

Recruiting, Retaining, and Advancing Women in STEM at an HBCU:

A Model for Institutional Transformation

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Abstract

Women, especially women of color (WOC), STEM faculty are underrepresented in full professor and leadership positions and overrepresented in non-tenure track positions. It is essential to develop organizational-level approaches which foster equitable and sustainable practices that lead to the success of women STEM faculty at Historically Black Colleges and Universities (HBCUs). The purpose of this paper is to share a model for institutional transformation focusing on recruitment, retention, and advancement of women STEM faculty. We describe our approaches, outcomes, challenges, successes, and lessons learned to serve as a model for other institutions. In order to transform our institution, we focused on changes in policy, practice, and programming. Several approaches were implemented to increase the number of women STEM faculty and position them for leadership opportunities. Our outcomes demonstrate that by implementing multi-faceted strategies we have successfully moved the needle for institutional transformation.

Keywords: Women of Color faculty, STEM, recruitment, retention, advancement

Recruiting, Retaining, and Advancing Women in STEM at an HBCU:**A Model for Institutional Transformation**

Women, especially, women of color (WOC), STEM faculty are underrepresented in full professor and leadership positions and overrepresented in non-tenure-track positions (Stephens & Wilson-Kennedy, 2019; Walkington, 2017). Unfortunately, during the course of their professional careers, women in STEM disciplines, will face a myriad of socially constructed barriers impacting persistence and advancement unrelated to their ability, skillsets, and interests (Laursen & Austin, 2020). Crucial to their persistence is the need for institutions to offer multiple forms of support to overcome these barriers, particularly for WOC.

WOC (women comprising the Black, Hispanic, Asian, Pacific Islander, American Indian, and Alaska Native racial/ethnic groups) account for only 10% of STEM faculty at US colleges and universities (National Science Foundation & National Center for Science and Engineering Statistics, 2017). According to the National Science Foundation (NSF) data on science, health, and engineering doctorates, WOC accounted for 5% of full professors, 10% of associate professors, and 13% of assistant professors (National Science Foundation, 2017). WOC, and more specifically Black women, continue to experience marginalization at the intersection of race, gender, and class. Marginalization can manifest as being hired to race-specific positions that may have less influence over the entire institutional organization culture. Also, WOC may experience burnout due to engaging in an enormous amount of invisible labor (advising/mentoring) with their service obligations often being overlooked or minimized during evaluations for tenure and promotion. WOC may experience limited access to mentors needed for navigating unspoken expectations in the academy and feelings of isolation due to a lack of

opportunities for networking and collaboration (Blackshear & Hollis, 2021; Spreitzer et al., 1997; Walkington, 2017).

From inception, HBCUs supported the social, economic, cultural, and political viability of African Americans. Representing only three percent of all colleges and universities in the United States, HBCUs continue to play a major role in producing a disproportionate share of African American leaders and professionals across all disciplines. HBCUs graduate higher numbers of Black students in STEM relative to their white institution counterparts; women faculty are major contributors to this success (Allen et al., 2020; Mack et al., 2010, 2011, 2013; Stephens & Wilson-Kennedy, 2019). Just as at Predominantly White Institutions (PWIs), the same systemic inequities embedded in the structures of work organizations are also seen at HBCUs (Acker, 1990). Also, women faculty at HBCUs experience the same barriers at PWIs with some additional dynamics (Bonner, 2001; Mack et al., 2010; Minor, 2004; Renzulli et al., 2006). HBCUs' unique history of advancing racial equity has in many ways limited discussions on the status and accomplishments of women in these institutions (Bonner, 2001; Minor, 2004) and within the academy in general (Bonner, 2001; Mack et al., 2010; Renzulli et al., 2006). Moreover, the underrepresentation of women in senior professorial and administrative roles at HBCUs continues to underscore significant inequities and a need to expand opportunities for women in these institutions. Therefore, it is essential to develop evidence-based organizational-level approaches focused on recruiting, retaining, and advancing women STEM faculty at HBCUs.

