Volume 15 (2025), pp. 87-100
American Journal of STEM Education: Issues and Perspectives
Star Scholars Press
https://doi.org/10.32674/apgaqn33

Ushering URM STEM Teachers into STEM Spaces: A Model to Increase STEM Community Access and Belonging

Beverly King Miller & Camille S. Burnett
Prairie View A&M University, USA

ABSTRACT

Historically Black Colleges and Universities (HBCUs) are poised to address underrepresentation and promote diversity in STEM fields by providing K-12 students with teachers from diverse backgrounds. This conceptual paper examines science, technology, engineering, and mathematics (STEM) initiatives aimed at supporting the inclusion of underrepresented and racially minoritized (URM) students, who will become future STEM teachers. Through new initiatives informed by best practices, researchers have proposed three strategies to integrate URM students into STEM communities and foster a sense of belonging among them as future STEM teachers. Preliminary findings from pilot studies support the notion that these strategies can be used to mitigate imposter syndrome among URM STEM students, thereby increasing their sense of belonging and inclusion within various STEM communities.

Keywords: imposter syndrome, self-efficacy, STEM belonging, STEM inclusion

Editors:
Uchenna Emenaha Miles, Assistant Professor, University of Texas at San Antonio, USA
Grant Clayton, Associate Professor, University of Colorado Springs, USA

INTRODUCTION

Historically, Black colleges and universities (HBCUs), such as Prairie View A&M University (PVAMU), have been uniquely positioned to address underrepresentation and promote diversity in STEM fields by equipping K-12 students with teachers from diverse backgrounds. This conceptual paper examines various STEM initiatives aimed at supporting the inclusion of underrepresented and racially minoritized (URM) students who aspire to become future STEM teachers. The paper incorporates preliminary data and student voices from innovative program initiatives at the PVAMU, which is in the implementation phase of its UTeach Program—PVU Teach. Researchers hired by the Educator Preparation Program (EPP) were tasked with enhancing and expanding the undergraduate STEM education program to increase the graduation rates of STEM teachers. Through the application of best practices, the researchers propose three strategies to integrate URM students into STEM communities of practice that foster a sense of belonging and inclusion for them as future STEM teachers. These strategies can be utilized in tandem with a well-designed teacher preparation program such as that proposed by Burnett (2022), which focuses on the different types of knowledge for teaching (Ball, 2016; Ball et al., 2008; Hill & Ball, 2009; Mishra & Koehler, 2006; Shulman, 1986), culturally responsive teaching strategies (Ladson-Billings, 1995), and other support mechanisms (e.g., learning communities, test preparation activities, and financial support). All the strategies have been piloted with at least one PVU Teach student; however, the data will include both non-PVU Teach and PVU Teach students whose narratives inform the importance and validity of the strategies. The strategies are as follows:

1. *Support for STEM/STEM Education Conferences:* Providing students with opportunities to attend and present at STEM/STEM Education conferences to network with professionals and gain exposure to current research and practices in their field.
2. *Participation in STEM Competitions:* Creating opportunities for students to engage in STEM competitions, which can enhance their problem-solving skills and teamwork.
3. *Experiential STEM Learning Opportunities:* Supporting STEM belonging through experiential learning field trips and studying abroad helps students connect classroom knowledge with the real world, fostering a deeper understanding and interest in STEM fields.

By implementing these strategies and drawing from the pilot data, this HBCU EPP aims to create a nurturing and inclusive environment that supports the academic and professional growth of URM students,

ultimately contributing to a more diverse and representative STEM teacher workforce.

BACKGROUND INFORMATION

HBCUs were founded to educate Black citizens when they could not attend predominantly white institutions (Stefon, 2023). HBCUs rapidly grew across southern China, primarily providing agricultural and teacher training institutions. These institutions had little difficulty with enrollment because there was such a desire throughout the Black Community in the United States to pursue education (Lovett, 2015). In recent decades, with added comparative degrees, they have helped to produce the Black middle class (UNCF, 2023).

