



African American Women in the Academe: A Comprehensive Literature Review through the lens of Intersectionality

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Abstract

College enrollment is on the rise. Universities have experienced a 37% increase from 2000 to 2010; this includes a rise in underrepresented minority (URM) students from 1976 to 2010. Hispanic student numbers rose from 3 percent to 13 percent, Asian/Pacific Islander students rose from 2 percent to 6 percent, and the percentage of Black students rose from 9 percent to 14 percent. However, the faculty demographic has not kept pace with the increase in URM enrollment. The percentage of URM faculty has remained flat over the last 20 years, hovering at just a little over 5 percent.

Researchers, educators, and practitioners believe that in order for students to succeed academically, they need role models and mentors with whom they can identify. Racial and ethnic diversity has both direct and indirect positive effects on the educational outcomes and experiences of students. The campus climate improves when the diversity of the student population matches that of the faculty. Students from majority groups equally benefit from learning and exchanging ideas in a multicultural environment, offering a wider range of research and a broader representation of alternative perspectives. Therefore, the shift in American demographics over the next ten years changes the question from *whether* colleges and universities want to support diversity in their faculty distribution to *how* colleges and universities will accommodate this necessity.

Thus, this is a review of the literature on one demographic in engineering academe, the African American woman. African American women are at the intersection of two of the most pervasive prejudices in this country: racism and sexism. This review will unveil some of the unique challenges African American female engineering faculty due to the intersectionality of race and gender. In order, to increase the numbers, the engineering education community must first fully understand the barriers these women face.

Introduction

College enrollment is on the rise. According to the National Center for Education Statistics¹, there has been a 37% increase from 2000 to 2010. This includes a rise in underrepresented minority (URM) students from 1976 to 2010. Hispanic student numbers rose from 3 percent to 13 percent, Asian/Pacific Islander students rose from 2 percent to 6 percent, and the percentage of Black students rose from 9 percent to 14 percent¹. However, the faculty demographic has not kept pace with the increase in URM enrollment. According to data from the National Science Foundation (NSF), the percentage of URM faculty has remained flat over the last 20 years, hovering at just a little over 5 percent¹.

Researchers, educators, and practitioners believe that in order for students to succeed academically, they need role models and mentors with whom they can identify². Racial and ethnic diversity has both direct and indirect positive effects on the educational outcomes and experiences of students. The campus climate improves when the diversity of the student population matches that of the faculty. Students from majority groups equally benefit from

learning and exchanging ideas in a multicultural environment, offering a wider range of research and a broader representation of alternative perspectives². Therefore, the shift in American demographics over the next ten years changes the question from *whether* colleges and universities want to support diversity in their faculty distribution to *how* colleges and universities will accommodate this necessity.

The National Engineering Education Research Colloquies set a research agenda that tasked engineering education researchers to increase diversity in the engineering body and to increase the U.S. contribution to the global engineering workforce³. In doing so, there have been numerous studies conducted analyzing the student body, recruitment, retention, and attainment of minority students^{4, 5, 6}. Such studies, however, tend to focus primarily on students of color or female students. The studies regarding faculty of color focus on the importance of faculty mentoring, pedagogical practices, and faculty development^{7, 8, 9}. Despite researchers, educators, and practitioner's beliefs, that in order for students to succeed academically, they need role models and mentors with whom they can identify², there are very few studies on minority engineering faculty. When narrowing that focus to African American women in the engineering academe, the results are virtually non-existent¹⁰.

Currently, 15.2% of the women enrolled in engineering undergraduate programs are African American¹¹. This translates to African American women comprising 1.2% of the total engineering population. Women (aggregated) comprise 18.8% of the engineering population. The same report states that women engineering faculty are at 13.2%, while African American faculty (men and women) represent 2.5%¹¹. This mismatch in data reporting, aggregated as women or minorities versus disaggregated as African American women, introduces challenges when trying to identify the current state of this demographic. We cannot identify the barriers to these women's success if we are not clear on their current numbers in engineering as students or faculty.

