Illuminating the Shadows: Unveiling the Path of Black Men in the Information Technology Workforce

Curtis C. Cain
Howard University

The absence of Black[1] men[2] in the Information Technology (IT)[3] sector is a pressing issue both in academia and society. Diversity enriches learning, with diverse backgrounds offering varied experiences. An ethnically varied IT field can significantly influence the recruitment and retention of minority undergraduates by offering mentors and role models. This research, rooted in the Individual Differences Theory of Gender and IT, uses qualitative methods and interviews to delve into the experiences of Black men. While many studies touch upon gender and racial disparities, few specifically address Black men's experiences. This paper bridges this gap, spotlighting the underrepresentation of Black men in IT, and identifies key factors for future research based on a study begun in 2011, further enriching existing literature and theories.

Keywords: theory extension, Individual Differences Theory of Gender and IT, IT, Black men

LITERATURE REVIEW

In the United States, a country that professes to promote the concept of social mobility, education is critical. Postsecondary education is now an essential criterion for participation in an increasingly competitive technical labor market (Wilkins, 2006). In higher education, the overall representation of all ethnic minorities is steadily increasing. Although still far behind white students in terms of participation, Black and Latinx students have experienced significant increases in postsecondary education participation over the last decade (McGee, 2017). However, the data on growth rates of Black students indicate more of a good news/bad news scenario. Even though the total number of Black students is increasing, the gender gap between Black men and Black women in higher education has grown wider (National Center for Education Statistics, 2003). While Black women are experiencing notable growth in enrollment and graduation, the participation of Black men is declining and is the lowest of all demographic groups (National Center for Education Statistics, 2003).

In the United States, the underrepresentation of Black men in higher education can be broadly explained in terms of three experiences: educational, environmental, and personal. In terms of education, Black men and women have been historically incorrectly deemed academically inferior to whites (Allen & Epps, 1991; Allen, 1988; McGee, 2017; McGee & Martin, 2011; Palmer et al., 2009; Morris & Monroe, 2009; Museus, 2008). Due to the history of socioeconomic stratification disproportionately impacting Blacks in the United States, Black students are more likely to attend ill-equipped schools, lacking resources that contribute to providing quality education at the same level white students receive (Codjoe, 2001). According to Joshi et al. (2016), a significant amount of research has examined Black men through the prism of a deficit model,

which primarily focuses on systemic and individual failure as a method to explain a lack of success. However, this research approach is insufficient, as it does not consider the positive factors that contribute to Black men's success. Framing the issues confronting the Black community in terms of a lack of resources runs risks analyzing it from a deficit-based perspective, which does not tell the whole story and is detrimental to student development and confidence, as well as failing to highlight and uplift Black students.

Black students cope with varying levels of their environment, including the household makeup, schools, and geographic location. One level is the prevailing racial environment in which they live; for example, a predominantly Black or an ethnically mixed neighborhood. Another level is the prevailing environment of the academic institution; an example is a predominately Black school or a predominately white school. Black students seamlessly shift between environments and adjust behaviors depending on their surroundings, a form of adaptation known as code switching (Casimir, 2020; Myers, 2020; Saeedi & Richardson, 2019). Code switching allows Black students to assimilate their style, demeanor, and overall tenor to an atmosphere that differs from that to which they are accustomed, but where they believe their authentic self would not be welcomed. This shifting of behaviors tends to intensify when attending college away from home and with a different demographic from the prevailing environment to which they are accustomed.

Lastly, there are personal experiences that influence underrepresentation. Relevant factors include personality and the ability to adapt and thrive in different surroundings, which overlap with code switching. Another aspect of personal factors is the process of building relationships and surrounding oneself with like-minded positive friends. One's family also contributes personal factors that can either positively or negatively affect their ability to cope with underrepresentation. The combination of educational, environmental, and personal experiences poses a significant hurdle to participating in society, let alone choosing a career in computing.

Digital Inequality

Vakil (2018) uses critical pedagogy and critical race theory to advance a framework for a justice-centered approach to equity in computer science education that comprises three elements: ethics, identity, and political vision. Vakil compares the justice-centered approach with the dominant approach, which he claims only focuses on improving learners' understanding of computer science and competencies and is oriented towards careers in technology companies. On the other hand, the justice-centered approach focuses on rights, freedom, and liberation of underrepresented students of color, ethical issues such as privacy abuse, designing learning environments that are culturally sensitive, and acknowledging and respecting students' racial identities.

