Developing Strategies to Address Enrollment Inequities for Black and Latinx Students in an Interdisciplinary Graduate Program that Spans Business, Tech, and STEM Fields

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Graduate programs in business and STEM fields face a persistent challenge of recruiting and enrolling domestic Black and Latinx students. As an administrator for one such program, the M.S. in Product Management program, located in the Northeastern United States, I aimed to increase the number of domestic-born Black and Latinx applicants to consist of 15% of domestic applicants to the MS program by 2023 based on the benchmark from the M.S.P.M program's previous admissions cycles of zero enrolled students of Color and only two applicants of Color. For this inquiry, I developed interview and survey protocols, based on English and Umbach's (2016) framework around graduate school choice, and conducted nine one-on-one interviews with participants who met the selected criteria. One inquiry question guided the design of this study: What lived experiences influence graduate school aspiration, both in general and for those looking to break into the tech industry, among domestic Black and Latinx people? The key findings of this inquiry included: (a) cost-benefit analysis is a major factor for prospective graduate students of Color; (b) habitus, further developed through college and early professional years, improves the prospect of graduate school aspiration; and (c) prospective students' interest in graduate education is influenced by the barriers to entry, or lack thereof, for graduate programs.

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Preface

I am fortunate to have been supported through my educational experience by many people, and this body of work is dedicated to them. First and foremost, to the Lord through whom all things are possible. To my wife Britt, who supported my idea to return to school, listened with concern and caring when things became challenging, and spent many Saturdays and evenings on her own with our kids when I was off studying and writing. I could not have done this without you. To my three children, Eleanor, Clara, and Micky, thank you for putting up with Dad being away from home at times, my tendency to be distracted when I should have been mentally present, and for supporting me throughout the program. To my parents, Kevin Sr. and Aida, and older sister, Jane, who instilled the idea of the value of a well-rounded education in me from a very young age and supported me throughout this educational endeavor.

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1.0 Problem Area

A major issue facing U.S. institutions of higher education today is the inequitable access to graduate education for students of Color¹ and subsequently their employment in tech industries requiring advanced degrees. When comparing the U.S. demographic representation of White, Latinx, and Black populations to their representation in graduate education and industry, the picture of a clearly inequitable system becomes clear. Demographic data from 2017 show that 61% of the U.S. population identifies as White while 18% and 12.3% of the U.S. population identify as Latinx and Black, respectively (Espinosa et al., 2019). Together, the Black and Latinx population in the United States is projected to increase from 31% to roughly 42.5% by 2060 (Vespa et al., 2018).

Meanwhile, graduate enrollment data reveal consistent, inequitable patterns of enrollment for Black and Latinx students in graduate education in comparison to their overall representation in the U.S. population. White students represent 63% of enrollees in graduate education, which is two points higher than their overall representation in the population (NCES, 2021). While broad graduate enrollment data are relevant, they were not the only data used in this study, which takes place within in interdisciplinary graduate program across graduate schools of business and computer science. In contrast to general graduate education, Latinx and Black students represent 9.8% and 14.7% of graduate business enrollment, respectively (Okahana & Zhou, 2018). Latinx and Black students compose 8.5% and 10.6% of enrollment in graduate computer science

¹ Though the term "people of Color" generally refers to Black, Latinx, Native American, and Pacific Islanders, when used in this text it will refer to Black and Latinx people, as this is the focus area of this study.

programs (Okahana & Zhou, 2018). While Black enrollment in business school presents a more encouraging picture because of the higher enrollment percentages, enrollment is inequitable for Latinx students in both business and computer science and Black students in computer science.

An analysis of the representation patterns of these two populations in industry show a similar pattern of underrepresentation. This inquiry focused on graduate students looking to work in the tech industry. Tech is defined as an industry composed of businesses that provide "a digital technical service/product/platform/hardware" (Heath, 2017, para. 1). However, tech has grown to include traditional brick and mortar companies with any sort of software product or service (essentially all companies), and as a result the line between technology firms and traditional firms is less clear, encompassing businesses that "capture value using technology" (Spacey, 2019, para. 1). This inquiry focused on a graduate business program that seeks to place graduates in the tech industry to lead in the development of products and services. The tech industry has long had a diversity and inclusion problem. Among some of the top tech firms (Apple, Facebook, Google, Microsoft, and Twitter to name a few), Black employees make up less than 9% of the workforce (Rooney & Khorram, 2020). Further, though companies have professed commitment to diversity, their numbers have fluctuated very little. Employment of Latinx and Black tech employees at Google and Microsoft rose by less than 1% between 2014 and 2019 (Harrison, 2019). Diverse representation is even lower in relation to leadership roles. For example, 3% of leadership roles at Apple are filled by Black employees (Rooney, 2020).

The most common undergraduate degrees of those in the tech sector are computer science, computer engineering, and software engineering (Institutions may have differing names for this degree, but these are the most common.) with 61.9% of those in the tech industry having obtained this bachelor's degree (Stack Overflow Developer Survey, 2020). A business degree is also a

pathway into tech although professionals who choose this pathway must still have some level of technical expertise (Bouw, 2015).

Diversity and support for historically minoritized students in undergraduate and graduate programs present a gloomy picture as well, which creates an issue with the pathway into tech graduate programs and jobs. In 2016, Latinx and Black students accounted for 19.8% and 15.2% of total undergraduate enrollment (Espinosa et al., 2019), yet in the field of computer science students of Color made up only 13% of enrollment in intro level computer science courses for majors at 134 doctoral-granting institutions surveyed in 2015 (Note this study did not disaggregate race or ethnicity, and this statistic includes Black, Latinx, Native American, and Pacific Islander students) (Computing Research Association, 2017). This number shrinks to 9% when accounting for enrollment in upper-level computer science courses (Computing Research Association, 2017). These data indicate a positive trend of increased overall enrollment of minoritized students in post-secondary education, but representation still lags in the area of computer science. As Latinx and Black populations grow in representation in the United States, so too must their enrollment numbers at both the undergraduate and graduate levels and ultimately in industry. But this will not happen without intentionality on the part of institutions.

The contrast in proportion of the population (current and projected) in the United States versus representation in undergraduate computer science education, graduate education, and industry is stark and reinforces the need to rethink recruitment and enrollment efforts for students of Color. As things currently operate, race-neutral policies lead to Latinx and Black students being left out of high-paying tech jobs, which may affect their ability to build long-term wealth. Examples of race-neutrality in higher education include ignoring race or ethnicity in admissions decisions, providing funding in manners that ignore race, or prioritizing full-pay students (i.e.,

tuition revenue) over those who require funding or scholarship support despite the fact that they can bring about diversity. Graduate programs in the computer science, computer engineering, software engineering, and business fields must prioritize the recruitment, enrollment, and retention of Black and Latinx applicants in order to disrupt inequities in enrollment, graduation, employment, and overall wealth.

I serve as the Student Services staff member for an M.S. in Product Management program at a predominantly White institution (PWI) in the northeastern United States that combines business and computer science training to prepare graduates for jobs in the tech industry. The M.S. in Product Management (M.S.P.M) program is jointly run between two colleges at the institution. Henceforth, I use the following pseudonyms for all three units: Northeast University (NEU), College of Business (CB), and College of Computer Science (CCS). In my role, I provide academic and student affairs support and lead and influence strategy and team members from various offices including Admissions, the Career Center, and more all housed within CB. I also provide strategic support on special projects, including recruitment and admissions strategy. I have worked at CB in this capacity for the last three years, which has allowed me the opportunity to work with the M.S.P.M. group since its inaugural class was on campus. As I work for CB, the observations in this dissertation in practice were focused on CB. I do not have a counterpart in CCS, nor do I have any formal role in CCS. CCS does not have an administrative support structure for this program. Below I discuss how all support for the program comes through CB. Though the M.S.P.M. program is still new, working in this capacity has allowed me a breadth of experiences and background from which I can draw upon to drive this program in positive directions.

1.1 Problem of Practice

The racial and ethnic enrollment inequities in graduate education described to this point extend to the realm of graduate business education at NEU where there is an absence of Black and Latinx students in our M.S.P.M. graduate program. There are no alumni who identify as domesticborn Black or Latinx people, even after matriculating and graduating three cohorts of students.² Further, recruiting and retaining domestic Black and Latinx prospective students have not been a priority through four admissions cycles. Until December of 2020, diversity, equity, and inclusion have not been a focus of discussion for the program, nor has the program intentionally recruited for diversity. This has resulted in only one application from a student from a historically minoritized background.

Bensimon and Harris (Bensimon, 2004; Harris & Bensimon, 2007) developed diversity and equity "scorecards" as a measuring tool for institutions to assess their ability to provide ethnically and racially minoritized students with the tools required to elevate their economic, social, and political status. Further, Bensimon (2004) cites the institutional imperative to go beyond standard diversity initiatives and work to ensure access to programs and degrees in highdemand and high-paying fields, resources, internships and fellowships, and financial support. As NEU, CB, and CCS work towards greater diversification of the U.S. workforce by producing graduates of Color (A goal of the institution is to create societal impact.), it is essential that the program take a racial equity-minded (Bensimon, 2004) stance in order to support and deliver the same enrollment opportunities to domestic Latinx and Black prospective students.

² The focus is on domestic-born, as domestic Black and Latinx people have endured centuries of racism, injustice, and inequity in the United States and may be economically and academically disadvantaged compared to international Black and Latinx people who pursue degrees in business and computer science.

My initial impressions at NEU led to the belief that the institution and both colleges have strong cultures in support of diversity, equity, and inclusion across both the undergraduate and graduate levels. From an anecdotal practitioner's perspective, during my start at the institution in 2018, I noticed greater diversity in the graduate student body, faculty, and staff at NEU in comparison with other places I had worked in graduate education. NEU is known for its global reach, and this reach is noticeably represented by the diversity of students, faculty, and staff who come from across the globe and from various backgrounds. NEU students come from over 115 countries (undergraduate and graduate), and ranks as one of the top 10 most international institutions in the U.S. Additionally, I observed that the institution does a good job of supporting these students by creating an inclusive environment where students can feel a strong sense of belonging to the community. Student-run affinity clubs and organizations and strong cultures of support and openness from faculty and staff are two aspects of institutional support for diversity.

Despite the presence of international diversity at NEU, the institution struggles to attract domestic diversity at the graduate level. Further, since its foundation the M.S. in Product Management program has not intentionally recruited students of Color and, thus, also struggles to attract domestic student of Color applications. The program draws heavily from international applicants. Over four application cycles, the M.S.P.M. program has received 241 applications. Of those, 87% (210 total) have come from international students leaving only 13%, or 31, domestic applicants over four years.



Figure 1 Domestic vs. International Applicants

Only 3% (n=1) of domestic applicants self-identified as having a racially minoritized background. Thus, this homogeneous, international group has significantly lacked U.S. domestic diversity. Representation from domestic students in general is minimal in the applicant pool and nearly non-existent for Latinx and Black domestic students. This issue is significant for the program as it seeks ways to have positive societal impact. It is also important for the tech industry, which must diversify. As the program's list of corporate partners continues to grow, so too must the ability to support them with diverse and capable job candidates. And lastly, the M.S.P.M. program must devote attention to this problem because it perpetuates issues of historic ethnic and racial inequity by graduating classes with no Latinx or Black students. The program contributes to the continued separation of people of Color by wealth and class that has been a part of the United States business and political culture since the country's inception.

I believe that the M.S.P.M. program has only enrolled one domestic student of Color, in part, because of lack of intentional focus on the "graduate school choice" journey of prospective students of Color and because of the program's lack of effort to attract domestic diversity and overall lack of concern for domestic diversity. English and Umbach (2016) describe the graduate school choice process as consisting of three phases: aspiration, application, and enrollment. These three phases are sequential, and the M.S.P.M. program struggles with the application and enrollment phases with regards to prospective students of Color, because there is no intentional focus on the aspiration phase. In other words, the M.S.P.M. program does not have a sense of the aspirations of domestic students of Color into the M.S.P.M. program. The M.S.P.M. program must center its focus on diversity and inclusion, and this requires intentional efforts to explore the aspirations of prospective students of Color and intentional recruitment and funding in order to increase the application and enrollment of historically marginalized populations.

For this dissertation in practice, I sought to increase domestic student of Color aspiration to the M.S.P.M. program using semi-structured interviews to inform the creation of a diversity recruitment plan. The M.S.P.M. program struggles in multiple areas, including domestic student enrollment, and the struggles with domestic diversity are not limited to Black and Latinx students, rather they extend to include Native Americans, Pacific Islanders, socioeconomic diversity, and more. However, with this inquiry I began with Black and Latinx students, and I will eventually look to use this inquiry as a roadmap to increase representation in other areas.

I approached this problem of practice as a biracial student affairs practitioner. I am a Latinx White American of Central American and Western European descent. My upbringing in a biracial household means that I was aware, as a child, of instances of racism that people of Color experience in the United States. Yet, despite my biracial upbringing, my first and last name of European origin along with my complexion and appearance (both decidedly non-Latinx White) allowed me privilege and the ability to hide my Latinx heritage, or code switch, as desired. I was raised in an upper-middle-class Catholic household with two heterosexual parents. Though only one parent obtained a college degree (and a graduate degree as well), both encouraged my sister and I to pursue higher education including post-baccalaureate studies. My privilege makes it easy for me to be unaware of or even ignore issues of social injustice and racism at my place of work in higher education administration; however, through my education and commitment to social justice and antiracism, I seek to increase my awareness of my own biases and challenge the dominant norms in which I was raised to better support students within my sphere of influence. Having witnessed the injustices and racism experienced by my Central American mother, this is vital to me.

1.2 Site Context

NEU is located in an urban setting in the northeast United States. The M.S.P.M. program is an interdisciplinary degree co-taught by faculty from CB and CCS. CB and CCS are two of NEU's seven colleges located in the urban center. All seven colleges enroll both graduate and undergraduate students. The highest graduate student enrolling college is the engineering school, with 2,025 students. The lowest is the college of science, with 299 graduate students. CB and CCS enroll 935 and 1,490 graduate students respectively. NEU also has campuses located in the western United States (graduate only), Africa (graduate STEM programs only), and the Middle East (undergraduate only). NEU's global campuses are consistent with its intention to have a global reach.

That global reach is also visible on the institution's main U.S.-based campus. NEU's total graduate enrollment during the fall of 2020 was 7,062 students, excluding satellite and international campuses, across 81 distinct graduate programs. Of the total main campus graduate population, 4,135 (59%) were international students, which indicates a strong international draw and intentionality toward international diversity. However, it needs mentioned that NEU's

international enrollment is distinctly homogenous, with students typically hailing from Asian or Southeast Asian nations. In addition, NEU's enrollment of domestic students of Color indicates a different facet of diversity, or lack thereof. In 2020, Black and Latinx graduate enrollment was 337 or only 4.7% of total graduate enrollment. Note that this percentage does not include any international students who may identify as Black or Latinx. Regardless, the low enrollment of Black and Latinx graduate students at the institution is a persistent problem.

I must also acknowledge that these data were collected during the height of the COVID-19 pandemic, which began to impact U.S. institutions of higher education in March of 2020. In the following admissions cycle (Fall of 2021 for traditional programs and Spring of 2021 for the M.S.P.M. program) programs at NEU, CB, and CCS suffered low enrollments to the extent that some enrolled 40%-45% fewer students than a traditional year. Thus, the enrollment of Black and Latinx students was also likely impacted by the pandemic with prospective students deciding against enrolling in graduate school in larger numbers.

CB offers two undergraduate programs, five masters-level programs, six dual-degree programs, and one Ph.D. program that consists of eleven different fields of study. The College has 131 staff members and 144 full-time and adjunct faculty who support and teach the 1,538 students enrolled in the school across all levels of education. The School's mission is to "create value for business and society by providing intellectual leadership, advancing the science and practice of management, and developing ethical leaders to be the agents of change in a world driven by technology and innovation." This is driven by the following core values: integrity, inclusive, collaborative, rigorous, entrepreneurial, and agile. CB has committed to the following actions in order to create impact in the DE&I (Diversity, Equity, and Inclusion) space: creating a more inclusive community environment at the school; identifying, attracting, and enrolling a talented

and diverse undergraduate and graduate student body; and establishing and following best practices for the recruitment and retention of staff and faculty who contribute to the diversity goals of the CB. Until recently, these initiatives did not trickle down to the M.S. in Product Management program where there was no direction for DE&I initiatives.