The study by Palmer et al. (2010) highlights a crucial aspect of HBCUs: their dedication to tailored programs that address the specific needs of their students. One such program is the PACE (Pre-Accelerated Curriculum in Engineering) program, which is designed to help incoming engineering freshmen strengthen their math aptitude and critical thinking skills. This initiative provides students with access to peer tutoring, mentoring, and research skill development, fostering a supportive environment. The PACE program has shown promising results, with 80% of participants achieving the necessary qualifications to test directly into calculus, thus bypassing foundational math courses (Palmer et al., 2010). The success of the PACE program exemplifies the resourcefulness and commitment of HBCU faculty, who often address students' unique needs in creative ways rather than turning them away. This approach aligns with the foundational mission of HBCUs: to provide educational support and opportunities to underrepresented and racially minoritized students, fostering growth that ensures their academic and professional success.

HBCUs continue to provide valuable services to the community because they affirm students culturally by accepting their racial ethnicity and history; HBCUs implement teaching and learning strategies that emphasize Black ways of knowing and being (Njoku & Owens, 2022). As a result, such institutions can be viable catalysts for diversifying STEM spaces, such as K-12 classrooms, which face a STEM teacher shortage (Cross, 2017; Feder, 2022). Although the 106 HBCUs in the United States represent only 3% of all American colleges and universities, they produce almost 20% of all African American graduates and, even more importantly, 25% of African American graduates in STEM (UNCF, 2023), who could help address this STEM teacher shortage.

Hurst et al. (2019) reported that informal STEM learning activities can increase students' STEM readiness and encourage them to pursue STEM careers. This is true for all the students. However, URM students

often enter college or university with deficits, and even if they are academically talented, imposter syndrome may limit their performance because of feelings of inferiority and misjudgment of their merit (Heslop et al., 2023). The next section explores STEM belonging and imposter syndrome as barriers to STEM inclusion.

CONCEPTUAL FRAMEWORK

Dweck (1999) proposed the importance of shifting mindsets to reduce the effects of imposter syndrome, which is one of the things researchers aim to do. A growth mindset involves embracing challenges and mistakes as opportunities for continued learning (Dweck, 1999). Too often, URMs are shamed when they make mistakes, which fosters imposter syndrome and the need to hide either their intelligence or areas of weakness (Heslop et al., 2023).

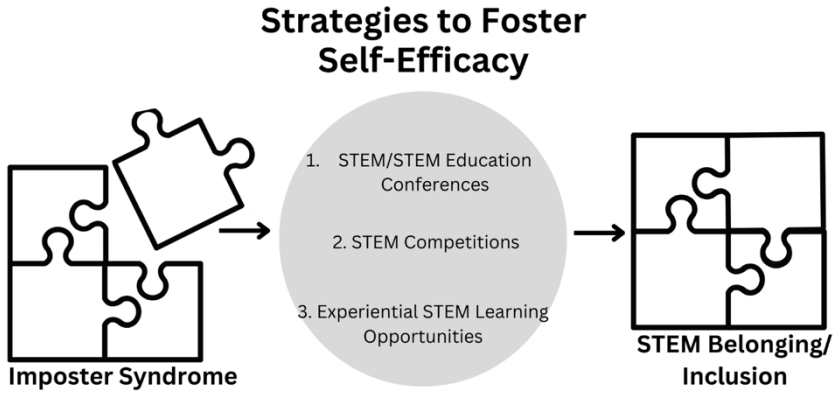
Imposter syndrome. Imposter syndrome is the inability of a person to feel competent, despite evidence to the contrary (Lige et al., 2017). For Black women who are marginalized by both gender and race, imposter syndrome is a common experience, stemming from their underrepresentation as Black individuals in STEM fields and as women in male-dominated STEM fields (Trotman, 2009). In their study, Twenge and Crocker (2002) argue that the low self-esteem experienced by some Blacks and Hispanics may result from historical trauma from experiences of racialized injustice; they conclude that having a positive racial identity is needed for positive self-esteem (Twenge & Crocker, 2002). Lige et al. (2017) reported the importance of addressing African American students' self-esteem to counter imposter syndrome, which can decrease academic performance and affect graduation rates and STEM career inclusion. In a study on STEM belonging for college STEM majors, Rainey et al. (2018) share a student comment that highlights the magnitude of imposter syndrome for Black students. This information technology student stated, "I feel out of place because I think some of [the other majors] know more than I do and I wonder how because we have taken the same classes" (Rainey et al., 2018, p. 9). Although he admits to taking the same courses as the other students do, his overall perception of himself is that he knows less than his peers do; this belief will impact his progression through STEM since self-efficacy is linked to motivation.