Vossoughi and Vakil (2018) critically analyze the relationship between the US military's perspectives and the sorters of equity and diversity in STEM education. According to the military stakeholders, STEM education is used to prepare students for their careers and national security. Vossoughi and Vakil (2018) claim that this position taken by the military is narrow as it focuses only on national interests. Although the authors lauded the efforts taken to redirect military priorities toward humanitarian technological developments, they were concerned that STEM education was used to encourage any loss of life. They also draw attention to the surveillance of Muslim youth.

Madkins and Morton (2021) envision a future for young Black learners when computer science and STEM education will be justice-focused. In this article, the authors discuss anti-Blackness's prevalence in science and mathematics education and address why teacher educators must disrupt anti-Black racism. Madkins and Morton argue that to achieve this disruption, educators, including pre-service teachers, need political clarity.

According to Mossberger et al. (2003), the digital divide describes patterns of unequal access to Information Technology (IT). Unequal access to IT was based on varying socioeconomic factors, such as education, race, gender, age, and income (Mossberger, 2003). Latinos and African Americans were much less likely to have access to personal computers and thus felt the greatest impact of the digital divide (Mossberger et al., 2003; Margolis et al., 2008; Watkins, 2011). Digital inequality, on the other hand, takes the digital divide a step further. It references differences in access and inequality between persons with

formal access to the Internet (DiMaggio and Hargittai, 2001). DiMaggio and Hargittai (2001) found that as Internet penetration increased and access to the Internet was becoming more widespread and a new type of inequality related to the differentiation between groups of people. He suggested that the digital divide must be expanded beyond a binary view, those who have and those who do not, and include identifying critical dimensions of inequality and modeling the relationship between different forms of inequality. DiMaggio (2001) continues by positing that society is the source of digital inequality, and policies should be enacted to combat inequality.

Kvasny & Keil (2006) conducted a case study in two Georgia cities, Atlanta and LaGrange, in response to the cities' attempts to readdress the digital divide. Their study focused on evaluating Atlanta's initiative to implement community-testing centers, while LaGrange's initiative provided Internet via a set-top box, similar to a cable box. Their findings indicated that inequality was reproduced due to the lack of a mechanism that extended beyond access to actual empowered usage. Empowered usage is being able to use the Internet and digital technology to communicate, access information, and create commerce.

Scholars have replicated the results from studies like Kvasny's (2006), which show the digital divide continues today, but in different forms (Jackson et al., 2008). Today's digital divide is not related to access but rather related to empowered usage, which Kvasny's (2006) findings indicated and that DiMaggio surmised in 2001. Kvasny's study was completed in the mid-2000s before the hefty uptick in mobile technology, which may have less impact in today's increasing mobile technology-centric atmosphere. Kvasny's research is crucial as it indicated that the digital divide's conceptualization should be expanded beyond the notion of "haves" and "have-nots." However, Kvasny's findings have shown that in the era of rapid computer expansion and Internet use, inequality remained a constant, which could be a precursor to today's mobile technology-centric culture. The digital divide was once categorized as an access issue between the "haves" and "have-nots," which was reproduced as a use issue in Kvasny's (2006) IT study, indicating that with equal access, a divide remains.

Black Men in IT in the United States Today

The United States Department of the Interior's Office of Civil Rights website (2016) defines diversity as:

> A term that is used broadly to refer to many demographic variables, including, but not limited to, race, religion, color, gender, national origin, disability, sexual orientation, age, education, geographic origin, and skill characteristics. America's diversity has given this country its unique strength, resilience, and richness.

However, statistics show that diversity based on race/color and gender within Science, Technology, Engineering, and Mathematics (STEM) is particularly low (Charleston et al., 2014; McClelland & Holland, 2015; Miriti, 2020; Prey & Weaver, 2013; Vardi, 2015; Whitaker & Montgomery, 2014).

The capacity to use IT enables individuals to participate fully in society. This is vital, particularly as capabilities, functioning, and well-being in society are a better measure of relative affluence or poverty than measures of income alone (Massey, 1996; Wen et al., 2003). Kvasny (2002) argued that IT can be used in ways that promote social inclusion and that technology capabilities and access are integral to inclusion. However, major surveys published show that Blacks have lower rates of home computers and Internet access (Perrin and Duggan, 2015). In comparison, 46 percent of Blacks use their phones as their primary source of Internet access, compared with 33 percent of whites (Perrin & Duggan, 2015).