CCS offers three main undergraduate programs, 27 masters-level programs, and doctoral degrees in 18 different fields. CCS has 747 staff members, 430 full-time and adjunct faculty, and 2,385 students at the undergraduate and graduate levels. CCS has pledged support and resources to its diversity and inclusion efforts, which include: embedding diversity, equity and inclusion in all and efforts; increasing BIPOC (Black, Indigenous, and People of Color) recruitment and hiring; establishing stronger connections with minority-serving undergraduate institutions, feeder programs, and Historically Black Colleges and Universities (HBCUs); publishing a diversity statement and plan for implementing it within hiring committees; creating onboarding and mentorship materials for all stakeholders, outlining commitment to DE&I; creating sources of advocacy and mentorship within each unit; using data benchmark progress; building ties to and increase connections within faculty, student orgs and staff members that foster inclusion and retention; communicating DEI progress across the school, including promoting upcoming events and opportunities for collaboration as well as sharing ideas for replicating program successes across divisions.

The M.S.P.M. program reports its enrollment numbers through CB. CB reported a total graduate student enrollment of 935 students in the fall of 2020, all masters and doctoral programs. Of that number, 26, or 3%, were Latinx students and 16, or 2%, were Black. In CCS, total graduate enrollment is 1,490, with 20 Latinx students (1.3%) and 17 Black students (1.1%). Overall, domestic diversity is lacking at both schools across graduate programs. These numbers indicate a

local form of the larger problem of inequitable enrollment for domestic students of Color. Further, low enrollment of students of Color at the graduate level on behalf of NEU contribute to the larger national problem of diversity in highly-skilled career fields.

	Graduate Enrollment	Black Enrollment	Latinx Enrollment
NEU	7,062 F20	161 (2%)	176 (2.5%)
СВ	935 F20	16 (2%)	26 (3%)
CCS	1,490 F20	17 (1.1%)	20 (1.3%)
M.S.P.M.	94 (since 2018)	0	0

Table 1 NEU, CB, and CCS Graduate Enrollment

The M.S.P.M. program administers its own admissions process through CB. Admissions processes administered at the individual college or program level are not unusual for graduate level programs. The admissions committee consists of one admissions officer, the Executive Director of the M.S.P.M. program, one faculty member from CB, and one faculty member from CCS. Decisions are made by the committee with a targeted class size in mind that is based on each individual applicant's past work experience, GMAT or GRE scores, and undergraduate background and academic performance. Standardized testing is a particularly interesting part of the research around graduate admissions. Over the course of this dissertation in practice, NEU has been affected by COVID-19 as have other institutions of higher education. In response to the difficulties that came with testing during the pandemic, NEU decided to allow applicants the option to opt out of the test, a change from the past, and instead submit several essays explaining the rationale to opt out of the test. This option has remained as a holdover in the latter phases of the pandemic.

It also bears mentioning that the M.S.P. M. program is progressively seeking older, more experienced applicants. With this admissions focus, the solution cannot simply be to develop an undergraduate pathway. Rather, the problem is one of securing a pathway of experienced practitioners from industry. A further difficulty is the unintentional international versus domestic breakdown of the M.S.P.M. program. Historically, the program attracts and enrolls international students at greater levels than NEU with international representation typically in the 70%-90% range. To be sure, this breakdown is not intended but is the result of a huge draw of interest from international students, mostly in Asia. Thus, in order to significantly increase diversity in the program, a focus must also be placed on attracting domestic students.

Equity and social justice, and their place within the ecosystem at NEU, are central to this problem of practice. Generally, diversity and equity initiatives occur in silos, spearheaded efforts by individuals, but not by whole departments or large entities within the organization. This has slowly started to change. Undergraduate and graduate students are demanding accountability and forcing institutions, including NEU, to take greater notice of institutionalized and systemic injustices and other issues related to equity propelled by the murders of Black people at the hands of police over the last decade and the protests dictating change during the summer of 2020. Partly in response, NEU recently created and hired a new position, Vice Provost for Diversity, Equity and Inclusion. Both CB and CCS also created institutional plans to hire an Associate Dean of Diversity, Equity, and Inclusion in each school's leadership offices to lead the DE&I efforts. These new stakeholders will join the institution and focus on efforts at both the undergraduate and graduate level. Beyond these hiring priorities, NEU needs further understanding and emphasis of social justice at a granular level that impacts the day-to-day student experience. The current method of operating with non-performance (Ahmed, 2006) space does not sufficiently create

positive impact on issues of equity and social justice like this one. Non-performance connotes that institutions, both public and private, companies, governmental organizations do not "do what they say" they do (Ahmed, 2006, p. 104). There is not commitment or obligation for institutions to actually follow through on their words with action.

1.3 Significance of this Problem Area

Stakeholders impacted by this problem of practice include Black and Latinx people with aspirations for careers in the tech industry, greater U.S. society, and the U.S. tech industry itself. The program has yet to prioritize enrollment of Black or Latinx students, and, thus, we are unsure of the size of the group being affected. With that said, this group was a critical component, and through this inquiry, the program needed to understand the experiences and aspiration of these individuals in higher education and in deciding to ultimately aspire to graduate programs like the M.S. in Product Management program and/or careers in the tech industry. There are consequences of inequitable access to a program like the M.S.P.M. program and the lack of career development support for Black and Latinx people that has led to a lack of knowledge or awareness about the M.S.P.M. program. These consequences include perpetuating issues of access to graduate education for people of Color, fewer career options for people of Color, poor representation in the tech industry, and the racial wealth gap. Interrupting the cycle of inequitable access could lead to significant changes for Black and Latinx people with aspirations into tech careers.

Another group affected by this problem area was the broader U.S. community where a racial wealth gap exists. In a random sampling of American families, the U.S. Federal Reserve reported that the average White family maintains roughly five times the wealth of the average

Latinx family and roughly eight times the wealth of the average Black family (Bhutta et al., 2020). White families are also significantly more likely to pass along their wealth to younger generations than families of Color. From home ownership to retirement investment and emergency savings (all indicators of wealth), Latinx and Black families are significantly behind their White counterparts (Bhutta et al., 2020). Access to education and higher earnings in U.S. private industry directly impact these outcomes. Increasing the wealth and earning power of a broader swath of U.S. society also impacts the U.S. economy. Greater wealth amongst a greater body of the population means more opportunities for money to circulate in the economy, providing a boost to the economy and U.S. industries.

Lastly, the tech industry in the United States stands to benefit from positive changes in this problem area. These companies have a vested financial interest in finding a qualified and diverse candidate pool to fill their tech and leadership roles. Columbia Business School professor Katherine Phillips (2014) posited that a company "would not think of building a new car without engineers, designers and quality-control experts—but what about social diversity?" Companies need more tech leaders of Color because there are significant positive outcomes that come from diversifying the workforce. First, diversity leads to better financial performance. A McKinsey study found that companies in the bottom quartile for gender and ethnic/racial diversity are less likely to report financial returns that are above average than companies who are considered average in their diversity (Hunt et al., 2015). Essentially, companies with less diversity are not as profitable. Diversity within companies and teams also begets creativity and solutions, better team performance, and teams that build better products (Phillips, 2014; Stowe, 2018). The upsides continue to executive and leadership levels of firms, where representation amongst senior management lead to higher overall values for firms (Phillips, 2014).

The lack of access to knowledge about graduate school for Latinx and Black students is a problem that warrants further exploration within the M.S.P.M program at NEU for several reasons. First, this problem is significant given the projected growth of racially minoritized people in the population relative to the United States' overall population. The Latinx and Black populations are slated to grow over the next four decades (Frey, 2018), and yet, business schools enroll African Americans at just 8% of their total enrollment (Thomas, 2020). In the computer science field, Black men and women made up just 2% and 1% of graduate enrollment in 2014 (Dillon Jr. et al., 2015). Similarly, Latinx students comprise just 7% of business school attendees and 8.5% of enrollment in graduate computer science programs (Daniel & Caruthers, 2016; Okahana & Zhou, 2018). Put together, these numbers depict low business school and computer science enrollment despite the projected growth of these two populations. It is clear that graduate programs in business and computer science must prioritize the recruitment, enrollment, and retention of students from minoritized backgrounds.

In addition, this problem area has significant influence over the greater body of work of the graduate education and professional tech communities. As both spaces participate in systems that produce inequitable outcomes, there is tremendous opportunity for positive impact by focusing on supporting students of Color in career development that potentially leads to enrollment in graduate education. The data presented thus far in this inquiry acknowledge the fact that graduate schools in general, and business and computer science schools specifically, enroll inequitably low numbers of students of Color. This inquiry will move toward addressing this problem.

2.0 Review of Supporting Knowledge

It is documented that people from historically minoritized racial backgrounds enroll in graduate school at lower rates than their White counterparts (Cuellar & Gonzalez, 2021; NCES, 2021; Okahana & Zhou, 2018; Smith, 2005). Broader research on graduate school aspirations reveal that people of Color aspire to graduate school at similar rates as White people but do not enroll and matriculate at the same rates. In this review of supporting knowledge, I aimed to explore why graduate programs lack diversity, first discussing theoretical frameworks for graduate-choice decision-making, and then reviewing literature about the barriers that keep people of Color from aspiring to graduate school, factors that influence people of Color toward graduate school, and recommended diversity recruitment strategies. I provide a general review of graduate school barriers and influencing factors as I worry that the literature specifically in business and computer science is too limiting.

2.1 Conceptual Frameworks

I used English and Umbach's (2016) model for assessing graduate school choice behavior to frame the review of supporting knowledge and my inquiry. English and Umbach built on an existing model developed and utilized by Perna (2006) for undergraduate school choice behavior. Perna posited that college choice is influenced by four contextual layers: (1) habitus, (2) school and community context, (3) higher education context, and (4) social, economic, and policy context.

Habitus refers to various characteristics: gender, race, socioeconomic status, social capital (knowledge and resources available in navigating educational processes), and cultural capital (knowledge and values around education shared by family) (Perna, 2006). Cultural capital consists of the various characteristics which are handed down from one's parents. These include qualities like language skills, cultural knowledge, and mannerisms. These can often delineate one's class status (Perna, 2000b). The amount of cultural capital a student holds influences how they are able to find their way through a graduate school choice process where wealth and alignment with cultural norms prove to be advantageous factors. Social capital theory is similar but more so based on the network one has (English & Umbach, 2016). The model also asserted that an individual's evaluation of expected costs and benefits is influenced by all of these contextual layers (Perna, 2006). English and Umbach (2016) argued that graduate school choice, grounded in Perna's (2006) model, manifests itself in a decision-making process consisting of three phases: (1) aspiration to graduate school, (2) application to graduate school, and (3) enrollment in graduate school. The review of supporting knowledge and my inquiry focused on the first phase, aspiration. Though aspiration on its own does not lead to graduate school enrollment and success, it is a key first step in the process and informed by multiple factors.

Both models account for econometric factors in decision-making. English and Umbach (2016) acknowledged the limiting nature of prior studies that use either an econometric or sociological framework in isolation. Traditional econometric models state that a person makes decisions based on the difference in benefits and costs in a given situation, comparing the costs and benefits across alternatives, and deciding on the choice with the most economic benefit (Perna, 2000b). Perna (2000a) ultimately supports an expanded econometric model inclusive of cultural and social capital theories and argues that school choice decisions are economically driven with

significant influences from a student's social and cultural capital. Perna (2000a) found that traditional econometric models lose value when they do not account for other methods like cultural capital theory. Decisions of graduate school attendance are financially influenced but not exclusively so.

English and Umbach (2016) modified Perna's (2006) model for postbaccalaureate decision-making to better reflect the context surrounding graduate school choice. For example, their research explored the influence on graduate school aspiration, application, and enrollment of a prospective student's background, undergraduate institution, undergraduate major, and amount of accumulated debt (English & Umbach, 2016). English and Umbach utilized four contextual layers to inform the decision-making process: (1) they maintained the use of habitus but updated various aspects to reflect the differences between the undergraduate to graduate school transition instead of the secondary to postsecondary transition, (2) the second layer consists of undergraduate school context, (3) the third layer consists of graduate school context, and (4) the final layer of social, economic, and policy context remained the same (English & Umbach, 2016).



Figure 2 English and Umbach Graduate School Choice Framework

2.2 Barriers to Graduate School for Students of Color

There are numerous barriers to Latinx and Black graduate school choice decision-making that deter aspiration to graduate school. Barriers influenced by the first three layers of the English and Umbach (2016) model, habitus, undergraduate school context, and graduate school context, will be the focus of this section. Decision-making at the graduate school level relies heavily on an individual's habitus or their internal set of beliefs, perceptions, and values formed through lived experience (English & Umbach, 2016). Each person navigates decision-making uniquely based on their habitus, and the supporting knowledge identifies several existing barriers to graduate school that are based on the concept of habitus. These barriers include cost of attendance, academic and performance perceptions, and cultural barriers. Additional barriers exist in alignment with the second layer of English and Umbach's model, undergraduate school context, including advising, career guidance, and institutional support from a student's undergraduate level. Supporting knowledge also discusses a barrier consistent with the third layer, graduate school context (English & Umbach, 2016), in the fear of the standardized test (GRE or GMAT are most commonly used in graduate business education) caused by testing bias.

2.2.1 Cost of Attendance

Financial factors and cost of a graduate education factor significantly into graduate school decision-making and aspirations. English and Umbach (2016) asserted that graduate school choice is discernable as an investment decision, and prospective students make decisions based on costs and benefits as perceived and weighed by each individual student. With tuition on college campuses rising over the last decade (Gee, 2018; Mitchell et al., 2017), the cost of graduate education weighs as a potentially large factor in decision-making. In a study of prospective graduate student behavior in psychology, Pietrantonio and Garriott (2017) expressed concern that undergraduate students of Color, including Black and Latinx students, might steer toward not enrolling in graduate programs in psychology when they discover the cost and potential debt associated with possibility. In a study of Latinx participation in post-baccalaureate education, Berg and Tollefson (2014) noted that cost of education can also be viewed as a risk not worth taking for Latinx students when considering the potential payoff. Many Latinx graduate students also have other obligations (e.g., family, work, daily commute) that factor, and the cost of graduate education can make the decision to attend an impractical one for many (Berg & Tollefson, 2014). These

factors combine to make the cost of a graduate education a very influential, and often deterring, factor in assessing graduate school aspiration.

Undergraduate debt also plays a role in decisions to apply to graduate school. This is important because Black and Latinx students are more likely to borrow and incur higher levels of debt during their undergraduate education (Heller, 2001). Millet (2003) found a strong connection between debt from college and graduate school nonattendance, noticing that Black students were less likely to enroll in graduate school. Millet (2003) found that Latinx students were as likely to aspire to and enroll in graduate school as White students, though more reliant on loans. Similarly, Malcolm and Dowd studied the effect of undergraduate student debt on enrollment in STEM graduate programs and found there to be a negative association, or "debt penalty", between the two (2012, p. 293). Black and Latinx students were found to have a higher debt penalty than White students. Additional supporting knowledge shows that perspectives on student debt can also change over time. A longitudinal study of student debt perspectives among recent HBCU graduates found that, during their undergraduate study, students initially indicated that debt would not affect their postbaccalaureate decision-making. However, a few months after graduation, a majority of the participants indicated a change in their immediate or long-term career plans at least partly because of their accumulated debt (Baker, 2019). Given the higher reliance on borrowing among students of Color (Baker, 2019) and the cost-risk aversion, debt and the cost of graduate school can be a significant barrier to aspiring to and enrolling in graduate programs for racially minoritized students. However, institutions can seek to alleviate cost as a barrier, as Millett's study found that financial aid resulted positively in graduate school attendance.

2.2.2 Academic Barriers

A review of the supporting knowledge makes the case that a prospective student's academic performance, along with their own self-perception of their ability (based on their academic performance), has a strong influence over graduate school decision-making (Berg & Tollefson, 2016). Research shows that undergraduate GPA, undergraduate major, and the selectivity of the undergraduate institution can all serve as influencing factors that impact the probability of applying to graduate school (Nevill & Chen, 2007; Ramirez, 2013). English and Umbach (2016) incorporate these factors into their model as a component of human capital, which influences graduate school choice at all three points in the process, finding that students with higher levels of academic performance would be more likely to exhibit graduate school interest.