Self-efficacy. Self-efficacy, which counters imposter syndrome, refers to the belief a person holds regarding their capacity to perform necessary activities to affect positive outcomes. Albert Bandura's (1977, 1995) theory of self-efficacy refers to the belief that a person holds regarding

their ability to perform a task. As self-efficacy increases, motivation tends to increase (Bandura, 1995). When students are motivated, their willingness to participate and actively engage is visible. Four sources of self-efficacy affect motivation: mastery experiences, vicarious experiences, social persuasions, and physiological and emotional states (Bandura, 1995). Increased self-efficacy has a positive impact on STEM inclusion and belonging.

Self-efficacy is important because African American and Latinx students must resist stereotype threats regarding STEM inclusion to perform in STEM spaces (Steele & Aronson, 1995). Hegemonic structures that sustain the belief that those of African descent are less intelligent and do not possess the skills for STEM training continue to affect educational attainment (Rothstein, 2004). Improving students' self-efficacy through shifting mindsets impacts their degree of STEM membership.

Figure 1: Conceptual Framework with Strategies
Graphic design by Abigail Bradshaw



Sense of Belonging. Persistence in STEM is linked to a sense of belonging; however, for underrepresented groups, who often do not feel a sense of belonging, this may result in STEM attrition and underrepresentation (Hansen et al., 2023). Rainey et al. (2018) reported that female STEM majors reported feeling that they did not belong to STEM in greater numbers than their male counterparts did. The study considered gender and race and revealed that Black men's and women's perceptions of not belonging were greater than those of all other subgroups, which included white men's and women's perceptions and Asian men's and women's perceptions. STEM belonging and connection to peers and

instructors are important for STEM belonging, which results in STEM persistence. The following are strategies to foster self-efficacy and STEM belonging to increase the degree of STEM persistence that leads to STEM inclusion (see Figure 1).

STRATEGIES TO PROMOTE STEM BELONGING AND INCLUSION

All three strategies were piloted with at least one PVU teaching student. These strategies are part of a research study that has obtained Institutional Review Board approval. As a result, the preliminary data collected from the pilot studies are used to substantiate the assertions offered in this conceptual paper.

Strategy 1: **Support for STEM/STEM Education Conferences.** Attendance and participation in STEM/STEM education conferences provide students with opportunities to network with professionals and gain exposure to current research and practices in their field. Data from two such conferences in 2024 provide evidence. For the first conference, four PVU Teach students attended the 2024 UTeach STEM educator conference. The UTeach STEM Educators Conference is geared toward faculty, staff, students, alumni, and others affiliated with the UTeach network and offers sessions that focus on current issues in the research and practice of STEM education. The PVU Teach students had the opportunity to network with other students interested in becoming STEM teachers. During one of the daily debriefs, the students shared that some sessions were engaging and connected to their content, but other sessions had challenging conversations that emphasized the critical need for the diversity of STEM spaces and the importance of the inclusion of themselves and their future students within these spaces. The students were initially hesitant about their own sense of belonging in the K-12 STEM classroom. Attendance at conferences such as this one reinforces the need for their presence in STEM classrooms and validates their sense of belonging.

