participant. The interview served as the primary method of data collection. All participants identified themselves as FGML and had completed their first year at an urban, STEM University in the northeastern part of the U.S. at the time of the interview. Table 1 summarizes the participants' demographics and allows for easy reference to their self-reported identities. Following the table, I provide a brief description of each participant. Pseudonyms for each participant were selected by the researcher.

#### **Table 1: Participant Demographics ( $n=10$ )**

<b>Pseudonym</b>	<b>Age</b>	<b>Racial/Ethnic Identity</b>	<b>Gender</b>
Anika	19	Asian	Female
Belinda	18	LatinX	Female
Barto	19	Asian	Male
Desirae	18	Black	Female
Fatima	18	Asian	Female
Hasina	19	Black	Female
Jacinto	19	LatinX	Male
Jaylin	18	Black	Male
Keya	19	Black	Female
Nero	19	LatinX	Male

#### Anika

Anika, a 19-year-old female, emigrated from Southeast Asia with her family to become a doctor and soon realized engineering was more of her life's passion. She prided herself on being a woman in STEM and wanted to be able to motivate other girls from her village in Southeast Asia.

#### Belinda

Belinda, an 18-year-old female, was the first child born to parents who emigrated from South America to the U.S. She always had a thirst for knowledge and even pursued courses outside of her college education to better her understanding of the social injustices in the world.

#### Barto

Barto, a 19-year-old male, was the son of parents who emigrated from Southeast Asia and he felt it was important to build a career in a field he was passionate about. He took computer programming courses in high school which solidified his decision to pursue a STEM degree.

#### Desirae

Desirae, an 18-year-old female, was the daughter of militant parents who emigrated from Africa. She was excited to live on a college campus but fearful of distractions she would encounter. Unfortunately, she went through many personal hardships during her first semester transition, but also prevailed at the end of her second semester with both good grades and close relationships. She was one of two participants to share the racism and sexism that occurred for her and other women on campus.

#### Fatima

Fatima, an 18-year-old female, was the daughter of parents who emigrated from Southeast Asia and who had lived in multiple cities in the U.S. Fatima had never been exposed to many friends of her same ethnic background as she attended many predominantly white schools. Therefore, when she started college, she enjoyed building friendships with classmates of similar backgrounds.

#### Hasina

Hasina, a 19-year-old female, was the only child born to parents who emigrated from Africa. In her first year, she wanted to experience everything college had to offer from the courses in her STEM field to joining student and professional organizations. She felt college should be more than just academics, and wanted to build life skills as well. She was one of two participants to discuss the sexism that occurred for her and other women on campus.

#### Jacinto



Jacinto, a 19-year-old male, was the firstborn child to parents who emigrated from South America. Being from a low-income household was always in the forefront of his mind. Jacinto felt disadvantaged by the high school he attended and having to worry about how he would pay for his next meal. However, with supportive parents who motivated him to continue when times became difficult, he was able to persevere and end his first year successfully.

#### Jaylin

Jaylin, an 18-year-old male born to parents who emigrated from Africa to the U.S., had a unique experience, as he began college younger than most of his classmates. Although he excelled academically, he relied heavily on the support of his mother when he met some challenges with social relationships on campus.

#### Keya

Keya, a 19-year-old female, emigrated from Africa to the U.S. with her parents. She felt fortunate to be able to both attend a STEM university in the U.S. and be exposed to so many different people and opportunities. She even took on applying for an on-campus position during her first semester.

#### Nero

Nero, a 19-year-old male, was born to parents who emigrated from South America. His parents constantly modeled for him what hard work and dedication looked like. From watching his parents struggle both physically and financially in their blue-collar positions, he learned he did not want to work in the blue-collar sector and thus wanted to pursue a STEM degree that would lead him to a well-paying professional career.

The participants were all children born to immigrants who migrated to the U.S. for a better life and a better education for their children. The importance of education seemed to be

something that the families of all the participants engrained in them. When participants were asked, “What was your reason for attending college?,” all participants responded that they did not have a choice, as their parents had always stressed to them how crucial it was to obtain a degree in higher education in order to lead a prosperous life. Some of the participants also shared how economic hardships, racism, and sexism were a part of their first year STEM college transition. In the coming section, I will further discuss the participants’ experiences through the thematic findings from the data analysis.

### **Thematic Analysis**

Participants provided rich descriptions regarding their STEM college transition and the people, things, and characteristics that helped them in their transition. For the participants in this study, feeling connected and building their own social capital was essential in persevering through the barriers they faced and having a successful first-year STEM college transition. Five themes represented the college transition experience of FGML: 1) *Finances: How will I pay for college and live day to day?* 2) *Academics: Acclimating is “exceedingly difficult,”* 3) *Guide Me: Experiencing Mentorship,* 4) *Connect with Me: Experiencing new peer relationships,* and 5) *La Familia: Experiencing college with the family.* The aforementioned themes represent the participants’ first-year STEM college transition. Themes will be presented in chronological order from when the participants began their college transition journey and will include a discussion of subthemes. The selected excerpts from the participants’ interviews are representative of the corresponding themes.

#### **Theme 1: Finances: How will I pay for college and live day to day?**

Students from low-income backgrounds were not just solely concerned about paying for college, but also what that means for their own basic needs. In this study, that was evident.

Many FGML pondered daily, “will I be able to pay for transportation to and from school?”; “When will I get my next meal?”; “How can I pay for supplies for my Architecture class?” Nine out of the 10 participants stated their initial concern during their first year at a STEM college was financing their education and still being able to pay for food and other necessities. The participants also discussed not wanting to burden their parents with having to pay for college. Although the participants were excited to start college, they did feel insurmountable stress about having to pay for tuition and other items, such as books, needed for all four years of college, while also assisting their families financially and trying to be academically successful. The weight of financing their new college life weighed heavily on their minds throughout their first-year transition, with little time to focus on their own mental, emotional, and physical well-being. Therefore, participants tried to learn ways in which they could fund their education and survive, whether it was getting a job, applying for loans, or most times a combination of both. There were two subthemes that emerged: 1) *Frustrations with utilizing financial aid*, and 2) *Working to fund college and life*.

**Frustrations with utilizing financial aid.** When analyzing the participants’ reflections on the challenges of utilizing financial aid, I learned that it was much more than just completing a form, but rather the mental toll it took on the participants. Participants were unable to truly feel unadulterated excitement for college with the burden of economic hardship, such as having a roof over their heads and food on the table. This subtheme details the need to finance college for eight out of the 10 participants. In order to make college more equitable, the U.S. federal government does have funds available to students who want to attend college and are in financial need. The participants in this study, all from low-income households, discussed the first step towards college as the application for state and federal financial aid. However, in order to obtain

the aid, they had to confirm they were financially in need. This is done by completing the Free Application for Federal Student Aid (FAFSA) using filed income tax returns. To add to the stress they already had regarding how to pay for college and survive, participants also had to learn how to best complete the FAFSA so they could get aid. Since participants were first-generation students, they did not have any family members who understood the FAFSA process. On top of already being worried about being able to meet their basic needs while attending college, participants also had to gather all the appropriate paperwork needed to complete the application themselves, which was both time-consuming and overwhelming. They stated that the notion of completing a document with the federal government that could potentially help with paying for college was quite taxing. Therefore, FGML's first barrier to college was paying for it. For example, when asked what her biggest struggle was in the college transition process, Belinda discussed the task of completing the FAFSA on her own:

The first time I did FAFSA, I was definitely put in a hard spot. I had to like do it without my parents at this point...I had to do it all on my own and I had to figure out how to do everything like without their help so that was stressful. Recently, like I was helping one of my friends the other day because she was recently applying for it and she had never done it before but her parents like they had all the information for her so they could do their part and I was like, wow it's easier. It's easier when your parents understand the process and can complete most of it...Yeah and I was thinking for me, just like for me I had to figure it all out on my own. My parents just handed me their paperwork and then my parents, they were like here figure out how to put that in there.

FAFSA was just the first step for these participants, and their main concern was how to continue to pay for school every year. Financial concerns and ways to fund college are unique concerns

for those students who come from low-income households. For example, when asked what her concerns were about starting college, Fatima shared how overburdened she felt just thinking about the thought of financing her education:

I wish I didn't have to think about my financial situation, like, you know tuition and stuff. Most of my tuition is covered with grants and they cover most of my tuition. But yeah, the tuition was too high. So, I had to like think about getting another financial loan and continuously think about my loan before like seventh semester ends to pay back. I think that was another concern, like I think financial stress is worse when you are studying and trying to do well in school.

Participants also worried about how much debt they would accrue and did not want to be a financial burden on their parents. For example, Desirae described how her main concern with starting college was ending up in debt: “I think it was debt. I don't know why I had this belief that I'm ready to graduate with a hundred K in debt and I will have no sleep for the next four years.”

When asked what his biggest concern with starting college was, Barto explained that he did not want to burden his family, especially when the global COVID-19 pandemic hit, which left his mother unemployed:

Yeah, the...the thing that worried me more was the amount of money that I was going to have to pay. Mostly because you know my parents... my Dad is working to support not only me and my mom but also my little brother. So...I don't want to put that much of a burden on them and be like, yeah, listen...you guys are going to have to help me pay like, you know, \$24,000, but I don't want to do that to them with everything that's going on,

especially now with the whole pandemic situation that, you know, work hours were cut ...So, right, that was always like a thing that I was always thinking about.

Economic hardships affected FGML's first-year transition at a STEM college because instead of being able to explore and learn more about themselves freely and openly, they were constantly trying to juggle how to continue to financially survive day-to-day while also trying to be academically successful. Essentially, instead of being able to reflect on themselves and their personal growth while in college, they had two things on their mind: 1) meeting basic needs, and 2) academic success.

**Working to fund college and life.** As eight out of 10 participants applied for tuition assistance, they also began to think about obtaining a job or increasing hours at their current job. Students felt they needed a steady stream of income to continue funding college, save money to pay back student loans, and be able to pay for transportation and food. The concern of having to work is not a true of all college students, but very much so apparent in the college transition of the participants, as they were each part of a low-income household. In my analysis, FGML were focused on funding their basic needs so that they could eventually complete their degree and become financially stable and employed in professional fields. Unfortunately, they realized that the cost of college, books, materials, good Wi-Fi, and other hidden costs was more than they had thought would be a part of furthering their education. For example, when asked about the biggest struggle in his first year of college, Jacinto described the hardships of living day-to-day after also paying for college:

It's like you have to change the pace of studying because I'm part of a low-income household, there's not that much money to go back and forth with the train and eating becomes a major concern, like you can only afford packaged food especially when I went

on public transportation and when I went to college and then I had to make sure that I had all my work done before I go home. I worked in HVAC with my Dad at times, sometimes, so during the weekend when I usually have time to relax a little bit, I'd go to work in order to help my family and pay for you know tuition, food, and rent.

Nero, similar to other participants, detailed how his priority became looking for a high paying job that could fund his whole tuition for college, rather than studying more:

So, I basically have to cover I would say a hundred percent of my tuition at that point.

Because I know my parents are hardworking but it's one of those things, like they already have enough things going on in their life, bills. And that's why I take up college. I'm, I take the paying for my school on myself, by myself. I haven't needed any assistance, but it does get difficult all the time. Once payments are due then you have to have this much saved up. Otherwise, you're going to get charged late fees, which is going to just be more of a hassle. So, I recently started working about like three months ago.

Nero's example highlights the time that is taken to work at a job, which could mean time taken away from meeting new friends, spending time with family, studying, or completing an assignment. Not all college students struggle with financial concerns while also trying to excel academically, but FGML do. Participants many times had to come to terms with getting "B" and "C" grades in courses, rather than the "A" grades they could have achieved if they did not have to worry about money or take time to work. Participants shared that, for them, the college degree was the path to become financially stable professionals who do not have to think about meeting their basic needs.

In my analysis of the participants' explanation of the struggle to pay for college,

I found financial barriers to be the first barrier that comes between FGML and completing their college education. Once classes begin, there are also hidden costs for students, such as books, special computers, and materials for classes within STEM disciplines. Additional costs unbeknownst to the participants and imposed by the university were an additional stressor. The institution assumes students can afford such items, not realizing that there are students who can barely find money to feed themselves. Therefore, FGML are left with trying to be successful in a setting that does not always recognize their needs, making it difficult to do well academically and graduate.

### **Theme 2: Academics: Acclimating is “exceedingly difficult”**

One participant, Jaylin, described his first-year STEM college transition as “exceedingly difficult,” and I could see the struggle in his eyes as he spoke of the transition. He was not alone in his feelings, as the other nine participants also discussed their own struggles with the academic transition to a STEM college as FGML. Participants shared the ways in which their own personal issues and the global COVID-19 pandemic affected their academic transition. Ultimately, three subthemes were indicative of the participants’ experiences, including: 1) *Adjusting to the academic rigor*, 2) *Utilizing time management*, and 3) *Utilizing academic resources*.

**Adjusting to the academic rigor.** The financial barrier imposed on FGML attending a STEM college also is evident in their performance in the classroom. Nine out of 10 participants discussed the difficult time they had with the demands of their STEM courses. Participants shared how they did not expect college-level work to be as difficult as it was for them. At times, the participants had to teach themselves and catch up on course material they were unprepared for. Although many students struggle with the transition from high school academics to college academics, the FGML participants share a unique experience in that they did not have 1) the



social capital that their continuing-generation counterparts had, and 2) they came from communities with underfunded public education systems. Underfunded schools provide fewer opportunities to prepare for college-level work (e.g., advanced coursework). Jacinto described this best when he shared how he did not feel prepared for some of his STEM courses:

I felt okay, but some part I feel like I was a little behind because my high school didn't offer placement in like AP [Advanced Placement] classes that some people had in their high schools. I went to a public high school. So yeah, that's like I feel like I was at a disadvantage and was also trying to catch up.