Thus, this is a review of the literature on one demographic in the engineering academe, the African American woman. This review will unveil some of the unique challenges African American female engineering faculty encounter due to the intersectionality of race and gender. In order, to increase the numbers, the engineering education community must first fully understand the barriers these women face.

Theoretical Framework

Intersectionality. In 1976 Malcom, Hall, & Brown introduced the science world to the “double bind” of being a woman and a person of color. It was a phrase coined during the exploration of the status of minority women in science. The “double bind” was comprised of the effects of dual oppressions, being both a woman and a person of color. After all, African American women are at the intersection of two of the most pervasive prejudices in this country: racism and sexism¹². On the most general level, oppression denotes structural and material constraints that significantly shape a person's sense of possibility and opportunities¹³. Oppression restricts both self-determination and self-development, and ultimately limits who they can imagine becoming and the power to act in support of their own rights and aspirations¹⁴. The concept of dual oppression is also known as intersectionality. Intersectionality is used when referring to

intersecting oppressions, for example, intersections of race, gender, and class¹⁵. When talking about Black women, oppression cannot be reduced to one fundamental type of oppression. There are in fact two types of oppressions working together to create injustice¹⁵. Furthermore, the intersectionality experience is greater than the sum of racism and sexism, meaning you cannot look at racism and sexism exclusive of one another and add the oppressions together. You must, instead, look at the compounded effect. Crenshaw made clear that any analysis that does not take intersectionality into account does not adequately address the manner in which Black women are subordinated¹⁶. Being sure to look at the Black woman as she is, both a woman and a black person, is both powerful and insightful. The studies in this literature review use an intersectionality lens by looking specifically at African American women.

For the African American woman faculty member oppressions take the form of invisibility, isolation, and other barriers that stand in the way of career advancement as faculty. Malcom, Hall, & Brown discovered in their analysis almost forty years ago that, “[t]he more an individual resembles the ‘typical scientist’ the lower are the costs. Each deviation from the norm raises the costs so that, as a group, minority women must pay a tremendous price for a career in science”¹³. The same can be said about minority women in the engineering academe, as we will see through the exploration of existing studies.

Methods

Searching for literature on African American women faculty in engineering required several iterations of queries. Identifying the correct key terms to search proved to be one of many challenges. For example African American women can be referred to as African American women, Black women, Women of Color, minorities, and underrepresented. Other related terms included diversity, broadening participation, and inclusion. Meanwhile, domains such as the university are referred to as academy, academe, high education, undergraduate, and graduate. Maintaining a broad enough search categorization to ensure appropriate inclusion of all potential combinations of terms is a challenge. When the literature was collected it was bounded by publication year. The results yielded reports with self-reported data from universities compiled by Yoder and Nelson & Brammer, as well as studies that provided richer narratives that provide context to the numbers. However, the literature on these women engineering was limited, requiring an even broader search of the literature that included African American faculty (men and women, non-engineering) and African American women faculty (non-engineering).

This literature review will explore research from the last five years in the space of African American faculty, African American women faculty, and close with the literature on African American women engineering faculty.

The numbers of African American Female Faculty in Engineering

In 2012, the American Society for Engineering Education (ASEE) published a report, *Engineering by the Numbers*, generated from the ASEE institutional database. Data consists of self-reported and ABET accredited engineering programs, implying the data set is not complete. The absence of non-ABET accredited engineering programs and those that have not yet reported, leaves the reader with an incomplete picture of the engineering university landscape. This report

shed light on the state of engineering by discipline, race, gender, domestic, and international status. It profiled faculty and students looking at rank and degree level (respectively). Although most public data are reported as disaggregated data, there is a possibility for data in the faculty section to be parsed into categories separated into women, African American, Asian, Hispanic, etc. This method of reporting leaves the state of African American engineering woman faculty unknown. It is unclear whether African American engineering women count as a woman, or an African American faculty. She gets *lost* in the aggregated numbers. Worth mentioning is that in most cases there has been slow growth in almost every area with the exception of African-American engineering faculty members. Starting in 2008 the growth stopped. The percentage of African-American engineering faculty is the same as it was in 2007, 2.5%¹¹. This is even more alarming when you place it in the context of women engineering faculty experiencing a continued growth since 2003, with a 2011 number reported at 13.2%. However, findings by Berry, Cox, and Main, while exploring the disaggregated data in the ASEE database, uncovered that “African American women comprise 4% of all women currently in the engineering professoriate, an increase of 1%, since 2001”¹⁰. Despite the incongruence in the numbers, it is evident that growth has been slow.

