

BIPOC Males' Experiences in a Structured Virtual Peer Mentee Training Program

Wendt, J., Jones, V., & Bruewer, A.

University of the District of Columbia & Bethune-Cookman University

Abstract

There is a continuing need to broaden participation in science, technology, engineering, and mathematics (STEM) in order to capitalize on the available pool of talent and to strengthen the United States' ability to maintain a competitive edge within the global economy. Despite myriad efforts to diversify the STEM workforce, men who identify as Black, Indigenous, and other People of Color (BIPOC) remain underrepresented. Mentoring, however, has been shown to be a promising strategy for encouraging participation of those who are historically marginalized. In this study and as part of a larger online peer mentoring program, male mentees engaged in a series of online training modules to prepare them for engaging as mentees in a peer mentoring program while simultaneously developing interest in STEM, self-efficacy in STEM, and a sense of community within the STEM landscape. After completing the online training, focus groups and individual interviews were conducted and analyzed. Analysis yielded various themes indicating that participation in the online peer mentee training increased participants' interest in STEM, self-efficacy in STEM, and sense of community.

Introduction

It is well known that participation in STEM degrees and career fields remains unrepresentative of the diversity found within the U.S. (NSF, 2021). In particular, men who identify as Black, Indigenous, and other People of Color (BIPOC) remain underrepresented in STEM degree programs and career fields. Peer mentoring, defined as "a reciprocal, dynamic relationship between or among peers where one peer is usually more skilled or experienced than the other" (Rockinson-Szapkiw, Herring Watson et al., 2021, p. 2), is one promising intervention for broadening participation in STEM. The benefits of mentoring have been well established within the research literature (see NASEM, 2019; Pfund et al., 2015). Further, research has supported the need to intentionally train individuals in developing skills that enable effective mentoring relationships (Pfund et al., 2016; Rockinson-Szapkiw, Herring Watson et al., 2021; Rockinson-Szapkiw, Wendt et al., 2020; Sorkness et al., 2015), and this extends to the need to formally train individuals in how to effectively foster and engage in peer mentoring relationships as mentees. However, few studies exist that examine the impact of formal training among BIPOC males to become effective mentees within a peer mentoring relationship. As such, the current study sought to explore the impact of BIPOC males' engagement in online peer mentoring training at one historically black institution.

Conceptual Framework

The overall peer mentoring program (eSTEM Peer Mentoring Program; see <https://www.udc.edu/estem/>) was framed using several theories, including persistence, self-efficacy, identity, and mentoring research and theory (see Rockinson-Szapkiw & Wendt, 2020; Rockinson-Szapkiw, Herring et al., 2021; Rockinson-Szapkiw, Wendt et al., 2020; 2021). Social Cultural Career Theory (SCCT), however, provided the foundation for the online peer mentee training component of the program. SCCT (Lent et al., 1994) supports that interest is a key component to promoting intention to engage in and persist in a STEM degree and career pathway (Fouad et al., 2016). This interest motivates action and subsequent successes and failures, providing feedback that further impacts feelings of self-efficacy and performance outcomes. Self-efficacy, the belief that an individual has about his ability, in tandem with an individual's beliefs about the likelihood of a specific behavior leading to a specific outcome, then influence his motivation, goals, and, ultimately, his persistence toward a STEM degree and career. Thus, individuals who have a high level of self-efficacy will be more likely to engage in and persist in STEM degrees and careers than individuals who have a low level of self-efficacy.

Self-efficacy has been shown to be related to the development of a science identity (Rockinson-Szapkiw, Herring Watson et al., 2021). The development of science identity, in turn, can facilitate persistence in STEM (Hunter et al., 2007). Individual characteristics such as gender, race, and ethnicity may influence persistence, as supported by SCCT (Chang et al., 2001; Johnson et al., 2011; Lent et al., 1994). Mentoring is one method that can be utilized to support the development of self-efficacy and science identity, especially as they relate to social identities that must be negotiated in tandem with STEM identities.

Literature Review

While recent reports indicate that the number of BIPOC men earning STEM degrees in the past decade has increased, BIPOC men remain inequitably represented in STEM fields (NSF, 2021). For instance, recent reports indicate that Black and Indigenous individuals' participation in computer science degrees and career fields has declined, while participation in science and engineering has overall held steady since 2008 (NSF, 2021). Participation of BIPOC individuals overall in STEM, however, is not representative of the diverse racial and ethnic make-up of the U.S. Thus, efforts to continue broadening participation are needed, and an enhanced understanding of what methods work for facilitating engagement in and persistence in STEM is needed, especially among those who remain historically underrepresented. These efforts are not only important to ensure that a diverse talent pool is represented but also that all individuals are provided opportunity in an equitable manner. Equitable and diverse representation is a matter of national interest if the U.S. intends to remain competitive in a global society (Huderson & Huderson, 2019).