Participants fell behind in coursework, but many also were not acclimated to the academic level that STEM college courses were taught or what was expected from them by their professors. Unlike the participants, some of their continuing-generation peers learned about the academic rigor of college courses and the way they are taught, graded, and tested from their parents or siblings who had attended college. Nero was able to detail how and why a college math course was much more difficult than he expected, due to both the grading policies that were new to him along with tests created in a way he was not accustomed to:

[T]he curriculums, they were almost designed not to benefit us like the main issue here is more of like the math classes because I know the math classes at the university just get very, very difficult as you go. And me being an engineering major, I have to go through all of the higher level ones. So, they're almost designed to like, they're testing you on like, for example for calculus, you take an exam for calculus. Usually, the calculus part is very easy, but then you get graded on like the little algebra aspects like simplifying and things like that and simplifying to basic and if you don't simplify properly, you could lose let's just say eight out of 10 points on a question or 10 points on an exam, which I

understand that point but it's to the point where it's like, oh you did the calculus correct, why really be graded on the algebra? Right? This took adjusting too as high school was more straightforward and less detailed on past math I knew.

In my analysis of the reflections of Nero, Jacinto, and the other participants, I learned that the participants were faced yet again with another barrier to their academic success that stemmed from being part of a low-income household. Participants were not given the same high school education as some of their continuing-generation counterparts who went to more affluent high schools, making it difficult for them to succeed in their transition to college. Participants shared that they had grown accustomed to the barriers placed in front of them and seemed ready to combat these barriers, as they have all their lives. FGML had to work harder to achieve the same academic success as some of their continuing-generation counterparts who had assistance through their own social capital.

**Time management.** Along with adjusting to college-level STEM courses, all 10 participants shared their struggles with how to manage their studies with other life responsibilities. When starting college, most students need to learn how to manage their time. However, participants in this study were not only learning to manage their time, but they were doing it with less availability for their studies, as they also worked and/or were assisting their parents with taking care of siblings and the home. All the aforementioned factors, combined with the need to spend more time studying for advanced level college courses, made the first-year experience and managing time difficult for participants. The participants discussed being overwhelmed and tired; they were studying all night long so they could work and go to classes during the day, often compromising their own wellness. For example, Hasina described how her

first semester in college taught her about time management, especially when she was also looking to have a social life on campus:

But I will say college showed me a lot about time management. School showed me a lot about where time is going and just kind of like how to navigate between school and like your life, because even though we (all students) essentially didn't have a life, we were still trying to make friends. We were still trying to, like, work and work things out on our own and I remember crying many times, especially when I would be up late.

Participants looked for ways in which they could organize their time better, so they could get sleep and do well academically. Some participants explained the usage of a planner for the first time in their lives. Nero outlined this best when he spoke on how he had to manage his time so he could make it to work and classes:

Planning out your day planner and your schedule a lot harder versus the high school schedule where you have this the 7 am to 3 pm schedule every single day Monday to Friday. Now, it's like I have a break in like every day and every week my schedule is different. I have a Monday to Saturday, for example, classes at various times. It's just getting used to that, managing a work schedule, as well, so I could help pay for this [college] and everything like that.

The high cost of college pushed participants to be extremely disciplined with their time. In order to be academically successful in their first year, participants described how they had to find time to work, attend to family responsibilities, attend classes, study, and complete assignments/projects/papers.

Along with the need to plan out their days and weeks, participants also discussed how although family was influential in their college endeavors, they spent less time with them. Due

to increased student and work responsibilities, less time was spent with family, and as family was a means of support to the participants, the college transition became very overwhelming at times. For example, Belinda explained how her biggest obstacle was the difficulty of fitting in family time in her first year:

Trying to manage all the different aspects of my life, like family, work, friends, while still getting good grades. I think that has definitely been a challenge because like I said architecture it's like if I don't dedicate every free second that I have to that project, it won't come out the best of my abilities, you know, and I think having to have a job really like lessened my, my connection like to my family maybe, not so much my friends, just because they were all around me like while we were all working on projects, but I think my family like my connection to my family definitely took a toll last semester, especially I remember that my parents were very upset when they were like, you come home you go to sleep and then you leave again the morning like they'd barely ever saw me so that was a little challenging, you know, trying to figure out how to balance, but I did eventually find one.

Participants felt worn out by the amount of energy they had to put in to manage their time. Not only were they drained physically and mentally, but also emotionally as they did not get as much time with supportive family members. Participants, at times, felt defeated as they had to then find ways to make time for school so that they could be academically successful, while compromising time with their support system. The first-year transition stress was compounded by additional factors as they tried to excel in their courses and keep up with the academic difficulty of a STEM institution.

**Use of academic resources.** Eight out of 10 participants stated that they also needed to make time to get help with their rigorous STEM classes. They described getting assistance through tutoring, online videos, a first-year seminar course, and/or attending professors' office hours. Since the participants do not have parents who attended college, many of them felt they could not go to their families for help, as they could when they were in elementary school or high school. Also, the participants did not have the funds to hire private tutors, as some of their continuing-generation classmates did. Therefore, they looked to the university to provide resources to assist them, as their high schools did. Nero shared the aid he received from tutoring centers and his frustrations during the global COVID-19 pandemic:

...I do have to give credit where due to the tutoring center, as it has helped out as well, but that was when it was in person and now that it's virtual it's not as like pleasant to go to anymore and like you can't really go in person. So that's kind of been a little difficult. I know they have like virtual stuff, but...you have to set up a meeting and that can get kind of frustrating...like say you have a quiz next week, but then you don't have a meeting available until the week after next, it kind of defeats the purpose.

Similarly, when asked about what was most useful to him in his college transition, Jaylin explained his frequent usage of the tutoring centers and how meeting with professors proved helpful to him:

Resources I could find and used the most is the physics tutoring center. But, every tutor knows my face in the math tutoring center...that I missed during quarantine. I went in there like consistently, constantly, to the point where you'd think like I was like looking for a tutoring job because like I was always in the tutoring centers and I went to see professors. It was very helpful and good.

Jaylin, like most participants, needed resources to help augment the learning that took place in his classes. Many participants could not afford private tutors, so they looked for the resources made available to them by the university, which were already included in their tuition.

In my analysis, participants tried to manage with what resources they had to reach their end goal of an academically-successful first year of college. However, they struggled with a lack of time and how to excel in their classes while working to afford college. The financial barriers they experienced did bring them to breaking points, where they would feel mentally, emotionally, and physically defeated. Therefore, they looked inside themselves for the strength in addition to a network of both peers and mentors to aid them through this transition full of hurdles. In the end, FGML found the stress that accompanied the academic rigor increased the mental and emotional strains on their first-year college transition experience.

### **Theme 3: Guide Me: Experiencing Mentorship**

Understanding the barriers they had already encountered and would meet in their college journey, eight out of 10 participants built a network of social capital with mentors who guided, supported, and helped motivate them throughout their first-year college transition. Participants in this study did not begin college having the professional and social capital that many continuing-generation students had already established. The participants, however, looked to build their own social capital to help them get through some of the challenges they were encountering. Participants shared stories about the mentors in their communities and/or within the university. All eight participants discussed the assistance they received from either faculty mentors or community mentors, such as church leaders or karate instructors. Mentors also assisted FGML when they were struggling with the racism and/or sexism they experienced on

campus. The two subthemes that emerged were: 1) *Experiences with Faculty Mentors*, and 2) *Experiences with Community Mentors*.

**Experiences with faculty mentors.** When acclimating to a new setting, having someone within that setting to speak to helps individuals to feel more comfortable and connected. Eight out of 10 participants mentioned faculty members as mentors. The participants were looking to receive mentorship from faculty on how to become professionals in their fields as well as how to excel academically and socially in college. The participants would attend the faculty members' office hours in person, and then virtually during the global COVID-19 pandemic. Participants described how faculty mentors helped serve as guides for them in academia and in their personal lives. When asked whom or what was most helpful to her in the first-year college transition, Belinda stated how she was questioning her choice in academic major and it was a faculty mentor who assisted her in gaining clarity:

I think someone that's been helpful is the professor that I had last semester for architecture. She really helped me to realize like why I'm doing this and she, she gave me some really good advice during a semester when I had a little bit of a situation. I was in a little bit of a tough spot and I didn't know if I wanted to stay and she told me something that was really good. She said...I see that you love it now, but every once in a while you need to stop yourself and just ask if this is still where you want to be because you may think you're loving it but then at some point you...might change your mind. Yeah, that was really helpful because...to change my mind I thought would be terrible. Like I thought if I changed my mind, I would have to start from scratch again. It would have been a waste of time, but she helped me to gain clarity that if I wanted too, I could

change, and it would be okay. In the end I decided to stay with my major, but her help and time she spent with me was amazing.

Participants in the study shared how some faculty expressed care for them. They discussed that they were able to connect best with faculty mentors who gave them the time they needed to share their own thoughts and feelings. The students appreciated the time their faculty mentors gave them and felt they were genuine and caring individuals. Connecting to faculty mentors helped the participants feel more comfortable knowing they had a support system that understood the college experience. Participants felt less pressure to have to get through barriers on their own. For example, Desirae was verbally and sexually abused by men she thought were her friends on campus, so she had to work on building her self-esteem back up. She felt the best way to lead a healthier and better life was to surround herself with positive people. Desirae described how she felt care and positivity from her faculty mentor and someone she could go to for academic and professional advice:

I'm cutting off ties with people who don't care about me. I'm finding people who care about me, even on campus, faculty who actually do care and being able to...differentiate from people who are just doing their jobs and genuinely care and I think that to me, that's my greatest success because they help you, put you in a better path.

For some, the notion of surrounding themselves with positive professional mentors on campus came about due to the negative interactions the participants had with racist and sexist faculty. Desirae shared:

When I first came to the university, I've never seen men treat woman so bad. I don't know if people actually realized it, but I feel like people are really in it and may disregard the comments. But I had seen men, a lot of them, like say terrible, terrible, mean things to



our faces and they did not mind telling you to your face that you should not be here (college). It's not like they respect women at all. Like what am I supposed to think that I'm... I'm... I'm a double minority. I'm a woman and I'm black and they will tell you straight up your face, like asking you, "what are you here for?"

Similar to Desirae, Hasina spoke on how society and her current college environment made black women, like herself, feel self-conscious about their bodies and their hair. She specifically discussed how she would no longer listen to the negativity of the outside world and focus on positive self-talk about her body and hair. After being asked what her greatest success was in her first-year transition, Hasina shared:

I'm very proud of my hair, very, I'm deconditioning it right now. I'm very proud of my hair. Yes, very proud of my hair. But it's just always been like a body and hair issue for me. And I really don't know what I can actually do because society demeans women and women get targeted for their body or hair all the time and black women get it even more. Yeah. So I was just like, we're not going...we're going to stop the negativity this year. I think that has been a really good success, I guess talking to myself. I guess clearing all the doubts that I have or negative emotions that I have.

In my analysis, participants felt they had to ignore or battle through the sexist and racist comments they received to persevere in their academic and professional goals. However, by speaking to faculty mentors the students were able to release some of their emotional turmoil regarding the discrimination they faced. Also, I could see the emotional and mental toll various oppressive experiences took on the participants as they were retelling the stories of the past year, making their first-year college transition more challenging with the compounded barriers brought about by their intersecting minority identities.

**Experiences with community mentors.** In this study, seven out of 10 participants discussed community mentors who assisted them in many ways, from guiding them with academics to helping them with food and transportation. The participants felt that it was the support of community mentors who had attended college that provided them the motivation to continue on in their first year of college. The seven participants discussed how community mentors knew them even before their college transition, and thus the participants felt safe confiding their successes and struggles to them. When asked who or what assisted him in his first-year transition, Jacinto shared who supported him:

I'll say my karate instructor. He understands studying and college and how classes can be hard because he had them and he knows the feeling as he went to a university. And you know I just talked to him and he would tell me, you know karate is one thing but make sure you finish your studies... [A]s a friend, he like pushed me further than I thought I could go and he would like drive me to like, you know to school sometimes when he knew I was tired, and I was like, you know, I need something to eat and he would get me a sandwich.

Similarly, Hasina described how her church leader was like a mentor to her in many ways:

My church and specifically like one person I want to mention...she has always checked in with me, to make sure I was OK, if I needed something, she would try to help get it. She's always been hopeful even before quarantine, I want to say, ever since I started going to church she's been there to always take an interest in me. So I'm very thankful for her and her support to me always.

In order to assist them in their first-year college transition as first-generation students, participants continued building their social capital through both faculty and community mentors

of all races and ethnicities. Participants outlined the wish to have mentors who showed both genuine care and knowledge about all aspects of college life. In my analysis participants enlisted the aid of mentors they trusted to lessen the burden of handling the financial, racial, and sexist barriers that were affecting their overall wellness and their first-year academic success.

#### **Theme 4: Connect with Me: Experiencing new peer relationships**

In continuing to build their social capital, all 10 participants described how their connections with their peers, whether through study groups, clubs, and/or friendships either supported or hindered them in having a successful transition. The participants wanted to connect with other students and sometimes those connections provided more challenges for them than expected. The subthemes include: 1) *Peer interaction within study groups*, 2) *Peer interaction within clubs and/or organizations* and 3) *Peer interaction within friendships*.