Nelson disaggregated the numbers in her report of survey data, self-reported by department chairs from the top 100 departments identified by the National Science Foundation¹⁷. The findings demonstrated that, “[...] Black female professors in physical sciences and engineering is near zero”¹⁷. She goes on to state that “[...] numbers this small would not survive the statistical treatment, which would be necessary if they were samples”¹⁷. There are so few African-American or Black female engineering faculty that they literally disappear statistically. In an attempt to determine if this was a matter of supply shortage, Nelson compared the hiring pool (most recently graduated Ph.D.’s) to the most recently hired (assistant professors) in engineering and sciences, and determined that the number of new faculty hires in “[...] the top 50 departments was generally comparable to or greater than” the number of Ph.D. recipients. However, those numbers decrease when evaluating higher professorial ranks (Associate and Full professorship)¹⁷. Engineering and science are graduating more Black women Ph.D. students and in some cases hiring them at the same rate; however, they are not promoting them or retaining them beyond the Assistant Professor level. Hamilton further analyzed the Nelson report and determined that with, “[...] the exception of *one* [emphasis added] Black full professor in astronomy, there were no Black or American Indian Full Professors in the science or engineering [departments]”¹⁸. However, Berry, Cox, and Main found in their analysis of ASEE data that there were in fact 30 African American female full professors in the U.S. in 2012¹⁰.

Looking at quantitative studies of African American women engineering faculty unveils a few challenges: aggregated data loses the African American woman, and disaggregated data is based on self-reported surveys meaning the data is incomplete. The studies in engineering have almost exclusively been focused on race or gender, not both. These women are being reduced to one fundamental category, despite the fact that they are both a woman and African American.

The Experiences of African American Female Faculty in Engineering

In the absence of literature on engineering faculty there was a review of the literature of African American faculty in all disciplines. The search returned various qualitative studies that

explored the experiences of African American women in universities. This uncovered themes of isolation, mentoring, and culture/climate.

Part I. African American Faculty

Mentoring. Mentoring has been identified as a tool necessary for academic achievement. Faculty of color often discuss mentors that helped to shape them as scholars and educators¹⁹. A study conducted by Tillman discussed race and gender in mentoring relationships²⁰. The study highlighted the benefits professionally to a faculty career regardless of race matching. In instances when the mentor and the mentee were different races, it had no bearing on the professional success and professional satisfaction of the relationship. They did note, however, that the personal relationship encountered challenges due to racial/cultural differences but that it did not impact success of the pairing. This challenged the assumption that same-race match would be a strong predictor of success in a mentoring relationships. The African American mentees did tend to establish secondary mentoring relationships with someone of the same race to aid in overcoming feelings of isolation. Although the primary mentoring relationships helped to overcome professional challenges, they were not enough to overcome personal feelings of isolation²⁰.

Experiences.

Culture/Climate. Culture is said to shape the attitudes of people towards each other. One way is by constructing social division and setting group boundaries. Racial and gendered divisions, for example, are based on assumptions that different social groups possess different capabilities²¹. In a study by McGowan culture is discussed in great depth through the challenges African American faculty encountered with students²². Results indicated African American faculty perceive that some white students are eager to critique their classroom effectiveness, challenge their authority, report their concerns and critiques to the professor or to his or her superior, and generally have a lower level of respect²¹. McGowan paints a picture of a culture that values African American faculty less than their majority counterparts.

II. African American Women Faculty

Narrowing the scope to the literature on African American women faculty unveiled themes of isolation and culture/climate, consistent with African American faculty. It also offered studies on tenure and promotions barriers that African American women faculty encountered in the academe.