As with the literature on women, including racially and ethnically minoritized women (see Rockinson-Szapkiw, Herring Watson et al., 2021; Rockinson-Szapkiw, Wendt et al., 2020), a dearth of research exists that examines STEM mentoring among men who are BIPOC (Ladeji-Osias et al., 2018). Research has suggested, however, the need to examine practices that best support mentoring specific to the BIPOC experience (Endo, 2020). As Endo (2020) surmises, the existing dominant mentoring models at institutions do not necessarily account for the sociocultural challenges and realities that many BIPOC men may encounter. Mentoring programs that employ a peer mentoring approach and offer opportunities for BIPOC men to engage in mentoring relationships with other BIPOC men are promising (Ladeji-Osias et al., 2018). However, little research has examined the experience of BIPOC men engaging in intentional peer mentoring training, especially outside of the research laboratory and within the context of a historically black institution.

Methodology

The current study extended a peer mentoring model developed in a previous pilot study (see Rockinson-Szapkiw & Wendt, 2020; Rockinson-Szapkiw, Herring Watson et al., 2021; Rockinson-Szapkiw, Wendt et al., 2021) to develop a series of eight virtual training modules to prepare individuals enrolled in STEM degree programs for engaging as peer mentees in an online peer mentoring program. Each of the eight modules included three major components: 1) a topical discussion that provided an overview of the module and the related research pertaining to the module content; 2) a case study that provided a demonstration of how the module content could be applied and that was intentionally designed to encourage motivation, emotion, and volition; and 3) a personal application and reflection that provided an opportunity to apply the module content to the individual's personal experience and situation. In addition to the online training modules, participants also were asked to engage in an online community hosted on the Slack platform to facilitate networking, reflection, and the building of community. Each of these program components aligned with the theoretical framework on which the study was grounded (SCCT) in an effort to encourage interest in STEM, motivation to persist in STEM, and self-efficacy (see Rockinson-Szapkiw, Wendt et al., 2020). It should be noted that the current paper focuses on only the online peer mentee training component of the overall eSTEM Peer Mentoring Program and only on the experiences of BIPOC men who participated in the peer mentee training.

In Summer 2020, participants were recruited at two historically black institutions ($N = 34$; $n = 8$ mentors, $n = 26$ mentees). Participants were required to be enrolled in a STEM degree program at one of the participating historically black institutions, identify as a racial or ethnic minority, and possess a GPA of 2.0 or higher. After a rigorous application process, participants were selected and asked to complete the series of virtual training modules in Summer 2020 and Fall 2020. The current paper and related presentation focus on the experiences of one cohort of mentees ($n = 4$) who identified as male and as BIPOC, all of whom were enrolled at the same historically black institution. This particular cohort was selected for examination as it was the only cohort that consisted entirely of BIPOC males. It should also be noted that the participating institutions were engaged in emergency remote instruction due to the COVID-19 pandemic, which, while certainly impacting the participants, did not impact the overall implementation of the program above and beyond, extending the amount of time allotted to complete the online training. After completing the online training modules, the participants completed a focus group and individual interviews.

Using a case study approach (Merriam, 2016), with the BIPOC male cohort serving as the case, open-ended interviews and a focus group were conducted, and data was collected and transcribed for analysis. Using a grounded theory approach (Strauss & Corbin, 1990), emergent codes were first identified through a memoing process that occurred during transcriptions, gaining

an overall feel for the data (Esterberg, 2001). These codes were used to organize the data before grouping codes around identified axial codes, from which emergent themes were identified to address the central purpose of the research.

The following research questions were examined:

- RQ1: How, if at all, was participation in the online peer mentee training useful in furthering students' STEM self-efficacy?
- RQ2: How, if at all, was participation in the online peer mentee training useful in furthering students' sense of community in STEM?
- RQ3: How, if at all, was participation in the online peer mentee training useful in furthering students' intent to persist in a STEM degree program and, ultimately, their intent to pursue a STEM career pathway?