For the second conference, two students and two faculty members presented about aquaponics at STEAM at the 2024 Space Center Houston Educator Conference. Students were recruited from the Fall 2023 Science Methods course for elementary and middle school teacher candidates. Both students were new to the EPP program and had not previously attended or been presented at conferences but were open to stretching themselves. The Space Center Conference team reported that this presentation was one of the most common presentations (27 face-to-face attendees and 244 virtual participants) and was completed within days of

the program notification. One student shared the following after the conference: "I remember the first time I walked into your classroom. I was very shy and kept to myself and didn't like to talk that much…but you taught me how to be myself how to shine and to be creative…You created a classroom where I feel so safe with my stuttering and my personality."

This statement effectively highlights the critical role that attendance and participation in conferences play in supporting URM in academia, which can promote STEM inclusion in professional spaces. It underscores how experiences such as conferences and co-presentations not only enhance learning but also combat barriers such as imposter syndrome, which is particularly prevalent among URM students and professionals. Faculty support enables students to confront fears and anxiety, which are an outgrowth of imposter syndrome. This conference presentation also created networking opportunities for URM STEM students. One student received two job offers! Opportunities to network in STEM spaces, along with adequate support, help URM students feel competent and validate their sense of belonging in STEM fields.

Strategy 2: Participation in STEM Competitions. The second strategy is to create opportunities for participation in STEM competitions for K-12 students, where the students who want to become STEM teachers volunteer and 'teach' content. Through volunteering at competitions such as the Regeneron International Science and Engineering Fair (ISEF), which is the largest science fair competition hosted by the Society of Science (2024), HBCU students are exposed to competitions for STEM teacher educators to involve their students. Since 1928, the Society of Science has conducted science fairs for sixth- through twelfth-grade students. Students compete for over $9 million worth scholarships. There are over 60 countries representing over 1600 students, parents, teachers, university judges, and sponsors. Education Outreach Day gives thousands of local students and their teachers from the host city a chance to participate in a full day of hands-on STEM activities that are conducted by volunteer STEM exhibitors (Society of Science, 2024).

In 2023, three students participated in the ISEF as volunteers under the mentorship of one of the researchers. These students were involved in the planning and implementation of an Education Outreach Day STEM activity. Their volunteer responsibilities also included verifying that high school participants from around the world met qualification standards and serving as volunteers at a local museum to ensure that global visitors felt welcomed.

The following is the reflection submitted from Dallas, Texas, event. The student stated, "Day 2 of ISEF was very impressive! We started it off with meeting students and teachers from all over the world… Next, we were able to shadow Dr. Q as she began judging the microbiology

projects. I was personally so impressed that these high school students are doing college-level projects and that they were amazing! Seeing them trying to solve global problems as young as 15 years has motivated me to finish my undergraduate college career so I can bring ISEF to my students."

There are two key takeaways from this response. First, the student recognized that they were exposed to advanced scientific research conducted by high school students globally, which motivated her to complete her degree and pursue a career as a STEM teacher. As a future high school teacher, she says that she aspires to offer similar opportunities to her students. Second, for URM students, who often face imposter syndrome, this experience empowered them to see herself as an agent of change. This sense of empowerment fostered her belonging in STEM and strengthened her commitment to supporting future URM students. Her reflection suggests that such participation not only increases interest in STEM but also promotes belonging, which can diversify STEM spaces.

In May 2024, two students participated in ISEF, one of whom was from the first cohort of students in the PVU Teach program. As a biology major, he was very excited to be invited to work with high school students. He stated, "Thankfully they assigned me to the biology areas, and I was very familiar with many of the topics and was able to communicate with… people. As we were going to the center today, I was speaking on several healthcare disparities, and it was so coincidental that I saw several topics on the things that I had spoken about with my concerns."