In addition to the impact of debt on decision-making, Heller (2001) found that positive letter-grade changes resulted in an increase in the prospect of graduate school aspiration and potential enrollment. Often, institutions focus on retention and completion among students of Color without appropriate attention given to academic performance, which ultimately influences interest in graduate school. Collins' (2012) study of postbaccalaureate behavior among Black students agreed, finding that institutional support programs and academic services aimed toward improving undergraduate GPA can help Black students achieve their graduate school goals. In a study of factors related to prospective students' probability of enrolling in graduate schools after completing their undergraduate, those with GPAs at or above 3.5 were more likely to aspire to and enroll than those carrying lower GPAs (Nevill & Chen, 2007). The impact of academic performance can carry significant weight in a person of Color's decision-making process. Poor academic performance can leave a prospective applicant with poor self-perception if their undergraduate GPA is not in line with those sought by graduate programs, resulting in a decision

not to apply (English & Umbach, 2016). Berg and Tollefson (2014) also found that poor academic performance during undergraduate years led to poor self-concept and less aspiration toward graduate school for Latinx students.

2.2.3 Testing Fear

Graduate schools also pay undue credence to prestige through an overreliance on testing, and this mindset negatively impacts Latinx and Black prospective students. Graduate business programs utilize the GRE (Graduate Record Examinations) or GMAT (Graduate Management Admission Test) to evaluate candidates. The reasoning is that the institutions use the same tool (the exams) to measure all prospective students using a supposedly level and unbiased entrance exam. However, an overreliance on the exams has shown to be problematic, biased against testtakers of Color, and an unreliable predictor of a candidate's capability (Bayer et al., 2020; Burton & Wang, 2005; Miller & Stassun, 2014; Miller et al., 2019; Moneta-Kehler et al., 2017; Peterson et al., 2018). For example, when assessing for predictability, studies have shown that, for some graduate programs, students who have higher scores are more likely to be non-completers while students with scores in the lowest 25% are more likely to complete (Peterson et al., 2018). In most cases, testing was not useful in predicting which students would graduate (Miller et al., 2019; Moneta-Kehler et al., 2017). In the best of cases, entrance exams proved to be moderate predictors of first semester grades and graduate GPA, but, given the unpredictability of program completion, studies have called for institutions to reevaluate how they utilize standardized testing for candidate evaluation (Bayer et al., 2020; Burton & Wang, 2005; Miller & Stassun, 2014; Miller et al., 2019; Moneta-Kehler et al., 2017; Peterson et al., 2018).
Business schools use the GMAT to determine quantitative and non-quantitative aptitude of prospective students. In a study used to analyze the ability of the GMAT to predict business school performance, Sireci and Talento-Miller (2006) discovered that Black test-takers performed worse on the quantitative portion of the exam compared to White test-takers. Quantitative skills, and thus that portion of the test, are often viewed by administrators and faculty as critical for business school students. When institutions use testing cutoffs to eliminate candidates and exhibit an overreliance on the exam, they exhibit bias and disproportionately affect applicants of Color. A separate study examined the effect of implementing the GRE as a requirement for physician assistant school at NYIT. The result was a significant drop in the school's African-American applicant pool and subsequent questioning of the importance of using testing as a performance predictor (Wolf, 2014). This study shows hesitance on the part of Black test-takers due largely to the bias exhibited through test results and incorporation into the admissions process. It also shows how institutional norms and standards present barriers to graduate school interest in candidates of Color.

Testing has shown to favor students from historically privileged backgrounds (Miller et al., 2019), negatively impacting candidates of Color. According to Miller et al. (2019) the weak or lack of correlation between testing and program completion is explained by factors related to testing experience and the small sampling of a student's capability. Test-taking strategies can be learned, but not all students may be able to afford or know to seek access to test tutoring. In addition, a test taken on a single day does not represent a comprehensive analysis of a student's ability to graduate from a program or contribute to the field overall. Yet, institutions dismiss both points. This tends to favor White candidates over racially and ethnically minoritized candidates and leads prospective students of Color to view testing as a real structural barrier to admission

(Bayer et al., 2020), which exists to measure and increase institutional prestige while simultaneously disadvantage students of Color (Bayer et al., 2020; Miller et al., 2019).

It is noteworthy that the Wolf (2014) study did not implement any GRE cutoff score for applicants. Yet, the mere addition of the requirement for admissions resulted in a notable drop in Black applicants in the applicant pool. This is significant, because it points toward a fear of the test. Respondents in one study even went so far as to state they were actually afraid or intimidated by the GRE (Ramirez, 2011). Another study examined the effects of a test waiver as a part of the admissions process, and those conclusions point to the possibility that a test waiver option may encourage applications from individuals who might otherwise opt not to apply because of a testing requirement (Gibson et al., 2007).

Again, the effects of COVID-19 starting in 2020 also need mentioned here. As the pandemic hit the U.S., institutions of higher education were forced to close down classrooms and push learning online, testing agencies were shut down for a period of time, and graduate admissions offices were faced with significant barriers to attracting students (Camara, 2020). The pandemic forced graduate programs to adjust, and they did so by increasingly offering applicants the option to forego the standardized test. Kell et al. (2021) studied the testing behavior of over 15,000 graduate school aspirants from historically marginalized populations (in this case, Black/African American, Hispanic/Latino, Multiracial, Native American/Pacific Islander) and compared them with international aspirants. The study found that when given the option, international aspirants were more likely to submit test scores than U.S. aspirants of Color, though this trend did not hold across all disciplines or across levels (master's, doctoral, etc.). While the study suggested that the testing option was neither a singular solution nor a detriment to diversity,

the authors noted the overall low number of aspirants of Color. They encouraged programs to think about the testing option as part of a larger overall strategy not a singular solution to this problem.

2.2.4 Cultural and Social Capital

Cultural and social capital also affect graduate school decisions by influencing how a prospective student approaches decision-making and what resources are available to them (Perna, 2006). Cultural capital refers to a person's cultural knowledge set, which is often passed down by parents and other family members (English & Umbach, 2016) while social capital refers to a person's social network and their ability to utilize and maintain that network (Collins, 2012). A person's cultural and social capital can thus affect their ability to navigate the graduate school choice process based on their capital's alignment with the norms valued by dominant, existing structures (English & Umbach, 2016; Perna, 2006). Cultural and social capital can include parental education levels and attainment and parental involvement and encouragement in education attainment (Perna, 2006). Perna and Titus' (2005) study of undergraduate school choice showed that decisions can be influenced by level of cultural and social capital, and the absence of cultural and social capital aligning with educational values can serve as an obstruction to education (Perna, 2005, 2006).

Capital can come in the form of knowledge. This includes knowledge about processes, values, and norms but can also include knowledge about pathways and career fields. Institutions also fail to adequately support Latinx and Black students in preparing for their career options after their undergraduate education (Falconer & Hays, 2006). Students of Color at undergraduate institutions have often had to find their own way through not just the academic programs at an institution but also the process of discerning their next step in life (Cuellar & Gonzalez, 2021).

This has a tremendous impact on graduate school aspiration as oftentimes institutions do not acknowledge the cultural norms of students of Color and instead favor cultural norms of the dominant population (Yosso, 2005). In this case, students with the cultural knowledge of what a pathway to graduate school may provide, and the ability to navigate that pathway, are favored. Additionally, and as a result, Black and Latinx students are often reported to have low career self-efficacy and lack overall confidence in their career plans, which directly overlaps with graduate school aspiration (Falconer & Hays, 2006; Grier-Reed et al., 2009; Kezar et al., 2020). This puts students of Color at a delay and disadvantage when considering their likelihood to aspire to graduate school.

With regards to the possibility of graduate business education, a 2019 GMAC survey found that business degree candidates from ethnically and racially minoritized backgrounds report having considered a graduate business degree later in their careers when compared to their White counterparts (Hazenbush & Schoenfeld, 2020). This supports the argument for a trend that students of Color are less likely to be exposed to the possibility of graduate business education at a young age. This has a direct impact on the pathway to graduate education and speaks directly to the fact the institutions and programs need to do a better job of supporting the career development of students of Color during their undergraduate education. For-profit institutions lend credence to this argument. A 2018 study found that for-profit institutions attract diversity into graduate business programs at higher rates than non-profit institutions (Hazenbush, 2018). A main reason cited for this important differentiator is the fact that for-profit institutions begin the conversation about graduate business education while prospective students are still undergraduate students (Hazenbush & Schoenfeld, 2020).

Aspiration to higher levels of educational achievement is influenced by parental influence and education levels (Collins, 2012; English & Umbach, 2016; Hamrick & Stage, 2004; Perna, 2006). Students with parents who are classified as highly educated are more than three times as likely to enroll in graduate education (Mullen et al., 2003), demonstrating a strong positive correlation between parental education level and graduate education ambition for their children. McCarron and Inkelas (2006) studied decision-making for first-generation college students and found that parental and familial involvement, despite a lack of cultural or social capital that aligned with education norms, was the strongest predictor of educational aspirations. In cases where parents have not been to college or been through the application process (undergraduate or graduate), prospective students of Color often seek support outside of the home. In such cases, prospective students of Color relied on a network of peer and mentor supporters (Smith, 2005; Varhegyi & Jepsen, 2009).

2.2.5 Advising, Career Guidance, and Institutional Support

Students of Color often lack the support and guidance necessary to navigate the graduate school choice process. Moreover, parents from low-income backgrounds, disproportionately consisting of people of Color, may not have the knowledge about graduate school application processes (Collins, 2012), and so low income students need additional support in researching and learning about the graduate school choice process. This support should come from faculty and advising and career services staff at undergraduate institutions. However, students of Color often encounter barriers where they should find support. For instance, Gonzalez et al. (2003) described that Latinas seeking an undergraduate acceptance encounter institutional neglect in an institution's lack of desire or ability to properly support students. Similarly, Gonzalez et al. (2003) identified

institutional abuse toward Latinas via actions taken by the institution that undercut students. Such actions might include withholding information from students, being discouraging toward students, providing inaccurate information, and more (Gonzalez et al., 2003).

Ramirez (2011) found similar instances of institutional abuse when examining the experience of Latinx undergraduate students seeking graduate school opportunities. One student from the study cited that they believed they did not gain entrance into any PhD programs due to poor guidance from a faculty advisor (Ramirez, 2011). Advisors created negative and abusive experiences by coming off as elitist and discouraging toward mentees (Ramirez, 2011). Instances of microaggression and institutional racism like these isolate and alienate students of Color on college campuses, leaving them to feel dissuaded and discouraged from graduate school aspiration (Ramirez, 2011).

In cases where institutions did provide proper support, it was found to positively affect graduate school choice outcomes (Collins, 2012; Ramirez, 2013). One study found that when faculty positively engaged Latinx undergraduate students in mentoring and advising, the interactions over the course of an undergraduate career resulted in graduate school enrollment (Ramirez, 2013). Another study found that the earlier Black students are engaged by the institution in receiving information about the graduate school process, the more likely those students were to engage in the process (Collins, 2012). Additionally, engagement in undergraduate research opportunities and support from the institution was found to help Latinx students steer through the graduate school choice process (Ramirez, 2011). Students cited that they were not sure they would have landed in graduate school without the support and guidance through the graduate school choice process from institutional advisors (Lara & Nava, 2018).

2.3 Motivating Students of Color to Enroll in Graduate School

While significant barriers exist to graduate school enrollment for racially and ethnically minoritized candidates, it is also important to document the factors that lead to graduate school enrollment. Here, the supporting knowledge indicates that a candidate's habitus and social and cultural capital can play an important supporting role along with instances of support from key players including family, mentors and advisors, and more, during their undergraduate career.

2.3.1 Family Engagement and Importance of Social Capital

As family and social capital are key components of habitus (English & Umbach, 2016), familial engagement and support and the use of social capital are important parts of the graduate school choice process. Fleming et al. (2014) studied the behavior of Latinx students in undergraduate engineering. The study found that engineering students with parents who worked in engineering were more likely to aspire to graduate degrees. The study also found that participation in professional organizations was positively associated with graduate school choice (Fleming et al., 2014).

Cuellar and Gonzalez (2021) found that social agency learned from parents through the formation of a candidate's habitus positively correlated with degree inspiration. In a study of the decision-making of undocumented Latinx students, Lara and Nava (2018) highlighted the importance of social networks for those Latinx students in advancing toward graduate school. For Black students, parental involvement and education levels also impacted their aspiration level. For example, one study found that Black students' aspirations were impacted by their parents' guidance and expectations along with the level of education their parents achieved (Hamrick &

Stage, 2004). In the absence of a high level of parental education or involvement, Black students also relied on a network of support (Collins, 2012).

2.3.2 Institutional Factors

The reputation of a student's undergraduate institution is also a contributing factor to a candidate's graduate school decision-making. In analyzing Latinx decision-making, Cuellar and Gonzalez (2021) discovered that the selectivity of the undergraduate institution, along with its status as public versus private, impacted a student's academic self-concept, which in turn affected that student's graduate school aspiration. This factor extends to include the reputation of the graduate school. For example, students graduating from HBCUs were found to consider three factors including reputation of the graduate school most heavily when assessing graduate school choice (Strayhorn et al., 2013). Morelon-Quainoo et al. (2011) also found graduate school reputation and ranking to be a key factor in decision-making.

It has also been argued that diversity and representation in the makeup of graduate programs is a critical factor in evaluating program quality (Cowell, 1985), and this includes the racial climate on campus. For example, a study of enrollment factors for doctoral students indicated that the climate on campus was important to candidates' decision-making (Poock, 1999). Additionally, diversity within the faculty plays an important role in application. Strong diversity amongst the faculty, or a lack of diversity, speaks to institutional commitment to diversity (Quezada & Louque, 2004). The presence of a diverse faculty indicated a certain level of importance of diversity to prospective students and created an immediate level of comfort and trust among ethnically and racially minoritized students (Quezada & Louque, 2004). In a study of

perceived the career field and graduate program as a viable option for them when they saw faculty of Color teaching in the program (Louque, 1994).

2.3.3 Undergraduate Support

Just as a lack of support from the undergraduate institution is a barrier, supporting knowledge shows that tangible mentoring and support from key players during a candidate's undergraduate career can serve as a true motivating factor for graduate school because of its impact on academic self-concept (Berg & Tollefson, 2014; Cuellar & Gonzalez, 2021). Activities where undergraduate students have the chance to interact with campus staff and faculty such as mentoring and advising, undergraduate research, and campus employment, increased graduate school aspiration among Latinx students (Cuellar & Gonzalez, 2021). Berg and Tollefson (2014) used the term "professional cultural capital" to describe the mentoring and professional network development that is pivotal for graduate school aspiration, enrollment, and degree completion (p. 306). Their study of Latinx students indicated that support from mentors in a positive and developmental manner was the most important factor in undergraduate success and could lead to graduate school aspiration (Berg & Tollefson, 2014).

2.4 Recommended Strategies for Recruiting Ethnically and Racially Minoritized Students

The goal of this dissertation in practice was to provide recommendations for the recruitment of ethnically and racially marginalized candidates to graduate business school. While there is not supporting knowledge that addresses strategies specifically for graduate business or

computer science programs, this section assesses strategies that have been successful for various types of graduate degree programs.

2.4.1 Committing to Diversity

Institutions have sought to increase their commitment to diversity, and over the last few decades several strategies around commitment to diversity have proven to be effective. Griffin and Muñiz (2011) conducted a comprehensive study of strategies recommended by 14 graduate diversity officers. In the study, diversity officers classified an institutional commitment to diversity as a force that influences their efforts rather than as a specific effort or activity to increase diversity. Diversity officers spoke specifically about buy-in from faculty as the most tangible form of institutional commitment to diversity that directly affects recruitment efforts. More specifically, diversity and recruitment officers need the help of faculty to recruit and develop relationships in fulfilling commitments to diversity. A lack of commitment to diversity appears through infrequent and inconsistent faculty participation in recruitment efforts. Of course, a commitment to diversity must be institution-wide as well, with support coming from the highest levels of the institution (Griffin & Muñiz, 2011).

2.4.2 Intentional Relationship Building

Several studies discuss the importance of relationship building to begin to cultivate a strong culture of diversity and attract potential applicants (Foster et al., 2018; Griffin & Muñiz, 2011; Moerchen et al., 2018). One study discussed that graduate diversity officers conducted several activities to attract students of Color like attending graduate school fairs and conferences, hosting

summer programs, developing a robust campus visit program, and building relationships with faculty and staff at undergraduate minority-serving institutions (Griffin & Muñiz, 2011). However, the study also comments on the challenges of attracting students without the intentional formation of relationship with potential applicants (Griffin & Muñiz, 2011). Similarly, Moerchen et al. (2018) endorsed fostering relationships with professional organizations in a study that discusses increasing representation within physical therapist programs.