The purpose of this paper is to share a model for institutional transformation at an HBCU focusing on recruitment, retention, and advancement of women STEM faculty. We describe our approaches, outcomes, challenges, successes, and lessons learned to serve as a

model for other institutions. It should be noted that our program was open to all women STEM faculty; however, the majority (81%) of our participants were WOC (i.e., African American, Latina, and Asian faculty). HBCUs have organizational complexities emerging from race and gender intersectionality that can provide a much-needed perspective in the knowledge domain (Minor, 2005; Perna, 2001; Renzulli et al., 2006; Roebuck & Murty, 1993). Furthermore, because our focus was on institutional transformation, non-STEM/SBS faculty also benefited from some of our approaches. To date, in addition to our university, only four HBCUs (University of Maryland Eastern Shore-cohort 3, Jackson State University-cohort 5, Howard University-cohort 6, and Florida A&M University-cohort 9), have received institutional transformation funding from the ADVANCE program. As the ADVANCE program continues, our work can inform efforts to ensure institutional transformation benefits women of color at all types of institutions.

STEM women are frequently marginalized from informal networking, mentoring, and professional development opportunities (Ong et al., 2018; Ong et al., 2011). This marginalization of women STEM faculty can also manifest as difficulty accessing beneficial resources and training; therefore, we created professional development workshops and provided opportunities for leadership training. Moreover, we sought to create an environment where individuals with decision-making capacity about hiring and tenure and promotion would be trained in strategies to reduce and eliminate bias. We also sought to make explicit policies about tenure clock stoppage, and mandatory bias training for chairs and deans to create a climate where equity is valued and integrated into all aspects of the university.

These approaches were selected based on a 2013 university-wide faculty campus climate survey which revealed that women faculty reported lower job satisfaction, higher

gender discrimination, and professional inequities that limit their career advancement as compared to their male peers. To address these gender inequities, we proposed an ADVANCE Institutional Transformation (IT) project aimed at catalyzing university-wide systemic changes to increase the representation of women at all levels. We intended to maximize opportunities for women faculty by taking a systemic approach to creating an environment that works for all through focus on transforming the organization rather than transforming the women (Laursen & Austin, 2020). Most organizational change interventions focus on a specific set of problems and challenges. To ensure that we were able to address several outcomes, our approach integrated multiple strategies for change (Laursen & Austin, 2020).

The strategic approaches of our ADVANCE project were selected to address major challenges faced by women faculty in STEM disciplines: (a) barriers to representation of women in STEM disciplines, (b) obstacles to promotion and representation at the rank of full professor, and (c) barriers to establishing and sustaining research productivity. Based on programmatic outcomes, our strategic approaches fall under four broad topic areas: recruitment, retention and advancement, leadership opportunities, and policy and climate change (see Table 1).

Approach

In order to transform recruitment, retention, and advancement, our institution focused on changes in policy, practice, and programming. Several approaches were implemented to strengthen recruitment, retention and advancement of women STEM faculty.

Recruitment

Approaches included (a) the development of a compendium of resources for recruitment of women and faculty of color, (b) a mandatory training of search committees on bias and best

practices to combat bias during the hiring process, and (c) additional funding to cover travel expenses for highly qualified women candidates for campus interviews in STEM departments whose travel budgets are limited.