**Peer interaction within study groups.** There were eight out of 10 participants who shared how study groups positively affected their first-year transition. These groups assisted them with understanding the material in their courses and learning how to lead and work in a team environment. For example, when asked what was most helpful to him in his college transition, Jaylin shared his experience with a successful and productive study group. He stated how the study group aided him during his first-semester math course:

I had a really good study group in my first math class which was differential equations. The group was challenging but extremely fun because the people I met in that study group really liked learning and there's a guy who I made friends with who was actually like in his second master's degree. And so like, you know, he looks like every other student because he was super baby face, but he was like I'm 22, but he was sort of like took a leadership role in our study group, that I started, and he was really good at

teaching so he taught all of us and you know, we taught him and it was a great study group, because that's what it should be like.

Jacinto also discussed how a study group was helpful to him and his academics, but it also taught him how to manage his peers when they were not participating effectively:

Yeah picking the right people who really want to work and not mess around. At first just people would just join in and not do anything and we had to tell them, you know, you can't stay in the group. Those that weren't doing any work we just told them, you know you can't be in the group anymore and then we would stop texting and calling them, you know about the day and time we are meeting and if they asked about it we would tell them you weren't working so you had to go.

The participants seemed excited and happier when they discussed the study groups. These study groups aided in bringing both connection and positivity into their first-year transition. Participants wanted to feel connected to others in college to combat barriers associated with being first-generation students and get the information they needed to be successful in their coursework. Therefore, participants felt starting study groups was a great method to both achieve academic success and survive within their college culture.

**Peer interaction within clubs and/or organizations.** Along with study groups and building on to their social capital, eight out of 10 participants brought up how clubs and organizations they joined helped them through their first year. They created networks they could go to for academic, personal, and career assistance. Participants shared their desire to be a part of a club/organization with students of the same race or ethnicity as them and where most members would be in a similar STEM field. Participants wanted to work with students who were facing the same barriers so they could help each other as a community. Like other

participants, Jaylin described how being part of a STEM professional organization in his first year was essential to his positive transition to college:

I hang out with like the upperclassmen in IEEE [Institute of Electrical and Electronics Engineers], a lot of them. They're like, yeah, I totally understand your experience. You know your first year, like you should not change your major, like we've all been through that, like really comforting like be near like the people who have had like the same particular situation.

Similar to other participants, Barto and his peers also were able to either join existing clubs or create their own club:

I and my friend created this club. It was called the Russian Club, even though no one was Russian, but it wouldn't be like a club. You could just talk about school, helping with homework and stuff like that. So, I joined that that was fun. I also did the art club. That was really fun because I've always loved to draw so...a different styles of art and how people you know, drew was really awesome.

Participants wanted to be able to connect to those who would be beneficial to their future professional careers. However, connecting with them in study groups would give them the ability to, at times, relax and take a break from their concerns and worries with financial, racial, and sexist barriers.

**Peer interaction within friendships.** Friendships were brought up in all 10 interviews and all participants described how impactful these relationships were to them, both positively and negatively. Many participants discussed how happy and excited they were to be able to build relationships with students of their same ethnicity and race. They felt like “finally,

someone who understands.” For example, Keya shared how critical having a healthy social life in a new place was for her and how she formed friendships with her classmates:

I was lucky, actually I think, because I could be friends with some friends in my classes like Physics or Calculus and I could talk with them and some of them are really friendly they have responded to me kindly and they kind of...they understand me because they were new, also. They kind of knew what am I going through and what kind...what kind of feeling I have, really helped me so I got friends and I think I did a really good work for my social part.

Anika, like other participants, expressed how she enjoyed making friends of a similar background to hers:

I never really had friends from like the same background as me, I'm South Asian. So I never really had that many South Asian friends, but I did at the university and I got a community of people with my background which I was hoping to, which was nice. I honestly think it's very cool that so many other children of immigrants go to the university. One of my friends she came here from Pakistan like three years ago. There are many immigrants from Nigeria and like the rest of Africa and like I don't think I've met this many children of immigrants anywhere else.

On another note, three out of ten participants described how they made connections with peers they thought were their friends but were not; they shared how difficult it was to find true friendships at the start of their college career. Jaylin explained how the friends he made in his first few weeks of college turned into a negative interaction that left him very distrustful of his peers. He made friends with students in his dormitory and went with them to a party where he

spoke to a girl. Unfortunately, his friends presumed he was “stalking” the girl. Jaylin recounts how he was bullied in the cafeteria by two students to scare him due to his “stalking:”

And these two guys are near me just standing there like with their, the arms like tightly folded their chest and they're like, they basically asked me. Do you know such and such girl we heard you were stalking her so you're going to have to stay away from her because she's not allowed to date until graduation and you know, removing the such-and-such restraining or blah, blah, blah, and then they left. It made me feel worried about going back to my dorm and I called my mom for advice. I was so confused and she asked me to report it to the Dean of Students since we did not know what these guys could do to me.

The three participants cited their eagerness to meet new friends at the start of their college transition, but their first choices in friends led to more unnecessary challenges. Poor choices in friendships resulted in the participants’ negative outlooks on the college transition and their own personal self-confidence. However, when positive friendships were made, participants felt more connected with the institution as they built connections with those around them who were also encountering similar barriers. Participants wanted to learn how to handle their new environment and thought they could do so by navigating it with peers similar to them. Again, creating social capital mitigated the mental and emotional toll that the financial, racial, and sexist hurdles took on the participants.

### **Theme 5: La Familia: Experiencing college with the family**

All 10 participants not only discussed peer connections as being vital to combatting the barriers faced in their first-year college transition at a STEM institution, they also shared how family played a large role in their transition. Participants’ family members, and parents in

particular, had not experienced college, but stressed to their children how important it was to attend and obtain a degree. Either intentionally or incidentally, parents were a model for the participants what their lives may be like if they did not have a college education, which included working long hours in blue-collar positions. The participants shared that they wanted to try and build a life that would be in ways easier than their parents'. Therefore, although family members had never attended college, participants did look to them for support and motivation. In the interviews, participants shared how their family members were sources of motivation and support. The subthemes include: 1) *Motivation from family*, and 2) *Support from family*.

**Motivation from family.** When participants were asked what kept them motivated throughout their first year, all 10 participants responded that their family made them feel motivated. Fatima, describes this well when she shared how her family motivated her and how she plans to motivate others:

So one of my brothers, my second brother. I have a huge family. So he's in Bangladesh still, he's an engineer and he's like the inspiration for all of us and my parents always wanted us to study even through our struggles, they didn't go to college but they always wanted us to have a degree and like do what we want to do, like shape our future and stuff. So yeah, I am from a village and my father is the chairman of our area. So if we go to college, then many other people in the village, especially girls will be inspired from us.

Barto also discussed how his parents not only impacted his desire to go to college but also to specifically major in a STEM field:

My mom doesn't work, but she used to work and I used to see how she would you know work two jobs and then run home to pick me up from school so that I could go home and she would stay up with me doing homework. So I like, I saw her struggle from not having



an education and coming from a different country where she only finished high school. She didn't get the opportunity to do more, so I kind of saw her struggle for not having like a higher education and my father as well...so like throughout my childhood I've seen my dad change various jobs. So now he works with engineers on a daily basis, even though he doesn't do like the, like the designing, he does like the hard work, he knows how to read the plans that they draw and how to operate the machine. When I graduated from high school I went to his job and I got to see what it was like working, you know, as a, as like my dad does so I was like, you know, I get paid, you know good, but I'm also physically like exhausting myself. I was like, is that really something I would be willing to do for the rest of my life if I don't, you know decide to pursue a higher education and then I also started to see like what the engineers do. So I really liked that environment and most of them were mechanical engineers. So that kind of like influenced my decision of studying mechanical engineering.

In my analysis, participants needed their families to motivate them and remind them of the goals they had in place for themselves and their families. FGML want to make their families proud and be able to graduate, become professionals, and give back to their families no matter what barriers they encounter. Therefore, they like to have that family connection to keep them motivated.

**Support from family.** Along with being motivated by family during their first-year transition, eight participants discussed the varying levels of support that their families gave them. The families of the participants did not truly understand what their children were going through in college, but many family members supported the participants in their own way. Belinda, like

the other seven participants, explained how her parents were supportive even when she felt they did not understand the demands of her college assignments:

I feel like my parents have tried to be supportive throughout this process, but it's just been a little difficult for them to understand like why certain things were so much of a challenge for me. For example, there were a lot of nights where I would like have to stay at the studio to try to finish a project or...or something like that and my dad would just like message me, like you have to be home right now, but I couldn't I had to finish my project, that conversation happened like so many times over the past year and it's challenging because I know a lot of my architecture friends they'll dorm just because it is easier for them to always just be there and because we do have like a lot of rough nights, but my dad really doesn't want me to dorm, so being a commuter and also him not really like understanding why I have to stay there was a fight every time. We were able to kind of, we worked something out a little bit. He was like, okay, you can stay till midnight no later than that. So I would just kind of cram as much as I could into my project by midnight and it actually really helps because I was going to sleep really, really, late last semester and it was not good. There were some nights where I just didn't sleep and then this semester I kind of learned where as long as I sleep, if I wake up early, I can still get the work done the next day, but I needed that break, you know and so him kind of telling me like hey come home and sleep was actually like really helpful, you know.

Keya, like many participants, shared the support her mother provided her when she feared doing anything new in college:

Oh my mom, she was very supportive. She was like go do this like as far as applying for an on-campus position. She was really supporting me in like going for it and applying.

She told me you will meet new people, you will learn things, you're social, even your language can improve. Yeah, she is also very positive and she always supported me for doing new things and doing them correctly. Like she always says, like if you have questions go ask.

Although families did not always understand the participants' first-year college transition, the participants still expressed the gratitude they had to their families. They were grateful for the nurturing they provided when they were younger and for pushing them to excel in college. Participants and their families felt that a college degree would be their key to a future that would be free of financial burdens and allow them the flexibility to enjoy life.

### **Chapter Summary**

In this chapter, I presented the findings from this dissertation study. I discussed the five overarching themes and respective subthemes that emerged through phenomenological data analysis. The *Finances: How will I pay for college and live day to day?* and, *Academics: Acclimating is "exceedingly difficult"* themes depicted participants' largest concerns and barriers to their first-year college transition. The *Guide Me: Experiencing Mentorship, Connect with Me: Experiencing new peer relationships*, and *La Familia: Experiencing college with the family* themes were indicative of participants lived social experiences and desire to maintain and build social support to assist with persevering past the barriers they encountered. I provided excerpts from participants' interviews as exemplars of the themes and subthemes. In chapter 5, I will provide a discussion of the findings, including how the findings relate to existing literature and theory, strengths, and limitations of this study, and implications for higher education.

## **Chapter 5: Discussion**

In the previous chapter, I presented the findings from this dissertation study. I discussed the five overarching themes and respective sub-themes that emerged through data analysis of participant interviews. I also provided quotes from participant interviews to capture the essence of the themes and sub-themes. In this chapter, I will provide a summary of the findings, interpretations of the results relating to the existing literature, and the strengths and limitations of the study. I will end the chapter with the implications for counselor education, higher education, and future research.

### **Summary of Findings**

The purpose of this dissertation study was to understand the Science, Technology, Engineering, and Mathematics (STEM) college transition experience of first-generation minority students from low-income households (FGML). As a first-generation college student turned STEM higher education administrator, I embarked on this study to truly learn, from FGML themselves, how they experience the first-year transition to a STEM university. The current literature focuses on programs that have been implemented within institutions for college students of varying minority identities and what researchers' and educators' found to be the issues for these populations (Goonewardene et al., 2016; Maietta, 2014; Museo, 2011; Sinanan, 2016). However, there is little known about how the STEM higher education first-year college transition is experienced by undergraduate college students with multiple intersecting identities, such as FGML. Through their stories, I hoped to uncover what aided and deterred these students from a successful transition. My goal is to inform STEM higher education institutions in the U.S. how to better serve FGML, as they are not graduating at the same rate of their white, continuing-generation counterparts from middle to high-income households (Allan, Garriott & Keene, 2016; Byrd & MacDonald, 2005; Cox, 2016).

During the course of the interviews, participants shared their perceptions, understandings, and experiences with the transition to a STEM college. Their encounters as FGML influenced the participants' perceptions and interactions within the college adjustment experience. Participants described the STEM transition as stressful and "exceedingly difficult." Due to their intersecting minority identities, the participants encountered financial hardships and systemic barriers. Racism and sexism had emotional and mental effects on the students' college transition experience. The importance of race was shared by the participants, and critical race theorists posit that race is central both to people's lived experiences and their worldviews (Crenshaw et al., 1995; McCoy & Rodricks, 2015). Participants discussed race as something they learned about early in their lives and reported experiencing racism and/or race-related discrimination during their STEM college transition. Participants' experiences with learning about race and experiencing racism coincided with the permanence of race and racism tenet of Critical Race Theory (CRT), or the notion that race will continually affect the lives of people of color (Haskins & Singh, 2015; Trahan & Lemberger, 2014).

Participants also discussed how their various identities intersect with their racial identity, fostering unique experiences. These experiences correspond with research on intersectionality (Crenshaw, 1989; 2014), a salient aspect of CRT (Haskins & Singh, 2015). Further, it is noteworthy that the identities participants discussed regarding intersectionality were minority identities (i.e., gender for female participants). The experiences discussed by participants align with the tenets of intersectionality that describe how people experience discrimination differently depending on their overlapping identities (Crenshaw, 1989; 2014). For example, a black female may experience microaggressions differently than a black male.