Experiences.

Culture/Climate. There were two studies that looked at the intersectionality of race and gender of faculty. One study by Patitu & Hinton interviewed administrators in the academy and found that these women were split on whether their race outweighed their sex or the reciprocal with regards to discrimination, however they all spoke of experiencing some form of discrimination in their efforts to retain their positions in administration²³. This was consistent with the researchers assertion that for most African American women, racism and sexism are not always distinguishable. Often they exist in tandem²³. Only one participant explicitly stated that

she believed that racism and sexism were equally as problematic in maintaining her career attainment²³.

Another study looked at motivations for leaving the academe of women faculty of color. They utilized the newcomer adjustment framework to determine the factors that contributed to their departure from the academe²⁴. They were careful to select women in different stages of their tenure pursuits: first year, mid-tenure (three to four years), and final year as an assistant professor. They determined that there exist unique challenges at each phase. First year professors contended with the challenges of gendered and racial isolation. Mid-tenure faculty challenges consisted of self-efficacy and lack of role clarity. Final year tenure track women that departed from the academe cited mismatch with their institution on the grounds of social acceptance, self-efficacy, and role clarity²⁵. The researcher correlated social acceptance to isolation, self-efficacy to institutional fit, and role clarity to mentoring. Cultural norms in the engineering academe lead to social isolation for those that do not conform²⁶.

Tenure and Promotion. Advancement in any career is of paramount importance when considering job satisfaction. However, when looking at doctoral faculty that are minority they are barely visible, regardless of field. They are even less represented at the highest ranks and less likely to be tenured²⁷. Patitu & Hinton cited conflicting information, unwritten rules, higher expectations for minority faculty than others, and the absence of mentoring and direction from others as reasons for tenure and promotion frustrations²³. While a Thompson & Dey quantitative study measured stress in African American male and female faculty identifying time constraints and promotion concerns as the most common sources of stress²⁸. Women faculty at four-year colleges experienced greater levels of stress than men in both areas²⁸. Career advancement is at the forefront of most faculty, however the stress of advancement appears to be elevated in African American women faculty.

III. African American Women Engineering Faculty

Qualitative studies on this demographic are difficult to find. In order to round out the literature, expansion into science, technology, and mathematics is necessary. There appears to be a preponderance of literature on Black faculty in a broader sense; however, literature on Black or African-American engineering women faculty are limited. The studies appear to either capture the *experiences* of being a Black woman faculty member, discrediting *stereotype bias*, or defining *success* and providing mechanisms for success in the academe. Additional details are found in the next section.

Stereotype bias.

Jackson conducted a study that sought to either “[...] confirm or dispel the tacit notion that the presence of white women and members of ethnic minority groups diluted the quality of the engineering faculty”²⁹. The research did so by investigating the productivity of tenured engineering faculty to determine if gender and race/ethnicity impacted faculty productivity²⁹. In the areas of teaching and research there was little to no difference in productivity. While in the area of service, “[...] Blacks and Hispanics and white women performed at levels that were at or higher than performance levels of white men”²⁹. The area of research where obvious differences by gender and race were apparent, were in the categories of personal experience and climate.

Experiences.

Culture or climate. Stanley explores the idea that culture created by colleagues in the academy can either contribute to the success of racial minority faculty or it can contribute to their departure from the academe¹⁹. This notion was confirmed by Jackson in a study that discovered that, “[...] nearly one-fourth of the Black/Hispanic engineering faculty reported having experienced race discrimination”²⁹. A participant in another study stated that, “African American professors are confronted with institutional racism on a daily basis”²⁹. Likewise, 33 percent of Black/Hispanic engineering faculty felt, “[...] little to no support from colleagues”²⁹. However, culture in the academe is not limited to peers/colleagues, it includes the student body as well. Stanley found when conducting a qualitative study that some of the biggest offenders of creating a hostile work environment for Black female engineering faculty were the students¹⁹. One participant recounted her experiences in the classroom with an anecdote of an engineering course where she states that, “[...] after I had explained a point in class, a [white] male student would attempt to explain the point again in a manner that suggested my explanation was incorrect”¹⁹. Turner confirmed these findings with a participant that talked about her experience of witnessing students allowing white male professors to go unchallenged despite presumed incorrect information³¹. They may talk to their peers about that professor; however, “[...t]hey feel quite comfortable challenging the African American woman in class”³¹. Panelists in another study, “[...] defined climate as the quality of respect and support accorded to women and minorities on individual campuses” and that one could assess culture, “[...] by the number of women and minority faculty members at junior and senior levels”³¹.