The IT workforce is nearly 90 percent white and Asian men (Zweben, 2016). While addressing the National Education Association in 2010, President Barack Obama said, "We understand that our nation's prosperity is tied to innovation spurred on by students' engagement in STEM" (NEA, 2010). He continued by saying, "For America to be technologically competitive in the future, our students must become more fluent in complex science and math." If the United States is to meet its need for world-class talent in STEM, it is essential that a diverse population be attracted to engineering and other technical fields (Chubin, May, & Babco, 2005).

Black Men in IT Postsecondary Education

A variety of approaches have been used to investigate the topic of diversity in computing. Of the many skillsets possessed by computing professionals and have received significant attention is mathematical ability, which is often seen as a factor of success in IT. One of the prevailing approaches to studying underrepresentation in computing starts at the primary and secondary education levels (K–12), analyzing mathematical success among young Black men in the United States, which is widely accepted as the foundation for computing (Berry, Thunder, & McClain, 2011; Berry, 2003, 2008; McGlamery & Mitchell, 2000).

In the educational landscape for IT careers, Blacks are vastly underrepresented in the IT fields of study in the United States. Although Black men represent 6 percent of the United States population, they only account for 2.2 percent of those employed in computing occupations (Pew Research Center, 2018). Black students' interest in Computer Science is apparent and is no different than any other demographic group (Bonner and Bailey, 2006). One approach focuses on postsecondary education and the overall student experience of Black men, including the influence of university culture and self-efficacy (Bonner & Bailey, 2006; Cuyjet, 2006; Kvasny et al., 2015; Strayhorn, 2013). The issue of underrepresentation is also evident outside the research space. According to a College Board report (Ericson & Guzdial, 2014), the entity that administers the Advanced Placement (AP) exams, which grants college credit to high school students, indicated that of the 30,000 students who took the AP exam in Computer Science in 2013, only 3% were Black. In fact, 0% of Black students took the AP exam for Computer Science in 11 states, including Mississippi, where Blacks make up 37% of the population. Furthermore, less than a third of Black men and women who receive a degree in computing stay in their chosen field (United States Census, 2018).

Black Men in the IT Workforce

In terms of race, gender, and sexual orientation, a diverse workplace has been shown to be effective in assisting underrepresented groups adapt to a new workplace, department, or division (Adler, 2002; Martin, 2014). Additionally, diverse workplaces tend to have managerial staff that is more aware of and responsive to different cultures, which aids in the organization's perspective and ability to launch new products, create new ideas, assess emerging trends, and develop new marketing plans (Adler, 2002; Martin, 2014).

Holloman et al. (2018) argue that building a diversified engineering and computer science workforce is not likely if the country continues to lose marginalized racial minorities, especially Black Americans, at crucial junctures along the education-to-workforce pipeline. The authors conducted a systematic literature review, and the findings indicated three issues: student identity, recruitment and persistence, and students' perceptions of graduate school. To address this issue, the authors critically assessed what is causing the disconnect between research and practice in terms of extending participation and what is driving students away. They devised a comprehensive plan for going forward.

Blacks are underrepresented in both the workforce and academia. Preparing for and adapting to careers in IT where there are few people of color poses a challenge on a personal level. Most Black people leave IT occupations (NSF, 2008). And they are disproportionately underrepresented in higher education. When comparing percentages of women to men, studies of underrepresentation in computing have historically focused on women, ignored within-group variation, and assumed that all men are well represented. Research on women in computing has led to an increase in their participation. Some of the barriers that impeded women's adoption of IT careers were beliefs about their intelligence and stereotypes. Understanding social factors play a role; however, it is not the only factor in understanding women's underrepresentation (Trauth & Connolly, 2021). For example, a stereotype about men being intellectually superior to women in mathematics affects women entering fields that rely heavily on mathematical concepts. Similarly, understanding social factors play a significant role in understanding Black men's representation in IT.

The differences in educational, environmental, and personal experiences lend themselves to research that focuses on further understanding how these factors influence IT identity development and career choice (Carter & Grover, 2015). Not all Black men are the same; there are differences among them that must be evaluated and accounted for. An investigation of these differences may provide useful insight into what

attributes successful Black men in IT possess; differences like this, among the same group, are referred to as within-gender variation (Kvasny et al., 2009; Trauth et al., 2009; Trauth et al., 2016).