Another intersecting marginalized identity the participants all shared, was being part of a low-income household. Socioeconomic status (SES) has an effect on how the participants experienced their first-year college transition (Stephen, et al., 2012). The participants shared what the research on low SES students describes, that in general, they have fewer resources and less academic preparation for college than those available to students in a higher SES (Mompremier, 2009). The participants felt behind in their academic studies as compared to their higher SES classmates, they explained feeling their confidence drop a bit and having to work harder and find more time to catch up in their academics. Therefore, not only did they have concerns for how to pay for school and have to work to emotionally get through sexual and racial microaggressions, participants also had to overcome the obstacles that came from being from a low SES household.

Along with encountering systemic barriers and financial hardships, peer relationships also came up as both positively and negatively affecting their STEM college transition and academic success. The literature indicated peer support is crucial to first-generation minority students (Phinney & Chuateco, 2005). However, the participants in this study, instinctually had the know-how to acquire on their own and utilize new social capital, such as positive peer relationships and faculty mentorship, to positively aid in their new transition to a STEM college. The utilization of new social capital, coupled with the participants' unwavering desire to succeed academically for themselves and their families, led them to persevere through systemic hurdles and acclimate to their new environment during a global pandemic.

### **Foundations of the First-Year STEM College Transition**

According to the participants in this study, the initial concern with their STEM college transition began with how to pay for college and succeed in college-level academics. In the *Finances: How will I pay for college and live day-to-day?* and the *Academics: Acclimating is*

“*exceedingly difficult*” themes, participants discussed their initial thoughts, feelings, and experiences with the STEM college transition. Participants shared that their first concerns with college were encountering financial disadvantages and academic challenges. The participants shared that their inability to fund college on their own as well as a lack of academic preparation from their K-12 education affected the time they had to study, work, and live.

The *Finances: How will I pay for college and live day-to-day?* theme was consistent with existing research and theory that detail the stress and burden of funding college for this population (Astin, 1993; Gayles & Ampaw, 2014; Maietta, 2014). Literature suggests that FGML need financial supports in place to have a successful college transition (Feller & DeCrane, 2016; Tinto, 2010). Participants came from low-income households and poorly funded K-12 education systems and, upon arrival at the university, they quickly realized they would have limited time to study and adequately prepare for classes because they had to work to fund their education. Similar to other minority student participants in the current literature, most did not attend well-funded high schools and they were not as exposed to preparation for college-level classes as students from well-funded high schools (Allan, Garriott & Keene, 2016; Byrd & MacDonald, 2005; Cox, 2016). Therefore, due to their socioeconomic status, participants felt they had to work harder to be academically successful than their continuing-generation counterparts who came from middle to high-income households. At times, participants were required to buy supplies for their classes (e.g., art supplies or special computers) to complete their assignments. As a higher education administrator, I did not realize that professors require students to purchase items in addition to textbooks in order to take some classes. It is exceedingly difficult for the participants who cannot afford their books or food to have additional funds to purchase what is required to successfully pass a particular course. This is an

institutional financial barrier for FGML, which results in an inequitable educational setting. For example, most students from middle to high-income households are able to afford the best internet access and computers, making it easier for them to succeed in their classes. However, the participants in this study do not have the funds to purchase the best equipment that would help them succeed in their courses. Essentially, in this study I found that students who do not have both social capital and adequate financial means, essentially a low socioeconomic status, may have a more difficult time transitioning and being academically successful in a STEM institution of higher education.

The importance of attending college was instilled in participants by their families. Participants detailed their belief in the importance of having a professional degree in order to become financially successful in the future, but they also knew of their families' financial hardships and did not want to burden them with funding for college. Thus, they took it upon themselves to find jobs or apply for loans, scholarships, and anything that would assist them financially in reaching their academic goals. Both Critical Race Theory (ASHE, 2015) and the Critical Multiculturalism model (Alenuma-Nimoh, 2016) highlight the need for traditions and social practices to be regularly assessed for equity for minority races. An example for the higher education social system would be universities officials reviewing when the university's campus centers operate and how and if the hours and practices benefit all students, including FGML. Another example would be how open to changes the educational system is in order for the betterment of society as a whole, including the right of underrepresented groups, such as FGML to have equitable access (Alenuma-Nimoh, 2016; Rocco, Bernier, & Bowman, 2014). This qualitative study, while limited in scope, suggests that the higher education system in the U.S.



may need to consider accessibility and funding for FGML in STEM majors if they would like retention and graduation rates to rise for FGML (Camera, 2016; Pell, 2011, 2018).

In the *Academics: Acclimating is “exceedingly difficult”* theme, participants described how arduous it was to get adjusted to learning at the STEM college level. The feeling that college-level coursework is difficult is common to many first-year students (Goonewardene et al., 2016; Tinto, 2006; Tomasko et al., 2016). However, for the participants in this study, they described that it is quite different for them as opposed to many of their white peers from middle to high-income households, who were able to hire personal tutors (Maietta, 2014; Riggs et al., 2018). Participants shared that they felt academically unprepared in STEM courses (i.e., Math, Physics, and Chemistry). This is consistent with the existing literature. Researchers have discussed how first-generation students, especially those from low-income households, may be academically unprepared in their first year of college and will need academic support systems in place to have a successful transition (Astin, 1993; Gayles & Ampaw, 2014; Maietta, 2014; Pascarella & Terenzini, 2005; Sinanan, 2016; Tolliver et al., 2019). However, the existing literature does not address findings from my study which suggest that FGML who are pursuing STEM are so determined to succeed that they will take it upon themselves to find the resources and social capital they need to be successful in their studies and their social life. Faculty, staff, and administrators in STEM institutions may need to learn and find innovative ways to share early on in the transition process the programs and resources they have in place to help FGML. If they do not have any programs in place, they may need to assess the need on their campuses and possibly start implementation of such programs in order to create a more equitable educational experience for FGML, which could, in turn, lead to higher graduation rates for this population.

Participants discussed their need to employ academic resources on campus, such as utilizing professors' office hours and attending tutoring, to be academically successful in their courses. This is also represented in the existing research. Researchers have discussed how many students from first-generation minority groups need tutoring for a positive college transition (Bir & Myrick, 2015; Byrd & MacDonald, 2005; Goonewardene et al., 2016; Museo, 2011; Stephen et al., 2012). Both the participants and the research literature support that the need for tutoring does not stem from their lack of academic ability but rather systemic barriers (ASHE, 2015, Cox, 2016). An example would be not having accessibility to a well-funded high school because the student resides in a low-income neighborhood. There are many more resources available to high schools in middle to high-income areas, which allow them to better prepare students for a college-level education (Cox, 2016; Goonewardene et al., 2016; Pynes & Means, 2013). This is also another example of systemic racism discussed in Critical Race Theory and the Critical Multiculturalism model, which affects the academic success of the FGML population, as they are not afforded the same opportunities as their white, continuing-generation counterparts (Crenshaw et al., 1995; Gillborn, 2015; Hamedani et al., 2020; Hurtado, 1994; Pope et al., 2014; Rocco et al., 2014). What was not evident in the literature and was revealed in my interviews was that these students pursuing STEM degrees actively sought out and used as many on-campus resources as possible and looked to meet people who can help them through their first-year college transition. Although resources are put in place by institutions, sometimes, as STEM higher education administrators, and at my institution, we hear students are not taking advantage of such resources as professor office hours and tutoring; these negative perceptions run counter to what FGML shared in this study as they utilized all the resources they knew about and looked to gain social capital in order to succeed.

### **Social Capital in the College Transition**

Through the *Guide Me: Experiencing mentorship*, *Connect with Me: Experiencing new peer relationships*, and the *La Familia: Experiencing college with the family* themes, participants described a myriad of interpersonal experiences they navigated. Many of the findings within this theme mirrored the existing literature. Participants discussed the need to make new friends and feel connected on campus (Stebbleton et al., 2014; Stephens et al., 2012; Tinto, 2006). They also shared how essential it was to their college transition to have a core group of classmates to study with in the same major, and at times, with the same racial and ethnic identity. Not only did participants emphasize the importance of study groups, but they also spoke about the need to connect with their faculty as mentors (McCoy et al., 2015; Sinanan, 2016). Along with friendships, study groups, and faculty mentorship, participants explained how the successful completion of their first-year transition could not have been possible without the support and motivation of their families (Tate et al., 2015; Wang, 2014).

In the *Guide Me: Experiencing mentorship* theme, participants shared how helpful it was to receive guidance from faculty members and members of their communities during their first-year college transition. Participants illustrated that the support from these individuals allowed them to have a smoother time navigating their new college environment. This is consistent with the existing literature, which describes how social capital in the sense of faculty and staff mentors can potentially lead to academic success (Almieda, Smith, & Ruiz, 2019; Sinanan, 2016). Researchers found that first-generation college students from underrepresented backgrounds in higher education need mentorship in the first year, especially from faculty, to feel connected to the college, be retained, and graduate (Alenuma-Nimoh, 2016; Graham, 2013; Johnson, 2007; Johnson, 2011; Malone & Barabino, 2009; Tierney, 1999; Zeligman et al., 2015). The participants exemplified perseverance and an unwavering willingness to seek out new

friendships and mentors in order to build their social capital and work towards becoming academically successful in their first year. Much of the information in the current literature addressed how researchers and educators can find ways to assist minority student populations (Bir & Myrick, 2015; Byrd & MacDonald, 2005; Cox, 2016; Goonewardene et al., 2016; Museo, 2011; Stephen et al., 2012); however, not much of the literature indicated how minority students take hold of their own academic success by organically employing varying methods, such as utilizing academic resources and engaging in peer relationships. All in all, some of the literature, portrays the FGML population in a negative fashion, and through this study, we can see the strength students took to combat systemic racism and forge their own path toward attaining social capital in order to get closer to their academic goals.

Participants recounted multiple stories of the value and support that came from interactions with their classmates. The *Connect with Me: Experiencing new peer relationships* theme is consistent with the existing theory and literature. Participants' experiences correspond with research on first-time transitions, which states that students can be retained and graduate if they have a peer group going through the same courses and challenges as they are (Leary, 2018; Schlossberg, 1995; Workman, 2015). Further, it is noteworthy that participants shared the value of connecting with classmates of the same ethnic background as well as in the same major. The literature does present that first-generation minority students will look to connect and learn from those who are a racial/ethnic match (Sinanan, 2016; Tierney, 1999). At the same time, many participants shared how connecting with peers who did not have their best interest at heart was detrimental to their academic success. The existing literature does not emphasize that negative peer relationships can cause the academic success of FGML to falter.

Although the majority of participants discussed the positive nature of peer relationships they had during their first-year, others described negative experiences with peers. The participants encountered emotional, mental, and physical traumas, which, at times, sidetracked them from doing as well academically as they would have wanted. The suffering confronted by the participants stemmed from instances of racism, sexism, bullying, and rape. What surprised some of the participants about their first-year transition to a STEM institution, and specifically the female participants, was the sexism they encountered (e.g., one was asked why she was studying at a STEM school since she was a woman). Participants were very aware of their intersecting marginalized identities and the way the STEM campus community interacted with them based on these identities (Caplan & Ford, 2014; Hays, 1996; Pines & Mean, 2013). Due to the systemic barriers and individual experiences of racism and sexism, it is no wonder why FGML are not graduating at the same rate as white, continuing-generation students from middle to high-income households (Allan, Garriott & Keene, 2016; Byrd & MacDonald, 2005; Cox, 2016; Pell, 2011, 2018).

In the *La Familia: Experiencing college with the family* theme, participants illustrated how their families were sources of motivation and support during their first year. Although participants' parents had never attended college, the majority of families provided encouragement to the participants throughout their first-year college transition. Some participants shared how throughout their first-year transition to college their families would push them to try new things that would help them grow personally, academically, and professionally. Other participants described how watching their parents work hard to take care of the family motivated them to complete college, not only for a better life for themselves but for their families as well. This is in some ways consistent with the existing literature. Researchers have noted that

when first-generation college students first attend college, they want to do well and make their families proud (Christe, 2013; Maietta, 2014; Tate et al., 2015b; Tolliver et al., 2019). There has also been some research completed on the intrinsic and extrinsic motivators that college students hold and how they affect their academic success. Studies show that students can have varying level of both intrinsic and extrinsic motivators and that this can vary by students' marginalized identities. One research study showed that those students with high intrinsic motivation with a combined medium level of extrinsic motivation tend to excel academically (Lin, McKeachie, & Kim, 2003). They also found that those students who solely focus on extrinsic motivators, such as good grades, tend to not be as successful as compared to those with a combination of both intrinsic and extrinsic motivators (Lin, McKeachie, & Kim, 2003). Similarly, FGML throughout their first-year transition, strove not only to make their families proud, but to achieve academic success in order to live a more enjoyable, prosperous, financially-stable life in the future for themselves (Lin, McKeachie, & Kim, 2003; Trevino & DeFreitas, 2014).

### **Strengths and Limitations**

This study was a qualitative, phenomenological exploration of the first-year STEM college transition of first-generation college students of color from low-income households. There are several strengths of this dissertation study. This study adds to the growing body of literature on FGML and specifically on their first-year transition to a STEM college. In fact, this study is one of the few to specifically review undergraduate first-year, first-generation minority students in a STEM college. Through interviews, the participants were able to use their own voices and stories to describe their first-year STEM college transition and how they navigated the barriers they faced. The students seemed willing to share more about being first-generation after they heard that I was a first-generation college student and welcomed my interest as a higher education administrator in their first-year college transition experience.

