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Realigning the Crooked Room:

Spelman Claims a Space for African American Women in STEM

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“African American women are standing in a room skewed by stereo-types that deny their humanity and distort them into ugly caricatures of their true selves. As they struggle to find the upright in this crooked room, they are beset by the emotional, physiological, and political consequences of race and gender shaming. This shaming has tangible, even disastrous consequence...”

—Melissa V. Harris-Perry

In Melissa Harris-Perry’s 2011 book, *Sister Citizen*, she references various psychological studies of altered judgment and decision making that can arise in irregularly shaped environments, and uses them to explicate the struggles women of color face at the intersection of race and gender stereotypes. These environments, or “crooked rooms,” represent an unlevel plane where misrecognition or lack of acknowledgment diminishes the contributions of women of color to the success of the nation.

Recognizing the prevalence and conundrum of the crooked room, there are institutions making strides toward changing the way the world looks at African American women leaders, scholars, artists, writers, scientists, and global change agents. One institution in particular has welcomed women of African descent in support of their becoming technically proficient and civically astute. At Spelman College, an institution committed to excellence inside and outside of the classroom, students are provided with the tools needed to cultivate the character, confidence, and intellectual curiosity that will not only shape and define them, but also enable them to think both broadly and deeply as they address some of the world’s most complex problems.

As is typical of the legacy of most historically black colleges and universities (HBCUs), Spelman has a rich tradition of assisting students in finding the wherewithal to assume an upward trajectory as they navigate a proverbial room that is made crooked by negative stereotypes. Founded in 1881 and grounded in its mission to empower and inspire commitment to positive social change in African American women, Spelman enrolls approximately 2,100 students from forty-four states, one territory, and eleven countries and offers a robust, challenging liberal arts curriculum with twenty-seven academic programs. Notably, Spelman College is classified by the Carnegie Foundation as a highly selective and highly competitive Baccalaureate I institution and serves as host to a chapter of the Phi Beta

Kappa Honor Society. It is also one of six Model Institutions of Excellence, as designated by the National Science Foundation, for its achievements in undergraduate science and mathematics education; Spelman ranks second among all institutions from which black science and engineering doctorate recipients earn bachelor's degrees (National Science Foundation 2013).

A LEGACY UNVEILED DESPITE THE CROOKEDNESS IN THE ROOM

“If we’re going to out-innovate and out-educate the rest of the world, we’ve got to open doors for everyone. We need all hands on deck, and that means clearing hurdles for women and girls as they navigate careers in science, technology, engineering, and math.”

—Michelle Obama

Spelman has continued to expand its national visibility and increase the scope and vitality of its educational curriculum, particularly in the sciences (Thompson and Scriven 2008). As a result, 16 percent of its graduates have entered STEM graduate programs, and forty alumnae are currently in the pipeline. However, while Spelman College is exceptional in empowering women of color to achieve doctoral degrees in STEM fields, the national racial disparity among individuals earning doctorates in the United States is startling. Women represent 24 percent of the STEM workforce, with African American women constituting 1.6 percent of those with bachelor's degrees, and only 1.4 percent of those with doctoral degrees (Lehming 2013). When considered against this back-drop, Spelman's record of accomplishments illustrates the critical role this institution serves in redressing the under representation of women of color in STEM fields and in contributing to national efforts to create a more diverse scientific workforce.

Thus, Spelman has engaged in a sustained effort to build an exemplary undergraduate science program. Infrastructural developments in the past decade reflect the institution's strong commitment to building a research-intense environment necessary to sustain innovative science curricular and training resources. In 2000, Spelman College completed the building of a \$37 million science center that enhances institutional capacity for teaching in modern laboratories. Currently, efforts are underway to create spaces that support hands-on instruction, exploration, and the infusion of technology in every aspect of the curriculum. The college has also aligned its strategic plans to institute effective research structures. These activities anchor the Spelman MILE, “My Integrated Learning Experience,” an institutional imperative that combines a rigorous liberal arts curriculum with applied and service learning, teamwork and leadership development, and global learning. By coupling such academic initiatives with cultural relevance, Spelman is creating a novel framework of high-impact practices that provide students, particularly those of underrepresented groups, with essential experiences to nurture and build the key competencies (e.g., critical thinking, effective communication, and quantitative reasoning) researchers agree are necessary to the success of today's students (Kuh 2008).

HALLMARKS OF SPELMAN'S SUCCESS

The Spelman model for empowerment nurtures the collective strengths of women, pushes students to challenge the notion that there is one correct path or one demographic especially suited to attain success, and intertwines experiences that resonate with women of color within a progressive and rigorous academic curriculum.

