

Increasing the Representation of Black Male Students in STEM through Culturally Grounded Curriculum, Instruction, Mentoring, and Professional Learning Communities

* Jumoke Oluwakemi
Ladeji-Osias
Morgan State University

Sean T. Coleman
Bowie State University

Julius Davis
Bowie State University

Research on Black male students in STEM specialty areas and Black male educators in STEM education disciplines has continued to increase and provide new evidence of these populations. The scholarly literature on young Black male students in STEM disciplines (Berry, 2008; Bonner & Goings, 2019; Grant, Crompton, & Ford, 2015; Davis, 2014; McGee & Pearman, 2014; Wright, 2011) and Black male teachers in STEM education fields (Brockenbrough, 2015; Bristol, 2020; Davis, 2018; Frank, 2018; Mensah, 2009) has primarily been limited to their experiences in school and classroom settings. Scholars have provided insight into the out of school STEM experiences of Black male students during the summer and school year (Hrabowski, Maton, & Grief, 1998; Maton, Hrabowski, & Pollard, 2011; McGee & Pearman, 2015; McGee & Martin, 2011). Studies of Black male students in STEM out of school programs have emerged in mathematics (Berry & McClain, 2009; Berry, Thunder, & McClain, 2011), but little is known about their experiences in other STEM specializations.

The majority of research on Black men teaching in STEM education fields of study are in mathematics (Davis, 2018; Davis, Frank, & Clark, 2013; Harris & Davis, 2018; Johnson, 2020; Frank, 2018) and little in science (Mensah, 2009) and absent in engineering and technology education. Investigations of Black men teaching in STEM education areas have come from four primary areas: a) research of Black men in STEM disciplines, b) studies exclusively of Black men, c) research of Black teachers, and d) studies of teachers that include Black men (Brockenbrough, 2013; Bristol & Goings, 2019; Foster, 1997; Pabon, 2016; Lynn, 2001; Malloy, 2010; Mathews,

2010; Mensah, 2009; Milner 2008; Tafari, 2013). There is not much known about Black men teaching in STEM education in out of school spaces, in general, and specifically, at Historically Black Colleges and Universities (HBCUs).

Popular and scholarly literature has advanced and questioned efforts to increase Black male educators' role as role models, disciplinarians, and father figures to Black boys (Brockenbrough, 2012, 2015; Brown, 2009; Maylor, 2009; Reza-Rashti & Martino, 2010). Very little attention and consideration have been given to how Black men shape curriculum, enact pedagogy, develop meaningful relationships, and interact with Black male students in out of school settings in STEM areas. Research and scholarship about professional learning communities devoted to impacting teachers' practice and learning of Black boys in STEM are practically non-existent. Collectively, this special issue entitled, *Increasing the Representation of Black Male Students in STEM through Culturally Grounded Curriculum, Instruction, Mentoring, and Professional Learning Communities* seeks to provide insight into applied and research-based practices.

Overview of the Special Issue

The commentary and articles presented in this special issue seek to contribute new knowledge and perspectives of Black boys and men in STEM education spaces. It begins with commentary from James Earl Davis about Black males in STEM specialty areas. He delves into the importance of research and practices needing to focus on Black boys in STEM by providing opportunity and access through effective systematic programming, cultural resources, and an asset-based approach to enhanced academic achievement and career availability. Further, Dr. Davis highlights this special issue embraces the importance of Black boys' lived experiences in general and specific to STEM education.

The articles presented in this issue build on existing literature focused on middle school-aged Black boys and Black male educators in STEM disciplines as it addresses the void of engineering and technology STEM foci. In the first article, Samuel M. Burbank, Kmt G. Shockley, and Kofi LeNiles describe how they used an African-centered perspective to develop a STEM out of school program for Black boys, specifically engineering and technology, with very strong connections to science and math. They argue that Black boys learning STEM content and participating in engineering and technology programs must be educated about their people's contribution to the field starting in Africa. Black boys' history and culture must be a central part of their STEM experiences.

The second article shares a critical autoethnography of how a Black male engineering educator developed an out of school curriculum and taught Black boys. In this autoethnography, James S. Holly, Jr. shares how he created a culturally ground engineering curriculum for Black boys. He shares his reflections on the program content, developing relationships with Black boys, learning activities, and teaching practices. These first two articles provide similar yet differing perspectives of how Black men shape the curriculum and liberatory experiences for Black boys in STEM fields such as engineering and technology.

Julius Davis and Keisha McIntosh Allen present findings from a qualitative study of Black men's culturally responsive teaching and mentoring practices in an out of school STEM program for Black boys. They describe the culturally responsive teaching practices of Black male college students in the program with no formal training to be STEM educators. Davis and Allen also provide empirical evidence of the culturally responsive mentoring and instructional practices of Black men. There is limited research on the culturally responsive instructional and mentoring

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practices used to teach Black boys in out of school STEM spaces. Holly, Davis, and Allen expand the culturally relevant/responsive pedagogical literature of Black male educators to out of school STEM learning spaces.

The fourth article from Tamika Bradley, Jennifer Young Wallace, and Barbara Howard shares the inner workings of a STEM professional learning community (PLC), with a focus on engineering and technology, at an HBCU devoted to teaching Black boys. A vast body of literature has discussed PLCs in education and STEM education for research, policy, and practitioner audiences in school contexts. Bradley and Wallace shed light on a STEM PLC designed to enhance the teaching and student learning of Black male students participating in an out of school STEM program. They provide insight into how the program and PLC impacted Black boys' learning and experiences.

In the last article, Sean T. Coleman and Julius Davis examine the asset-based pedagogy used to teach Black boys in STEM programs through quantitative methods. Using a STEM attitude survey, they report findings of how the STEM program effectively increased Black boys' motivation and interest in technology. Coleman and Davis also described how an instructional and learning survey of Black boys in the program illustrates how meaningful learning, learning community, and teacher-student relationships support their knowledge of technology and development of critical thinking.

Research of Black boys and men in STEM and STEM education fields is still developing and needs further examination (Maton et al., 2011; Moore, 2006; Jett, 2013; McGee, 2013; Terry & McGee, 2013). There is a need for more research of middle school-aged Black boys in STEM specialties, specialized programs, Black men teaching in the discipline, and Black boys. To be more specific, there is a need for more research on middle school-aged Black boys in specific or interdisciplinary STEM programs. There have been studies of Black male students' participation in mathematics programs, but minimal STEM disciplines (e.g., computer science, engineering, etc.). This volume contributes to the ongoing dialogue about Black boys in STEM specialties, such as engineering and technology, and Black men in STEM education areas.

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