Therefore, my presence may have helped ease the anxieties of the participants, who may have felt nervous meeting with someone they had never met before and who was associated with their institution. On a deeper level, the interview experience helped FGML participants to feel heard and validated in their experiences, and more specifically, by someone representing the institution and showing interest and care in their experience at the institution.

To increase the likelihood of accurate representation of participants' lived experiences, member checking emails were sent to participants to review data for accuracy, as well as frequent consultation with critical friends throughout the data collection and analysis process. Further, bracketing was performed throughout the research process to minimize the manifestation bias or contamination of participants' data. Also, as a higher education administrator, I knew the institution which allowed for an easy discussion for the students as they did not have to clarify certain aspects, such as acronyms for colleges and departments of the institution. Another strength of this study was the composition of the sample. Students with differing racial/ethnic identities and self-reported genders were intentionally sought to increase diversity among participants. Within this study, participants reported diversity among race, ethnicity, and gender.

Despite the aforementioned strengths, this study does have limitations. More participants may have shared additional detailed encounters with racism in their first-year if I had phrased questions differently (See Appendix E), or if, as a researcher, I would have asked more targeted questions surrounding racism. However, I do feel that participants may have been even holding back more detailed narratives of the racism they encountered in their first year due to my white, majority race. Perhaps they did not feel comfortable enough to share more than surface-level mentions of racism or perhaps I missed moments to capture more information or details

regarding race and the effects of racism on their first-year transition due to my own privileged mindset. Also, if I had asked more about the racism they encountered with faculty and staff, I could have brought about deeper discussions regarding power and oppression. Also, being an administrator in the college the students attended could also have kept the students from sharing more details as there is a power dynamic between me as an administrator and the participants, as students. Because only one interview was conducted with each participant, and trust is built over time, some participants may not have shared as much as they would have with an additional interview. Focus groups may have also assisted in eliciting more information as students feel more comfortable with other students around. Therefore, additional interviews or focus groups may have assisted in gaining more information on their experiences of systemic racism, as well as further exploration of themes across the interviews.

Furthermore, other theoretical frameworks that attend to the intersecting identities of the participants may have allowed for a different understanding of the narratives they provided. For example, although Critical Race Theory specifically attended to the race of participants, relational cultural theory (1976) or theory of intersectionality (Crenshaw, 1989) may have allowed for a different understanding of responses given the attention to race, gender, class, and other identities.

Other limitations are those common to qualitative research. That is, the sample size of this study ( $n = 10$ ) does not allow for generalizability. Additionally, despite having diversity among participants, participants were all residing in the Northeast Region of the U.S. and ages were skewed toward young adulthood (mean age = 18 years). Lastly, due to the global pandemic, there were no in-person interviews; all interviews were conducted through video-conferencing. The literature describes both the benefits and challenges of the video-



conferencing format for qualitative interviewing (Deakin & Wakefield, 2014; Hanna, 2012; Irani, 2018; Seitz, 2016). Some of the benefits highlighted in the research are the avoidance of travel costs, scheduling flexibility, as well as the comfortability for some participants to discuss personal matters from their own homes or a private location of their choosing (Irani, 2018; Seitz, 2016). However, some of the drawbacks include missing the physical proximity that is sometimes needed to comfort a participant when discussing sensitive topics (Hanna, 2012). Also, video-conferencing only allows you to see the participant from the waist up, therefore, a researcher may miss important non-verbal cues, such as feet or finger tapping (Deakin & Wakefield, 2014; Hanna, 2012). Perhaps more comfort could have been given in an in-person interview thus allowing the participants to reveal more sensitive and pertinent information within the interview session (Irani, 2018). Though these limitations are important to note, the strengths of this study are such that it effectively contributes to existing literature.

### **Implications**

This study was the first to explore the STEM college transition experience of first-generation racial and ethnic minority students from low-income households. Additionally, this study is one of the few to explore STEM college transition. Research on the needs of FGML often has been done through different types of institutions of higher education such as non-STEM four-year colleges, two-year colleges and graduate schools (Maietta, 2014; Sinanan, 2016). However, researchers have not specifically studied first-generation undergraduate college students with intersecting identities and the role that plays in their first-year STEM college transition. As such, there are numerous important findings from this study that have implications for counselor education, higher education, and future higher education research.

**Recommendations for Counselor Education**

This study offers multiple implications for counselor education. Foremost, counselor educators should continue training students on the importance of race, sex, and socioeconomic status within society and higher education specifically. Race is generally conceptualized as a categorical aspect of people's identity, but race is more complex and carries social and cultural meaning. Perhaps counselor educators, can discuss constructs in a college student development course as well as in practicum, internship, and supervision classes. Counselor educators can stress to students in their classes that race is a nuanced construct that intersects with other marginalized identities (sex and socioeconomic status), potentially eliciting innumerable experiences within the educational system and society. Further, counselor educators can begin to discuss first-generation students of color from low-income households and the related experiences discussed within this study (e.g., peer relationships, mentorship). For example, counselor educators in a college student development course can provide graduate students with information regarding the potential mental health and wellness needs for first-generation undergraduate students of color from low-income households, specifically related to STEM academic success and in response to microaggressions they encounter while in college. Counselor educators can bring in case scenarios for the graduate students to review and discuss in groups the steps they would take to assist FGML with ways to advocate for themselves when they are faced with microaggressions while trying to be successful in their STEM courses.

In addition to a commitment to ongoing multicultural training, counselor educators should consider increasing the multicultural education component of counseling programs. Many counseling programs require only one course in multicultural training. The single course is typically devoted to covering a vast number of topics ranging from education about terminology and theory, to increasing insight and awareness of counselors in training. In

fact, the Council for Accreditation of Counseling and Related Educational Programs (CACREP), a major accrediting body for counseling programs, provides only broad objectives for multicultural training (CACREP, 2016). This study helps to provide a rationale for increased multicultural training in counseling programs. Celinska and Swazo (2016) stated “a single multicultural course to cover the ‘quota’ established by the accrediting and licensing bodies is not only insufficient but also professionally irresponsible” (p. 305). As such, counselor education may be enhanced through additional required and elective multicultural coursework, a course dedicated to the multicultural counseling of college students, or a successful infusion of multicultural teaching across the counseling program curriculum, allowing for more complex multicultural discussions to occur throughout training.

### **Recommendations for Higher Education Institutions**

This study can be used to inform multiple aspects of higher education, including ways to assist STEM institutions in creating a more equitable environment for FGML. Participants in this study expressed having a positive experience discussing their first-year college transition. This suggests the importance of being able to have conversations about underrepresented minority student needs within higher education with the students themselves, as students may not have opportunities to have these conversations elsewhere. It may behoove faculty to continue to encourage conversations about the first-year college transition of first-generation college students in their advising sessions. Many participants discussed this dissertation study as being their first time speaking about their experiences as first-generation minority college students from low-income households transitioning to a STEM university.

Participants in this study described speaking about their identities as empowering, validating, and potentially providing benefits to their academic and personal success. Therefore, faculty, staff, and administrators may want to consider reaching out to their FGML populations,

as was done for this study, and then creating regular conversations on race, as well as socioeconomic status and gender, as such conversations may help institutions become more responsive to the needs of FGML and make the students feel seen and heard by the institution. A key aspect of personal outreach to students to note is to understand the current generation of FGML. Faculty, staff, and administrators may want to try to outreach to them in creative ways that they will respond too, such as using social media and text messaging to invite them to conversations on race (Turner, 2015). FGML want to connect to those in their new environment and want to feel comfortable, so sometimes just the act of personally reaching out to students and inviting them to have a conversation on race helps open the doorway to a more racially literate and culturally competent campus. Faculty, staff, and administrators can “facilitate more effective learning experiences and conversations” (Hamedani, Marcus, & Moya, 2020, p. 2) with their FGML students about their experiences and race. Hamedani and colleagues (2020) discussed the utility of difficult dialogues, such as those surrounding race, in promoting positive psychological outcomes, including increased cognitive complexity and promotion of students’ identity development through increased racial literacy on campus.

Moreover, it may be fruitful for faculty, administrators, and staff to indicate that conversations about socioeconomic status and race are safe and welcomed on campus. Faculty of color, however, who may have also experienced systemic racism, may not feel safe to express their experiences within the institution, potentially dissuading them from speaking about their own intersecting identities and race in general (Hamedani, Marcus, & Moya, 2020). Faculty of all races and ethnicities need to feel safe to lead effective discussions regarding race and other marginalized identities, both inside and outside the classroom (Hamedani et al., 2020). Once safety is established, then a college can become a setting that promotes students’ sense of

belonging and feeling welcomed on campus, which in turn can assist with increased motivation and graduation rates for FGML.

Faculty, administrators, and staff in institutions of higher education may want to be mindful of the ways STEM culture and climate can influence students' lived experiences. This study suggests the importance of campus culture in assisting FGML students. Faculty, staff and higher education administrators may need to consider and be prepared to assess how the campus culture can affect FGML students' academic success and peer relations. For example, some participants described stressful experiences such as receiving negative, racist, and sexist responses from professors when asking for assistance in courses. It may be important for faculty to explore the potential consequences of these experiences for FGML as they are still trying to acclimate to a new environment; these negative and traumatic experiences can hinder the students' psychological wellbeing and academic success (Jackson, 2012; Tran et al., 2016).

Relatedly, it is important to recognize this population is experiencing classism, sexism, racism and racial discrimination often within institutions of higher education. The consequences of classism, racism, racial discrimination, and racial microaggressions can include a variety of negative mental health outcomes possibly leading to poor academic success, and are well documented within the existing literature, including increased anxiety, increased depression, and lowered self-esteem (Huynh, 2012; Nadal, Griffin et al., 2014; Nadal, Wong et al., 2014; Pascoe & Smart Richman, 2009; Sue et al., 2007; Sue et al., 2008). Thus, the participants' experiences herein emphasize the need for faculty, administrators, and staff to be aware that classism, sexism and racism can affect students' and their retention and graduation.

Professionals working in institutions of higher education also should attend to any specific concerns related to students' socioeconomic status. Researchers have discussed the

relationship between positive mental health and academic outcomes for persons from low, middle, and high household income status (Forsyth & Carter, 2012; Mandara et al., 2009; Wakefield & Hudley, 2007). However, it is possible FGML may experience unique challenges in their transition to college due to unforeseen costs. Faculty and staff should be prepared to discuss financial concerns with FGML and either limit the costly resources students are asked to purchase in order to be successful in a course or advocate that the university help cover such costs. Specifically, faculty and staff can discuss different programs in place within the institution that can aid FGML, such as food pantries, scholarships, and sources for laptops they can borrow. Often, in my experience as an administrator, students can at times be unaware of some programs, and faculty, administrators, and staff may need to find better ways of communicating and sharing this information with all students, especially FGML.

In order to assist STEM institutions with becoming more equitable, institutions can establish robust faculty mentorship programs for FGML. Through this study and the literature, it was evident that FGML need guidance navigating college life, and they look first to their professors for academic, professional, and life information (Denson, 2009; McCoy et al., 2015; Sinanan, 2016). They want to not only attend classes at an institution, but FGML want to feel part of the campus culture. FGML at a STEM institution are more times than not interested in research, and they look to faculty members for information and how they can be like them in the future (Christe, 2013; Maietta, 2014). Therefore, if institutions begin to connect FGML with faculty mentors early on, they will feel much more welcome and have a smoother transition. There are many informal and formal variations of mentorship programs that universities can adopt for FGML. However, the most important aspect, as numerous researchers have noted, is creating and fostering trusting relationships, where the mentee feels comfortable enough to share

and ask anything of their mentor and the mentor understands the benefits to the student (Housel & Harvey, 2009; Markle, Wessel, & Desmond, 2017). In order to create mentorship relationships, faculty who are recruited should be trained on what the goals of the university mentorship program are, what a mentor is and what is required of them, what qualities they should hold, and then be taught more about the student populations they will be mentoring (Housel & Harvey, 2009; McCoy et al., 2015; Markle et al., 2017). Faculty mentorship, when done well with the appropriate training for mentors as described above, can essentially assist FGML in getting familiar with college, feeling welcome in their new academic environment, and can possibly lead to a rise in their retention and graduation (McCoy et al., 2015; Sinanan, 2016).

Lastly, faculty, administrators, and staff should be prepared to attend to potential concerns of FGML related to group membership. Researchers have discussed the varying ways in which FGML may develop friendships and experience social acceptance or rejection (Doyle & Kao, 2007; Quillian & Redd, 2009). Similarly, participants in this study discussed experiences of social acceptance and rejection among peers. FGML attending a STEM institution can sometimes be introverted or not know the best ways to communicate with their peers and others on campus (Sinanan, 2016). As such, faculty, administrators, and staff should assess their institutions for a stable community of support. Faculty and staff working in different offices on campus (e.g., Dean of Students' office, academic advising, career counseling, and counseling clinics) can inquire directly about students' experiences with social acceptance and rejection, determining if their experiences are developmentally appropriate or possibly related to the campus climate and culture. In the classroom, faculty can allow students to break up into dyads or larger groups to help foster student connections as well as lead class discussions on how the social transition to college is going. Further, if students are not developing healthy social

relationships, faculty, administrators, and staff can provide appropriate interventions to assist students in getting better connected with peers, including sharing the professional and multicultural student organizations available on campus. Working to make sure FGML feel connected and welcome on their STEM campus will aid not only with their academic success, but also this populations' retention and graduation rates (Tinto, 2010).