Tenure and Promotion. Jackson surveyed engineering faculty and discovered that when asked about tenure and promotion only 43 percent of Black/Hispanic engineering faculty believed the process was fair²⁹. In one study, participants challenged the merits of tenure if it does not allow for research and service in the areas of diversity³². One participant explicitly recounted her department chair recommending she remove all diversity-related efforts from her tenure packet because she did not want to be “[...] known as an Affirmative Action [supporter],” as it would reflect negatively before the committee³².

Success. Success is defined in many ways. One study explicitly explored the definition of success for Black female faculty to shed light on unique motivations of this demographic³³. While one participant listed gaining tenure at a predominately white institution and publishing in top journals as success³³. The rest of the participants listed service and “the journey” as their definition of success³³. This misalignment between what the academy defines as success and how faculty define success could explain gaps in career advancement of African American engineering female faculty.

Stanley centered research around not just barriers but included the mechanisms that aid in achieving success¹⁹. The largest and most consistent contributor to success was mentoring. A participant in the study stated that they had been assigned a mentor but found the real benefits came from her extended network established through conferences and other universities that really aided her in achieving success¹⁹. When you couple this with reflecting back on the impact culture and collegiality have on faculty success, it becomes clear that relationships are important to the continued success of African American engineering female faculty.

Discussion and Implications

Explorations of current quantitative and qualitative studies have shown us that, “[...] much has changed, and much has not changed” with regards to advancements of the status of minority women in STEM³⁰. For most African American women, racism and sexism are not always distinguishable. Often they exist in tandem²³. The quantitative studies demonstrate that the numbers are increasing; however, the barrier of culture still persists. Culture impacts tenure and promotion and breeds isolation. Meanwhile, feelings of success impact a faculty member’s desire, decision, and opportunity to stay in the professoriate. Through the review of the literature it is clear that there is an absence of research on African American women engineering faculty. Quantitative studies fall short in some cases due to the invisibility introduced via aggregated data. In other cases, the small number renders this demographic insignificant because of the inability to withstand statistical treatment. There appears to be an opportunity to explore these women through a mixed methods approach that could give a rich story to the numbers. A deliberate attempt to capture the experiences of African American women engineering faculty could shed some light on small numbers and the even smaller numbers in the senior ranks of engineering faculty. Crenshaw in her argument for intersectionality research, points out that looking at the most deviated from the norm could shed light on all³⁴. If we wish to meet the supply and demand of engineering workforce, we must grow in numbers. In doing so we must not overlook the African American woman because of numbers, as helping them overcome barriers will be sure to diminish barriers for all engineers present and future.

Considerations

Even at our best, we can always do better. In fact, Turner points out that action taken in an attempt to diversify faculty continue to be one of the least successful of campus initiatives for diversity³¹. Hopkins found that increases in the representation of women and minorities are not simply happenstance, but are the result of specific pressures, policies, and positive initiatives designed to increase hiring of women or minorities; and when these pressures dwindle or disappear, the hiring progress stops³⁵. Hiring underrepresented minorities for engineering in higher education has to be deliberate. After reviewing some efforts taken by other institutions, below are four recommendations for all engineering institutions to consider in an attempt to address this deficiency.

Opportunity. Breu, Guggenbichler, & Wollmann suggest that every fall the Dean in concert with the Provost should engage in prudent planning. Consideration should be given to the current profile of faculty diversity, upcoming searches (opportunities for diverse hiring), best-practice in outreach, recruitment, and hiring with respect to faculty diversity³⁶. Strategic planning would allow the appropriate hiring body to adequately assess the current faculty demographics, opportunities on the horizon, and the most effective approach to achieving diversity goals.