Exposure to STEM competitions provides preservice STEM educators with a valuable opportunity to bridge their classroom learning with real-world applications. Initially, these students may feel confident in discussing topics within their content area, but through engagement in these competitions, they start to see how their field can contribute meaningfully to society. This experience allows them not only to deepen their understanding but also to connect with peers who are exploring STEM in innovative and impactful ways. He further added, "As someone who's pursuing…a very untraditional degree plan, today inspired me to be even more untraditional after viewing the several speakers. I feel more motivated to pursue my passions…" Ultimately, this is the goal of an EPP – to promote critical thinking in order to benefit societal needs.

Strategy 3: **Experiential STEM learning opportunities.** Experiential learning experiences involve learning by doing so that the learner actively participates in hands-on experiences and reflection (Kolb, 1984). Two examples of such experiences include study abroad and field trips, both of which can positively impact STEM belonging and inclusion.

There were two field trips in 2022 and 2023 that were part of a pilot study that included Space Center Houston and a local STEM Maker

Space. The 2022 field trip to the Maker Space gave participants the opportunity to engage in mathematics and science activities directly related to the content of their teacher certification examinations. Of the nine students from the colleges of education and engineering who attended the field trip, six completed the post-trip survey. All the respondents found the trip valuable and agreed that more STEM outings should be offered on the campus. They also agreed that the content knowledge was impactful and that the activities were engaging and interesting. The researchers observed that the students were actively learning content and that the experience was a productive struggle.

The 2023 field trip to Space Center Houston involved 18 students from the colleges of Education, Arts and Sciences, and Engineering. The field trip included a tram ride to various space rockets and behind-the-scenes tours of the astronauts' work laboratories. Incorporated in the event was an educational activity where students worked in small interdisciplinary groups to solve problems related to space exploration. A postsurvey question about the challenge revealed that all 18 students valued working in diverse, interdisciplinary teams. This experience highlights the importance of including multiple perspectives to solve complex challenges.

The findings from both field trips suggest the importance of cross-pollination, where college students have increased interactions with those from different disciplines, which gives them the opportunity to collaborate and connect with the content in a more engaging way. This interactive experience promoted students' self-efficacy and reduced the effect of imposter syndrome, resulting in an inclusive space for the students. These interdisciplinary opportunities enable interactions to foster diverse perspectives that are crucial for the STEM workforce, thus creating a sense of belonging for URM students.

In terms of studying abroad as an experiential learning opportunity, a PVU Teach student participated in a study abroad to Panama in the summer of 2024 that one of the researchers implemented for preservice teachers. The study abroad gives preservice teachers the opportunity to cofacilitate a STEM education program in Panama with the researcher. In its eighth year, this program aims to support disadvantaged students in Panama by offering a one-week camp that includes STEM and literacy curriculum activities, nutritious meals (breakfast and lunch), and a field trip that aligns with the academic focus of the week (King Miller, 2023). Seven students from the university, along with a professor from the College of Arts and Sciences, engaged with 79 local children, providing them with hands-on STEM learning experiences in the summer of 2024.

The 10-day Study Abroad program in Panama not only enhanced the PVAMU students' teaching skills but also influenced their sense of belonging and cross-cultural integration in this informal STEM learning

space. For the PVU Teach student, the program was transformative, fostering a sense of inclusion while building self-efficacy. One poignant moment came during an assignment where participants reflected on their experiences through five photos. The PVU Teach student chose a photo from their first group meal in Panama. With nine U.S. participants and a local family member present, she described the experience as a "family meal," symbolizing her feelings of belonging within the new community. This connection reflected her inclusion in Panamanian culture while strengthening her ability to embrace cultural differences and cultivate a global identity as part of honing her skills as a future STEM teacher.