All in all, the findings from this study suggest that STEM higher education professionals must work to create an equitable system for FGML. Faculty, administrators, and staff must review their current practices and eliminate any that are discriminatory in nature, and in fact, create a more welcoming and equitable environment for marginalized students. STEM institutions have traditionally been known to focus more so on research and academics, and less so on the interpersonal growth of students and creating culturally open, warm campuses (Christe, 2013; Gayles & Ampaw, 2014). Therefore, this study aids in uncovering the need of a culturally competent STEM campus culture to assist in raising the retention and graduation rates for FGML. Higher education personnel may need to increase conversations on race, provide and clearly communicate financial programs and/or college supplies available to students, create and maintain faculty mentorship programs, and assist students in building strong, positive peer connections.

### **Recommendations for Future Research**

This study informs future research on the first-year STEM college transition experience for FGML by highlighting the areas that are important to FGML such as funding for college and supplies, faculty mentorship, and peer relationships. However, there is still much to be studied about this population. Perhaps future research could include focus groups, as students tend to get more ideas and remember items as they listen to their peers. Researchers will possibly be able to



obtain more nuanced discoveries in the areas of systemic racism and how to best assist this population in reaching graduation, if they incorporate focus groups within the study.

As stated in the limitations, as the researcher I did not ask specific questions about race. Therefore, future research must include poignant questions on systemic issues, including racism. Questions on race and racism would open up a deeper dialogue with perhaps more rich narratives from FGML surrounding their first-year STEM college transition. This in turn would provide more data to assist in creating equity in STEM higher education programs in the U.S.

Additionally, in the limitations, I mentioned that the sample consisted of FGML from the Northeast region of the U.S. Therefore, there was no variance in the location of the participants. In order to hear the voices of all FGML in the U.S. STEM higher education system, future research should include FGML from across the nation. There was also no variance in the age of the participants as all participants were about 18-years old. Gaining information about the STEM first-year transition from the perspective of different age groups would help to include all FGML, including those considered non-traditional students. Now more than ever, there are significant high school graduates taking gap years prior to starting college. Future research can also consider interviewing FGML who are upper-classmen or who have graduated in order to gain a perspective on their college transition in the context of their entire college experience. The experiences of FGML at different ages and those who have graduated or are close to graduating, will have differing views on the first-year STEM college transition experience and their voices will also need to be heard.

I employed Critical Race Theory (ASHE, 2015) and the Critical Multiculturalism model (Alenuma-Nimoh, 2016) to frame this study; perhaps future research could utilize other models that better attended to relationships in a different way. Relational Cultural Theory's focus on

connections could work to shift the focus on relationships as they relate to FGML in STEM. As mentioned earlier, future research, may want to take a deeper review of the way peer relationships can both positively and negatively affect academic outcomes for FGML. Similarly, Intersectionality Theory, for future research could address race, gender, and class in perhaps more concrete ways than Critical Race Theory.

First-generation minority students from low-income households are graduating at rates lower than their continuing-generation counterparts. However, in this study, the participants displayed such motivation, perseverance, and discipline to battle through systemic barriers and complete their first year at a STEM college. It would be important to learn about their experiences in each year of college to learn what happens as they continue on in their studies. Therefore, I would recommend future researchers create a longitudinal study to truly understand the FGML college experience and better inform higher education professionals of what is keeping them from graduating at similar rates to their continuing-generation counterparts.

Then administrators can move beyond reviewing research to creating programs that can assist FGML in their academic success. Future researchers can then investigate the effectiveness of faculty mentorship programs, weekly conversations on race, and/or STEM tutoring programs. Also, future administrators can look to implement and conduct research on a robust FGML student program that includes faculty mentorship, peer connections, tutoring for STEM courses, and zero-cost resources. The researchers can use a mixed-model methodology combining both qualitative and quantitative methods to see both how the students felt about the program as well as how they did academically, utilizing their grade point averages. In order to better help FGML in STEM, it is beneficial to learn from the students themselves and then take action and implement programs that will help them reach graduation.

### **Chapter Summary**

In this chapter, I provided a summary of the findings and a discussion of the results related to existing literature. Then, I described the essence of this study highlighting its importance and the value it added to the existing literature. Thereafter, I discussed the strengths and limitations of the study. Lastly, I shared the implications for higher education professionals and for future higher education research.

In conclusion, this study included an in-depth study of the first-year STEM college transition experience of FGML. The results provided a wealth of knowledge relevant to the higher education field and future research on the complexity of the experience of FGML. Finally, this study highlighted the voices and experiences of an under-researched, growing population who need a more responsive and equitable higher education system.

### **References**

Alenuma-Nimoh S. (2016). Reexamining the concept multicultural education:

- Recommendations for moving beyond "Eating the other multiculturalism". *Journal of Intercultural Disciplines [serial online]*.doi:2016; 15: 128-146. Available from: Academic Search Complete, Ipswich, MA. Accessed September 19, 2016.
- Allan, B. A., Garriott, P. O., & Keene, C. N. (2016). Outcomes of social class and classism in first- and continuing-generation college students. *Journal of Counseling Psychology*, 63(4), 487-496.
- Allen, J., Muragishi, G. S., Smith, J. L., & Thoman, D. B. (2015). To grab and to hold: Communal goals to overcome cultural and structural barrier for first-generation college students' science interest. *Translational Issues in Psychological Sciences*, 1 (4), 331-341.
- Almeida, D. J., Byrne, A. M., Smith, R. M., & Ruiz, S. (2019). How Relevant Is Grit? The Importance of Social Capital in First-Generation College Students' Academic Success. *Journal of College Student Retention: Research, Theory & Practice*.  
<https://doi.org/10.1177/1521025119854688>
- Amankwaa, L. (2016). Creating protocols for trustworthiness in qualitative research. *Journal of Cultural Diversity*, 23(3), 121-127.
- American Psychological Association (2016). *Socioeconomic status*. Retrieved from <http://www.apa.org/topics/socioeconomic-status/>
- Anderson, G. (2020). *Organizing for change*. Retrieved from:  
<https://www.insidehighered.com/news/2020/06/09/students-organize-racial-justice-campus-and>
- ASHE. (2015a). Critical Race Theory. *ASHE Higher education report*, 41(3), 1-15. doi: 10.1002/aehe.20021
- ASHE. (2015b). Critical Race Theory as a (Student) Development Theory. *ASHE Higher*

*Education Report*, 41(3), 57.

Balemian, K. & Feng, J. (2013). First-generation students: College aspirations, preparedness, and challenges. *College Board: Advanced Placement Annual Conference*. Las Vegas, NV.

Banks, J. A. (2002). Race, knowledge construction, and education in the USA: Lessons from history. *Race, Ethnicity, and Education*, 5(1), 7-27.

Bir, B., & Myrick, M. (2015). Summer bridge's effects on college student success. *Journal of Developmental Education*, 39 (1), 22-30.

Byrd, W. C., Luney, L. T., Marie, J., & Sanders, K. N. (2019). Demanding attention: An exploration of institutional characteristics of recent student demands. *Journal of Diversity in Higher Education*. Advance online publication. <https://doi.org/10.1037/dhe0000133>

Byrd, K. L., & MacDonald, G. (2005). Defining college readiness from the inside out: First-generation college student perspectives. *Community College Review*, 33, 22–37. Retrieved from <http://dx.doi.org/10.1177/009155210503300102>

Bowman, A. J. & Sharon, L. (2016). Examining the career decision self-efficacy and career maturity of community college and first-generation students. *Journal of Career Development*, 43(6), 512-525.

Camera, L. (2016). *Study: College graduation gap is still growing*. U.S. News and World Report. <https://www.usnews.com/news/blogs/data-mine/2016/03/23/study-college-graduation-gap-between-blacks-whites-still-growing>

Carlton, G. (2020). *Higher education and pandemics: A history of universities and viral outbreaks*. BestColleges. <https://www.bestcolleges.com/blog/higher-education-and-pandemics/>

- Celinska, D., & Swazo, R. (2016). Multicultural curriculum designs in counselor education programs: Enhancing counselors-in-training openness to diversity. *Journal of Counselor Preparation & Supervision*, 8(3), 288–310. <http://dx.doi.org/10.7729/83.1124>
- Chapman, Jr., K.M. (2020). *Is it good for business?* Insidehighered. retrieved:<https://www.insidehighered.com/advice/2020/04/24/even-and-perhaps-especially-pandemic-colleges-should-mindful-importance-giving>
- Christe, B. (2013). The importance of faculty-student connections in STEM disciplines: A literature review. *Journal of STEM Education: Innovations and Research*. 14(3), 22-26.
- College Board. (2012). National survey of school counselors and administrators. *Report on survey findings: Barriers and supports to school counselor success*. [https://secure-media.collegeboard.org/digitalServices/pdf/nosca/Barriers-Supports\\_TechReport\\_Final.pdf](https://secure-media.collegeboard.org/digitalServices/pdf/nosca/Barriers-Supports_TechReport_Final.pdf)
- Council for Accreditation of Counseling and Related Educational Programs (2016). Section 2: Professional counseling identity. Retrieved from <https://www.cacrep.org/section-2-professional-counseling-identity/>
- Covarrubias, R., & Fryberg, S. A. (2015). Movin' on up (to college): First-generation college students' experiences with family achievement guilt. *Cultural Diversity and Ethnic Minority Psychology*, 21(3), 420-429. doi:10.1037/a0037844
- Cox, R. D. (2016). Complicating conditions: Obstacles and interruptions to low-income students' college choices. *Journal of Higher Education*, 87 (1), 1-26.
- Crenshaw, K. (1989). Demarginalizing the intersection of race and sex: A Black feminist critique of antidiscrimination doctrine, feminist theory and antiracist politics. *U. Chi. Legal F.*, 139-167.

Crenshaw, K., Gotanda, N., Peller, G., & Thomas, K. (Eds.). (1995). *Critical race theory: The key writings that formed the movement*. New York, NY: New Press.

Crenshaw, K. [Southbank Centre]. (2017, March 14). *On intersectionality – Keynote* [Video file]. Retrieved from <https://youtu.be/-DW4HLgYPIA>

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

Creswell, J.W. and Poth, C.N. (2019) *Qualitative inquiry and research design choosing among five approaches*. 5th Edition, SAGE Publications, Inc., Thousand Oaks.

Deakin, H., Wakefield, K. (2014). Skype interviewing: Reflections of two PhD researchers. *Qualitative Research, 14*, 603-616.

Denson, N. (2009). Attitudes and advocacy: Understanding faculty views on racial/ethnic diversity. *Journal of Higher Education, 80*(4), 415-438.

Denzin, N. K. & Lincoln, Y. S. (2011). *The Sage handbook of qualitative research (4th Ed.)*. Thousand Oaks, CA: Sage.

Doyle, J. M., & Kao, G. (2007). Friendship choices of multiracial adolescents: Racial homophily, blending, or amalgamation? *Social Science Research, 36*, 633-653.  
doi:10.1016/j.ssresearch.2006.12.001

Emerson, R. W. (2015). Convenience sampling, random sampling, and snowball sampling: How does sampling affect the validity of research? *Journal of Visual Impairment and Blindness, 109*(2), 164-168.

Engle, J., Tinto, V., & Pell Institute for the Study of Opportunity in Higher, E. (2008). *Moving beyond access: College success for low-income, first-generation students*. Pell Institute for the Study of Opportunity in Higher Education.

Erickson, F. (1986). Qualitative methods in teaching on teaching. In M.C. Wittrock (Ed.), *Handbook of research on teaching*, 119-161. Old Tappan, NJ: MacMillan

Flaherty, C. (2020). *Making sense of the senseless*. Retrieved from:

<https://www.insidehighered.com/news/2020/06/03/academics-called-help-interpret-guide-national-response-police-violence-and-related>

Forsyth, J., & Carter, R. T. (2012). The relationship between racial identity status attitudes, racism-related coping, and mental health among Black Americans. *Cultural Diversity and Ethnic Minority Psychology*, 18(2), 128-140. doi:10.1037/a0027666

Franfurt, T. (2020). *How the pandemic could forever change higher education*. Forbes.

<https://www.forbes.com/sites/forbestechcouncil/2020/05/08/how-the-pandemic-could-forever-change-higher-education/#203b701b7b93>

Gay, L. R., Mills, G. E., & Airasian, P. W. (2011). *Educational research: Competencies for analysis and applications (10th Ed.)*. Boston, MA: Pearson.

Gillborn, D. (2015). Intersectionality, critical race theory, and the primacy of racism: Race, class, gender, and disability in education. *Qualitative Inquiry*, 21(3), 277-287.

doi:10.1177/1077800414557827

Goonewardene, A. U., Offutt, C. A., Whitling, J. & Woodhouse, D. (2016). An interdisciplinary approach to success for underrepresented students in STEM. *Journal of College Science Teaching*, 45(4), 59-67.

Guba, E. G. & Lincoln, Y. S. (1982). Epistemological and methodological bases of naturalistic inquiry. *ECTJ*, 30(1), 233-252.

