

D-STEM EQUITY MODEL

DIVERSIFYING THE STEM EDUCATION TO CAREER PATHWAY!!!

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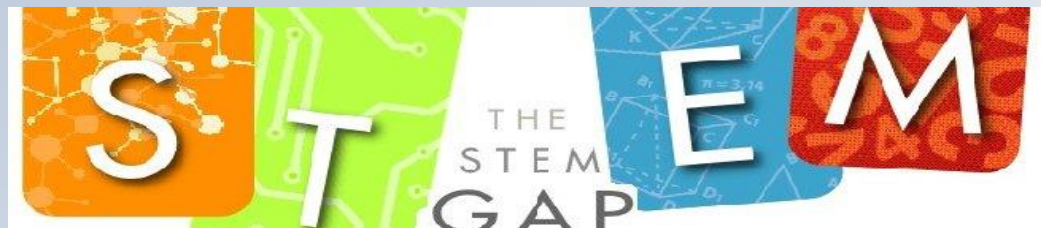


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STEM

(science, technology, engineering and mathematics)

- “an interdisciplinary approach to learning where rigorous academic concepts are coupled with real-world lessons as students apply science, technology, engineering, and mathematics in contexts that make connections between school, community, work, and the global enterprise enabling the development of STEM literacy and with it the ability to compete in the new economy (National Center on Gifted and Talented, 2013).”



STEMTalks

DIVERSIFYINGSTEMMATTERS

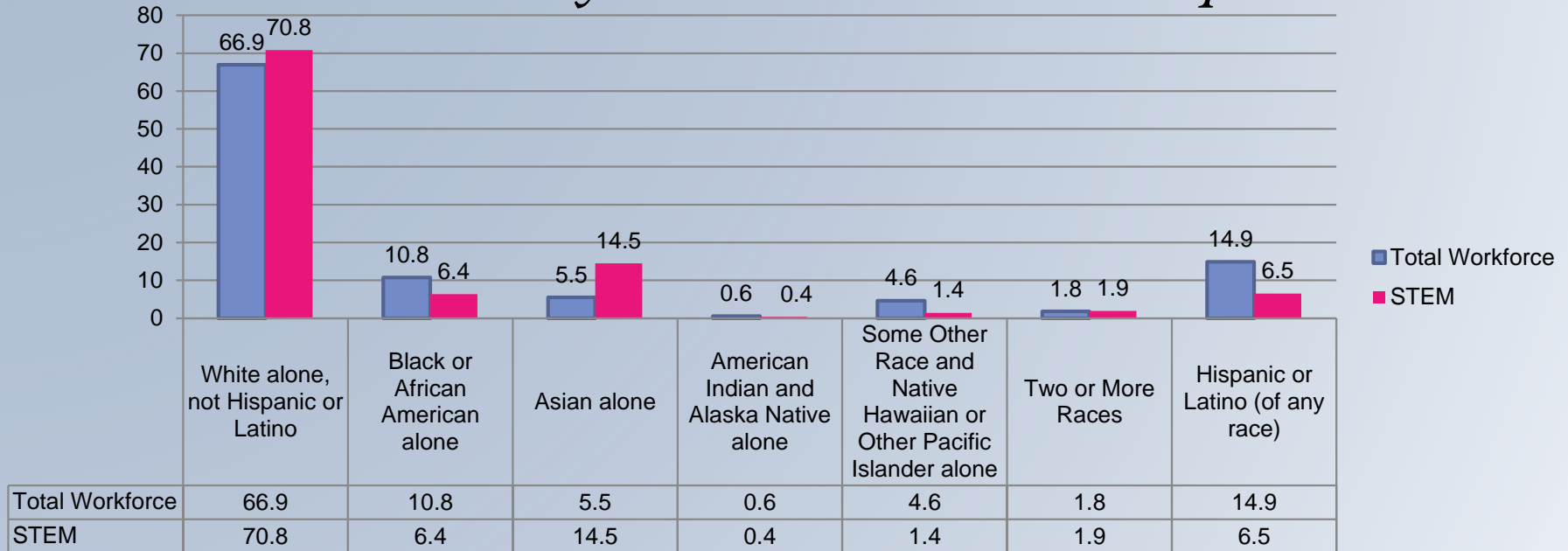
“The National Academy of Sciences suggests that, without the participation of individuals of all races and genders, the increasing demand for workers in STEM fields will not be met, potentially compromising the position of the United States as a global leader” (NSF, 2014).

“The additional benefit of developing a STEM-literate and well-trained domestic workforce is that this ensures that we adequately address challenges related to healthcare improvement, national production capacity, and research excellence” ([Allen-Ramdial](#) & [Campbell](#), 2014).

“The National Action Council for Minorities in Engineering believes that diversity in STEM leads to improved decision-making, enhanced innovation and problem-solving” (2017).