Another study outlined and analyzed interventions aimed toward recruiting and retaining students of Color to a biomedical Ph.D. program. The researchers implemented four changes related to recruitment: (1) attendance at recruitment fairs, (2) regular recruitment and admissions seminars at undergraduate institutions for interested applicants, (3) application fee waivers, and (4) annual on-site visit invitations for professionals in the field, faculty at Minority Serving Institutions (MSIs), and members of professional organizations (Wilson et al., 2017). While not linked to any one intervention, the institution found an increase in student of Color applicants over a three year span (Wilson et al., 2017). Tull et al. (2012) discuss the impact of "PROMISE", a program setup to support recruitment and retention of graduate students of Color in the University of Maryland System. The system instituted a series of campus visitation conferences, training seminars on graduate school preparation and recruitment at national conferences (e.g., Society for Hispanic Professional Engineers, Society for the Advancement of Chicano and Native American Scientists, etc.), and year-round network building (e.g., National GEM Consortium and Institute for Broadening Participation) to enhance diversity recruitment efforts. Faculty were asked to participate in recruitment efforts, and data showed an increase in diversity enrollment at the three partner institutions (Tull et al., 2012). Another study sought to improve student of Color enrollment in dental school at 15 participating institutions. Short-term outreach and recruitment programs, like summer enrichment programs for undergraduates, postbaccalaureate programs, summer research programs, mentoring programs, and collaborative relationships with clubs and organizations were found to effectively increase enrollment of Latinx and Black students (Brunson et al., 2010). Though more difficult to measure, 11 of the schools cited the importance of long-term outreach programs, like programs in PK-12 schools, in increasing diversity in dentistry (Brunson et al., 2010). Each of these interventions speak to intentionally supporting and fostering relationships with prospective students (even at young ages), the institutions where those students completed their undergraduate training, and professional organizations with whom they may be connected.

2.4.3 Coaching/Support for Undergraduate Students

Research also points toward the importance of ensuring that people of Color are aware of career pathways. As Latinx and Black undergraduate students are found to have less knowledge of graduate school and career pathways and low career-related confidence and self-efficacy (Falconer & Hays, 2006; Grier-Reed et al., 2009; Kezar et al., 2020), they face more immediate and frequent struggles in exploring career and graduate education options. Cuellar and Gonzalez (2021) identify the importance of working with undergraduate students to increase knowledge about career pathways. Studies point to the impact of early career-related and training activities like getting involved in research, working on campus, and involvement in mentoring and career exploration activities. In such studies, students' interest in graduate school and their career self-efficacy increased (Berg & Tollefson, 2014; Cuellar & Gonzalez, 2021; Falconer & Hays, 2006; Kezar et al., 2020). Additionally, program outreach to undergraduate institutions to develop relationships can positively affect graduate school choice outcomes. In cases where programs

reached out to undergraduate schools to develop regular recruitment and development sessions with their students, Latinx and Black applications were shown to increase (Wilson et al., 2017).

2.4.4 Financial Support

Funding constitutes another of the major influencing factors that influence graduate school choice behavior of Latinx and Black candidates. Rogers and Molina (2006) analyzed recruitment strategies of 11 graduate departments and programs in psychology. Across the programs, faculty and students of Color included in the study responded most positively to the strategy of providing financial aid or funding (Rogers & Molina, 2006). Further, programs felt it was important to make funding a focal point of the website and communications (Rogers & Molina, 2006). These recommendations hold up with prospective students. In analyzing the impact of undergraduate debt on graduate school choice, students were found to benefit when graduate programs provided detail on information about financial resources and funding opportunities (Malcolm & Dowd, 2012).

3.0 Theory of Improvement

Graduate business schools and programs in the United States have not experienced high levels of diversification despite an increase in Black and Latinx undergraduate enrollment. Underrepresentation extends to business and the tech industry where Latinx and Black employees are underrepresented at all levels (Hazenbush, 2020; Muro et al., 2018). This problem encompasses my institution, NEU, where the M.S.P.M. program has struggled to attract domestic applicants of Color and has yet to enroll a domestic student of Color in its four years of existence. To address this problem, I focused on the aspiration phase for prospective M.S.P.M. students and sought to understand prospective students of Color aspiration to the M.S.P.M. program at NEU. For this theory of improvement, I conducted semi-structured interviews with professionals of Color working in the tech industry and utilized the data obtained to develop strategic and targeted outreach and recruitment recommendations. Through interviews I hoped to understand the lived experience of participants and explored their aspirations for pursuing the M.S.P.M. program at NEU. The M.S.P.M. program is culpable in perpetuating inequitable access to higher levels of education as, to this point in its existence, the M.S.P.M. program has not intentionally attempted strategies toward attracting aspiring Latinx or Black prospective students.

The aim of this improvement plan was to increase the number of domestic-born applicants of Color to consist of 15% of domestic applicants to the MS program by 2023 based on the benchmark from the M.S.P.M program's previous admissions cycles of zero enrolled students of Color and only one applicant of Color (Please note: the M.S.P.M. program has an off-cycle admissions timeline with new students beginning the program each January). This overall aim is modest. However, it is critical that the M.S.P.M. program develop a better understanding of student

of Color aspiration to the program in order to implement targeted interventions that positively address the problem.

	Graduate Applicants	<u>Black</u>	<u>Latinx</u>	Domestic	International			
				- 2.1				
M.S.P.M.	241	1	0	31	210			
Note: 8 Domestic applicants identified as dual citizens.								

Table 2 M.S.P.M. Applicants 2018-2021

The aim was derived from statistical premises: the M.S.P.M. program has attracted almost no interest from domestic professionals of Color through four application cycles consisting of 241 total applications. Of those 241 applications, only one candidate self-identified as Black or Latinx. Additionally, the program struggles to draw interest from domestic applicants of Color. Of the 241 applicants to the program, only 31 have come from domestic students while the remaining 210 applicants have been non-U.S. citizens. Most applications (68%) have come from India, with the second-most coming from the U.S. (13%), followed by China (7%). In total, the M.S.P.M. program has received applications from 20 different countries. The average work experience of M.S. program applicants is 4.8 years, and the most common undergraduate degrees are computer science, computer or software engineering, electrical engineering, information technology, business, or mechanical engineering.

3.1 Inquiry Question

One question guided this inquiry:

1. What lived experiences influence graduate school aspiration, both in general and for those looking to break into the tech industry, among domestic Black and Latinx people?

3.2 Context

This section establishes the setting and context in which the inquiry took place. Context is important to understand fully as it details current functioning of the program and its contribution to the problem space. This inquiry took place within the structure of the M.S.P.M. program at NEU. The M.S.P.M. program is an interdisciplinary, graduate business program in which students take courses in business and product design and development through NEU's College of Business (CB) and College of Computer Science (CCS). The current format of the program is a one-year, in-person, full-time program. Students complete 111 units and one internship over the course of three semesters (Spring, Summer, Fall). Currently, there is no online, hybrid, or part-time version of the program. The M.S.P.M. program is supported by staff from CB who benefit from collaborating across colleges in areas of diversity and equity, corporate partnership, career and student support, and more. The program is directly supported by six CB staff members: the program's Executive Director, an admissions officer, a career coach, a leadership coach, a corporate relations officer, and me, the student affairs lead. Despite my student affairs role, I have had the opportunity to influence all aspects of the program since its inception since there is a small number of staff supporting the program.

Admissions in the M.S.P.M. program are unique from other graduate admissions processes at NEU. The role of recruitment falls to one staff member within the CB Admissions Office in conjunction with the Executive Director of the program and an external firm that conducts marketing for the M.S.P.M. program. However, the program does not recruit in the traditional sense of travelling to meet with and cultivate prospective students. The majority of recruiting is done via the program's marketing. The program's website and marketing ads are administered by professionals from the outside marketing firm. The firm historically opens the admissions cycle in March, promoting the program and application through a series of blog-posts, stories, and digital marketing launches, and concludes in October. Over the course of the partnership the firm did not openly bring up the lack of diversity in the M.S.P.M. program. When the program discussed the shortcomings, the firm discussed the idea of including more photographs of people of Color (non-matriculants) on the program website. The program did not pursue this suggestion. Ultimately, the M.S.P.M. leadership opted to sever its relationship with this firm. It remains to be seen whether this firm had an overtly negative effect on diversity in the program (A new firm was onboarded in April of 2022.), but it is clear that they did not have a clearly positive effect on diversity.

The program is marketed to U.S. tech hub cities (i.e., Silicon Valley), in order to increase balance of domestic students. Since the program is generally for technical people to move into management, the assumption is that these cities have a dense customer base. Marketing is targeted toward individuals with at least two years of work experience. Since the program draws a number of students from India, we do not pay for ads there, as the program sells itself in that market. Aspirational students, also called leads, are generated either from the program's website, marketing posts, or word-of-mouth communication about the program. The program does not currently do recruitment travel in any form.

Faculty are not involved in the cultivation of prospective student leads or in the processing of applications. Only two faculty members (one from each college) are involved in application decisions along with the Executive Director of the M.S.P.M. program who leads all aspects of

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administering the program and the admissions staff member who supports the M.S.P.M. program. The program has traditionally required a GRE or GMAT score for acceptance to the program, but during the COVID-19 pandemic a test waiver option was introduced. The test waiver option requires applicants to address their undergraduate and professional background and achievements, other graduate coursework completed, and informs waiver applicants that they may be offered conditional acceptance contingent upon the completion of several short courses offered online in business or computer science. They may also be offered an outright acceptance.

Tuition is steep for the M.S.P.M. program, at \$66,278 for the entire program. This cost does not include living expenses, cost of books, transportation, or other associated costs, nor does it include the foregone wages a student would surrender over the course of their year in the program. The program also does not offer any form of scholarship or aid for any students. Students are limited to self-funding or loans to finance their degree. Students do receive compensation during their required summer internship, but this is likely insufficient to effectively balance the challenge brought about by the overall cost of the program. In combination, the cost of the program and lack of funding present a presumably tremendous hindrance.

The M.S.P.M. program also has no currently existing diversity recruitment strategy. As all generated leads come from marketing efforts, the program can influence lead generation but has less overall control over prospective student of Color lead generation until it is willing to be more intentional about diversity recruitment. The program has yet to create or craft a marketing strategy that targets prospective students of Color, but leadership recently highlighted this as a priority, and this inquiry is the first step in doing so. Historically, the program has not sought to target partnerships with organizations that promote diversity, nor has it sought to recruit at any career fairs or conferences for prospective students of Color interested in graduate business programs.

The program recently formed a Diversity, Equity, and Inclusion (DE&I) committee, which I lead. The committee consists of myself, the program's Executive Director, the program's admissions officer, and a recently-hired adjunct instructor who has a vast amount of industry experience. The committee began meeting periodically, but irregularly, in late May of 2021 before moving to weekly 30 minute meetings in July of 2021. This committee serves as the program's primary support and initiative-driver in the DE&I space in the future. The aim of the committee is to support diversity and access to technology and business education at all levels of the problem space from K-12 computer science education to graduate school enrollment. The committee uses beta-testing methods to determine what interventions create positive changes to the problem space and then scale improvements to create more impact. This committee is also the central support for this inquiry, serving in an advisory and support role. They were supportive of this inquiry and are eager to view results. Additional support comes from CB's Executive Director of Community and Inclusion with whom the committee lead (me) and Executive Director meet monthly.

3.3 Inquiry Approach

The inquiry followed an improvement science design centered around incremental changes and subsequent analysis in a professional place of practice (Hinnant-Crawford, 2020; Perry et al., 2020). Improvement science calls for careful and thorough systems analysis and understanding, which enables practitioners to understand forces and stakeholders at play in their respective settings. Incremental changes in improvement science are iterative, ensuring that the controlled changes are conducted through at least one Plan-Do-Study-Act (PDSA) cycle (Perry et al., 2020). The PDSA cycle for this inquiry began with a series of interviews and post-interview surveys that helped me "plan" by collecting data and feedback. I conducted a number of interviews with Latinx and Black professionals in order to draw connections at a high level about the experience of students and professionals of Color around the inquiry questions. The data enabled the "do" part of the PDSA cycle. Based on the collected data, I created a diversity recruitment plan. This served as the intervention for this study. This study explored the aspirations of domestic Latinx and Black interest in the M.S.P.M. program using a qualitative approach to the inquiry and guided by theory embedded in English and Umbach's (2016) model of graduate school choice. This inquiry did not utilize the "study" and "act" portions of the PDSA cycle due to time limitations. However, I will develop a plan for further studying and acting based on findings and after completing the intervention. These are discussed in chapters 5 and 6.

This inquiry was completed at NEU, a mid-sized, predominantly White institution of higher education in the Northeast United States. The inquiry consisted of two phases. The first phase included collecting data to inform the second phase, which was the creation of a strategic and targeted outreach and recruitment plan. First, I interviewed individuals (either undergraduate students or young professionals) who identified as either a domestic Latinx or Black. The second phase, the intervention, was the creation of strategic and targeted recruitment plan. I identified thematic barriers to graduate education for the participants through the collected data. Additionally, I identified thematic elements related to possible motivation and aspiration to any type of graduate education. Themes guided recruitment plan development.

At the time of the study, the M.S.P.M. program did not have data that definitively addressed the lack of diversity in the program. Thus, any conceivable intervention to disrupt the pattern of low application to the program from domestic people of Color would have been mere guesswork. This inquiry, and the critical recruitment plan developed based on the data, provided the program with actionable and relevant next steps to address the problem. Stakeholders also played a pivotal role in developing the recruitment plan. After collecting and reviewing the data, I worked with all stakeholders (admissions, marketing, the DE&I Committee, and the Executive Director of Community and Inclusion) to collect input and inform proper stakeholder buy-in for the final recruitment plan product. Together, we created a recommended diversity recruitment plan for the program to implement.

3.3.1 Study Sample

The targeted population for this intervention was domestic Black and Latinx people working or studying within the tech industry or seeking to transition into the tech industry. Both current undergraduates and active professionals participated in the interviews. I selected these populations because they are the central focus of the stated aim, and both bring experiences to the graduate school journey from critical points on the pathway. Saldaña (2011) notes that researchers should seek participants that are appropriate and best able to provide data-rich answers in the interview. The population directly relates to the larger problem of significant lack of diversity in graduate education. I conducted outreach to individuals at several organizations in order to call participants for this study, including individual student and professional chapters of the National Society of Black Engineers (NSBE) and Society for Hispanic Engineers, the Carnegie Mellon University Robotics Institute Summer Scholars (RISS) program, Techqueria (a non-profit that supports Latinx professionals in the tech industry), and more. I had a pre-existing relationship with CMU RISS and Techqueria, but the remainder of the outreach was done in the form of cold-contacting. In total, I reached out to over 50 eligible participants, which yielded 9 participants. I

kept the study sample size small in order to better provide an in-depth analysis of the problem area, and the ability to do so decreases as the study sample increases (Creswell, 2002).

A pilot interview and survey were conducted prior to any outreach to potential participants, and this was helpful on two main levels. First, the pilot survey allowed me to undergo the experience of conducting the interview and survey, and discover any weaknesses or issues in my line of questioning. The other effect the pilot had on my protocols consisted of focusing the protocols. The pilot allowed me to reflect on the overall purpose of my inquiry, and focus my protocols, particularly the interview, on the desire to better understand the experiences of Latinx and Black people, versus the aim to increase enrollment in this graduate program. This is a subtle, but important variation.

Participant	Race/Ethnicity	Gender Identity	Years of Work	Undergraduate Major	First- Generation	Undergraduate Enrollment		
		·	Experience	Ū.	to College	Status		
Pablo	Non-White	Male	4	Computer	Yes	Enrolled		
	Hispanic.			Science		(Senior)		
	Indigenous							
	(tribally							
~ 1	unaffiliated)*			~				
Charles	Black	Male	2	Computer	No	Enrolled		
			• •	Science		~		
Ana	Latinx	Female	20	Chemistry	No	Completed		
Nicolas	Latinx	Male	2	None	Yes	Did Not		
						Complete		
Liliana	AfroLatina	Female	1	Psychology	Yes	Completed		
Myia	Black	Female	6**	Industrial	No	Enrolled		
	American			Engineering		(Senior)		
Jessica	Hispanic/Latinx	Female	.5	Mechanical	Yes	Completed		
				and				
				Biomedical				
				Engineering				
Viviana	Hispanic/Latino	Female	.5**	Civil and	Yes	Enrolled		
				Environmental		(Senior)		
				Engineering				
David	African	Male	1	Electrical and	No	Completed		
				Computer				
				Engineering				
Note. Participants were asked to self-identify their race/ethnicity via open-ended question.								