Hall, S. (2020). *A global view on the pandemic's effect on higher education*. The Center



- Foundation. <https://tcf.org/content/commentary/global-view-pandemics-effect-higher-education/?agreed=1>
- Hamedani, M., Markus, H.R., & Moya, P. (2020). Pushing back against racism and xenophobia on campuses. *Inside HigherEd*, <https://www.insidehighered.com/views/2020/05/14/five-ways-college-educators-can-have-more-effective-conversations-about-race>.
- Hanna, P. (2012). Using internet technologies (such as Skype) as a research medium: A research note. *Qualitative Research*, *12*, 239-242.
- Haskins, N. H., & Singh, A. (2015). Critical race theory and counselor education pedagogy: Creating equitable training. *Counselor Education and Supervision*, *54*(4), 288-301.
- Heppner, Wampold, Owen, Thompson, & Wang (2016). *Research design in counseling*. 4th Edition, Boston, MA: Cengage.
- House L. A., Neal, C., & Kolb, J. (2020) Supporting the mental health needs of first generation college students, *Journal of College Student Psychotherapy*, *34*(2), 157-167, DOI: [10.1080/87568225.2019.1578940](https://doi.org/10.1080/87568225.2019.1578940)
- Housel, T. H. & Harvey, V. L. (2009). *The invisibility factor: Administrators and faculty reach out to first-generation college students*. Boca Raton, FL: BrownWalker Press
- Hurtado, S. (1994). The institutional climate for talented latino students. *Research in Higher Education*, *35*(1), 21-41.
- Huynh, V. W. (2012). Ethnic microaggressions and the depressive and somatic symptoms of Latino and Asian American adolescents. *Journal of Youth and Adolescence*, *41*(7), 831-846.
- Irani, E. (2019). The use of videoconferencing for qualitative interviewing: Opportunities,

challenges, and considerations. *Clinical Nursing Research*, 28(1), 3–

8. <https://doi.org/10.1177/1054773818803170>

Jackson, K. F. (2012). Living the multiracial experience: Shifting racial expressions, resisting race, and seeking community. *Qualitative Social Work*, 11(1), 42-60.

doi:10.1177/1473325010375646

Jacob, S. A., & Furgerson, S. P. (2012). Writing interview protocols and conducting interviews:

Tips for students new to the field of qualitative research. *The Qualitative Report*,

17(42), 1-10. Retrieved from <https://nsuworks.nova.edu/tqr/vol17/iss42/3>

Johnston-Guerrero, M. P. (2017). Reasoning through race: College students of color and the dynamics of racial authority. *Journal of Diversity in Higher Education*, 10(1), 72–85.

<https://doi.org/10.1037/dhe0000040>

Josselson, R., Lieblich, A., & McAdams, D. P. (Eds.). (2003). *The narrative study of lives. Up close and personal: The teaching and learning of narrative research*. American Psychological Association. <https://doi.org/10.1037/10486-000>

Korstjens, I. & Moser, A. (2017). Series: Practical guidance to qualitative research. Part 4: Trustworthiness and publishing. *The European journal of general practice*. 24, 1-5. 10.1080/13814788.2017.1375092.

Li, C. & Lalani, F. (2020). *The COVID-19 pandemic has changed higher education forever. This is how*. World Economic Forum.

<https://www.weforum.org/agenda/2020/04/coronavirus-education-global-covid19-online-digital-learning/>

Lin, Y., McKeachie, W. J., & Kim, Y. C. (2003). College student intrinsic and/or extrinsic motivation and learning. *Learning and individual differences*. 13(3), 251-258.

- Lincoln, Y. S. & Guba, E. G. (1985). *Naturalistic inquiry*. Newbury Park, CA: Sage Publications.
- Maietta, H. (2016). Unfamiliar territory: Meeting the career development needs of first-generation college students. *NACE Journal*, 4(1), 200-210.
- Mandara, J., Gaylord-Harden, N. K., Richards, M. H., & Ragsdale, B. L. (2009). The effects of changes in racial identity and self-esteem on changes in African American adolescents' mental health. *Child Development*, 80(6), 1660-1675. doi:10.1111/j.1467-8624.2009.01360.x
- Markle, L., Wessel, R., & Desmond, J. (2017). Faculty mentorship program for students with disabilities: Academic success outcomes (Practice brief). *Journal of Postsecondary Education and Disability*, 30(4), 385-392.
- Markowitz, T. (2017). The barrier to success and upward mobility for first-generation students and how to fix the problem. *Forbes - Leadership*.  
<https://www.forbes.com/sites/troymarkowitz/2017/08/08/the-barriers-to-success-and-upward-mobility-for-first-generation-students-and-how-to-fix-the-problem/#2784bf9e1cb3>
- McCoy, D. L. & Rodricks, D. J. (2015). Critical race theory in higher education: 20 years of theoretical and research innovations. *ASHE Higher Education Report*, 41(3), 1-15.  
doi:10.1002/aehe.20021
- McCoy, D. L., Winkle-Wagner, R., & Luedke, C. L. (2015). Colorblind Mentoring? Exploring white faculty mentoring of students of color. *Journal of Diversity in Higher Education*, 8(4), 225-242.
- McKenzie, L. (2020). *Calls for Change*. Retrieved from:

<https://www.insidehighered.com/news/2020/06/02/higher-ed-leaders-address-protests-racial-tensions-and-killing-george-floyd>

McLeod, J. (2011). *Qualitative research in counseling and psychotherapy*. Thousand Oaks, CA: Sage.

Merriam, S. B. (2009). *Qualitative research: A guide to design and implementation*. San Francisco, CA: John Wiley & Sons.

Merriam, S. B. (2015). *Qualitative research: A guide to design and implementation*. San Francisco, CA: John Wiley & Sons.

Mompremier, L. (2009). Special topics: Issues of SES in higher education: Socioeconomic Status and higher education adjustment. *The SES Indicator Newsletter*.

<http://www.apa.org/pi/ses/resources/indicator/2009/04/adjustment>

Moustakas, C. (1994). *Phenomenological research methods*. Thousand Oaks, CA: Sage.

Nadal, K. L., Griffin, K. E., Wong, Y., Hamit, S., & Rasmus, M. (2014). The impact of racial microaggressions on mental health: Counseling implications for clients of color. *Journal of Counseling and Development*, 92(1), 57-66. doi:10.1002/j.1556-6676.2014.00130.x

Nadal, K. L., Wong, Y., Griffin, K. E., Davidoff, K., & Sriken, J. (2014). The adverse impact of racial microaggressions on college students' self-esteem. *Journal of College Student Development*, 55(5), 461-474. doi:10.1353/csd.2014.0051

National Center for Education Statistics (2012). U.S. Department of Education. *The Condition of Education 2012*. <https://nces.ed.gov/pubs2012/2012045.pdf>

National Center for Education Statistics (2016). U.S. Department of Education. *The Condition of Education 2016*. <https://nces.ed.gov/pubs2016/2016144.pdf>

National Conference of State Legislatures. (2016). *Higher education legislature in 2016*.

<https://www.ncsl.org/research/education/higher-education-legislation-in-2016636179095.aspx>

Osborne, J. (1994). Some similarities and differences among phenomenological and other methods of psychological qualitative research. *Canadian Psychology*, 35(2), 167-189.

Pascoe, E. A., & Smart Richman, L. (2009). Perceived discrimination and health: A meta-analytic review. *Psychological Bulletin*, 135, 531-554. <http://dx.doi.org/10.1037/a0016059>

Pell. (2011). U.S. Department of Education. *Federal pell grant: End of year report*.

<https://www2.ed.gov/finaid/prof/resources/data/pell-2011-12/pell-eoy-2011-12.html>

Pell. (2018). U.S. Department of Education. *Federal pell grant: End of year report*.

<https://www2.ed.gov/finaid/prof/resources/data/pell-data.html>

Petty, T. (2014). Motivating first-generation students to academic success and college completion. *College Student Journal*, 48(2), 257-264.

Phillippi, J. & Lauderdale, J. (2017). A guide to field notes for qualitative research: Context and conversation. *Journal of Qualitative Health Research*, 28(3), 381-388.

Phinney, J.S., & Chuateco, L.I. (2005). The Role of Motivation, Parental Support, and Peer Support in the Academic Success of Ethnic Minority First-Generation College Students. *Journal of College Student Development* 46(3), 223-236. [doi:10.1353/csd.2005.0023](https://doi.org/10.1353/csd.2005.0023).

Pope, R. L., Reynolds, A. L., & Mueller, J. A. (2014). *Creating multicultural change on campus*. San Francisco, CA: Jossey-Bass.

Population Reference Bureau. (January, 2013). *U.S. low income working families increasing*.

Retrieved from: <http://www.prb.org/Publications/Articles/2013/us-working-poor-families.aspx>

Quillian, L., & Redd, R. (2009). The friendship networks of multiracial adolescents. *Social*

- Science Research*, 38, 279-295. doi:10.1016/j.ssresearch.2008.09.002
- Riggs, E. M., Callahan, C., & Bray, J. (2018). Research on access and success of under-represented groups in geosciences. In K. S. John (Ed.), *Community Framework for Geoscience Education Research*. Northfield, MN: National Association of Geoscience Teachers.
- Rocco, T. S., Bernier, J. D., & Bowman, L. (2014). Critical race theory and HRD: Moving race front and center. *Advances In Developing Human Resources*, 16(4), 457-470. doi:10.1177/1523422314544294
- Saldana, J. (2016). *The coding manual for qualitative researchers (4th Edition)*. Thousand Oaks, CA. Sage Publications.
- Seitz, S. (2016). Pixilated partnerships, overcoming obstacles in qualitative interviews via Skype: A research note. *Qualitative Research*, 16, 229-235.
- Sinanan, Allison. (2016). The value and necessity of mentoring African American college students at PWI's. *The Journal of Pan African Studies*, 9(8), 155 – 166.
- Smith, J.A., Flower, P., & Larkin, M. (2009). *Interpretive phenomenological analysis: Theory, method, and research*. Thousand Oaks, CA. Sage Publications.
- Stebleton, M., Soria, K., & Huesman, R. (2014). First-generation students' sense of belonging, mental health, and use of counseling services at public research universities. *Journal of College Counseling*. 17. 10.1002/j.2161-1882.2014.00044.x.
- Stephens, N. M., Fryberg, S. A., Markus, H. R., Johnson, C. S., & Covarrubias, R. (2012). Unseen disadvantage: How American universities' focus on independence undermines the academic performance of first-generation college students. *Journal of personality and social psychology*, 102(6), 1178-1197. <https://doi.org/10.1037/a0027143>

- Storey, V. A. & Wang, V. C. X. (2017). Critical friends' protocol: Andragogy and learning in graduate classroom. *Journal of adult learning*, 28(3), 91-98.
- Sue, D. W., Capodilupo, C. M., Torino, G. C., Bucceri, J. M., Holder, A. M. B., Nadal, K. L., & Esquilin, M. (2007). Racial microaggressions in everyday life: Implications for clinical practice. *American Psychologist*, 62(4), 271-286.
- Sue, D. W., Nadal, K. L., Capodilupo, C. M., Lin, A. I., Torino, G. C., & Rivera, D. P. (2008). Racial microaggressions against Black Americans: Implications for counseling. *Journal of Counseling & Development*, 86(3), 330-338. <https://doi.org/10.1002/j.1556-6678.2008.tb00517.x>
- Tate, K. A., Caperton, W., Kaiser, D., Pruitt, N. T., White, H., & Hall, E. (2015). An exploration of first-generation college students' career development beliefs and experiences. *Journal of Career Development*, 42(4), 294-310. doi:10.1177/0894845314565025
- Tate, K. A., Fouad, N. A., Marks, L. R., Young, G., Guzman, E., & Williams, E. G. (2015). Underrepresented first-generation, low-income college students' pursuit of a graduate education: Investigating the influence of self-efficacy, coping efficacy, and family influence. *Journal of Career Assessment*, 23(3), 427-441. doi:10.1177/1069072714547498
- Tatum, B. D. (1997). *Why are all the black kids sitting together in the cafeteria?* New York, NY: Basic Books.
- The Learning Network. (2020). *What students are saying about the George Floyd protests??* The New York Times, retrieved <https://www.nytimes.com/2020/06/04/learning/what-students-are-saying-about-the-george-floyd-protests.html>
- Tinto, V. (2006). Enhancing student persistence: Lessons learned in the United States. *Analise*

- Psicologica*, (1), 07.
- Tinto, V. (1975). Dropouts from higher education: A theoretical synthesis of recent literature. *A Review of Educational Research*, 45, 89-125.
- Tomasko, D., Ridgway, J., Waller, R., & Olesik, S. (2016). Association of summer-bridge program outcomes with STEM retention of targeted demographic groups. *Journal of College Science Teaching*, 45 (4), 90-99.
- Trahan, D. J., & Lemberger, M. E. (2014). Critical race theory as a decisional framework for the ethical counseling of African American clients. *Counseling and Values*, 59(1), 112-124. doi:10.1002/j.2161-007X.2014.00045.
- Tran, A. T., Miyake, E. R., Martinez-Morales, V., & Csizmadia, A. (2016). 'What are you?' Multiracial individuals' responses to racial identification inquiries. *Cultural Diversity and Ethnic Minority Psychology*, 22(1), 26-37. doi:10.1037/cdp0000031
- Trevino, N. N. & DeFreitas, S. C. (2014). The relationship between intrinsic motivation and academic achievement for first-generation latino students. *Social Psychology of Education: An International Journal*, 17(2), 293-306.
- Tuval-Mashiach, R. (2017). Raising the curtain: The importance of transparency in qualitative research. *Qualitative Psychology*, 4(2), 126–138. <https://doi.org/10.1037/qup0000062>
- Van der Zanden, P. J. A. C., Denessen E., Cillessen A. H. N., & Meijer, P. C. (2019) Patterns of success: first-year student success in multiple domains. *Studies in Higher Education*, 44(11), 2081-2095, DOI: [10.1080/03075079.2018.1493097](https://doi.org/10.1080/03075079.2018.1493097)
- Wakefield, W. D., & Hudley, C. (2007). Ethnic and racial identity and adolescent well-being. *Theory into Practice*, 46(2), 147-154.
- Wang, T. R. (2014). 'I'm the only person from where I'm from to go to college': Understanding



the memorable messages first-generation college students receive from parents. *Journal of Family Communication*, 14(3), 270-290. doi:10.1080/15267431.2014.908195

Ward, L., Siegel, M., & Davenport, Z. (2012). *First-generation college students: Understanding and improving the college experience from recruitment to commencement*. San Francisco: Josey Bass.

