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DATA 201

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The Impact of Black Underrepresentation in STEM Fields

The realization of my exceptional Black identity became evident very early in my life. Growing up in a smaller, predominantly Caucasian city in the Deep South, I noted the lack of diversity in my honors and Advanced Placement (AP) courses and tangibly observed the economic and racial lines that divided the city and its people. These experiences provided subtle reminders of a cemented distinction. Throughout my childhood and into adulthood, I remained aware of these differences, often curious if anyone else did. As I matured and established myself as a dedicated student, the feeling of being the only one in certain settings became the norm for me. My identity as a Black, female, and intelligent individual solidified, enabling me to engage in academic spaces that only a few others who shared that identity could access, especially given my specific environment. During this time, I discovered the concept of assimilation and began to adapt to environments where the majority demographics did not match my own. Throughout K-12, I had no more than three Black teachers: my first in Kindergarten, the next in 9th-grade Biology, and the last during 11th and 12th grades at a technical school in my Programming/Software Development course. Thirteen years of schooling, and only three Black teachers. When it came to selecting a university, I applied to multiple Historically Black Colleges and Universities (HBCUs) and was awarded scholarships, yet

I ultimately chose a Predominantly White Institution (PWI) that offered me the least financial assistance. I selected my alma mater not only for comfort but also for the degree options available in computer science. However, looking back, I realize that the fear of not fitting into the "culture" at an HBCU also significantly influenced my decision. There is much more to be addressed regarding my situation, but it emphasizes the critical lack of Black representation in technical disciplines, particularly in STEM (Science, Technology, Engineering, and Mathematics). Moreover, we must consider how this underrepresentation has lasting impacts on the Black community and society as a whole. Therefore, I am compelled to focus on the lack of representation of Black individuals in STEM fields.

Exploring the Data

The representation of Black Americans in STEM-related fields remains extremely low across the United States. According to the National Science Foundation's Diversity and STEM: Women, Minorities, and Persons with Disabilities 2023 report, Black Americans comprised only 9% of the STEM workforce in 2021, a slight increase from 7% in 2011 (National Science Foundation, 2023). This underrepresentation is further seen in median earnings, as Hispanic, Black, and American Indian or Alaska Native STEM workers reported lower earnings compared to their White and Asian counterparts (National Science Foundation, 2023). Notably, while Black students earned 12% of bachelor’s degrees in social and behavioral sciences in 2020, their representation in engineering was just 5% (National Science Foundation, 2023). The inequality extends to the overall workforce, where, in 2021, White workers accounted for the largest demographic in STEM occupations at 22.4 million, followed by Hispanic (5.1 million),

Asian (3.6 million), Black (3.0 million), and American Indian or Alaska Native (216,000) workers (National Science Foundation, 2023). According to Collins, despite the high growth potential in STEM careers—projected to add millions of jobs by 2020—persistent recruitment and retention challenges hinder the progress of underrepresented minorities (Lockhart & Wolf, 2012). Factors such as gender discrimination, racial disparities in funding opportunities, and inequities in scholarly reviews contribute to these barriers (Ceci & Williams, 2011). Even as educational attainment among women has increased, their representation in science and engineering fields remains disproportionately low (National Science Board [NSB], 2016). The urgent need to enhance minority representation in STEM is a pressing concern for educators, employers, and policymakers alike (Agrawal, Stevenson, & Gloster, 2016; National Science Foundation, 2014; Wladis, Hachey, & Conway, 2015) (Collins 144-145).

Pertinent Issues, Social-Minded Solutions

The analysis of the data highlights several concerning trends, including the disproportionate gender and racial gaps contributing to the underrepresentation of Black individuals in STEM fields. Barriers such as limited access to educational opportunities and the continuation of cultural stereotypes exacerbate these alarming disparities. Brown et al. emphasize the need to cultivate an identity among young African American males that aligns with striving to become scientists. When examining achievement differences between Black men and women, the "matriculation results highlight the confounding gap... between African American men and African American women in science" (173). Moreover, the emphasis on math and literacy in assessments, rather than science, has further restricted access to STEM opportunities. As Brown notes, "one rationale for this

lack of access is the impact of assessments that emphasize math and literacy at the expense of science" (171). This prioritization leaves students unprepared for the rigorous coursework that STEM majors require, and as a result, many students lack the solid foundation necessary for university-level STEM studies. This issue is compounded by a lack of support at the university level, leaving students struggling to keep up with the demands of their programs. In a UK-based study on Black STEM students, when asked how they approached difficulties in their coursework, most students ranked asking lecturers for help as a last resort, often preferring to persevere alone or ask friends. The study concluded that "students doubt their abilities, and this hinders them from asking for help... due to the lack of representation in the department" (Greaves et.al, 56). This hesitancy to seek assistance points to the critical need for increased representation and supportive environments within STEM education.

However, Brown et.al explores a rather dynamic solution when it comes to help young Black boys align their identity with being science oriented. They noted that "[teachers] have to prepare these young men academically, while preparing them to supersede the subtle attacks on their potential identities as both African American male and scientists" (175). Furthermore, a challenge was emphasized to for "educators to view urban schools from a position that highlight what the students and schools can do instead of what they are lacking" (175). This would in return help fine-tune cultural perception, stereotypes, and identity to align not with a limiting mindset, but of one of excellence and intelligence. This solution breaks the cycle of the unintelligent and incompetent being and promotes "non-stereotypical science identities for students" (Brown et.al). Even more so, with these identity-affirming and representational practices, it is evident the

importance and necessity of having a diverse representation in classrooms and educational spaces. Lee et.al highlights that “representation of Black teachers in U.S. classrooms as leaders and those who guide primary instruction provides several educational benefits for Black students (Cholewa et al., 2014; Decker et al., 2007; Harrell-Levy et al., 2016; Egalite, & Kisida, 2017; Egalite et al., 2015). Black teachers, who share an ethnoracial identity with their students, are often equipped to support students’ socioemotional development from a culturally-informed lens (Henderson et al., 2018; Jackson et al., 2014; Goings & Bianco, 2016)”.

In conclusion, increasing the representation of Black individuals in STEM fields requires both systemic change and cultural support within educational institutions. By providing diverse role models, encouraging identity alignment with scientific achievement, and addressing structural barriers in education, we can begin to close the racial and gender gaps in STEM. It is vital to develop an environment where Black students feel empowered to pursue and thrive in these fields, thereby contributing to a more diverse and innovative STEM workforce, closing the gaps in the current and future trends.

Works Cited

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