Most importantly, and central to the focus of this paper, cultural diversity has a positive effect on coalescing the many ways in which people from different cultures think, which can lead to more ideas and solutions (Martin, 2014; Al-Jenaibi, 2011). There are several places by which to launch an investigation into the underrepresentation in computing, such as primary or postsecondary education. Inquiries can also be started at the workforce level. The lack of diversity in the field is a problem, and there is a disconnect between Black students who may be exposed to Computer Science in primary and secondary education versus those who receive exposure at the college level, regardless of where one chooses to launch. The gap among these lines of inquiry is an understanding of the racial divide in IT of Black men in computing from their own perspective. The unique challenges that Black men face in the field of IT demand further investigation (Kvasny et al., 2015).

THEORY

The Individual Differences Theory of Gender and IT (IDTGIT) was developed as a theoretical alternative to two perspectives on the topic of underrepresentation of women in the technical workforce, essentialism, and social construction. The essentialist view attributes women's underrepresentation in IT to biological factors (Trauth, Quesenberry, and Huang, 2009). Trauth and Connolly (2021) disagrees with the essentialist perspective arguing while some relevant differences in ability may be biologically based, they are not based on gender. Further, essentialism does not add contextual factors affecting an individual's perspective or interaction with technology.

The second perspective used to understand gender and IT is social construction, or social grouping, which describes gender as "two separate groups of men and women affected by two different sets of sociological influences. Hence, men and women are viewed as having different or opposing socio-cultural characteristics, which subsequently affect their relationship to and adoption of technology." (Trauth and Quesenberry, 2007; p. 23). Social construction identifies social forces, which may shape men's or women's lives, but does not consider individual agency or experiences that affect responses to those factors (Trauth et al., 2009; Trauth, 2002). Given the two different theoretical perspectives of essentialism and social construction, they can be interpreted as describing partial elements of women's situation in the IT workforce.

In developing IDTGIT, Trauth (2002, 2006, 2011, 2013) adopted the perspective of intersectionality, which sought a different viewpoint that rejected binary approaches in-lieu of inclusive characteristics, such as the intersection of gender and other identity characteristics (e.g., race, ethnicity, socio-economic status) (Crenshaw, 1989). Trauth (2006) points out, "current theories about gender and IT do not fully account for the variation in men's and women's relationships to information technology and the IT field" (p. 1759). This variation that Trauth has argued is central to different people's experiences, decisions, and relations to technology.

The IDTGIT constructs work together to give insight into women's decisions to enter and remain in the IT field. The individual identity construct encompasses personal demographics and career items, consisting of race, age, gender, job title, and type of IT work. The individual influences construct encompasses factors such as personal influences, including education level, personal abilities, experiences with computing, and mentor and role models. The last construct, environment influences, includes values that represent attitudes about culture and physical and organizational location, such as attitudes about women and attitudes towards IT work. These constructs provide robust attributes to examine aspects of an individual's background, experiences, and lifestyle.

TABLE 1
CONSTRUCTS OF INDIVIDUAL DIFFERENCES THEORY OF GENDER AND IT

Construct	Subconstruct	Examples
Individual Identity	Personal demographics	age, ethnicity, socio-economic class
	Type of Computing work	software development, Information Systems (IS) design
Individual Influences	Personal characteristics	educational background, personality traits, abilities
	Personal influences	mentors, role models, significant life experiences
Environmental Influences	Cultural influences	attitudes about women & computing
	Economic influences	cost of living
	Societal infrastructure influences	availability of childcare
	Policy influences	laws about gender discrimination

(Trauth, Cain, Joshi, Kvasny, and Booth, 2016)

The IDTGIT has been successfully used to explore the variation of women in IT. More recently, the theory has been expanded outside of women in IT and used to consider barriers encountered by Black men in IT (Cain and Trauth, 2021). While the theory has been particularly valuable in addressing "what" factors contribute to underrepresentation, there is also a need to understand the "how" and "why" thereby moving beyond a static context of explaining a moment in time towards a dynamic conceptualization. Using the IDTGIT to analyze 63 stores of women in Ireland from the 1970s – 2010s, Trauth and Connolly (2021) have demonstrated that identifying the factors that influence gender equity in IT are largely static. However, the nature, and how the factors present themselves, are dynamic and change over time. Some of the changes are gradual, such as those implemented, or influenced, by laws that support a patriarchal system and gender legislation. Other changes are dynamic that influence interest in IT, opportunities, and daily life. Trauth's theory represents an integral theoretical basis for research and an opportunity for theory extension.

