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RESEARCH BRIEF

**MODELS OF SUCCESS: FACTORS
THAT CONTRIBUTE TO FACULTY
PRODUCTION OF MINORITY
STEM GRADUATES:
IMPLICATIONS FOR HBCUS AND
BEYOND (NSF AWARD# 171952)**

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ABSTRACT

The overarching goal of this research is to create viable solutions to the conundrum of low representation of African Americans in the STEM workforce and to provide formal guidance to all interested stakeholders. Results will provide tangible data and recommendations to assist higher education institutions in their efforts to develop strategies that they, along with internal and external policymakers, can follow to achieve and maintain significant increases in the number of African-American students with STEM degrees. Findings from this project will have implications even beyond HBCUs and PWIs to K-12 education communities, workforce diversification efforts, and beyond.

BACKGROUND

For more than three decades, both educational and scientific communities have channeled efforts and resources aimed at increasing the number of African-American students completing STEM degrees and subsequently pursuing STEM careers. (Chubin, May, & Babco, 2005; Gasman & Nguyen, 2014). As minority populations continue to increase, their participation in the STEM workforce will be critical to the health of our growing economy. A significant facet of increasing minority student participation in the STEM workforce is to understand the role faculty should play in preparing these students and assisting with their matriculation to graduation and ultimately their participation in the workforce. Hence, a key emergent question then becomes:

What factors are critical for faculty who prepare HBCU STEM majors for graduate and professional school as well as careers in the STEM workforce?



RESEARCH QUESTIONS

Research questions for this study include:

- 1. What factors by STEM faculty support minority student persistence and retention in STEM?**
- 2. What strategies can faculty implement to effectively prepare minority students for graduate education and careers in the STEM workforce?**

The study population includes HBCU STEM faculty from five institutions that consistently rank among the top 10% for producing African-American STEM (physical sciences, engineering, and technology) graduates (Diverse Issues, 2014). Specifically, the institutions are:

- **Jackson State University**
- **Prairie View A&M University**
- **Tennessee State University**
- **Tuskegee University**
- **Xavier University**

RESEARCH DESIGN AND METHODOLOGY

A mixed methods approach will use both qualitative and quantitative measures to identify the factors that contribute to faculty production of successful minority STEM graduates at HBCUs. This Broadening Participation Research Project is implemented in an effort to better understand how HBCU STEM faculty can structure successful collegiate experiences to impact the quantity and quality of STEM degree graduates.

The specific objectives of this project include:

- **Develop a qualitative protocol informed by findings from a previously funded NSF (HBCU-UP) research project (NSF, Award #0714963)**
- **Conduct an extensive qualitative (focus groups, interviews, virtual chats) investigation with HBCU STEM faculty**
- **Develop and validate a quantitative (web-based survey) instrument based on qualitative findings**
- **Conduct a large-scale quantitative investigation with HBCU STEM faculty**
- **Disseminate findings through publications and national presentations**

PRELIMINARY RESULTS



STEM Faculty Characteristics (Factors) that Support Minority Student Persistence and Retention

In a qualitative study, a total of nine (9) STEM faculty at three (3) Historically Black College and Universities are interviewed. Preliminary results suggest that seven (7) characteristics that faculty need to support increases in the number of African-American students with STEM degrees include understanding, approachable, integrity/fair, caring/compassion, commitment, knowledgeable and encouraging. Findings provide critical insight on faculty development for HBCU faculty in general and HBCU STEM faculty in particular and will inform best practices for STEM faculty development also in PWI contexts. Each factor is listed below with a quote from a research participant to demonstrate its importance.

UNDERSTANDING

“Understanding. Put this one in quotes, “sympathetic.” What I mean by that is a willingness to listen to what’s going on with the student. It doesn’t mean you’ve got to bend over backwards and break the rules or even agree with what they might be saying but a willingness to listen to what’s going on with them.” (0007)

APPROACHABLE

“Make sure that you are approachable because a lot of students they think that you’re hard. Well because I’ve had students say that they were scared....Make them feel like they can come and talk to you.” (0010)

INTEGRITY/FAIR

“And, of course, overall fairness. Being fair with all students. Well, let me just by -- do that as a byproduct or a slash. Fairness/integrity. Because if you're not operating in integrity, it's going to start dwindling in other areas and it's going to cause question and also problems in your program.” (0003)

ENCOURAGING

“Tell them that you believe that they'll do well. Just continue to turn your work in, breathe, come by. Encourage them even with family life, if they've had something going on, be encouraging in that perspective as well.” (0010)

CARING/COMPASSION

“Number one, Compassion. You have to care for the students. You have to care for the students. Yes, you have to care for them. If you really care for the students, everything will fall in place. You will be motivated to do better. You will be motivated to prepare your lessons better. To deliver your material better and do all that. “ (0009)

COMMITMENT

“So I guess once they see that you are interested in them and in their success in the class and in their matriculation to the program, they'll feel like you're more committed. You're committed to their success...By you acknowledging them and speaking and smiling -- just different things make them feel like they belong.” (0010)

KNOWLEDGEABLE

“I believe most of the faculty are knowledgeable... I think when they prepare their lecturing please always think if you are the students. Do you think your way of lecturing, you teach this way, assuming you know nothing about these things, if you lecture this way, do you really understand? Okay, think about the most critical things because your job is to help the students understand the critical things.” (0062)

NEXT STEPS

The next steps for our research team are to complete the qualitative research, finalize the qualitative data analysis and to use those qualitative findings to create the quantitative survey instrument.

SIGNIFICANCE

A unique aspect of this investigation is its primary focus on HBCU faculty. It is also significant that this research will identify factors, through a multi-institutional model, further increasing the applicability of results. The knowledge base in the area of HBCU STEM faculty effectiveness is shallow, yet there is a large demand. The studies that have attempted to address the problem of minority underrepresentation and underachievement in STEM have not specifically addressed the contributions of faculty--particularly those faculties in the institutions who continue to produce the most significant numbers of African-American STEM graduates. Outcomes of this research have the potential to challenge traditional perspectives and conventional wisdom regarding how faculty can structure successful collegiate experiences for minority STEM students.

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