An essential component of Spelman's success is the sense of community shared by students. By capitalizing on this concept of social integration (connecting with the institution and fellow students), The Spelman model for empowerment also combines recognition of the relevance of being a woman of color with the belief that such an identity does not limit one's academic or professional potential. Both faculty and alumnae agree that this is the foundation of Spelman's sustained success, which is grounded in:

- faculty who recognize the uniqueness of our student population and are committed to ensuring their intellectual growth and future success;
- engaged alumnae who mirror for students their potential to become change agents;
- a community focused on nurturing the whole woman, providing academic experiences that support both professional and personal development;
- a commitment to supporting women of color in seeing themselves as members of a global community;
- a curriculum that recognizes and is responsive to generational differences, while reflecting rigor and high expectations;
- a core curriculum and cocurriculum that center the experience of women of African descent as major contributors to all disciplines and to society as a whole; and
- highly visible faculty who provide students access to same-race and same-gender role models and opportunities to identify with their chosen professions as scientists, scholars and practitioners.

TRAINING THE INVISIBLE SCIENTIST

To get a better view of the attributes of the Spelman experience from alumnae in STEM, we conducted a survey of forty-six Spelman alumnae who have doctorate degrees or who are currently enrolled in graduate studies in STEM fields. Among those respondents who reported having a mentor, 43 percent indicated they had mentors in their own department and that they admired the individual. When asked to identify the experiences and opportunities provided at Spelman College that were instrumental to their success as a graduate student, the primary response from alumnae was confidence instilled through Spelman's unique culture; a feeling of academic preparation; and participation in independent research.

“Spelman gave me the confidence to work amongst students in Ivy League institutions and not feel inferior because I'm a minority or female.”

—Spelman STEM graduate

Among a mixed group of both Spelman alumnae and current students, many suggested that key factors that encourage women of color to pursue a STEM career are closely related to their ability to identify with being a scientist. In addition, 58 percent indicated that the perceptions about what scientists “look like” must be changed, and 39 percent indicated that there is a need to increase the presence of more relatable role models.

As STEM faculty, we build on a foundation that is established when the student enters Spelman. Our mission is to train women of color to position themselves for success in an environment where they are likely to be invisible. This often includes providing students opportunities for professional development, peer and faculty mentoring, innovative content delivery strategies, and learning resources. These activities are scaffolded over both the individual student’s Spelman journey and a community that acknowledges the intersection of gender and race and fosters the success of women of color in the STEM disciplines.

THE CURRICULUM

The STEM departments at Spelman have broadened their strategies to meet the ideals of a liberal arts education while simultaneously providing students with the tools and resources needed to become effective problem solvers and critical thinkers. This is reflected by a progressive curriculum that encompasses modern pedagogical approaches (e.g., blended classes, project-based learning, and inquiry-based learning) and the infusion of technology (via computational modules, molecular modeling projects, and iPads). In fact, more than 50 percent of the STEM faculty are using web-enhanced technology, blended-learning, and/or active learning applications. In the department of chemistry and biochemistry, there has been an infusion of open-ended research-based courses and modules, many of which focus on computational modeling.

Likewise, the departments of biology and physics have developed transdisciplinary modules that integrate biology into physics courses and vice versa, enabling biology majors to see their curriculum in relation to other sciences. These initiatives are supported by a multipronged approach that strategically engages faculty and peer mentors to promote success and retention among first- and second-year majors. Peer tutors provide an additional learning resource that is interactive in nature and promotes “learning by doing.” They work in collaboration with the course instructors to facilitate one-on-one tutoring and mediated group study for focused reinforcement of concepts, typically those identified by the instructor as necessary for success in the course. In addition, they support active learning exercises conducted during the lecture and moderate online blogs, allowing peer tutors to provide faculty with feedback regarding teaching strategies and how students approach learning and problem solving.

THE RESEARCH

More than thirty years ago, Spelman recognized the need for its STEM students to participate in independent research and established the first funded research internships at the institution. It was then noted that conducting independent research develops students’

confidence by giving them the ability to integrate information to solve complex, real-world problems. Since this time, student research activities have been supported through a wide range of mechanisms (federal programs, industry partners, and private donors). Faculty are actively involved in research projects that create opportunities for more than 20 percent of STEM students each academic year. Research at Spelman has become more interdisciplinary, extending beyond the STEM disciplines, creating natural alliances with scholars in sociology and anthropology (e.g., in the exploration of food science/studies) and women's studies and economics (e.g., in the exploration of women's health and health disparities). With the college's new quality enhancement plan, our students are also engaging in international research experiences that can span the summer months or a full semester. This ensures that they understand the value of contributing to the STEM enterprise on a global level, while allowing them to become more competitive and confident in their technical skills. As such, Spelman now requires every student, regardless of major, to engage in independent research projects and to have an international experience prior to graduation.