CONCLUSION

HBCUs that serve URM groups can contribute to the diversification of the STEM workforce. This conceptual paper explored three strategies that have been piloted as part of a program to improve STEM teacher preparation and increase the STEM teacher candidate completion rate at the PVAMU. Through pilot study data that included student voices, three strategies have been presented that may help increase belonging and promote STEM inclusion for URM students.

As science education and mathematics education faculties, researchers have supported each other and designed programs and projects to increase STEM access for URM teacher candidates. The strategies include supporting students in attending and co-presenting with faculty at STEM education conferences, creating opportunities for students to volunteer at STEM competitions, and providing students with experiential learning opportunities in STEM. These strategies can be used to mitigate imposter syndrome by increasing self-efficacy among URM students to increase their sense of belonging and inclusion within the STEM workforce.

REFERENCES

Ball, D. L. (2016). *Content Knowledge for Teaching: Examples from Elementary Mathematics* [PowerPoint Slides]. https://static1.squarespace.com/static/577fc4e2440243084a67dc49/t/578e3ab6f5e23104634e6f10/1468938935751/051116_ETS.pdf

Ball, D. L., Thames, M. H., & Phelps, G. (2008). Content knowledge for teaching: What makes it special? *Journal of Teacher Education, 59*(5), 389-407. https://www.math.ksu.edu/~bennett/onlinehw/qcenter/ballmkt.pdf

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*(2): 191-215.

Bandura, A. (1995). *Self-efficacy in changing societies.* New York: Cambridge University Press

Burnett, C. S. (2022). A framework for preparing underrepresented and racially minoritized STEM teacher candidates. In W. T. Hoston, L. B. Foster, & F. G. Cambrice (Eds.), *The Crucial Conversation: Educating Through an Anti-Racist Lens* (pp. 115-128). Kendall Hunt.

Cross, F. (2017, May). *Teacher shortage areas: Nationwide listing 1990-1991 through 2017-2018*. U.S. Department of Education, Office of Postsecondary Education. https://www2.ed.gov/about/offices/list/ope/pol/bteachershortageareasreport201718.pdf

Dweck, C. (1999). Stanford SparQTools. https://sparqtools.org/mobility-measure/kind-of-person-implicit-theory-scale/#all-survey-questions

Feder, T. (2022). The US is in dire need of STEM teachers. *Physics Today*, *75*(3): 25–27. https://doi.org/10.1063/PT.3.4959

Hansen, M.J., Palakal, M.J. & White, L. The importance of STEM sense of belonging and academic hope in enhancing persistence for low-income, underrepresented STEM students. *Journal for STEM Educ Res, 7,* 155–180 (2024). https://doi.org/10.1007/s41979-023-00096-8

Heslop, G., Bonilla-Velez, J., Faucett, E.A. et al. (2023). Understanding and overcoming the psychological barriers to diversity: Imposter syndrome and stereotype threat. *Curr Otorhinolaryngol Rep, 11*, 63–70. https://doi.org/10.1007/s40136-023-00456-3

Hill, H., & Ball, D. L. (2009). The curious -- and crucial -- case of mathematical knowledge for teaching. *Phi Delta Kappan, 91*(2), 68-71.

Hurst, M.A., Polinsky, N., Haden, C.A., Levine, S.C. and Uttal, D.H. (2019), Leveraging research on informal learning to inform policy on promoting early STEM. *Soc Policy Rep*ort, *32*, 1-33. https://doi.org/10.1002/sop2.5

King Miller, B.A., Haaf, J., Hill, A., (2023). Design, Development, Implementation, Reflection and Praxis: Developing a Social Justice Curriculum for English Language Learners in Panamá. In S. Blackman (Ed.), Equitable *Education for Marginalized Youth in Latin America and the Caribbean* (pp.207-236). Routledge Research on Educational Equity in Developing Nations.

Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development.* Prentice Hall

Ladson-Billings, G. (1995, Summer). However, that is just good teaching! The case for culturally relevant pedagogy. *Theory Into Practice, 34*(3), 159-165.