STEM Significance

Career Stability and Economic Development



□ According to the Washington-based Center for Political and Economic think tank, **the U.S. workforce could employ as many as 140,000 additional Black and Latino college graduates in STEM fields annually** if the gap in college completion by Blacks and Latinos closed to roughly match that of the White and Asian student graduation rates (Roach, 2014).

□ According to the U.S. Census Bureau, the median income for Blacks is \$32,229 and \$ 38,624 for Latinos, almost \$20,000 less than Whites; but **for Latinos and Blacks in STEM careers, the median income is \$75,000** which is only about \$10,000 less than Whites (Landivar, 2013).

Methodology

Diversifying STEM to Education Pathway, N = 415

Through qualitative research methodologies, students engaged in STEM, their parents, STEM educators, STEM professionals, and Community Organizations that implement STEM programming were asked to provide their perspectives and share their stories related to the intersection between race and STEM.

- **The Motivation of Black and Latino Students to Engage in STEM, n = 281**
 - *106 high school students, 86 middle school students, 27 STEM educators, 51 parents and 11 college students.*
- **Diversifying STEM Think Tank, n = 134 from 64 organizations**
 - *To understand from the perspectives of STEM professionals, Educators, and Diversity / Inclusion Officers strategies to diversify and strengthen the STEM education to career pipeline.*

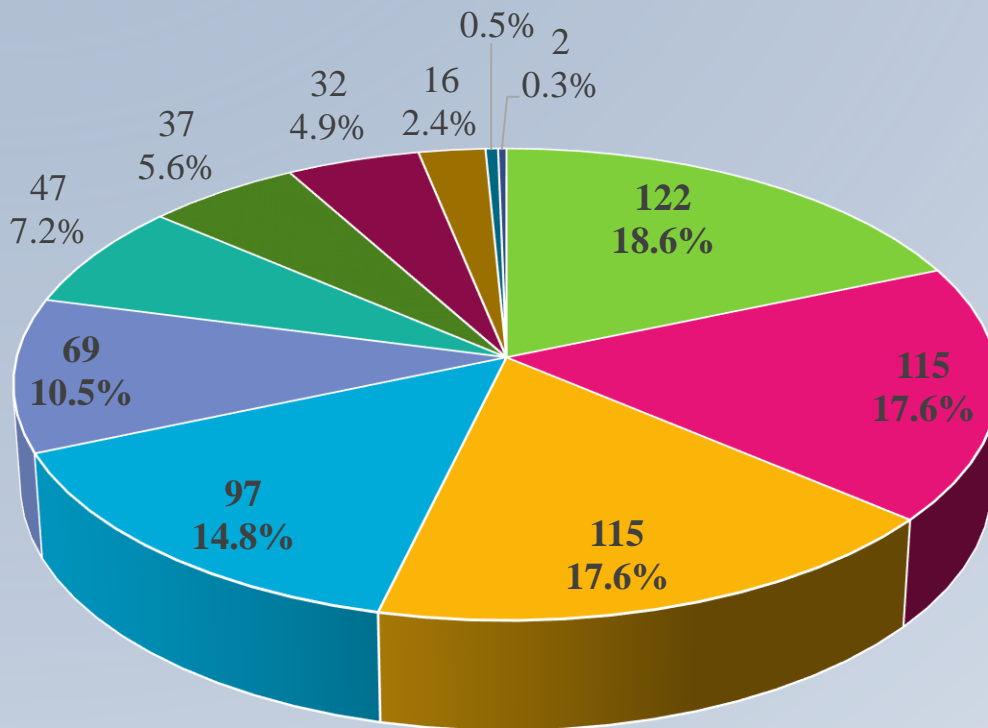
Critical Race Theory

Attempts to understand American education and reform, acknowledging the unique perspective and voice of people of color as victims of oppression in racial matters and valuing their story telling as a legitimate way to convey knowledge (Khalifa, Dunbar, & Douglas, 2013).



Factors that Motivate Black and Latino Students to Engage in STEM Education

($n_t = 281$, $n_r = 655$)



- Obligation to Black/Latino Community/Break Negative Stigma - Be different
- Future Success/STEM is a Prominent, Progressive Field
- Learning: Discovery of Knowledge and real-life applicability
- STEM Passion/Enjoyment
- Solve Problems/ To Advance Humanity
- Family/ Teacher Influence
- Challenge/ Competitive Nature of STEM
- Money
- Self-Motivated
- Not good at math
- Leadership

n_t = Total # of Participants,, n_s = Total # of Responses
 Since subjects can respond more than once to the question, the values for n_t and n_r are often not equal.

Middle School Student: I think the gap exists because humanity is tearing us apart. Something that would motivate me to engage in STEM is us blacks and Latinos working together to make the world a better and more positive place and for us not to think we can't follow our dreams.