Results

Preliminary results support that the overall experience in the online peer mentee training as one part of the overall online peer mentoring program was powerful in developing the participating BIPOC males' STEM self-efficacy, sense of community, and intent to persist in STEM. One participant noted that participation in the online peer mentee training was "nothing short of... completely outstanding...to be a part of" (Male 4), with several participants sharing that they felt that the training should be made available on a larger scale to all students enrolled in STEM degree programs at the institution. The participants reported appreciating both the structure and the content of the training.

STEM Self-Efficacy

Participation in the online peer mentee training helped to build participants' confidence and STEM self-efficacy. One participant shared, "this program is ... one of the best programs I say, I ever been in, and ... Now, I'm, I'm 100% sure that I can do it... since I've been in this program, I'm sure of myself" (Male 1). This was echoed by another participant who stated that,

before I might not have, um, and I don't know that I would have, I would have found that confidence if I wasn't, in a space where, like, I was able to talk about my race or my background, um, as a, as openly and honestly. (Male 2)

Participation in the online peer mentee training provided opportunities and space to develop self-efficacy in STEM and confidence, with another participant saying that,

it definitely gives you the confidence to you know network and you know ... you know if people are afraid ... of entering the the uh - the industry? Then, it definitely...I think its definitely capable of giving you the confidence to get into the STEM field (Male 3).

One participant also shared that they felt that the online peer mentee training was a "like, a foundation, I really wouldn't have thought that out on my own" (Male 2). Male 2 continued,

It's being more self-sufficient in - trying to find out what that would look like and what I would need to do. Yeah, like, I kind of wish we had this. This should be like a staple for every college student, right? Like, not just like, uh, something that's outsourced to career services like. This is what we should be doing, like, maybe our senior year, or junior year.

Sense of Community

The participants reported that their participation in the online peer mentee training solidified their beliefs of belonging in STEM. For instance, one participant who was a political science major said,

for me, like, it gave me a little more. So, I never really thought of my major as STEM. So, being in this program, kind of, gave me the opportunity to connect with what STEM actually is and to see myself as a part of this STEM community (Male 3).

This sense of belonging was furthered by opportunities to learn about networking, an important point for some of the participants, as this was something that had been told to them, but never really shown. Participation in the online peer mentee training provided foundational skills to encourage growth in STEM fields, as it fostered the potential for success moving forward. Male 3 noted,

one thing that was really important to me is [learning] how to make connections with mentors because I have a lot of connections, but not necessarily mentoring tips and so I was struggling with who I just reached out to random people on LinkedIn.

One participant shared how their mindset about belonging in STEM shifted as he internalized, “you are deserving of a place at whatever table like, you know” (Male 2).

Additionally, the structure of the online peer mentee training was foundational to the development and support of a sense of belonging in STEM, with a specific focus on offering resources and support to populations historically underrepresented in STEM through opportunities to develop skills related to the development and sustainment of peer mentoring relationships:

Do we really feel like, you know, we belong in STEM? Well, like, now I do like now, ... I absolutely do, whereas before I might not have, um, and I don't know that I would have... found that confidence if I wasn't in a space where, like, I was able to talk about my race or my background, um, as a, as openly and honestly (Male 2).

Intent to Persist

Overall, participants reiterated throughout the interviews and focus groups a strengthening of their interest and intent to persist in their STEM degree programs and trajectory into STEM careers. “So, for me, I'm sure 100 right now that I did the right thing to be in a STEM program 'cause I wasn't sure first of all” (Male 1). However, participants did share some of their concerns and anxieties about what their future in STEM careers will look like. For instance, one participant explained, “Like, am I going to fit in? Am I going to be discriminated against like, you know” (Male 2). Despite the concerns that were voiced about their future experiences, participants all demonstrated confidence in their choices of degree programs and their intent to persist in STEM career fields as a result of participating in the online peer mentee training.

Conclusion

While the experiences noted in this paper are derived from one single, small cohort of BIPOC male participants only, the results suggest that participation in the online peer mentoring training as part of the overall eSTEM Peer Mentoring Program was effective in imparting positive benefits for students enrolled in undergraduate STEM degree programs at one historically black institution. These benefits include an increase in an increase in self-efficacy in STEM, an increased sense of community, and an increase in intent to persist in STEM. These findings are important as they support online peer mentoring training in higher education as a positive means to broaden BIPOC male participation in STEM overall and to help support a more diverse U.S. STEM workforce in the future. Importantly, a dearth of research exists that examines BIPOC males' experiences in peer mentoring, especially within the context of historically black institutions. While the results of this study should be generalized cautiously due to the small cohort of participants, the results support the potential benefits of implementing the online peer mentee training at other historically black institutions to support the efficacy of their programs.

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