THEORY EXTENSION

Two separate studies involving 20 Black men at universities Predominately White Institutions (PWI) and Historically Black College and University (HBCU) in the South and Mid-Atlantic were conducted from 2011 – 2015. Students were interviewed using an established interview guide (Trauth, 2002), adapted to these studies. The original interview guide was developed with funding from a National Science Foundation Grant, "A Field Study of Individual Differences in the Social Shaping of Gender and IT" (NSF, 2002; NSF Award # 0204246; Trauth, 2002).

In addition to gauging the appropriateness and applicability of IDTGIT, the first study utilized theoretical constructs to analyze interview data on the presence of stereotypes and coping mechanisms of Black men who are studying IT education at a PWI. The research questions explored for that study were 1) Are Black men in IT education exposed to stereotyping or stereotype threat? 2) To what extent do stereotypes explain the participation of Black men in IT? The individual influences construct stereotypes about personal characteristics (i.e., personality). The findings of the study suggest three insights about the stereotyping of Black men in the IT field. One insight is the prevalence of Black men who wish to overcome stereotypes rather than succumb. A second insight acknowledges that Black men understand that they will be stereotyped in an environment dominated by White men. A third insight is that regardless of whether the

student attends a PWI or HBCU, they understand that barriers and overcoming outside of the institutional structure these barriers are critical to a successful career in IT. These findings give evidence that more research has to be done to identify ways to combat Black men's marginalization in IT. With the benefit of these findings, we will be able to create future interventions better. The study shows that years later, these problems still exist with the current generation and that recent research has not alleviated these concerns for Black men (Cain & Trauth, 2013; Cain, 2012).

The second study aimed to identify why Black men leave IT and the barriers to entry. To accomplish this, we launched a second interview-based investigation of Black men to identify how identity, influences, and environmental circumstances affect retention for underrepresented students at an HBCU. The study was designed to help understand inefficiencies within the education, which lead to barriers. A further modified interview guide from the first study was used. The constructs of the theory were used to analyze interview data about the lived experiences of Black men who are studying IT. The individual construct presented the importance of positive role models and mentors throughout one's upbringing. The identity construct highlighted potential issues related to one's race and feeling marginalized within the IT field. The environment construct was observed with issues related to university climate for Black men pursuing IT degrees (Cain & Trauth, 2015; 2013). The study's findings suggest three themes: one, the absence of positive mentors and role models for Black men. A second theme is that Black men feel a sense of marginalization within the IT field. A third theme is that there are differences between PWIs and HBCUs students. The main differences between PWI and HBCU students presented in the studies were the value of coursework and team building at the PWI versus the value of a one-on-one relationship with the academic advisor at the HBCU. These themes are related to the three constructs of the theory (Table 2).

TABLE 2
STUDY THEMES RELATED TO THE CONSTRUCTS OF IDTGIT

Construct	Sub-construct	Examples
Individual Identity	Personal Demographics	Race, Age, and Family
	Type of IT Work	IT Identity *(belonging)*
Individual Influences	Personal Characteristics	Personality, Exposure to IT
Environmental Influences	Cultural and societal infrastructure influences	University type & preparation for IT, and the role of advising

There is evidence that a diverse workforce can contribute to increased staff retention and productivity. It can enhance the organization's responsiveness to an increasingly diverse world and increase the organization's ability to cope with change, and expand its creativity. Understanding the factors that could contribute to decreasing underrepresentation could lead to underrepresented groups' thoughts and ideas being brought to the forefront. While these key findings (Table 3) help reveal factors that contribute to the underrepresentation of Black men in IT, there needs to be a deeper level of analysis of the factors (Cain & Trauth, 2021; 2015; 2013; 2012).

