Models of Success: Identifying Factors that Contribute to Faculty Production of Minority STEM Graduates - Implications for HBCUs and Beyond

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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. 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 and Study Population

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).
- North Carolina A&T State University
- Tuskegee University
- **Jackson State University**
- **Prairie View A&M University**, and
- **Xavier University**.

Research Design and Methodology
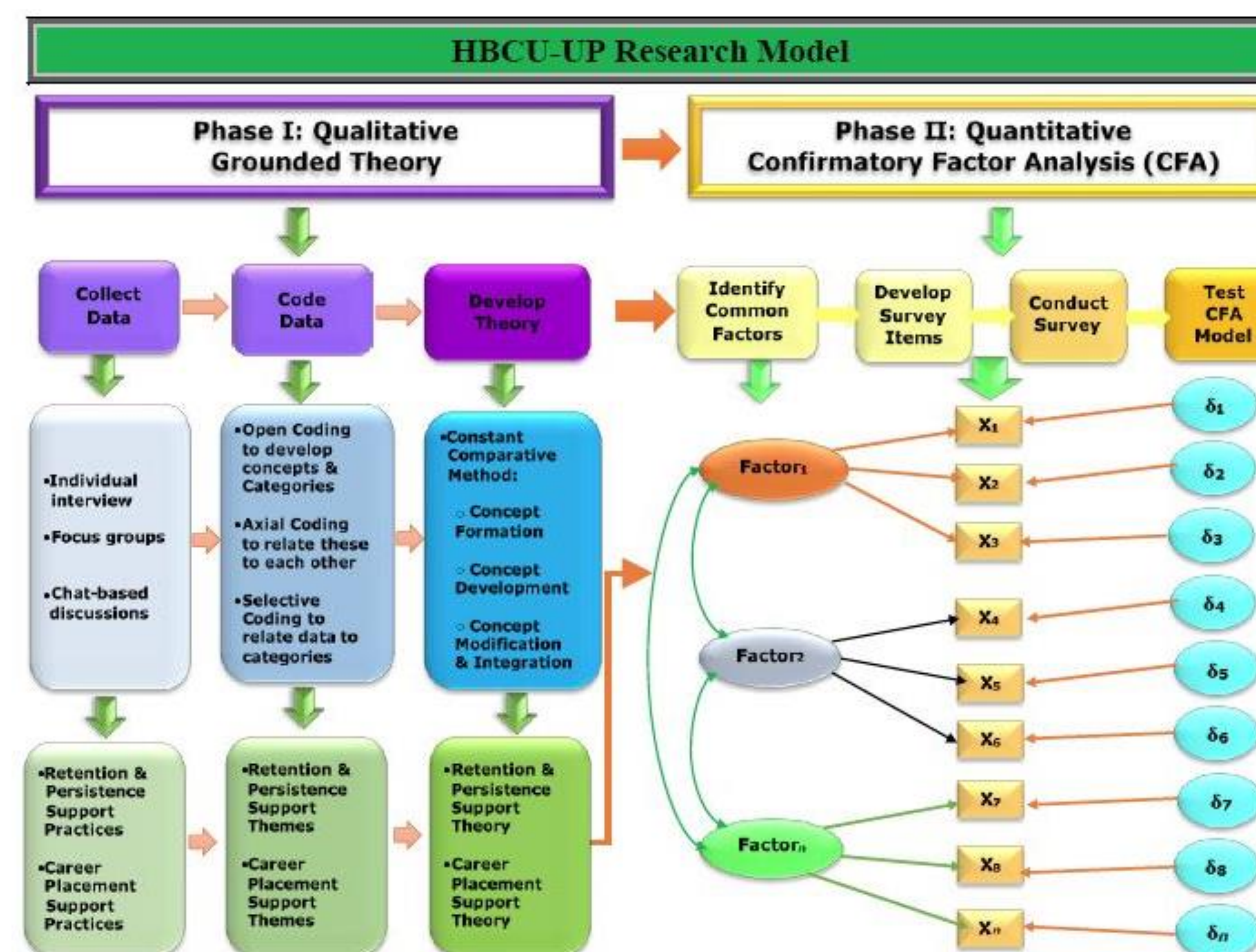
A **mixed methods approach** will use both qualitative and quantitative measures to identify the factors that contribute to faculty production of successful minority STEM graduates at HBCUs. This Broadening Participation Research Project is implemented in an effort to better understand how HBCU STEM 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 presentation

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

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 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 questions 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. 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 lecture please always think if you are the students. **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)

Reference: Diverse Issues in Higher Education. (2014). Top 100 Producers of Bachelor's Degrees, 2014. Retrieved from http://diverseeducation.com/top100/pages/BachelorsDegreeProducers2014.php

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