MENTORING

In addition to promoting academic excellence, Spelman is dedicated to the personal growth and professional development of its students. By employing a diverse body of teacher-scholars, students have access to faculty who are committed to providing mentorship and instruction that nurture their success. An added benefit is the capacity for Spelman students to identify with faculty of similar culture, ethnicity, or gender. This is achieved in a very fluid environment where student-faculty interactions are an innate part of the undergraduate STEM experience; it is not packaged in a formal mentoring program. Further, it provides a community of support that allows students to challenge the architecture of the "crooked room" and the boundaries of the nation's STEM enterprise. This mentoring model reverses the invisibility of women of color, particularly those of African descent, in the sciences and empowers them to persist.

THE NEW ROOM

Currently, efforts are underway to establish a national culture that encourages women of color to reach their full potential in the biomedical and behavioral sciences. Spelman is at the forefront of this effort with its Women of Color Legacy project. The core of the project will exploit impactful practices that have been developed at Spelman while addressing the holistic development of students as they navigate this "room" toward attaining STEM doctoral degrees. By considering development at various career points from middle school through college, it is envisioned that this initiative will ultimately give a voice to women of color in STEM. During the course of this project, we hope to capture the narratives of those who have persisted. We hope that this will bring recognition to the accomplishments of women of color, create a shift in the perceptions of women of color in STEM, and increase their visibility in STEM fields.

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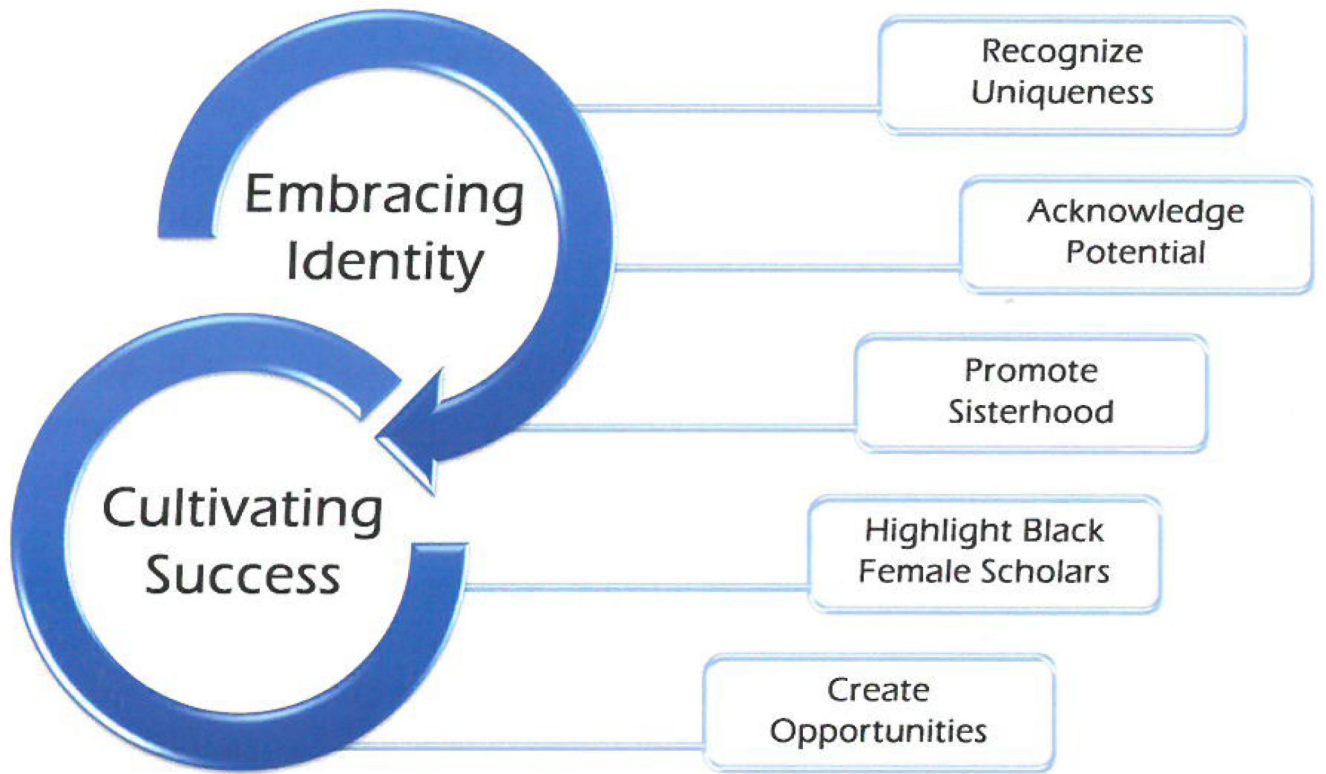


Figure 1.
A MODEL FOR EMPOWERMENT