Table 1

NC A&T ADVANCE Institutional Transformation Project Strategic Approaches

Programmatic Outcomes Topic Areas	Strategic Approaches
Recruitment Boost recruitment efforts at all stages of the process.	<ul style="list-style-type: none"> • Women and Minority Faculty Recruitment Directory • ADVANCE IT Recruitment Grant • Implicit Bias Training Search Committees – Search Committee Certification Program • Commitment to Faculty Success Workshop Series – Interactive Theater-based Implicit Bias Training for Search and Promotion & Tenure Committees
Retention and Advancement Provide faculty with professional and research/writing skill development opportunities.	<ul style="list-style-type: none"> • ADVANCE IT Faculty Scholars Program • Professional Development/Research & Writing Skill Development • Faculty Writing and Research Boot Camp • STEM Women's Writing Retreat • Faculty Writing Accountability Group (WAG)
Leadership Opportunities Support leadership development opportunities.	<ul style="list-style-type: none"> • External Leadership Development Programs • Internal Leadership Development Workshops
Policy and Climate Changes Promote policies that cultivate a supportive and positive climate.	<ul style="list-style-type: none"> • Faculty Handbook Revision - Promote gender equity policies and practices • Biannual Comprehensive Faculty Campus Climate Survey

Retention and Advancement

Strategies included (a) offering networking, professional development, and writing/research skill development activities geared to increasing scholarly productivity;

(b) requiring implicit bias training of tenure and promotion committees; and (c) training of chairs and deans in effective leadership.

Leadership Opportunities

Strategies included (a) support for women faculty to participate in external leadership development programs, and (b) internal leadership development training opportunities.

Policy and Climate Changes

Strategies included (a) institutionalizing specific policies, including explicitly stating the policy of stopping the tenure clock due to care of a child or elderly parents; and (b) administering the Biannual Comprehensive Faculty Campus Climate Survey.

Recruitment

Strategies to decrease barriers to representation of women in STEM include (a) compiling tools to expand recruitment in organizations and publications focusing on women, (b) providing resources in support of the recruitment process, and (c) training to mitigate biases that occur during the decision-making process of the search committee.

Women and Minority Faculty Recruitment Directory

The directory is a recruitment tool designed to foster diversity in faculty searches that departments can use to supplement advertisements in key discipline-specific journals and general academic publications. The directory includes a compilation of targeted publications and organizations to assist in the recruitment of STEM and non-STEM women and underrepresented people of color. The directory was adapted from recruiting resources at the WISELI-University of Wisconsin-Madison.

ADVANCE IT Recruitment Grant

The purpose of the recruitment grant was to increase the number of women on the faculty in STEM/SBS departments. STEM/SBS departments could apply for grants to (a) provide support for travel to assist with the recruitment of highly qualified women tenure-track faculty candidates, especially underrepresented women, in science, technology, engineering and math (STEM) and social, behavioral, and economic science (SBS) departments; and (b) provide support for advertising in targeted recruiting and outreach venues for underrepresented female candidates.

Implicit Bias Training for Search Committees

The Search Committee Certification Program (SCCP) was developed in partnership with the Division of Human Resources (HR) with the goal of ensuring that the recruitment and hiring process was void of artificial barriers preventing the hiring of qualified individuals. This comprehensive program provided faculty and staff, identified to serve on a search committee, with Search Committee Training that incorporated best practices and strategies for mitigating bias and discrimination. After completing the training, the search committee members received a two-year certificate to serve on a search committee. If the certification expires, that member must recertify to continue serving on a search committee.

Commitment to Faculty Success Workshop Series—Interactive Theater-based Implicit Bias Training for Search and Promotion/Tenure Committees

The ADVANCE project, in collaboration with the Department of Visual and Performing Arts, engaged in a novel undertaking to develop and implement an equity and inclusion workshop series. The workshop series employed an evidence-based approach to design interactive theater-centered equity and inclusion workshops structured around fostering accountability in decision-making processes. With an end goal of personal and institutional

change, the workshop series follows the steps of most change models: (a) gaining an awareness that change is needed, (b) devising strategies for change, (c) changing behavior, and (d) making change that occurs permanent (Armstrong & Braunschneider, 2016; Kaplan et al., 2006; Shea et al., 2019). The training serves as a mechanism for uncovering the impact that biases can have on hiring and tenure/promotion decisions. Through facilitated reflection and discussion, participants engage in reflective analysis to share their thoughts and engage in dialogue with actors in character to establish institutional change strategies for transforming the campus culture into one that is equitable, transparent, and supportive of all.