Table 3 Participant Demographic Data

* Did not state tribal affiliation. **Participant noted internship experience.

A call for participants (Appendix A) went out, explaining the reason for outreach, purpose of the study, and next steps if interested in participating. Nine individuals accepted the invitation. The participant's gender identities consisted of four men and five women, and five identified as first-generation college students. Participants self-identified via an open-ended question as African (1), AfroLatina (1), Black (1), Black American (1), Latinx (2), Hispanic/Latinx (1), Hispanic/Latino (1), and Non-White Hispanic and Indigenous Tribally Unaffiliated (1). Three participants studied or were still studying (four of the nine participants were still completing their undergraduate studies) a form of engineering (industrial, environmental, civil, mechanical, biomedical, electrical, and computer) in college, two were still studying computer science, one studied chemistry, one studied psychology, and one participant did not complete college. Two participants were alumni of NEU. The remainder had no formal affiliation with NEU. The final participant mentioned spent a year in college before leaving due to financial burdens. They entered the workforce and currently have two years of work experience. Work experience ranged from .5 (including internship and co-op experience) to 20 years. I assigned a pseudonym to each participant to ensure that confidentiality was respected. I kept the recordings, transcriptions, and coded data privately filed and confidential.

3.3.2 Methods

This inquiry utilized one-on-one stakeholder interviews as the primary method for data collection. Participant interviews are a common method of data collection in qualitative research methodology and enable participants to effectively convey their lived experiences in their own words (Saldaña, 2011). After each interview I kept a digital reflective journal, using Otter.ai to transcribe my thoughts. The journal was kept to allow space to consider power, privilege, and positionality as I collected and analyzed data (Ortlipp, 2008). During the fall of 2021 and spring of 2022, participants were sent a post-interview survey (see Appendix B). The survey was conducted after the interviews to avoid stereotype threat (Steele & Aronson, 1995). I sought to avoid having participants respond differently during interviews, based on the possible perception that they might be stereotyped in certain ways based on their survey responses. This survey asked participants to identify their level of work experience, undergraduate major, undergraduate GPA, and factors that might influence them to seek out graduate school.

I conducted semi-structured interviews with participants, using a protocol guided by English and Umbach's (2016) model and the review of supporting literature (Appendix C). The semi-structured format solicited open-ended responses from participants and allowed participants to entertain multiple response possibilities for each question (Mertens, 1998). In utilizing this format, I aimed to shift power from the interviewer (me) to the participant (Creswell, 2002). Interview questions were structured from the graduate school choice framework I utilized for this study. Questions aligned with each of the four contextual layers of English and Umbach's model: (1) habitus, (2) undergraduate context, (3) graduate school context, and (4) social, economic, and policy context. Responses to the questions spoke to the inquiry question, and participants had the opportunity to speak to the level of influence exerted by each contextual layer. After the interview, I identified themes through responses around these contextual layers, which informed the subsequent recruitment plan. Interviews took place over the Zoom meeting platform and were be recorded with the participants' permission. Appendix D contains a consent form completed by participants. The University of Pittsburgh Institutional Review Board determined this study met the criteria for exempt research (Appendix E). This study did not need approval from NEU via their IRB Office.

3.3.3 Analysis

I conducted data analysis based on the recorded interview transcriptions. Data analysis began immediately and occurred in an ongoing manner after each interview in order to allow for the immediate identification of trends and insights (Saldaña, 2011). Analysis included elements that may cause interest or aspiration to graduate school. I coded the data after each interview, utilizing hard copy printed transcripts with space for coding and note-taking in the margin.

Through data analysis, I identified one central theme or category and its relationship to several other subthemes or subcategories in an effort to address the inquiry question. Data analysis consisted of inductive coding by way of two types of coding techniques: open coding and In Vivo coding, (Creswell, 2002; Mertens, 1998). I incorporated an inductive reasoning approach to data analysis. Mertens described an inductive approach as the researcher's attempt to "make sense of a situation without imposing preexisting expectations on the phenomena under study" (1998, p. 160). This involves the researcher approaching the data with an open-mind and listening to the data to begin the interpretation process (Mertens, 1998; Saldaña, 2011).

The first coding technique, open coding, consisted of naming and categorizing data. This step in the process occurred after each interview was conducted in order to begin to identify patterns. I originally identified eleven categories through my research and analysis. As more interviews were conducted and more data collected, previous interviews and established codes were reanalyzed and refined. I identified categories during the open coding process using In Vivo coding (Saldaña, 2011) to best capture the experiences of the participants. Since In Vivo coding captures lived experiences of participants, it served as a good vehicle for answering the inquiry questions. This process assisted me in identifying codes that were not necessarily discussed explicitly in the literature. One example is the category of Industry Barrier/Support, which is discussed somewhat in the literature, but prevailed as a strong theme throughout the interviews.

Once the first step of open coding took place, I conducted an additional coding procedure called axial coding. Axial coding consists of drawing connections between categories identified during the open coding process (Creswell, 2002; Mertens, 1998). Axial coding was the phase in the process during which I began to identify one central theme or category from the data, and analyzed the relationships between the categories and the central theme (Creswell, 2002; Mertens,

1998). Lastly, after beginning to narrow categories into one potential overarching theme in the axial coding process, that main category was identified during the selective coding process (Creswell, 2002; Mertens, 1998). The open and axial coding processes ultimately led to narrowed and finetuned categories, from twelve down to a total of seven thematic categories. Final categories consisted of: (1) Barriers, (2) Demand for Graduate Education, (3) Habitus, (4) Undergraduate Institution Barrier/Support, (5) Industry Barrier/Support, (6) Graduate School Characteristics, and (7) Resources. An example of the narrowing of categorical themes includes combining themes like Social Capital and Cultural Capital into one broader theme, like Habitus. Fewer, broader themes allowed for a more focused analysis of the data.

This process informed the findings and the intervention (the creation of the recruitment plan) by highlighting common themes across the interviews. The intervention was a response to the findings, which were derived from the lived experiences, barriers, and motivating factors expressed by participants by incorporating these themes into the recommended recruitment plan.

3.3.4 Limitations of This Approach

Mertens (1998) correctly observed that no inquiry design is perfect, and this inquiry was no exception. First, this inquiry was subject to interest in participating in interviews from the study sample (Creswell, 2002; Mertens, 1998). For Latinx and Black industry professionals this variable was unpredictable. I worked from scratch to develop mutually beneficial relationships with the organizations I targeted for outreach. Doing so contained a good amount of uncertainty as organizations were hesitant about participating. This hesitation exists in order to protect organization members from requests that might be unreasonable. If organizations did share the invitation, there was still an issue of willingness to participate on the part of individuals. Black and Latinx people live under a microscope and do not always have a willingness to share their stories or experiences. For those who did participate, there was a level of uncertainty or ambivalence around exactly what they could contribute to the conversation.

Similarly, using one-on-one interviewing methods can lead to small sample sizes and issues of generalizability. Small sample sizes do have their benefits. For example, Saldaña (2011) noted that studying one person's experience will lead to rich data, but that such a sample size may not be representative of the entire population's experience. Having a larger sample size would be more informative and provide better feedback that could be incorporated into the intervention. Such an example is extreme, and I aimed to gather more data; however, the collected data's generalizability was a limitation of this interview method. Additionally, the use of only one main data collection vehicle, the interview, limited the feedback as well. But as an exploratory inquiry, the data were sufficient for this stage of the PDSA cycle.

3.4 Researcher Epistemological Approach

A researcher's epistemological approach is their paradigm for viewing the world and is composed of philosophical suppositions based on that worldview that guide the researcher's thinking, interpretation, research methodology, and data analysis (Mertens, 1998; Saldaña, 2011). I took an interpretive or constructivist approach to this inquiry. Constructivism is a common epistemology among qualitative researchers and advocates that there is no universal or absolute truth because truth is relative, based on perspective and interpretation, and is dependent on context (Saldaña, 2011). Further, the perspective connotes that knowledge and reality are socially constructed concepts, built by individuals based on their experience, perspective, and context, and not an absolute that is waiting to be learned (Mertens, 1998; Saldaña, 2011). The constructivist paradigm also utilizes a personalized approach to data collection such as one-on-one interviewing (Mertens, 1998).

Constructivism was an appropriate paradigm for this inquiry because of the nature of the inquiry and constructivism's natural appeal to honor people's lived experiences. Thus far, the M.S.P.M. program's response to its lack of diversity has been based on the perspectives, contexts, and interpretations of the predominantly White staff members that support the program. I disagree with the notion that the reality of the M.S.P.M. program's staff members is universal. Nor is it the same reality that guides the professionals of Color we seek to support. Rather, this inquiry sought to better understand the multiple realities within which this problem currently exists.

3.5 Researcher Reflexivity

Reflexivity in research means that researcher "is aware of and openly discusses his or her role in the study in a way that honors and respects the site and people being studied" (Creswell, 2002, p. 494). In other words, the researcher approaches the inquiry with an open-mind and awareness about different social constructs. I am a biracial, cisgender male engaged in the work of social justice. I have spent the majority of my life in upper middle-class circumstances, knowing privilege and rarely discovering hardship. These identities influence how I approach my social justice practice as I must recognize and challenge my own privileges as an upper-middle class white presenting bi-racial/bi-ethnic cisgender man. Dodgson (2019) also discussed a researcher's reflexivity as their relationship with their research participants. Reflexivity includes the intersection of multiple identifying factors, such as race, gender, age, socioeconomic status, and

more. As such, it is critical that a researcher relay their shared experiences, or lack thereof, to better reflect on power and how others have experienced it differently. As I conducted this study, it was critical that power, privilege, and my positionality be considered in my study design and interpretation and analysis of results.

Mertens (1998) noted that there is a need for researchers to acknowledge power differentials and that there is difficulty in a researcher becoming the equivalent of an "insider in a 'foreign' culture" (p. 26). However, Mertens went on to add that such a task is feasible if genuine desire exists on the part of the researcher. This is where I believed I could make an impact in my role as a researcher. During each interview, I acknowledged that I have experienced privilege for most of my life. I acknowledged that I was approaching the research as both a practitioner and researcher with an interest in creating positive changes in the space. By acknowledging my positionality and privilege, I hoped to position myself in the interview as a dedicated ally and advocate for social justice initiatives in spaces where I have the ability to impact and implement changes.

4.0 Findings

In this inquiry, I sought to identify the factors that influence graduate school aspiration, both in general and for those looking to break into the tech industry, among domestic professionals of Color. Four men and five women who identified as Black, Latinx, AfroLatinx, and/or Non-White Hispanic Indigenous participated. All have considered or are actively considering graduate education in tech/STEM and/or business fields. Only three of the nine participants have submitted any applications to graduate school. Their stories revealed the factors that influence graduate school aspiration and factors that may deter them from aspiring to graduate education. In this chapter I discuss the following central themes identified: (a) financial considerations are a major factor in decision-making; (b) professional and/or student organizations support capital-building and aspiration; (c) lack of institutional support for undergraduate students of Color may hinder aspirations; (d) professional experiences positively influence aspiration; and (e) personal motivators and deterrents.

4.1 Financial Considerations Are a Major Factor in Decision-Making

The financial burden of graduate school was discussed by all nine participants. All participants discussed the imperative of securing funding in order to attend graduate school, and most (n=7) cited lack of funding and the overall cost of graduate education as a reason not to attend graduate school in the near-term. When asked about factors that might cause him not to go to graduate school, Charles, a Black undergraduate student studying computer science, said, "Money,

first of all" and exclaimed that he would need to be selective about grad school because his family is "not that rich anymore." Charles spent time at several different undergraduate institutions due to difficulty adjusting. His family immigrated to the U.S. when he was a child, yet they came by financial hardship during his undergraduate journey. This factors in as Charles weighs the benefits of graduate school versus supporting his family. Liliana, an AfroLatina who studied psychology as an undergraduate and worked in PK-12 education for most of her career thus far, was in the midst of a career transition as a digital content creator at a small-sized firm. She pointed out the significance of finances and avoiding student loans, saying, "If I could find an employer that can...pay for it...I [would] do it." Ana, another Latina in the midst of a career transition from a chemistry background into tech stated, "My biggest hurdle [to graduate school] is...finances."

Several participants cited their background and standing within their family when discussing the financial feasibility of graduate school. Jessica, a first-generation to college Latina immigrant from a low-income family, earned a dual degree in mechanical engineering and biomedical engineering. She commented that very quickly after finishing college she became head of household after her mother suffered a stroke. With a younger brother in college, she went on to note, "I needed to start working after graduating, I couldn't spare a year of not working, because I needed to support my family...if nothing had happened, I would be in grad school right now." Pablo, who identified as Non-White Hispanic and Indigenous (tribally unaffiliated), and an undergraduate in his fifth year of college, came to school as a self-supporting student and had a similar comment to Jessica's saying, "number one for me is financial security" and elaborating, "I am a self-supporting student." Throughout his interview, Pablo noted the challenges that self-supporting students face. The need to fund their education trumps everything: research

opportunities, extracurricular experiences, even the amount of time that can be devoted to academics.

While many people may face similar financial barriers to pursuing graduate education, they noted this as a specific barrier for students from historically minoritized backgrounds. Viviana, a Latina undergraduate student in civil and environmental engineering, noted that for "students who come from first generation families or immigrant families, the money aspect is a big thing" and that graduate programs could improve these circumstances by offering "scholarships and other means of support for students." Meanwhile, Myia, a Black industrial engineering student, observed that students of Color "don't have the same funding for higher education as other people do" and that the lack of existing graduate school funding for students of Color "is a hindrance and a lot of the reason why people don't pursue it further." Pablo reaffirmed the statements saying that funding is an issue "not just for me, but for a lot of my peers" from similar backgrounds.

A lack of graduate level funding and scholarships are also barriers in addition to the overall cost of graduate education. Viviana noted that she had "not heard of any resources to get you funding." Liliana commented that, "If I could find an employer that can be like, 'Hey like go to graduate school' or pay for [it], some sort of scholarship...I would do it," but she also had trouble finding any such employer. Ana said that "All the programs that I had researched it just involved more money that I didn't have." And lastly, Myia spoke to the lack of funding specifically devoted toward education for people of Color by saying, "We don't have the same funding for higher education as other people do," citing outside scholarships and grants, and that work would need to be done to support graduate students of Color and "address the funding issue." Scholarships and funding also drive graduate school interest. Liliana noted that when looking at programs she looked specifically at ones that offer "scholarships for graduate school students like Latinx or women in

tech." Ana similarly stated that offering financial support might open applications up to a more diverse pool of candidates.

A majority of the participants also commented on the foregone wages to be sacrificed by attending graduate school. David, a Black professional working for a large tech firm who studied electrical and computer engineering in college, expressed that he is "hesitant about...completely leaving the company" he works for due to the financial implications. Further, he stated that prospective students are "not just looking at how much you're paying out of pocket for the education, you're looking at how much you're sacrificing right from leaving a job." Charles also stated, "I can probably make as much money as a computer scientist, as... you would, if you were to go to grad school," and when he talks to people about graduate school, they comment that, "It doesn't make sense" due to the cost and foregone wages. This is deeply impactful for someone like Charles who feels pressure to support his family in any way he can.

Other possible deterrents were discussed by participants. Jessica was torn about the possibility of having to leave full-time work for more than a year. In additional to several of the barriers she faced which have already been discussed, she noted that "enjoying the nine to five life" served as a barrier as does the prospect of a full-time program. She would be interested in a part-time program but felt concerns about not having enough time. Liliana, David, and Nicolas also spoke about concern surrounding the time commitment. Myia felt pretty certain about the idea of school but commented that life circumstances (e.g., family, children) might prevent her. Viviana, too, said that program length would influence her level of interest in a program. These factors all relate to the opportunity cost that prospective graduate students must weigh as they go through the aspiration phase.