Lige, Q. M., Peteet, B. J., & Brown, C. M. (2017). Racial identity, self-esteem, and the impostor phenomenon among African American college students. *Journal of Black Psychology*, *43*(4), 345-357. https://doi.org/10.1177/0095798416648787

Lovett, B. (2015). *America's Historically Black Colleges & Universities*. Mercer University Press.

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for integrating technology in teachers' knowledge. *Teachers College Record, 108*(6), 1017–1054. https://doi.org/10.1111/j.1467-9620.2006.00684.x

Njoku, N. R., & Owens, L. (2022). Student success at historically Black colleges and universities: Early findings and promising practices from the UNCF® Career Pathway Initiative. *New Directions for Higher Education*, *2022*(197), 69-78. https://doi.org/10.1002/he.20428

Palmer, R. T., Davis, R. J., & Thompson, T. (2010). Theory meets practice: HBCU initiatives that promote academic success among African Americans in STEM. *Journal of College Student Development, 51*(4), 440–443. https://doi.org/10.1353/csd.0.0146

Rainey, K., Dancy, M., Mickelson, R., Stearns, E., & Moller, S. (2018). Race and gender differences in how sense of belonging influences decisions to major in STEM. *International Journal of STEM Education, 5*, Article 10. https://doi.org/10.1186/s40594-018-0115-6

Rothstein, R. (2004). *Class and schools using social, economic, and educational reform to close the Black–White achievement gap.* Teachers College Press.

Shulman, L. S. (1986). Those who understand: Knowledge of growth in teaching. *Educational Researcher, 15*(2), 4-14. https://pdfs.semanticscholar.org/f29d/a5d8c806102b060e7669f67b5f9a55d8f7c4.pdf

Society for Science. (2024, June 7). *Home page – Society for science*. https://www.societyforscience.org/

Steele, C. M., & Aronson, J. (1995). Stereotype threat and the intellectual test performance of African Americans. *J Pers Soc Psychol, 69*(5), 797-811.

Stefon, M. (2023, August 14). *Historically Black Colleges and Universities*. *Encyclopedia Britannica*. https://www.britannica.com/topic/historically-Black-colleges-and-universities

Twenge, J. M., & Crocker, J. (2002). Race and self-esteem: Meta-analyses comparing Whites, Blacks, Hispanics, Asians, and

American Indians and comment on Gray-Little and Hafdahl (2000). *Psychological Bulletin, 128*, 371-408.
Trotman, F. K. (2009). The imposter phenomenon among African American women in US institutions of higher education: Implications for counseling. *Compelling counseling interventions: VISTAS*, *2009*, 77-87.
UNCF. (2023, July 23). *The impact of HBCUs on diversity in STEM fields.* UNCF. https://uncf.org/the-latest/the-impact-of-hbcus-on-diversity-in-stem-fields

---

Bios

BEVERLY KING MILLER, Ph.D., is Assistant Professor of Science Education at Prairie View A&M University. Her work focuses on STEM access for Latinx communities and other underserved populations. Her global work reaches marginalized communities through research, teaching, STEM camps, motivational speaking, and presentations. She has two book publications. Email: bamiller@pvamu.edu

CAMILLE S. BURNETT, Ph.D., is an Assistant Professor of Mathematics Education at Prairie View A&M University. Her research focuses on high school students' understandings of mathematical functions, STEM education, and teacher preparation, as well as best practices in teaching. She has also served as PI and Co-PI on several grants. Email: csburnett@pvamu.edu

Acknowledgment
The authors would like to acknowledge the use of OpenAI's ChatGPT in refining the language. The AI tool assisted in ensuring clarity and coherence. The contributions of ChatGPT helped enhance the overall quality of this work.

The authors wish to thank Abigail Bradshaw for her invaluable assistance in designing and creating the conceptual framework graphic presented in this article.