Retention and Advancement

The recruitment and advancement strategic programming initiatives were implemented to create and empower a networked community of women scholars at all professorial levels. After being hired, the university did not have a comprehensive plan for fostering the success of women STEM/SBS faculty through the ranks. Thus, our efforts have focused on building a strategic pipeline for academic and professional success of women STEM faculty, particularly those in the transition from associate to full professor.

ADVANCE IT Faculty Scholars Program

The ADVANCE IT Faculty Scholars Program provided STEM/SBS women faculty with focused programming to increase excellence in teaching, research and engagement; boost scholarly productivity; and enhance competitiveness for leadership roles in the academy. ADVANCE IT Faculty Scholars engaged in targeted professional and research/writing skill development workshops for one year. Through these activities, scholars developed a network of STEM and SBS (Psychology/Economics) women faculty fostering peer-to-peer mentoring, assistance with navigating the tenure and promotion process, and sharing of work/life

integration strategies. In addition, scholars received support for their research by either receiving summer research mini-grants or one-course release during the academic year. Central to their success, the scholars participated in targeted research-based professional development workshops, research/writing skill development workshops, received oral presentation coaching, engaged in informal mentoring and networking, and each completed an Individual Development Plan (IDP) to assist with their career progression.

Our ADVANCE IT Scholars program empowered women STEM/SBS faculty for academic and professional success through building community and capacity to engage in the research enterprise. The cohorts were comprised of associate and assistant professors for the engagement of women faculty at various stages of their academic career. Thus, to support the movement of women from associate to full required emphasis on career advancement and leadership skill development. Associate professors were able to engage in leadership opportunities by serving as peer-mentors to assistant professors to help position them for success during the tenure and promotion process. All participants received opportunities to engage in protected writing times to increase scholarly productivity to meet university requirements for promotion and tenure.

Professional Development/Research & Writing Skill Development

As a strategy to improve research and scholarly productivity, we facilitated, in a collaborative effort with other campus units, research-based professional development, and research/writing skill development workshops. The workshops offered were as follows: (a) Faculty Writing and Research Boot Camp, (b) STEM Women's Writing Retreat, and (c) Writing Accountability Groups. These workshops were offered to IT Faculty Scholars, STEM/SBS women faculty, and/or all faculty.

Faculty Writing and Research Boot Camp. The Faculty Writing and Research Boot Camp was designed to build and/or enhance the academic writing and research capacity of all faculty through hands-on writing and research skill development programming. The boot camp also provided faculty with support to jumpstart their summer research and writing efforts and opportunities to network with peers outside of their home department.

STEM Women's Writing Retreat. The four-day off-campus residential writing retreats were designed to assist attendees with publication and proposal skill development, as well as opportunities for networking, and peer mentoring in an environment that facilitated intensive focused writing time. The writing retreat also provided opportunities for collaborations and support in the development of individual writing plans for the summer and academic year. Additionally, the writing retreat helped its participants to develop strategic approaches that empower women faculty, who, in addition to managing the high demands of teaching, research, service, and administrative roles in the academy, often disproportionately bear responsibilities for family and the care of aging parents.

Faculty Writing Accountability Group (WAG). The WAG program was designed as a strategy to (a) encourage a commitment to engage in a dedicated weekly writing time, (b) increase the level of productivity in academic writing, and (c) foster collegiality and accountability through weekly progress reporting. WAG was offered in two formats: Virtual writing group and Write-on-site group. In each session, participants shared their progress, set new writing goals for the week, and worked on various writing tasks to complete an independent writing project.

Leadership Development

As of spring 2021, of the twenty-two (22) STEM/SBS departments, 23% (5 of 22) are chaired by women and 60% (3 of 5) of the STEM women chairs are full professors. The gender inequity at the chair level results in significant issues related to perceptions of fairness in the distribution of service and teaching responsibilities. Such disparate dynamics are increasingly problematic for the future of female leaders in STEM, because chairs and other university leaders are now expected to be at the full professor level or prepared to become full professors immediately after appointment. Leadership development opportunities were designed to increase representation of women in leadership positions across the institution. These opportunities consisted of external leadership development programs and internal leadership development workshops.