As these participants weighed the value of graduate school and postbaccalaureate programs, the high cost of graduate education and the lack of funding revealed to be perhaps the most significant factor along with the opportunity cost and foregone wages in deciding to attend graduate school. In the programs where scholarships do not exist and other forms of funding are minimal, students most often find themselves turning to loans for funding. As the participants of this study outlined in their interviews, this lack of funding and overreliance on loans causes prospective students to turn away from pursuing graduate school and, perhaps, not even express interest in the first place.

4.2 Professional and Student Organizations Support Capital-Building and Aspiration

All participants noted vast experience with organizations designed to support students and professionals of Color in tech and STEM majors and fields, and these organizations supported the development of their cultural and social capital. As a result, these organizations guided and influenced participants to consider graduate school. Organizations included both local and national organizations including the National Society for Black Engineers (NSBE), the Society of Hispanic Engineers (SHPE), Techqueria, the Robotics Institute Summer Scholars (RISS) at Carnegie Mellon University, McNair Scholars, Louis Stokes Alliance for Minority Participation (LSAMP), the Center for the Enhancement of Engineering Diversity (CEED) at Virginia Tech, Latinas in Tech, Grace Hopper, Educational Opportunity Fund, Excel (Pitt) and Women Who Code. Participants held a variety of participatory roles in these organizations, ranging from leadership (Myia, Valeria, Jessica, Liliana, David) to general membership roles. Regardless of their role, participation in these organizations led to the further development of social and cultural capital for

the participants in this study, which is positively correlated with graduate school aspiration and enrollment (Collins, 2012; Fleming et al., 2014).

4.2.1 Social Capital Building as an Indicator of Graduate School Aspiration

Several participants pointed out that tech and STEM industries have a representation problem. Research shows that a lack of similar beings within an industry means fewer opportunities to develop the necessary capital (support, mentoring, etc.) relevant to pursuing one's career and graduate school (Cuellar & Gonzalez, 2021). As Nicolas, a professional in the midst of a career transition discussed, "Not a lot of people in tech look like me." Another participant commented that it "kind of feels lonely" being a person of Color in tech. This is impactful for students and professionals of Color looking to navigate their way through their undergraduate and early professional experiences and affects them to the extent that they aspire less, take longer to aspire to graduate school, or may be less familiar than their White counterparts with the option of graduate school. Jessica, a first-generation college graduate, noted that initially, "I struggled to find a community that I felt like I could belong to." Early in her college career, Jessica experienced what Perna (2005, 2006) outlines as a lack of alignment between her social capital and those most valued by her undergraduate institution. This ultimately served as an obstruction that she needed to navigate as she worked to find a community in which she belonged. As she did so, Jessica noted that she learned about the possibility of graduate school later as a result of creating and finding community.

Interviews revealed that professional and student organizations served as a counter to the lack of representation in the field and provided social capital that ultimately contributed to graduate school aspirations. Viviana was a student who struggled early on in college and did not think that
she would be one to consider graduate school. She noted that her student organization was "actually what kind of started to get me thinking about graduate education" and that she benefited from learning from others who had gone on to graduate school. Myia had high aspirations even before college but noted similarly that she became interested by connecting and learning from others in her organizations and that both "definitely make getting a masters degree or any other type of like higher education very regular and have given a lot of like networking and connection opportunities" to members. Building this network and learning from others' experience influenced her to consider further education through guest speakers, workshops, and mentoring and networking opportunities. Jackie also commented that a mentor that she connected with through her student organization still encourages her to consider graduate school.

Organizations got participants thinking about graduate school and served as a method of building social capital around graduate school aspirations by including participants as members and expanding their networks. Liliana and other participants noted that involvement in organizations meant being a part of "community and seeing other folks that look like me." Further, it was motivating to see others who look like them, both their peers and older professionals whom the organizations brought in to speak and mentor, go on to graduate school. In addition to community building, organizations gave members an opportunity to learn from the graduate school experiences of others, network, discover mentorship, and learn from the career development of others with similar backgrounds and experiences.

4.2.2 Cultural Capital-Building as an Indicator of Graduate School Aspiration

Organizations also served as a vehicle to build cultural capital for members. Pablo mentioned that prior to being a part of his organization he felt directionless and unsupported by his undergraduate institution, a Minority-Serving Institution (MSI), when it came to learning about graduate school and seeking opportunities that might support his graduate school application. But discovering his organization through his network, "really changed things." This particular organization, as well as others, supported members through graduate school workshops about resumes, applications, funding, leadership talks, professional development, and career path conversations with alumni and more experienced industry members. Mentors and organizations also provided support with graduate school discovery, resume review, and interview preparation. By involving themselves in organizations, participants built a body of knowledge about graduate school that led to aspiration.

Ana, Liliana, and Nicolas, all professionals in the midst of a career transition, relied on professional organizations like Grace Hopper (a professional development and research conference for women in computing) to support their transitions into tech. It was in these organizations that they began to feel more comfortable and consider graduate education. Ana and Liliana spoke to feeling a comfort level because of the community of support from others who came from the same background. In addition to community-building and an emphasis on creating diversity in tech, these organizations provide professionals with free resources to build their knowledge and learn about the graduate school experience of others, enhance their resume, network, and land jobs.

The accumulation of knowledge included everything from cultivating the concept of graduate school, which many began to consider via guidance from a mentor, to facilitating the "how" behind getting into grad school. Members received support in researching graduate programs for fit and environment, funding graduate school, writing a strong graduate school essay and resume, approaching program faculty, and more. Many participants pointed to their network,

developed by their involvement in organizations, as the place to go when investigating programs further and seeking guidance during the aspiration phase of the graduate school choice process.

4.3 Lack of Institutional Support for Students of Color May Hinder Aspirations

Undergraduate experiences also affected and drove participants' interest in graduate school but only after they overcame lack of support from their institutions and other barriers. Positive and negative experiences alike influenced participants down their respective pathways toward graduate school. As undergraduates, seven of the participants felt a sense of isolation on campus, needing to navigate college on their own, with little support from their institutions. Negative experiences often have an impact on individuals' performance and graduate school interest (Berg & Tollefson, 2016; Heller, 2001), but it was the positive experiences that drove students into the graduate school aspiration phase.

Viviana spoke to dealing with imposter syndrome throughout her college and early career largely due to the lack of people that look like her. This had a strong effect on her undergraduate coursework, nearly causing her to switch out of her major. Conversely, the positive reinforcement can have a positive effect on that sense of belonging. Liliana spoke about her initial touch point with the possibility of transitioning into the tech industry stating,

I decided to stem into tech after speaking to another fellow Latina who's in cybersecurity herself. She advised me to look into tech just because the field is like mainly White dominated male field and there's such a need for representation.

Liliana's comment points out the importance of seeing others who look like her within her field.

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Charles had a similar experience to Liliana. While in college, he spent time transitioning from one institution to another, due to academic hardships he faced early on. He spoke to lack of people of Color in his industry and the need for validation for those early-career professionals of Color. This problem compounds itself at the graduate level where professionals of Color are generally less represented. Charles stated, "I guess if I had a Black mentor that was…maybe if he's doing this, I can do this [too]." Liliana and Charles both faced struggles in college, experiencing a sense of isolation or imposter syndrome, which could have easily posed as barriers into their fields and further education. Their experiences also point to the important role that racial-ethnic representation, even if in small numbers, can play in attracting and encouraging prospective students toward graduate school.

Pablo became interested in research opportunities that would improve his graduate school application yet had difficulty discovering opportunities, stating, "Before I really started to gain all the resources that led me to becoming a more research-oriented student, I can't really say that there was much [support]... it's not something that was easily found here." Further, he noted that when reaching out to faculty for research opportunities, "If they gave me a 'No,' that was the end of it." Pablo relied on his network to navigate to an organization that supports students of Color in pursuing graduate school and finding research opportunities. This opened up many opportunities for him, including the Robotics Institute Summer Scholars program at Carnegie Mellon where he was able to conduct research and learn about different graduate programs during the summer.

Unfortunately, Pablo's experience of self-navigating is not unique. Both Jessica and Viviana mentioned that they began college with interest in engineering but struggled to navigate both the academic and curricular decisions they had to make in their major. Jessica noted, "I didn't have exposure to…people with careers and four year degrees." She also recalls thinking, "I barely

know what it is, you expect me to specialize in it?" when needing to select a specialization. While neither participant drew a direct line from lack of support to deterrence from graduate school, research suggests this is a potential melting point for students of Color from graduate school aspiration (Gonzalez et al., 2003; Ramirez, 2011).

Viviana's transition into college and her major was also difficult. She commented that she was "unprepared for college," and that when she started college, "the beginning was definitely a challenge." Despite an interest in engineering, she remembered "going through everything...unsure." Ultimately, she needed to retake a core class in engineering, a difficult task to process, and spoke about the feeling of not being "super supported" during these beginning stages of school. She considered dropping from her major. Again, Viviana persisted to the point where she developed a peer support network and discovered the possibility of graduate school, but this is not the case for all students of Color. When it comes to supporting students of Color like her through their undergraduate studies and eventually learning about graduate school, Viviana offered, "I know how important it is to bridge that gap and offer those supports for minority students."

The combination of these undergraduate experiences, both positive and negative, ultimately led participants to aspire to grad school. It is noteworthy that students were left to navigate for themselves with less support from their institutions. Several participants, including Jessica, Viviana, Pablo, Charles, and David, leaned on student organizations to serve as a source of academic support that their institutions did not provide. Viviana noted that, if not for the organization that she was most involved in during her undergraduate education, she would not have learned about graduate school options or graduate school funding possibilities like those through The National GEM Consortium. Most participants made comments similar to Viviana's.

4.4 Professional Experiences Positively Influence Aspirations

Several participants commented on professional experiences that influenced them to consider graduate school. Three participants were career-changers in transition into a tech field through a STEM undergraduate degree. All three noted that their career transition and experience in the professional workforce influenced them to consider graduate school. Nicolas noted that he was committed to breaking into tech. Ana, Liliana, and Nicolas all had experiences during their early professional careers that caused them to seek changes. Nicolas lost his job during the beginning of the COVID pandemic. With a cousin who recently transitioned into tech, his interest was sparked by family influence. This cousin served as a mentor during his transition. Liliana had a similar experience and said that she had a colleague who "recruited me and got me very interested in software engineering."

Once she entered the professional workforce, Liliana learned about a graduate school "bridge program" through the professional organizations that she was involved with. Bridge programs offer students an opportunity to try graduate school courses for a short period of time. Designed for those in career transition and professionals of Color, in this case, students did not need a degree or work background in tech to enroll, and were not required to take the GRE, a key for Liliana. She ultimately decided not to pursue this program but credited her experience as a professional, networking and learning through organizations, with discovering the opportunity. To date, Liliana has not applied to graduate school.

Participants discussed the importance of internships in affirming their career decisions and, though they did not explicitly say so, they indicated that practical experiences while in college indirectly lead them to consider graduate school by exposing them to other career professionals who had gone on to graduate school. David, a professional with one year of work experience, felt so rewarded by his internship work that he received support from his academic advisor in determining a way to continue working while in college. They created a plan to overload on courses during a semester and leave another semester free for work. He took community college courses while continuing his internship. Myia participated in a co-op program at her institution. She spoke to the fact that it taught her "time management skills," allowed her to "network and connect with people," exposed her to professionals with graduate degrees, and showed her the applicability of her coursework. Ultimately, this ended up supporting her academically: "I'm able to apply it to real world and it actually helps when I come back to school because I know how focused I need to be." In this inquiry, practical experiences had positive impacts on participants, exposing them to other professionals in their field and allowing them to consider graduate school as an option. Practical experiences also contributed to keeping them in the STEM and graduate school pathway by confirming their career decisions.

Work experience in itself provides opportunities for professionals to put into practice what they learned in their coursework. But it also provides the chance to identify gaps in skillset and opportunities in the form of future educational pathways and career paths. Learning from the experience of others during these times proved influential in their graduate school journey. These experiences motivated participants to join the graduate school pathway, mostly in the aspiration phase. Myia commented that, "Just visually seeing them [those who attended graduate school] and still being able to talk to them" had an impact on her intentions as well as those of her peer group. Jessica noted that she was able to see, through her professional experience, that the graduate "degree opens opportunities." She also noted seeing graduate education as something to aspire to in order for others to take her seriously, and she felt inspired by the admiration she might receive by having a graduate degree.

4.5 Personal Motivators and Deterrents

Participants also spoke about various personal reasons for considering graduate school. Each participant said they considered graduate school, because there was a possibility that a graduate degree might boost their career. For example, Myia said that getting a business degree "would be a good step" as she hoped to own her own consulting firm someday. However, there were also differentiators in the perceived need for graduate school depending on sought-after career outcomes. For example, the three career-changers cited that a graduate program would boost their resume. Two participants with engineering backgrounds, Myia and David, sought to advance themselves on the business-side of their field and said they were interested in a graduate business degree but not further technical education. David, an engineer at a large U.S.-based tech firm, noted that while a business degree would open doors for him in the long-term and give him the availability to enter into other industries, he was hesitant about leaving his company and heard from others that when it comes to further technical education, "There is no point in getting an additional degree." Further, despite possible long-term benefit, he wondered about short-term "financial benefit to having a master's degree."

Charles was interested further technical education but agreed with Myia and David that he would need to really weigh the options, saying, "I can probably make as much money as a computer scientist as if I were to go to grad school." Jackie, Viviana, and Pablo all expressed strong intent to find their way into graduate school in a technical field despite an already strong technical background. Thus, there was no direct consensus on whether a graduate degree was necessary for technical fields. Rather, intent varied based on participants' perceptions. This indicates a unique aspect of STEM degrees: that to have a successful career, there is no consensus

to point to the need for a graduate degree. Interest in developing business and management skills is more common as the interviews indicated.

Three participants spoke to the desire to contribute to their communities as a motivator to aspire to graduate school. Pablo spoke at length to his experience in navigating college and the graduate school possibility. After enduring his own struggles on the journey, he felt the strong desire to seek and enroll in graduate school in order to give back and support those like him. Speaking about the possibility to pursue graduate school he said, "This is an opportunity that I've been granted, and it's an opportunity that I'd like to reciprocate onto my own community," and that he feels he has "an opportunity to inspire a meaningful change" into his community. This aligns with Charles's motivation, whose parents immigrated to the U.S. Charles noted about his major decision and the opportunity to pursue graduate school, "I thought computer science would be the best way to help my country [of origin]," and that his goal "is to basically gain as much from here and then go...use what I learned here to help them back home." Liliana, who was struggling with her career transition commented on the impact of support from other Latinas who transitioned into tech before her, and that she looked forward to "paving the path for Latinas in tech" too. Liliana's comment vocalized the significance with which she regarded diversity (race and gender) in her new industry.

Testing also appeared as a sure deterrent to graduate school and specific graduate programs with three of the nine participants commenting about viewing standardized tests as a barrier. Participants commented about concerns with biases against people of color that exist within standardized tests. Viviana commented that she viewed "standardized testing as...racially biased." She also commented that there was little value in tests, as a student's undergraduate performance ought to be weighted more heavily and serve as a better predictor than their performance on an exam. Jessica agreed with the bias comment, and noted that the playing field was not level, as some test-takers had access to greater resources, including tutors, than others. Lastly, Liliana openly stated that she envisioned the GRE as a "stressor" and "roadblock" on her path to graduate school. Viviana carried a similar sentiment, and noted that she would not consider any graduate schools that required an entrance exam.

5.0 Discussion: Learning and Action

The purpose of this inquiry was to learn about the experiences of Black and Latinx students in their graduate school aspiration journey while exploring factors that influence decision-making for graduate-level business and tech programs. The inquiry sought to identify participants' motives for and experiences in participating in the graduate school journey in order to begin addressing the lack of racial diversity in the M.S. in Product Management program at NEU. I invited undergraduate students studying in the STEM fields and professionals who majored in STEM and/or were working in STEM fields as professionals to participate in the study. In this chapter, I summarize key findings and make recommendations.

5.1 Key Areas for Consideration

This inquiry revealed several findings about domestic students' of Color decisions to pursue and enroll in graduate programs. In this section, I discuss the following key areas of consideration based on the findings: (a) cost-benefit analysis is a major factor for prospective graduate students of Color; (b) habitus, further developed through college and early professional years, improves the prospect of graduate school aspiration; and (c) prospective students' interest in graduate education is influenced by the barriers to entry, or lack thereof, for graduate programs.