Leadership. Kayes states that administrative leadership is crucial to a college’s success in attracting, hiring, and retaining faculty and staff of color³⁷. Hopkins credits Massachusetts Institute of Technology’s (MIT) success of increased hiring of women in engineering and science to the initiatives taken by administrators (Dean and Provost) which include: 1) Making it

clear to department heads that hiring women faculty was a high priority, and reinforced this commitment by returning a candidate to a department because he concluded that the search committee had failed to interview qualified female applicants. 2) They targeted departments that had been identified as having particularly poor records of hiring and retaining women faculty. 3) They pooled open faculty slots and made as many slots available for the pool as possible. 4) When canvassing other universities to ask informally for names of potential outstanding candidates (a standard process during job searches), search committees specifically asked for names of outstanding female candidates. 5) They made it clear that (a) All candidates for a faculty position were evaluated under the same criteria, including both academic qualifications and whether the candidate would contribute to high priority needs of the university. 6) Efforts were made to identify exceptionally talented women candidates who had not applied for the jobs in the conventional manner or whose names did not surface through other standard informal inquiries. 7) They took special efforts to court outstanding faculty candidates once offers had been made³⁵. The leadership at MIT made diversity their charter and took exceptional steps to ensure that they changed the face of MIT science and engineering.

Search Committee. According to Kayes, one of the most common myths in diverse faculty hiring is that if the president, dean, provost, chancellor, department chair, human resources officer, and trustees all openly advocate for faculty diversity then it will be evident in the search and hiring process³⁷. This myth assumes that the members of the Search Committees also prioritize diverse hiring when in reality many are unaware of the institutional and departmental advantages of a diverse faculty and staff³⁷.

Breu et al., recommends that all faculty Search Committee members participate in an orientation on best practices in outreach, recruitment, and interviewing strategies designed to ensure diverse candidate pools and to foster fairness and inclusion³⁶. The orientation would focus on elements such as: 1) collaborative discussions on how a diverse pool of candidates might be composed relative to the current diversity profile of the Program and the School, 2) resources on optimal strategies for recruitment of diverse candidates, 3) effective, culturally competent, and welcoming interview techniques. The Search Committee should be expected to work diligently to achieve a diverse pool of candidates and to continue outreach and recruitment until such a pool is identified³⁶. Comprising a Search Committee of underrepresented minorities (if feasible) might be another recommendation for avoiding intercultural sensitivity.

Advertisement. Breu et al., puts emphasis on language and terminology in order to ensure a script that is most likely to attract diverse candidates³⁶. Announcements should be sure to convey the message of the university's commitment to multicultural/diversity training and competence. Furthermore, Deans and/or Search Committees are expected to make every effort to disseminate the announcement widely and broadly and to target publications, associations, websites, and service lists that reach diverse prospective candidates.

Conclusion

One proposed approach to changing improving the experiences of African American women in engineering is to reassess hiring practices. Universities must proactively seek out diverse faculty members. This is not an unusual approach to seeking a candidate with a unique skill set; diverse candidates should be regarded as such. They put immense effort, planning and thought in to the initiatives and were indisputably successful. More universities could have the

same success with the same deliberate strategy. Increased hires of underrepresented minority faculty in engineering is something that can be easily measured and its impact on the university and its students would be immeasurable. It would need to be assessed annually for continued effectiveness and to ensure that the lapse in urgency does not lead to complacency. Lyndon B. Johnson once stated that, “We seek... not just equality as a right and a theory, but equality as a fact and as a result”³⁸. Changing culture at a university situated in a nation strife with racial and gender tension is no easy feat. However, being deliberate in seeking out a candidate based on specific qualifications (e.g. community cultural wealth), pooling candidates to create a cohort or network of minority candidates will aid in creating a more welcoming environment, and demonstrating an environment of active mentorship would go a long way to creating a more inclusive environment.

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