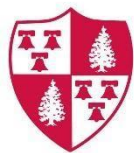
Young, J.R. (2020). *How a pandemic could change higher education*. Edsurge.

<https://www.edsurge.com/news/2020-03-27-how-a-pandemic-could-change-higher-education>

Yüksel, P., & Yildirim, S. (2015). Theoretical frameworks, methods, and procedures for conducting phenomenological studies in educational settings. *Turkish Online Journal of Education*, 6(1), 1-20. doi: [10.17569/tojqi.59813](https://doi.org/10.17569/tojqi.59813)

## Appendix A

(FLYER)



**MONTCLAIR STATE**  

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**UNIVERSITY**

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***Are you the first in your family to go to college? Is this your first year at NJIT?***

***Research Participants wanted!***



*This research study is for first-generation college students of color from low-income households who are in their first year at a STEM institution:*

We are looking at how first-generation college students of color from low-income households experience their transition to a Science, Technology, Engineering and Mathematics (STEM) university from high school.

- Are you the first in your family to go to college?
- Are you majoring in a STEM major?
- Do you identify as Black, LatinX (o/a), Asian, Native American, Bi-racial, and/or Multi-racial?
- Are you able to participate in one virtual interview for an hour?

**If you have all of the above, please contact Grazia (Grace) Gangitano, Doctoral Student in the Counseling Department at Montclair State University is conducting this study. If you are interested in participating or have more questions, please contact her at 973-596-5748 or [lopezg9@montclair.edu](mailto:lopezg9@montclair.edu)**

This study has been approved by the Montclair State University Institutional Review Board, MSU IRB #FY-19-20-1538

## **Appendix B**

**(Email or Personal Plea)**

Dear Students!

I would like to share with you an opportunity to participate in a research study about how first-generation college students of color from low-income households experience the transition from high school to college. We hope that in learning more about the experience of first-generation college students of color from low-income households from first-generation students

themselves, we may be able to voice any needs students may have in order to be academically successful. This study is being conducted by doctoral student Grazia (Grace) Gangitano from the Counseling Department at Montclair State University. This study will involve a single, one hour virtual interview.

The interview session will focus on your experience with transitioning to college from high school.

If you are in your first year of college, first in your family to go to college, identify as Black, LatinX (o/a), Asian, Native American, Bi-racial, and/or Multi-racial, and come from a low-income household, you may be eligible to participate.

You must also be 18 years of age or older to participate.

If you have any questions, please contact Grazia (Grace) Gangitano at 973-596-5748 or [lopezg9@montclair.edu](mailto:lopezg9@montclair.edu).

Thank you for considering participation in this study. This study has been approved by the Montclair State University Institutional Review Board, Study no. **IRB-FY19-20-1538**.

Sincerely,

Grazia Gangitano, Doctoral Student

Counseling, Montclair State University

## Appendix C

### (Screening Questionnaire)

#### **Study Number: IRB-FY19-20-1538: Participant Screening Questionnaire**

1. Today's date:

2. Age:

3. Gender:
4. Race/Ethnicity:
5. What major are you studying?
6. Are you the first in your family to go to college? Yes/No
7. Are you an international student - student here on an F1 Visa? Yes/No
8. Please choose from the list below which range best identifies the total annual income of all those that live in your home:
  - a. \$0 - \$31,000
  - b. \$31,000 - \$42,000
  - c. \$42,000 - \$126,000
  - d. \$126,000 - \$188,000
  - e. \$188,000 or more
9. Are you a part of Educational Opportunity Program (EOP), NCAA Athletics, or the Albert Dorman Honors College?

The term first-generation, in this study, refers to college students who are the first in their families to attend college.

- 10.. Based on this definition of first-generation, do you identify as first-generation? Yes/No

## **Appendix D**

### **(Consent Form)**

#### **ADULT CONSENT FORM**

Please read below with care. You can ask questions at any time, now or later. You can talk to other people before you sign this form.

**Title:** College Transition: Views from First-Generation College Students of Color from Low-Income Households

**Study Number:** IRB-FY19-20-1538

**Why is this study being done?** The research study is being conducted in order to understand how first-generation college students of color from low-income households experience the transition from high school to a STEM college.

**What will happen while you are in the study? As a participant in this study you will:**

- Have to complete a brief screening questionnaire to determine eligibility for participation in this study.
- Schedule one 60 minute interview that will take place by private video conferencing. The interview will involve an in-depth discussion regarding various topics related to your college experience and related experiences in your first year at a STEM college.
- Following the interview, you will be provided with a copy of your transcribed interview for review.

**Time:**

One interview, this study will take about a little over 1 hour of your time to complete.

**Risks:**

Your identity will be kept confidential as it relates to this study. However, if we learn of any suspected child or elder abuse, or danger to you or someone else, I am required by New Jersey state law to immediately report it to the proper authorities.

This study also has the potential to create strong emotional reactions to the questions that are posed, and some discomfort may be felt regarding the topics being discussed. In addition, if you become bored or restless during the 60-minute interview process and wish to discontinue your participation, you may, at any time, stop the interview or skip questions that you do not wish to answer. Lastly, given the nature of qualitative research and this particular study, complete anonymity cannot be guaranteed if you choose to share the same information shared with the researcher to other persons. For this study, all identifying information will be excluded from presentations and publications (i.e. names, places, dates).

**Benefits:**

You may find this study beneficial, as you will have the opportunity to speak openly about your experiences. This may help you to gain insight into your college transition as a result of the questions posed to you during our interview. Others may also benefit from your participation in this study to inform the practices and teachings of counselors and counselor educators respectively.

**Who will know that you are in this study?**

You will not be associated with any presentations or publications. I will maintain your anonymity by using a pseudonym when your data is being used for presentations and publications. Your interviews will be transcribed, and the audio recording will be destroyed

within 14 days of the interview. All data will be stored in an encrypted file on a password protected computer.

**Important to note:** You should know that New Jersey requires that any person having reasonable cause to believe that a child has been subjected to child abuse or acts of child abuse shall report the same immediately to the Division of Child Protection and Permanency.

**Do you have to be in the study?**

You are a volunteer! You do not have to answer any questions that you do not want to. You do not have to be in this study. It is okay to withdraw your participation at any time.

**Do you have any questions about this study?**

Should you have any questions, please contact me directly at [lopezg9montclair.edu](mailto:lopezg9montclair.edu) or my dissertation chair, Dr. Muninder Ahluwalia at [Ahluwalia@montclair.edu](mailto:Ahluwalia@montclair.edu).

**Do you have any questions about your rights as a research participant?** Phone or email the IRB Chair, Dr. Dana Levitt, at 973-655-2097 or [reviewboard@montclair.edu](mailto:reviewboard@montclair.edu).

As part of this study, it is okay to audiotape me:

Please initial: \_\_\_\_\_ Yes \_\_\_\_\_ No

**One copy of this consent form is for you to keep.**

**Statement of Consent**

I have read this form and decided that I will participate in the project described above. Its general purposes, the particulars of involvement, and possible risks and inconveniences have been explained to my satisfaction. I understand that I can withdraw at any time. My signature also indicates that I am 18 years of age or older and have received a copy of this consent form.

\_\_\_\_\_  
Print your name here

\_\_\_\_\_  
Sign your name here

\_\_\_\_\_  
Date

\_\_\_\_\_  
Name of Principal Investigator

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

**Appendix E**

**(Interview Protocol)**

**Interview Protocol**

**Study No. IRB-FY19-20-1538**

**Institution where interviews are taking place:**

New Jersey Institute of Technology, Newark, NJ

**Interviewee Mock Initials:**

**Demographic Information of Interviewee:**

**Age:**

**Race/Ethnicity:**

**Gender:**

**Any other demographic information the student chooses to self-disclose:**

**Interviewer:** Grazia (Grace) Gangitano

**Introductory Protocol:**

So today, I will be asking you a series of questions regarding your transition to college. Feel free to stop me at any time if you feel like you would like to take a break but the interview should take no longer than an hour. The interview will be digitally recorded and I will be taking notes with paper and pen.

Please sign the digital recording release form. For your information, only I, as the researcher, will have access to the tapes which will eventually be destroyed after they are transcribed. Transcribed means our conversation will be typed out word for word for my review after interviews are completed. In addition, you must sign a form meant to meet our human subjects' requirements. Essentially, this document states that: (1) all information will be held confidential, (2) your participation is voluntary and you may stop at any time if you feel uncomfortable, and (3) we do not intend to inflict any harm. Thank you for agreeing to participate.

I planned this interview to last no longer than one hour. During this time, I have several questions that I would like to cover.

**Introduction:**

You have been selected to speak with me today because you have been identified as someone who is transitioning to college and is the first in their family to attend a four year STEM university. My research project as a whole focuses on the experience of low income, first-generation college students as they transition into college for the first time. My study does not aim to evaluate your academic progress. Rather, I am trying to learn more about your experience, as a first-generation college student transitioning into college.

**Interviewee Interesting Background Information:**

What is your major?

What is the highest degree you plan on completing?

Are you or do you plan on working while in college? If yes, how many hours per week?

**Interview Questions:**

**Expectations/Transition**

1. What was your reason for attending college?
  - a. **Probe:** did you always know you wanted to attend college?
2. What did you expect college life to be like?
  - a. **Probe:** Did it end up being the way you expected?

- b. **Probe:** How did it feel when the expectation was or was not met?
3. Were you looking forward to college? Why or why not?
4. What were your concerns/worries prior to starting college?
  - a. **Probe:** If you had no concerns, what made you feel confident about starting college?

**Student Life**

5. What do you feel your biggest obstacle/challenge is as a student?
  - a. **Probe:** If you do not feel you need anything at this time, what do you feel you have that is assisting you in your success as a student?
6. What has had the biggest positive impact on you thus far and why?
  - a. **Probe:** Who has had the biggest positive impact on you?
7. What would you like the college to provide for you that you have not yet received, but that would be beneficial to your success as a student?
  - a. **Probe:** Have you ever thought you needed something and could not find it within the college?
8. How do you stay motivated in college?
  - a. **Probe:** Did anyone or anything assist in motivating you?
  - b. **Probe:** What causes you to become demotivated, if anything?

**Graduating/Post Grad**

9. What do you think you need personally in order to graduate with your degree?
10. What are your plans after you complete your STEM degree?

**Post Interview Comments and/or Observations:****Appendix F****IRB Approval Letter**

**cayuseIRB@cayuse.com** <cayuseIRB@cayuse.com>

Tue, Jun 16, 2020 at  
8:31 AM

To: ahluwaliam@mail.montclair.edu, lopezg9@montclair.edu

Cc: reviewboard@montclair.edu, ferrantec@montclair.edu



Jun 16, 2020 8:31 AM EDT

Ms. Grazia Gangitano  
Dr. Muninder Ahluwalia  
Montclair State University  
Department of Counseling  
1 Normal Ave.  
[Montclair, NJ 07043](https://www.montclair.edu/)

Re: IRB Number: IRB-FY19-20-1538

Project Title: SS College Transition: Views from First-Generation STEM Minority Students

Dear Ms. Gangitano,

***This study has been approved under the conditions set forth by current state regulations due to COVID-19. Please check those state mandates regularly at <https://covid19.nj.gov/> . At the time of issuing this letter, face-to-face contact with participants must be postponed until it is advisable and agreed upon by federal, state and MSU campus directives. If you have any questions about the impact of COVID-19 with regards to the methods proposed in your study, please do not hesitate to contact us.***

After an exempt review:

- Category 3.(i)(A). Research involving benign behavioral interventions in conjunction with the collection of information from an adult subject through verbal or written responses (including data entry) or audiovisual recording if the subject prospectively agrees to the intervention and information collection.  
The information obtained is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subjects.

Montclair State University's Institutional Review Board (IRB) approved this protocol on June 15, 2020. Your exempt study will require an Administrative Check In, every two years, updating our office with the status of your research project. Your check in date is June 15, 2022. We will send you a reminder prior to that date.

All active study documents, such as consent forms, surveys, case histories, etc. , should be generated from the approved Cayuse IRB submission.

**When making changes to your research team, you will no longer be required to submit a Modification, unless you are changing the PI.** As Principal Investigator, you are required to make sure all of your Research Team members have appropriate Human Subjects Protections training, prior to working on the study. For more clarification on appropriate training contact the IRB office.

If you are changing your study protocol, study sites or data collection instruments, you will need to submit a Modification.

When you complete your research project you must submit a Project Closure through the Cayuse IRB electronic system.

If you have any questions regarding the IRB requirements, please contact me at 973-655-2097, [cayuselRB@montclair.edu](mailto:cayuselRB@montclair.edu), or the Institutional Review Board.

Sincerely yours,

Dana Levitt  
IRB Chair

cc: Ms. Caren Ferrante, Graduate Student Assistance Coordinator, Graduate School