5.1.1 Cost-Benefit Analysis is a Major Factor for Prospective Graduate Students of Color

The findings of this inquiry are consistent with several studies that show that the *cost of graduate school* is a major factor that prospective graduate students weigh when deciding whether or not to pursue graduate education. English and Umbach (2016) alleged that a student's analysis of expected costs of undergraduate education is shaped by four layers of influence (habitus, undergraduate school context, graduate school context, and social, economic, and policy context) as "individuals weigh the expected monetary benefits and costs of graduate education and select the option that maximizes their utility" (p. 197).

All nine participants asserted that cost of a graduate education was a significant consideration for them. Six of the nine participants commented that cost would turn them away from a program or the idea of graduate school in general. Additionally, three participants noted that existing debt was a deterrent from considering graduate school. Similarly, three studies (Baker, 2019; Malcolm & Dowd, 2012; Millet, 2003) found a strong relationship between prior debt and graduate school non-attendance. Two participants pointed out that in STEM fields, graduate degrees were not essential for either career advancement or for higher pay. This notion served as a deterrent to graduate school. Berg and Tollefson (2014) also determined that students weigh costs and benefits and view further education as a risk when considering the potential payoff.

Berg and Tollefson (2014) noted the effect of familial finances on decision-making, with many Latinx graduate students weighing other obligations such as supporting their family financially or a lack of financial support from their family for education, when making decisions about graduate school. Three of the participants in this inquiry from both Black and Latinx backgrounds pointed out that they found themselves in the situation of either not having financial support and having to carry the cost themselves or needing to support their family and not having the time or finances to absorb the cost of graduate education.

In addition to the costs associated with pursuing graduate school, *funding for graduate education* is also a major consideration. Six participants suggested that funding might positively influence the decision to pursue graduate school. Proposed ideas ranged from scholarships and grant funding to stipends and payment during graduate internships. For participants, these possibilities presented options for lessening the cost of graduate education, minimizing debt upon completion, and supplementing foregone wages. English and Umbach (2016) similarly found that financial aid acted as an incentive for certain students to pursue graduate education.

5.1.2 Habitus, Further Developed Through Student and Professional Organizations, Improves the Likelihood of Graduate Aspiration

Social and cultural capital are both components of habitus and refer to an individual's social network and ability to utilize that network and their cultural knowledge set, respectively (Collins, 2012; English & Umbach, 2016). Both forms of capital impact an individual's decision-making related to educational matters, like graduate education. The findings from this inquiry are consistent with the research about the influence of cultural and social capital (Perna, 2005, 2006). Given that both forms of capital are heavily influenced by one's upbringing, family, and resources, they can deter prospective students of Color from seeking further education or persisting through such education, especially when an individual's social and cultural capital do not align with the dominant cultural norms. Yet participants talked about the various ways that they accessed social and cultural capital.

All participants pointed to a robust social and cultural capital generated through engagement with culture or identity-based organizations that supported them in navigating college, their early careers, and leading them to graduate school aspiration. Organizations supported aspiration through peer mentoring and advising, both academic and career-related, and organized by the organizations to positively relate to graduate school aspiration. Participants drew direct connections from their experiences with such identity-based organizations to graduate school aspiration. Similarly, Ramirez (2013) found advising and mentoring to positively impact graduate school enrollment. Studies show that engagement in research opportunities and graduate school workshops also meant Latinx and Black students and professionals were more likely to engage in the graduate school choice process (Collins, 2012; Ramirez, 2011). This was brought up within the context of this inquiry with two participants commenting that their participation in research, which they were not supported in finding from faculty or their institution but rather found with support from organizations which they connected with, resulted in leading them to eventually investigate graduate school. Six other participants mentioned participating in workshops hosted by their organizations as positively influencing their graduate school aspiration due to the mentoring, networking, graduate school workshops, and more that they received access to. This inquiry aligns with the body of knowledge in outlining the importance of cultural capital and the professional and academic organizations that support in building that capital for graduate school aspiration.

Early exposure to the idea of graduate education positively influences graduate school aspiration. All nine participants cited experiences during their undergraduate educations or early careers that created the idea of graduate school in their minds, despite the many struggles they faced as part of navigating their way through their college careers. Such occasions included moments of exposure with a student or professional organization or guidance from a colleague or

classmate. These moments consisted of seeing role models, Black or Latinx professionals who went on to graduate school in a similar line of study. Statements from participants indicate that this positively influenced their interest in graduate education. The data suggest that these moments normalized the idea of getting a graduate education for students and professionals of Color.

This finding aligns with English and Umbach's (2016) model that the experience at the undergraduate institution does impact graduate school aspiration. Other findings included increased graduate school aspiration when exposed to research opportunities and supported and mentored by faculty and staff at the undergraduate institution (Cuellar & Gonzalez, 2021). All nine participants spoke to direct peer-to-peer relationships, formed and further developed through involvement with organizations, as instrumental in supporting their interest in graduate school. A study by Lara and Nava (2018) discovered that networks such as organizations also support Latinx students in pursuing graduate school. Given the influence of student and professional organizations on social and cultural, graduate programs must begin to consider how they engage with such organizations in the future. Of course when this structure and support does not exist, research shows that students are less likely to aspire to graduate education (Ramirez, 2011).

5.1.3 Prospective Students' Interest in Graduate Education is Influenced by the Barriers to Entry, or Lack Thereof, to Graduate School

Findings also suggest that graduate programs need to make access to graduate education more seamless. Prospective graduate students face a multitude of barriers, many of which are designed for graduate programs to evaluate the potential for "good performance" in postbaccalaureate education. A primary example includes standardized entrance testing. The M.S. in Product Management program relies upon the GMAT (Graduate Management Admissions Test) and the GRE (Graduate Record Examinations). Schools and programs rely on these exams, but the reliability of the tests is inconclusive. Entrance exams can serve as moderate predictors of performance early on in graduate school (Bayer et al., 2020), but in other cases, testing has proven to not directly relate to graduate program completion (Miller et al., 2019; Moneta-Kehler et al., 2017).

Graduate entrance exams become increasingly problematic when they are used as a key consideration during the admissions process. This includes when institutions create a minimum score required for deeper consideration for admissions. Multiple studies report that when programs take this approach, Black and Latinx test-takers are disproportionately affected (Sireci & Talento-Miller, 2006; Wolf, 2014). Apprehension around test-taking surfaced in this inquiry. Participants noted that they felt a lack of certainty around taking standardized tests and that they added an additional burden to the process of considering graduate school. One participant even emphasized that they would not consider a program if it required them to take a standardized test for entry.

Other factors surfaced around ease of entrance into graduate programs. Participants specifically sought the path to graduate school completion that least obstructed their lives, making comments about not having time for graduate school and having other responsibilities that would keep them from graduate school. While these barriers are a reality, they are not necessarily created by graduate programs but rather are facts of life that influence graduate school aspiration. In addition to the possibility of an entrance exam waiver, key interest drivers, as stated by the participants, included the brevity of programs (especially short, one-year programs like the M.S.P.M. program), 5th year post-baccalaureate programs, the exemption of a master's thesis, and the possibility to complete a part-time, hybrid version of the program.

5.2 Strategic Recommendations

This inquiry revealed several themes that are relevant to how graduate programs approach admissions from cultivating prospective students of Color to supporting their enrollment in programs. These themes are highly relevant to the M.S. Program at NEU, as well as other MS programs at CB and CCS. The following are strategic recommendations based on the themes: (a) recruitment and outreach: target strategic partnerships with student and professional organizations to build a graduate-going culture, (b) admissions: minimize barriers to entry, and (c) matriculation and yield: provide funding internally and seek partners for external funding.

5.2.1 Recruitment and Outreach: Support Student and Professional Organizations in Building a Graduate-Going Culture

The experiences of the participants in this inquiry are consistent with research that shows that students of Color are left to navigate processes, including graduate school discovery, on their own (Collins, 2012; Gonzalez et al., 2003; Ramirez, 2011). They shared that they became involved in organizations that supported them and influenced them to graduate school aspiration. I recommend that the M.S.P.M. program partner with organizations that have stated goals of supporting the development of students and professionals of Color and become contributors to the development of social and cultural capital for students and professionals of Color. The program should do this at a localized level, for example supporting local SHPE and NSBE (student and professional) chapters through workshops designed to build a graduate-going culture. The program should also seek to develop relationships with larger national organizations, including SHPE and NSBE, but also other organizations. The M.S. in Product Management program must be an active

participant in creating a culture around attending graduate school for Black and Latinx professionals.

The program should also begin hosting graduate school pathway workshops for undergraduate students of Color at its own institution, where the M.S. in Product Management program is not currently involved in either supporting or recruiting undergraduate students of Color. Workshops should range from general awareness of graduate school pathways to essay writing tips and conducting panels with graduate degree-holders of Color to normalize graduate school aspiration for people of Color. From there, I recommend that the program begin outreach to other regional institutions so that students from those campuses may benefit from the enhancement of a graduate-going culture. Lastly, I recommend that the program seek to host similar workshops with targeted list of professional organizations that specifically support people of Color.

5.2.2 Admissions: Minimize Barriers to Entry

Participants highlighted the importance of eliminating barriers to graduate education. One participant said they would not consider a program if it required them to take and submit test scores. Over the past two years, the M.S.P.M. program has operated with a test-optional admissions criteria, asking applicants to explain why they are qualified for the program if they opt not to submit test scores. This policy was put in place on a temporary basis due to the global Covid-19 pandemic with the possibility that the option remains for applicants as we look to a post-Covid-19 landscape. I recommend that the program continue a test-optional admissions policy, allowing candidates to justify their candidacy for the program in lieu of submitting test scores. Doing this will minimize one additional barrier to those candidates interested in applying to the program.

Several participants spoke to their interest in 5th year programs for graduate school citing less disruption to their career. I recommend that the M.S.P.M. program consider this as an option as well. Including a 5th year option would create a program format that allows M.S.P.M. to recruit from its own undergraduate population as well as from other regional and local institutions. The current setup of recruiting from professional populations is difficult, and a 5th year option would allow for greater focus on recruiting people of Color to the program.

Lastly, I recommend that the program consider offering a part-time, hybrid option. All participants framed the possibility of graduate school from a high-level perspective in which they considered school in the grander arc of their career. Participants cited the need to seek the least amount of disruption to their career, and the possibility of a part-time program was brought up several times. I view a hybrid version of the program, stretched out over a longer period of time, as an opportunity to reach more domestic Black and Latinx candidates. The hybrid version allows for a national reach, versus only a regional reach. With a hybrid version, students can take courses remotely, regardless of their proximity to campus. This option would provide little disruption to the lives and careers of students, a key takeaway from the interviews.

5.2.3 Matriculation and Yield: Provide Funding Internally and Seek Partners for External Funding

Several participants spoke about the challenge of pursuing graduate education because of the cost to attend and the lack of funding. The weight of student debt from undergraduate education was also a factor as multiple participants spoke to their journey in this process as being heavily influenced by existing student loans from their college education. Lastly, several participants identified the difficulty in leaving or foregoing a year, possibly more, of employment and wages, adding on money lost to the already high financial cost of a graduate degree.

I recommend offering yearly, two fully-funded scholarships for a student of Color who matriculate to the M.S. in Product Management program. While this does not eliminate all aspects of this barrier (e.g., opportunity cost of lost wages, difficulty of being the head of household), it will go toward alleviating some of the financial pressure that comes with attending graduate school.

Further, I propose that the M.S. in Product Management program work collaboratively with existing funding streams. Organizations like the National GEM consortium, for example, offer already-existing funding toward various graduate degrees for students of Color including those in engineering. Funding may include full tuition and annual living stipends for a variety of graduate degrees in STEM fields. However, the M.S. in Product Management program does not currently work with either organization to advertise the opportunity to GEM applicants. I recommend partnering with this organization, and others that similarly support students of Color, to develop and advertise funding opportunities for prospective students of Color who are interested in the program. This way, the M.S. in Product Management program commits to improvement through its own funding and also seeks additional funding opportunities for prospective students.

An additional opportunity exists with possible industry partners, and I recommend that a part of the organizational outreach that occurs in the coming months include outreach to companies to propose the M.S.P.M. program as an option for their employees and future employees through a tuition remission program. This outreach should consist of a pitch for companies to provide funding for the education of future employees or for current employees to return to complete their graduate degree. An executive summary of these findings, to be presented to NEU, CB, and CCS leadership, can be found in Appendix F.

5.3 Implications for Future Research

While there is a large amount of literature about graduate school aspirations, there is considerably less literature relevant to graduate school aspirations for professional graduate business and tech programs. This inquiry sought to add to the literature by examining barriers to graduate school for prospective students of Color as well as motivating factors. It is my hope that this study contributes to that body of literature, leaving a trail for expansion for future researchers in this area of practice.

I recommend that future studies, even future studies within the M.S. in Product Management program, analyze the decision-making of prospective students of Color who filter into the application system as "leads" but decide not to apply. Similar research can be done on admitted students of Color who decide not to enroll. And lastly, data can be collected and analyzed as to the decision-making of prospective students of Color who do convert into matriculated students. Analyzing such decision-making can yield valuable data and inform programs on best recruitment practices to achieve more equitable representation within their enrolling cohorts.

The findings of this study highlighted the importance of a candidate's habitus in aspiring to graduate school. But what about the other layers discussed by English and Umbach (2016)? The results of this study did not dive deeply into the undergraduate school context, graduate school context, graduate school context, and social, economic, and policy context layers of the model. Yet, these layers more than

likely play a significant role in some form. Future studies can seek to analyze the impact of these layers more closely in graduate school decision-making.

6.0 Reflections and Learnings

This inquiry began with a desire to increase diversity and equity across a graduate program administered at a PWI in the northeast United States but developed into a much broader discovery of inequitable labor distribution in tech and STEM fields across the United States as a whole. Both problems have different sizes and scope, but they both coexist with one another. One cannot be solved without addressing the other. For that matter, a long list of problems contributes to these issues and exists because of them.

6.1 Key Learnings

Over the course of this inquiry, I have learned a great deal about myself as both a leader and an improver. First, it has been important to recognize the scope of what is feasible within the boundaries of this inquiry and focus heavily on that scope. As I have outlined, the area of impact of this localized problem is great—far greater than can be fixed in a short time frame. I have developed, and will need to continue to develop, my capacity for scoping a problem of practice from both a leadership and improvement perspective. Critical learnings in this area include: (a) understanding my audience and sphere of influence as a practitioner, (b) understanding how the culture of the workplace impacts improvement and using this to further the improvement, (c) strategically developing aims that are designed to improve the problem of practice and are practical and feasible, and (d) utilize data collection and analysis to impact the problem of practice. Improvement, and improvement science, takes a collection of people working toward the same strategic objective. This is a critical point as I have often preferred to operate in a silo to respond to problems in my work. However, as I developed as a practitioner and scholar throughout the duration of this inquiry and the doctoral program, it became critical that I recognize and utilize the personnel resources around me. I learned to strategically drive direction and conversation, moving like-minded people forward to achieve a common goal. This includes individuals at various levels of the organization from M.S.P.M. colleagues to the Executive Director of the program to folks in leadership and the Dean's Office. The conversation around diversity the last few years, in part driven by this inquiry, has gotten stakeholders moving in the right direction.

Systems also have an impact. Perry et al. (2020) say that problems, like the one I sought to answer through this inquiry, are created by the systems within which we function. The challenge I faced was not simply one of increasing enrollment of a particular demographic. Rather, I had to approach this problem as a participant within a system and work toward motivating that system to be a part of the change. The M.S. in Product Management program is interdisciplinary and one of a number of graduate programs offered by both of its housing institutions. This amounted to twice the number of usual stakeholders and twice the number of processes to navigate. Doing this in a manner that excluded the system, as I have been prone to do as a professional (navigate and solve problems on my own), would have meant to either not find a solution or create a solution that was not sustainable. As practitioners, we are served by having the ability to "see the system" at work in front of us, and work to address our problems of practice by using the system as a vehicle (Perry et al., p. 57). Just as a solid understanding and inclusion of various stakeholders was critical for this inquiry so too was the need to understand how internal and external systems operate. Improvement also takes time and can be measured in many ways. It is important for practitioners to understand how and when they reach their targeted aim. This inquiry is the starting point for larger strategic goals for the M.S. in Product Management program, and I needed to realize fairly quickly how I wanted to measure success for the inquiry as well as for the longer term goals. Initially I sought to cause immediate improvements in our recruitment aims. While this is more desirable, it incorrectly caused me to approach the problem with uneducated assumptions about possible solutions when I could not, in fact, solve the problem without having more information as to the problem's causes. This study is so critical because it allowed me to discover recruitment methods (recruitment and outreach, admissions, and yield) that should impact my aims directly. Measured success takes time, both in terms of the nearer term outcomes, as well as the longer term, lagging outcomes. With the support of other stakeholders, I was able to develop realistic expectations about when we should expect to see certain outcomes.