TABLE 3
KEY RESEARCH FINDINGS

Key Findings	
Examples	**Summary**
Race	Participants were consistent in referencing race as one of the most considerable barriers with which they had to cope when entering the IT field. They reference the dominance of white men and a low number of Black men.
Age	Age was not something that the participants saw as being a barrier. Even though most did not have an IT work history, they knew about IT's potential to be a lucrative career. This could be due to the participants being native to IT. "Native to IT" and "digital native" are terms that reference those raised around technology such that it is ingrained in who they are. The interviewees that did mention age, mentioned it as a factor when they were completing internships. They found it challenging to have their perspectives taken seriously because they were young and Black.
Family	Interviewees reference family as critical in supporting their career decisions. Furthermore, some of these young men were fathers, and they consider their education and desire to enter a lucrative field such as IT as a way for them to provide for their children.
IT Identity	The participants overwhelmingly faced difficulty trying to "fit" into the IT professional model. They referenced race as a critical factor for the struggle to find a place for themselves within the IT field and even in their coursework, internships, and group projects.
Personality	These Black men were persistent in their desire to pursue their dreams. They remained upbeat in the pursuit of their goals and aspirations.
Exposure	There were varying levels of exposure to IT at an early age for the participants. Exposure is what accounted for their initial interest. Some of the means for initial exposure were video games or family and friends in an IT field.
University Type	The type of institution the interviewees attended was a topic. Some referenced more resources for career placement and a larger variety of courses to choose from to gain experience. Others referenced larger or smaller classroom sizes and their inability to receive one-on-one instruction from a professor.
Preparation for IT careers	Interviewees experienced varying degrees of what they perceived to be preparation for the IT field. Those who participated in internships felt more prepared because they experienced what the work would be like. Those who did not experience an internship used insight from friends and faculty to interpret what work in the IT field would be similar to.
Role of Advising	The role of advising for Black men was a topic that consistent among the interviewees. At some institutions the students had an academic advisor and multicultural advisor. They would reference the difficulty in scheduling and meeting with advisors. Others would mention how much of a help their advisor had been towards shaping the IT professional they hope to become post-graduation.

Additional analysis was conducted from 2016 – 2017 as an autoethnography. The first author of this manuscript is a Black man in IT. Using himself as an exemplar, he documented his lived experiences and entrance into the IT workforce to identify individual and group themes that exist, relate them to existing literature, provide evidence of those obstacles being overcome using the IDTGIT, and to compare lived experiences with those from prior studies (Cain and Trauth, 2017). This research shows that autoethnography can be used to highlight how experiences relate to ongoing research. The concept of using an exemplar as the focal point of a research agenda can bring to the forefront nuanced detail that otherwise

may have gone unnoticed which can serve as criteria for inspection in future research. There are aspects of individualism and collectivism when analyzing influences and personal experiences.

DISCUSSION

When IDTGIT was conceptualized, the interpretative nature of the theory was seeking to identify what factors inhibit the participation of women in IT. Similarly, when using the theoretical lens for Black men, themes have emerged that limit and detract from the participation of Black men in IT. Additionally, when viewed through an autoethnographic lens the first author identified with the themes that emerged from study participants. However, there is a need to move beyond the static nature of identifying factors, while critically important and worthy of exploration, the next phase is dive deeper to denote the dynamic nature of *how* the factors are manifesting over time.

In 2021, a National Science Foundation funded project (Award #2047292) began to support understanding how the dynamic nature of underrepresentation of Black men in IT influences participation. One of the research questions being explored is, *how* are postsecondary career aspirations actualized and cultivated among Black men in IT? The study extends the geographic footprints and universities explored during earlier studies (Table 4).

TABLE 4
INSTITUTIONAL MATRIX

Institution	Type	Classification	Undergraduate Enrollment	IT Enrollment	Black IT Enrollment
Howard University	Private	Research HBCU	6,100	776	667
Morgan State University	Public	Research HBCU	7,447	464	385
The Pennsylvania State University	Public	Research PWI	36,646	9,725	278
University of Pittsburgh	Public	Urban Research PWI	19,330	5,027	126

At least 40 Black men are being interviewed across each institution of higher education. Howard University (HU), located in Washington, D.C., is home to several federal agencies with the mission of increasing technical expertise. HU routinely partners with the National Security Agency (NSA) to engage students with practical, declassified, problems to increase their exposure to security and threat analysis. HU has also established partnerships with industry leaders such as Google and Microsoft, which have offices in the D.C. area where HU students' intern, complete capstone projects, and present to senior company officials. HU and Morgan State University (Morgan), which is located in Baltimore, MD, recently entered a partnership with Google—Howard West-Tech Exchange—whereby students from each institution were immersed at Google's Mountain View headquarters for a full academic year. During the year, students took courses and worked closely with Google Software Engineers on projects. At the conclusion of the academic year, students returned to their institution to continue coursework towards the completion of their degree. Morgan also has a Facebook-in-Residence program, in which engineers from Facebook are embedded at Morgan, teaching courses and injecting practical problems into the curriculum. With HU and Morgan's strong ties to federal agencies, partially attributed to their proximity to D.C., tech company involvement with the two universities, and with each being an HBCU, Black students from each school were recruited for this project. Furthermore, these two institutions have a longstanding legacy of graduating Black men in STEM—notably, HU graduates more Black STEM students than any other institution in the country—and provide different HBCU contexts for exploration.

