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Commentary on Black Boys and Men in STEM

* James Earl Davis
Temple University

Black boys are filled with wonder and curiosity. They marvel at the world around them while asking questions and searching for evidence about natural mysteries. Unfortunately, the range of interests and instincts they develop early on is often met with tempered support and encouragement. A growing body of evidence suggests curriculum, instructional strategies, and teacher expectations are complicit in "cooling off" Black boys' excitement about learning (Bottiani, Bradshaw, & Mendelson, 2016; Gilliam, Maupin, Reyes, Accavitti, & Shic, 2016; Wright & Ford, 2016). Efforts to counter the underdevelopment of academic interest and engagement, especially in science, technology, engineering, and mathematics (STEM), are expanding with culturally responsive and strength-based perspectives. Programs that aim to increase Black boys' representation in STEM are likely to fall short without considering cultural alignment and content of pedagogy, curriculum, and learning relationships.

Representation in STEM is a salient theme in discussions of student learning opportunities, career and workforce preparation, and global competitiveness (Hrabowski, 2018). Over the past 25 years, research, practice, and policy about STEM have been driven by two fundamental concerns: broadening participation and leveraging this participation to make STEM more impactful. While considerable attention has been directed toward race and gender differences in STEM education outcomes (Saw, Chang, & Chan, 2018; Zilanawala, Martin, Noguera, & Mincy, 2018), much less of that work has focused specifically on STEM representation of Black boys and young men (Berry, Thunder & McClain, 2011; Nasir & Shah, 2011). This Special Issue of *JAAME* addresses a diverse range, but related issues in response to concerns about representation, recognizing the importance of increasing the number of Black male students who engage in STEM learning. In African intellectual tradition, all the authors recognize and provide evidence for the power of cultural work and affirmation in Black boys and young men's lives. Each is guided by an asset-based perspective grounded in culturally expansive notions of STEM teaching and learning across the education pipeline.

* Correspondence concerning this article should be addressed to James Earl Davis, Temple University, Philadelphia, PA. Contact: jdavis21@temple.edu

The discussion of representation in STEM and increasing Black male participation, especially in mathematics and science courses, is steeped in practice that values engagement as a tool of exposure and development. Strategic engagement with students has been more effective when race and culture were given conceptual and practical priority (Burt & Johnson, 2018; McGee, 2016). As an illustrative example, consider the following story that highlights engagement as an effective approach:

> *During a career exploration session at a large urban middle school, students introduced a group of young professionals from various fields. When asked about his career interest, a usually shy and unassuming Black fifth-grader, Jamal quickly replied, "I am going to be an engineer and design systems that help my community!" His enthusiasm was immediately greeted with giggles and curiosity among his classmates. Jamal's grades in math and science were average, and he was typically reserved in sharing any of his academic interests and ambitions. So, his confidence and excitement about engineering came as a surprise to his peers, but not his science teacher. The school's only Black middle grades teacher had nurtured Jamal's community-based interest in engineering and also introduced him to members of a local college chapter of the National Society of Black Engineers. This kind of engagement with a culturally competent teacher who recognizes Jamal's authentic interest, capacity, and motivation creates a potential pathway to a STEM career.*

Based on the cultivation of STEM interests through engagement with a teacher, this brief narrative offers a glimpse into how students may navigate STEM pathways. This broader theme of cultural connectivity echoes in research and practice focusing on increasing Black male students' representation in STEM. Jamal represents many potential STEM majors whose exposure to and excitement about STEM can be developed early in their academic lives. Using culturally informed engagement to expand conceptions and expectations about STEM helps Jamal see himself and his contributions in STEM (Strayhorn, 2015). Cultural engagement is based on special relationships of shared experiences; it is supportive, reciprocal, and sensitive to a student's aspirations and collective responsibility. And, it can provide an opportunity to engage STEM learning activities, interests, and career options that are responsive to Black boys' identity and realities entangled by race, gender, class, and culture.

This recent expansion of research on Black male students attempts to move discussions away from stereotypical problem-based themes to broader considerations of these students' experience in STEM (McGee & Pearman, 2015). As such, the literature recognizes race and gender's confluence and how it affects representation (Ibrahim, & Johnson, 2020). Without a doubt, Black male students' presence and perspectives in STEM have value (Brown, Mangram, Sun, Cross, & Raab, 2017), so supporting them as they learn to negotiate identity, culture, and school environments is critical.

Initially, much of the related research appeared in the study of post-secondary settings (Fries-Britt, 2017; McGee, 2016; Palmer, Davis, & Thompson, 2010), and more recently has influenced emerging topics related to interest cultivation and readiness for STEM at earlier ages (Joe & Davis, 2009). The literature reflects a growing awareness of exposing Black boys in early grades to high quality math and science materials, instruction, and role models (Davis & Farran, 2018; Wright, Ford, & Scott, 2017). Yet, the cultural assets of students and the communities that sustain them, are on the margins of studies of mathematics and science education. While many

researchers, educators, and advocates are aware of the role of race, culture, and cultural affirmation in Black student success, relevant programs and strategies, although accepted and supported by many educators, tend to lack evidence of their efficacy (Toldson & Esters, 2012). In particular, addressing cultural identity is important in actualizing academic success in STEM (Mocombe, 2018), with Black boys being more likely to experience meaning and success if the curriculum not only matches their interests, but also affirms their race, cultural identity, and sense of belonging (Strayhorn, 2015).

Identities are made in learning contexts, especially STEM identities formed by the confluence of curriculum, programs, learning strategies, teachers, and mentors. Within formal and informal learning settings, identity resources and makers are ever-present (Brown et al., 2017; Nasir & Hand, 2008). Identity-making sites range from classrooms, after school programs, community centers, faith-based settings, and family vacations. Culturally grounded resources in the sites should offer affirmation and support for Black male students to take on emerging STEM-related identities. Further, learning materials rich with African-centered STEM content can alter traditional STEM identities by incorporating community and collective ideas and aspirations.

Clearly, current efforts to increase participation for underrepresented groups and institutions afford compensatory strategies to counter a history of limited access to STEM opportunities in the United States and abroad. As a result, expanding the impact of STEM, especially in Black and low-income communities, continues to be compromised. On the one hand, I am completely aware and acknowledge the value of having more diverse participation in STEM fields. On the other, I do not accept the assumption that simply increasing STEM participation of Black male students is the absolute solution. Rather, it is essential to emphasize the specific ways students' interests and engagement in STEM are cultivated and maintained. To produce justice-oriented "STEMists" with liberatory and transformative values, there needs to be deliberate attention paid to STEM learning that is culturally responsive to the history, lived experiences, communities, and institutions that shape the identities of Black male students.

A more transformative conception of STEM learning is being called for during this unparalleled time of social unrest when the country is taking stock of its history of racial oppression and crippling discrimination limiting access to a variety of fields and professions. Our goal is misguided if success only means there are more Black boys taking science and math classes, and participating in STEM programming. Rather, the demand is for science and math curriculum and STEM programming to reflect a history and knowledge of STEM as a Black project—one that is tied to discoveries, inventions, explorations, and technological advancements and contributions of Black people. This culturally expansive conceptualization of STEM suggests that Black male STEM learners require teachers, mentors, classrooms, curricula, and higher education institutions committed to knowing and understanding them and their STEM legacy. Effectively engaging in producing more authentically engaged and culturally astute Black male STEM students and professionals, requires a reorientation of STEM learning, teaching, curriculum, and programs.

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