Finally, I recognize the importance of utilizing localized and relevant data to improve. As a higher education practitioner I have recognized problems of equity throughout my career. The problem of lack of diversity in the M.S. in Product Management program is easily recognizable as are the various problems of equity discussed throughout the literature review. Despite the ease that comes with recognizing problems in practice, practitioners need to recognize that their problems are contextual just like the issues this inquiry seeks to challenge in the tech and STEM fields. Each problem requires a different approach. In order to seek out and make effective changes, practitioners cannot only rely on visual or anecdotal data. Leaders in higher education do not make changes based on how things seem. This inquiry challenged me to analyze our admissions data beyond the matriculant data. I discovered and analyzed four years of applicant data. I also relied heavily on graduate enrollment across business and computer science schools. And finally, I pulled industry data to create a fuller picture the representation problem. Relying on data has allowed me to clearly articulate the problem and justify why it is a problem.

6.2 Leadership in Practice

I also learned to view myself as a leader within my organization through this process. During the early parts of my career I tended to steer toward solving problems on my own. I viewed obtaining buy-in from others and creating momentum for an initiative by leading others as tedious tasks. They require explanation, feedback, and convincing. Meanwhile, the alternative meant slowing down processes and getting stuck in bureaucratic discussions. But I learned through this inquiry that as problems of practice grow in importance, they require buy-in from a wider group of stakeholders. I could not have completed this study without the buy-in that I obtained throughout this inquiry from others, and the changes that will come as a result of this inquiry would not be possible without leadership.

6.3 Scholarly Practice

The most tangible takeaway from this inquiry is the implementation of the recommendations put forth in the preceding pages. Upon implementation, my team will also set up mechanisms to collect and evaluate data. Essentially, I want to know if the changes we implement are impactful. But, beyond this, improvement will play a significant role in my work as a scholar-practitioner.

The aim of this study began with increasing applications from Black and Latinx students to the M.S. in Product Management program at NEU. This goal will, hopefully, be fulfilled, but it is possible it is not fulfilled with the recommended changes. We will need to find out why, and improvement can help in doing so. If we are successful, other problems will appear in practice that can be addressed using continuous improvement. If we achieve more representation across our applicants but not our matriculants, we will need to find out why. Once greater representation is discovered in matriculants, we can use this research to increase representation from other communities that are not well-represented in this program, and in this field. These are a few examples of how I will continue to utilize improvement as a scholarly practitioner in my place of practice.

Appendix A Invitation to Participate

You are invited to participate in a research study that the University of Pittsburgh is conducting to address the lack of racial diversity in graduate programs at the intersection of business and technology. The purpose of this study is to explore factors that influence students of Color decision-making for graduate-level business and tech programs.

This inquiry is being conducted in order to complete my doctoral dissertation at the University of Pittsburgh. The data will be used to develop a diversity recruitment plan, aimed at increasing the number of students of Color in business and tech graduate programs.

Eligible participants include people who:

- Are 18 years of age or older
- identify as African American/Black, or Hispanic/Latinx;
- are a United States citizen
- do not yet have a graduate degree in the business, engineering, or computer science fields

Participation in this study is voluntary, and participants can withdraw from the study at any time. The research study involves one recorded interview, conducted over Zoom, of approximately 45-60 minutes in duration. Participant responses are anonymous and no identifiable information will be collected during the interview. The Zoom recording will be transcribed and quotations from the interview may be included in the dissertation, but no information that could identify participants will be used.

This study will provide important information to help educational administrators to better understand how influencing factors and background influence prospective student behavior. This understanding will be used to strengthen diversity recruitment efforts.

If you meet the stated criteria and would like to participate in this study, please email me at Kmd133@pitt.edu with your name and possible meeting times.

Thank you in advance for your consideration.

Sincerely,

Kevin Dietrick

Appendix B Post-Interview Survey Protocol

- 1. What is your gender identity?
- 2. How do you identify racially/ethnically?

3. Please indicate your number of years of work experience:

4. Please state your undergraduate major: ______

5. Please state your approximate undergraduate Q.P.A. (optional):

- 6. Are you a first-generation college student?
 - a. Yes
 - b. No
- 7. Please specify your citizenship:
 - a. U.S. Citizen
 - b. Non-U.S. Citizen
- 8. Have you ever considered attending graduate school?
 - a. Yes
 - b. No
- 9. If yes, in which program?

Appendix C Interview Protocol

Introduction Koy	Li L wanted to thank you for agreeing to this
Common and the	III, I wanted to thank you for agreeing to this
Components:	interview, and taking the time to chat today about your potential
Thank you	interest in graduate school and your experience exploring this
• Purpose	opportunity. Specifically, I seek to gain insight into your experience in learning about graduate school and your experience in considering graduate school.
Duration	This interview should take less than an hour. I do hope to record this session in order for me to reference again at a later date. I will be taking notes during this session, but again, it will be helpful to
How intervie	w nave the recording as a later reference.
will be condu	I think it warrants mentioning that this recording, along with your comments, responses, and identifying information, will be kept confidential. This means that your interview responses will only be shared with research team members, and we will ensure that any
Confidentiali	ty information we include in our report does not identify you as the respondent. Please note that you do not have to talk about anything
• Opportunity	for you do not wish to talk about, and you may end the interview at
Questions	any time.
• Statement of	Before we get started, do you have any questions about what I have just explained?
Consent	Are you willing to participate in this interview?
Questions	1 Tall me about yourself specifically what is your current
Background a	and position and how did you come to be in the position?
Graduate Sch	2. Tell me about your involvement in student or professional organizations specifically for Latinx & Black people in
Interest	business or computer science or engineering. (Layer 1)
• Influential Fa	actors3. Can you tell me about what influenced your career decision? (Layer 1 and Layer 2)
	 4. Can you tell me about how, if at all, your undergraduate experience shaped your thoughts about graduate school? (Layer 2)

	 5. If you have considered attending graduate school, can you describe how you became interested and which programs you are interested in pursuing? (Layer 3)
	6. Did anyone or any organization guide you or support your interest in graduate school? Can you tell me about that person or those people? (Layer 1)
• Barriers	 Can you describe any reasons why you might not pursue graduate school? (All Layers)
	8. Is the racial diversity of a school (students, staff, and faculty) important to your decision to apply to and then attend graduate school? If so, how? (Layer 3)
	9. As you consider the graduate school choice process, what other things might attract you or dissuade you from an institution? What kinds of things would be important to you? (Layer 3)
	10. Are you interested in learning more about the M.S. in Product Management program?
	11. If you were in charge of recruiting people of Color to a grad program, what would you do? What would you focus on? What would you change about the recruiting and admissions process, the curriculum, instruction, support, financing, etc.? (Layer 3 and Layer 4)
	12. If you could meet with the secretary of education, what would you want them to know about improving access to and persistence through graduate school? (Layer 4)
Closing Components:	That about completes the questions I had hoped to cover, but is
Additional	there anything you feel we have missed, or you would like to add?
Comments	
Novt Stone	We will be analyzing this information, along with the feedback of others over the coming months in order to create a finalized
• INEXT Steps	research report. I would be happy to share those results with you
• Thank you	once they are ready, if you are interested.
	Thanks again for your time today, and for the feedback you provided.

Appendix D Consent to Participate in a Research Study

I am asking you to participate in a research study titled "Exploring Influential Factors for People of Color That Impact Aspiration to Enroll in Graduate Education in the Business and Tech Sector". I will describe this study to you and answer any of your questions. This study is being led by Kevin Dietrick, EdD student at the University of Pittsburgh. The Faculty Advisor for this study is Gina Garcia, Department of Educational Foundations, Organizations, and Policy, University of Pittsburgh.

Study Purpose

The purpose of this research is to learn about the experience of Black and Latinx students in their application/matriculation journey to graduate school. You are invited to participate because you meet the criteria of coming from a U.S.-based yet racially diverse background. All students who meet the eligibility criteria are invited to attend. Our goal is to ask about your graduate school exploration journey and factors that might motivate you to exhibit interest in a graduate program in an interview that will run approximately 45-60 minutes. This study is being conducted in order to better inform how we attract and retain students of Color.

Your Participation

During the study I will ask you to answer a series of questions related to your career journey and what might interest you in graduate study. These questions will center around your career, career choice, and career support. This should take approximately 20 minutes. I will also ask factors that might influence you to seek out a specialized master's program or deter you from doing so. This line of questioning will take approximately 20 minutes. I will also ask who might be a source of support for you in seeking out graduate education. This line of questioning will take approximately 5 minutes.

Risks and discomforts

I do not anticipate any associated risks from participating in this research.

Benefits

Information in this study may benefit others in the future. I hope to learn more about potential pain points in the application process experienced by prospective students of Color. Thus, results from this research may translate into a more seamless experience for future prospective students.

Compensation for participation

No compensation will be provided for participation in this program.

Audio/Video Recording

In addition to agreeing to participate in this study, I am asking for your permission to allow for video and recording of the interview using Zoom. I will use the video and audio recording to ensure accurate capturing of the discussion, and to facilitate data analysis. The recording will be

stored in a secure electronic database and kept confidential. After 3 years, the video and audio recording will be destroyed. The recording will include an identification number and a record of what is said in the interview. If you say anything that you believe at a later point may be hurtful and/or damage your reputation, you can request to record over such information OR you can ask that certain text be omitted from the data and transcription.

Please sign below if you are willing to have this interview recorded (video and audio).

- I do not want to have this interview recorded.
- I am willing to have this interview recorded.

Signed: ______
Date: _____

<u>Privacy/Confidentiality/Data Security</u>

Your participation in this research will be kept private and confidential. As mentioned previously, your identity will correspond to an assigned identification number, which will be kept private and confidential. Please note that I will keep this information confidential by limiting access to the research data to myself and other key members of the research team and keeping it in a secure online storage facility. Your confidentiality will be kept to the degree permitted by the technology being used. We cannot guarantee against interception of data sent via the internet by third parties.

Participation is Voluntary

Participation in this study is voluntary. You may choose not to participate, and you may withdraw at any time during the study procedures without any penalty to you. In addition, you may choose not to answer any questions with which you are not comfortable.

Questions?

The main researcher conducting this study is Kevin Dietrick, an EdD student at the University of Pittsburgh. Please ask any questions you have now. If you have questions later, you may contact Kevin Dietrick at <u>kmd133@pitt.edu</u> or at (407) 592-0700. If you have any questions or concerns regarding your rights as a subject in this study, you may contact the Human Subjects Protection Advocate of the IRB Office, University of Pittsburgh (1-866-212-2668) to discuss problems, concerns, and questions; obtain information; offer input; or discuss situations that occurred during my participation.

Statement of Consent

The above information has been explained to me and all of my current questions have been answered. I understand that I am encouraged to ask questions, voice concerns or complaints about any aspect of this research study during the course of this study, and that such future questions, concerns or complaints will be answered by a qualified individual or by the investigator(s) listed on the first page of this consent document at the telephone number(s) given. I understand that I may always request that my questions, concerns, or complaints be addressed by a listed investigator. I understand that I may contact the Human Subjects Protection Advocate of the IRB Office, University of Pittsburgh (1-866-212-2668) to discuss problems, concerns, and questions; obtain information; offer input; or discuss situations that occurred during my participation. By signing this form, I agree to participate in this research study. A copy of this consent form will be given to me.

Appendix E IRB Approval



EXEMPT DETERMINATION

Date:	October 8, 2021
IRB:	STUDY21100013
PI:	Kevin Dietrick
Title:	Exploring Influential Factors for People of Color That Impact Aspiration to Enroll in Graduate Education in the Business and Tech Sector
Funding:	None

The Institutional Review Board reviewed and determined the above referenced study meets the regulatory requirements for exempt research under 45 CFR 46.104.

Determination Documentation

Determination Date:	10/8/2021
Exempt Category:	(2)(iii) Tests, surveys, interviews, or observation (identifiable); and for which limited IRB review was conducted via expedited review
Determinations:	
Approved	 Interview Protocol, Category: Data Collection;
Documents:	 Survey Protocol, Category: Data Collection;
	 Consent to Participate, Category: Recruitment Materials;
	 Exempt Application Form, Category: IRB Protocol;
	Invitation to Participate, Category: Pecruitment Materials:

If you have any questions, please contact the University of Pittsburgh IRB Coordinator, Amy Fuhrman.

Please take a moment to complete our <u>Satisfaction Survey</u> as we appreciate your feedback.

Appendix F Executive Summary

As of the graduating class of 2021, the MSPM program has not enrolled a domestic Black or Latinx student into the program. Additionally, in the same time frame, the program has only cultivated two (2) domestic applicants who identified as Black or Latinx. The following summary highlights the results of a qualitative inquiry with 9 students and alumni conducted in the Fall of 2021 and Spring of 2022. The inquiry explored the experiences of Black and Latinx students and professionals in STEM & Tech fields, their consideration of graduate school, and major motivating factors to and deterrents from enrolling in graduate school.

Key Takeaways:

This study revealed several findings about domestic Black and Latinx people's decisions to pursue and enroll in graduate programs. These key areas of consideration include:

- a. cost-benefit analysis is a major factor for prospective graduate students of Color
 - i) All 9 participants asserted that cost of a graduate education was a significant consideration for them.
 - ii) Six of the 9 participants said that cost would turn them away from a program or the idea of graduate school in general.
 - iii) Three participants noted that existing debt was a deterrent from considering graduate school.
 - iv) Six participants suggested that funding might positively influence the decision to pursue graduate school.
- b. networks developed through college and early professional years improves the prospect of graduate school aspiration
 - i) All participants pointed to robust social and cultural capital generated through engagement with culture or identity-based organizations (e.g., SHPE, NSBE) that supported them in navigating college, their early careers, and leading them to graduate school aspiration.
 - ii) Organizations supported aspiration through peer mentoring and advising, both academic and career-related, and sponsored by the organizations.
 - iii) Participants drew direct connections from their experiences with such identity-based organizations to graduate school aspiration.
- c. prospective students' interest in graduate education is influenced by the barriers to entry, or lack thereof, for graduate programs.
 - i) Participants noted uncertainty related to standardized tests and said that tests added a burden to the process of applying to graduate school (one participant even emphasized that they would not consider a program if it required them to take a standardized test for entry).
 - ii) Participants sought the path to graduate school completion that least obstructed their lives, making comments about not having time for graduate school and/or having other responsibilities that would keep them from graduate school.
 - iii) All participants framed the possibility of graduate school from a high-level perspective in which they considered school in the grander arc of their career.

Strategic Recommendations:

The following are strategic recommendations based on the themes:
- a. **Recruitment and Outreach**: target strategic partnerships with identity-based student and professional organizations to build a graduate-going culture.
 - i. partner with organizations that have stated goals of supporting the development of students and professionals of Color and become contributors to the development of social and cultural capital for students and professionals of Color.
 - ii. host graduate school pathway workshops for undergraduate students of Color, locally and regionally, where the MSPM program is not currently involved in either supporting or recruiting undergraduate students of Color.
 - iii. host similar workshops with a targeted list of professional organizations that specifically support people of Color.
- b. Admissions: minimize barriers to entry.
 - i. continue a test-optional admissions policy, allowing candidates to justify their candidacy for the program in lieu of submitting test scores.
 - ii. develop a 5th year option, which would create a program format that allows MSPM to recruit from its own undergraduate population as well as from other local and regional institutions.
 - iii. offer a part-time, hybrid option.
- c. Matriculation and Yield: provide funding internally and seek partners for external funding.
 - i. offer two fully-funded scholarships per year for students of Color who matriculate to the program.
 - ii. work collaboratively with existing funding streams to enable access for MSPM and MSPM students.
 - iii. conduct outreach to companies to propose the MSPM program as an option for their employees and future employees through a tuition remission program.

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