The Pennsylvania State University (PSU) is a rural, research PWI, located in University Park, PA, in the central part of the state. PSU houses a College of Information Sciences and Technology, which is part of the iSchool consortium. The iSchool consortium was founded in 2005 with the purpose of advancing the information field in the 21st century. PSU offers degrees in Computer Science, Engineering, and Information Sciences as well as Security Risk Analysis and Cyber Security. University of Pittsburgh (Pitt) is an urban, research PWI, located in Pittsburgh, PA. Pitt is home to both the Swanson School of Engineering and a School of Computing and Information, and like PSU, is an iSchool member. Combined with the rural nature of PSU and the urban nature of Pitt, both PWIs provide a stark difference from HU and Morgan in terms of student body composition and location. Participants were recruited from both PSU and Pitt as these institutions provide participants with different perspectives, experiences, and epistemologies. Overall, the diversity of institutions (i.e., urban HBCUs, a rural and an urban PWI) supports a heightened awareness of the experiences of Black men in IT at different types of institutions. Additionally, this work will investigate if geographical area and differences between urban and rural geography influences the personal and academic experiences of Black men.

It is worth noting this work is not developed in the same vein as Critical Race Theory (CRT). The purpose of this research is to analyze and explain the data collected. However, CRT can be used to correct socially derived conclusions. It is also possible to re-position an interpretative study as critical and arrive to different conclusions with implications greater than those at the individual level (Howcroft and Trauth, 2008; Trauth and Howcroft, 2006). This work's contribution to theory extension and development for underrepresented minorities in IT, researchers and practitioners concerning the computing education and career decisions of students of color is key. This research may inform policy decisions and future IT interventions for Black men and other marginalized groups. Furthermore, its research findings could help policymakers develop policy solutions to address the underrepresentation of Black men in IT. The positioning of Black men as "doers" of computing has far-reaching impacts for the IT community concerning the academic determination and strength of this group.

LIMITATIONS

There are several limitations to this manuscript. First, the results presented are not from a completed study but rather work that is in progress and additional work that will be conducted. Furthermore, the paper discusses the underrepresentation of Black men in the IT workforce, which is not controversial at this point and sadly represents a fact of the computing workforce. It is not the factors that contribute to the underrepresentation that would be of particular interest, but rather the systemic forces that cause the situation and interventions that have taken place and perhaps have not achieved their intended goal and which interventions would be worth exploring. There is an inherent inclination to compare groups (e.g., the underrepresentation of women in IT) and whether those forces are identical to those faced by Black men. There are limitations to the types and locations of the universities included in the study and the decision to analyze this subject at the collegiate level. There are limitations to approaching the topic from an interpretative epistemological sense when the subject matter may lend itself to an opposing critical perspective.

All of these concerns and critiques are valid. The initial studies are crucial because they establish the foundation for subsequent work. The federal funding received to pursue those lines of inquiry is important because it demonstrates that the work is of national significance. Scholars have taken interpretative studies and applied a critical lens to illustrate how the findings might be viewed from a different perspective, which is something that this work will allow. It is imperative to note that this proposed work is neither anti-woman in nature nor is it offered to discount the experiences of other racialized and marginalized groups, as each is unique and cannot be generalized or understated, which is also why this manuscript avoids comparing underrepresented groups. One of the goals of this research is to conduct follow-up interviews with study participants after they enter the workforce to seesaw their interactions and experiences shape their perspectives of the field. There is only one reason we should seek diversity in our organizations, societies, workplaces, schools: it is the socially just and moral thing to do. Talking about how diversity ensures a

large enough workforce and makes for better outcomes is self-serving at best.

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ENDNOTES

1. For the purposes of this study, Black is defined to be a person who identifies with the Black diaspora and who resides in the United States.
2. In this paper, "men" is used instead of "male" to respect gender identity and refrain from referring to people by their anatomy.
3. IT is used as the broad field that includes information systems, computer science, and other computing disciplines.

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