High School Student: In terms of me being interested in STEM as a Latina, I think it feels good to know that I'm kind of paving the way for someone else, I'm kind of going in there without knowing what to do and I have you guys to help me and it's kind of like the blind leading the blind. But I mean I know I'll get through it and that way I can help the next generation.

Parent: His intrinsic motivators are most likely his love to solve critical problems quickly. In elementary school, his nickname was calculator because he could solve problems faster than someone could insert into a calculator. In addition, he wants to represent Latino doctors in STEM because when he was seven years old, he asked me in the hospital, "Where the Latino doctors are at?" I remember replying that they are Latino doctors but they are very few of them. You can become one when you grow up. After that, he made it his goal to want to become a doctor for his want to represent the Latino Race.

Faculty: I know a student; he probably is a 3.7 or 3.5 GPA and is interested in math and science. His motivation is basically society always saying that African American males are not capable. He feels like they are not put to the test, if there is a white student that is in the same class as them that they are not expected to do as well as, and so he feels that he's motivated by hearing that you're not able and he says that I am able and that I am going to succeed. I think that goes for a lot of our youth. I think if they keep hearing, sometimes the more you hear that you can't do something, you know that you can do something. That's the motivation for a lot of our black males right now.

Diversifying STEM Education to Career Pathway

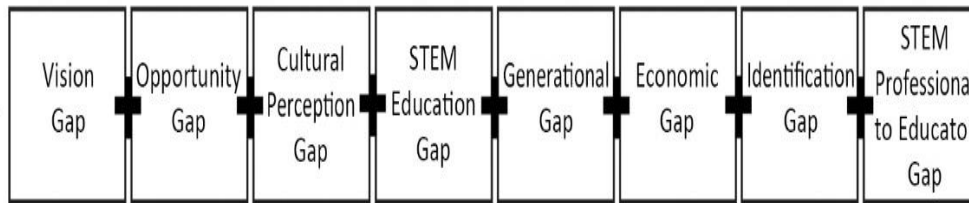
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Diversifying STEM Education to Career Pathway

D-STEM Equity Model

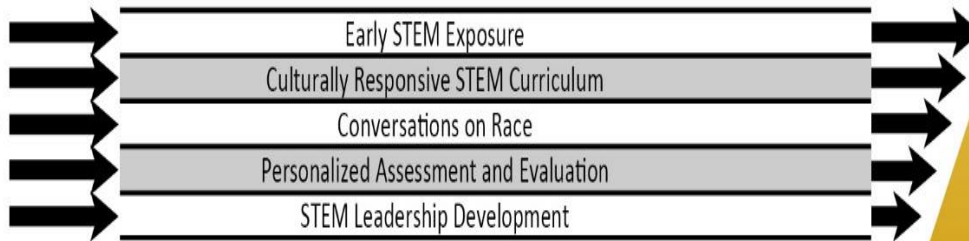
The Systemic Problem

Racial Inequity in STEM Education and Careers



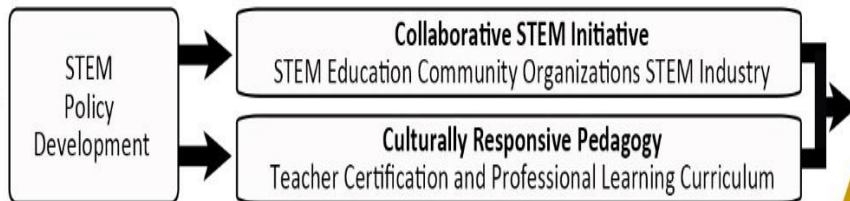
STEM Motivation

Factors that generate interest in and motivate Black and Latino students to engage in STEM education, majors and careers



Bridging the Racial STEM Divide

Policy-driven mandates to form stakeholder collaboration and funding



Racial Equity in STEM Education and Careers

Increase in motivation of Black and Latino students to engage in STEM education

Racially-based collaborative stakeholder approach to STEM programming (PreK-16) mandated by policy that addresses problems collectively and is driven by STEM motivation factors, with an emphasis on developing culturally-responsive teachers



Diversified STEM Education to Career Pathway

Global Scalability

1. Identify groups who are underrepresented in STEM and host “Diversifying STEM Think Tanks” with STEM professionals, educators, students, parents, to gain a better perspective as to why STEM inequities exist (the problem) within the respective group(s) and strategies to address.
2. Hold focus groups with members of identified group who are engaged in STEM to understand what motivates them to engage in STEM.
3. Identify stakeholders who will value from diversifying STEM and policy-makers who are STEM advocates to move toward a collaborative STEM initiative.
4. Identify the most prominent barrier to diversifying STEM that exists for the respective group(s) and prioritize in bridging the gap.
5. Based on the data collected, modify the language in the D-STEM equity model to include identified problem, motivation factors, bridging component, which include diversifying STEM policy development as well as identification of stakeholders and the most prominent barrier.

IMSA Black and Latino Students – STEM Motivation

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