External Leadership Development Programs

This component was designed to prepare STEM/SBS women faculty to transition into leadership roles by providing support to participate in various regional and/or national leadership programs. STEM/SBS and non-STEM/SBS women faculty have participated in the following programs including UNC BRIDGES, STEM Women of Color Conclave, Conclave Leadership Academy Fielding Graduate University, AAC&U Project Kaleidoscope STEM Leadership Institute (SLI), and HERS.

Internal Leadership Development Workshops

Internal Leadership Development Workshops consisted of various opportunities for on-campus leadership development trainings of particular relevance to women, including creating and implementing strategic networks, navigating the higher education landscape, work-life integration, and formal and informal mentoring, and networking, and coaching opportunities.

Policy and Climate Changes

ADVANCE has been intentional in leading institutional efforts to promote policies that cultivate a supportive and positive climate.

Institutionalization of Search Committee Certification Program

The credentialing process for Search Committee and Biases Training has become an institutionalized policy and practice. To date, approximately 350 faculty, staff, and administrators have been certified.

Incorporation of Policies in the Faculty Handbook

In 2018, the Faculty Senate completed the rewriting of the faculty handbook, with a member of the ADVANCE team in service on this committee. Also, the provost, and a member of the leadership team of the ADVANCE Project, had active engagement in this process. By having an ADVANCE IT team member on this committee, we were able to provide input on faculty handbook revisions to ensure that the language of policies promoted equity for faculty regarding the tenure and promotion process.

Data Collection and Analysis

Our ADVANCE IT team also worked to institutionalize an expansion of the data tracking system to promote transparency as well as practices and policies that support gender equity. This work has led the university to track women faculty statistics, which is now incorporated as part of annual data collection and RPT tracking. To date, ADVANCE IT has shared data about women faculty statistics in presentations provided to the provost, deans, and chairs. Our analyses to determine the impact of these strategies utilized data from the annual toolkit and our tracking of participation.

Biannual Comprehensive Faculty Campus Climate Survey

The evaluation of our program used a multi-method approach for assessment. A comprehensive faculty campus climate survey was used to measure institutional climate impacts for programs and activities. Three institutional climate studies were conducted over a 7-year period, i.e., 2013, 2017, and 2020. The 2013 Faculty Campus Climate Survey served as baseline data for the grant in the context of gender equity, with a major focus on gender. STEM versus non-STEM differences were examined in less detail. For the 2017–18 and the 2020–21 Faculty Campus Climate Surveys responses were from faculty in STEM and non-STEM departments and examined the experiences of men and women in these departments as well as the experiences of the IT Faculty Scholars.

Results***Participation in Activities***

From spring 2015 to spring 2021, ADVANCE IT has provided networking, professional development and writing/research skill development activities geared to increasing scholarly productivity. More than 1200 session participants have participated, and 78.8% (983 of 1248) of the attendees/facilitators for these events have been women faculty, staff, and/or administrators. Our ADVANCE IT Faculty Scholars program consisted of twenty-seven STEM/SBS women assistant and associate professors across three cohorts. Recruitment for the first cohort of nine scholars occurred 2015-2016, the second cohort of 6 scholars was formed in 2017, and 12 scholars were recruited for the third cohort in 2018. At the end of the first year of the IT Faculty Scholars program, our team began to compile a list of scholar-generated products obtained through self-reporting or from review of their curriculum vitae as a way to assess the IT Faculty Scholars' scholarly productivity. The initial data collection occurred at the end of cohort one's first year (June 2016) and was repeated each year in June. The milestones of the IT

Faculty Scholars program are shown in Table 2. The data represents a cumulative total of scholarly products generated by IT Faculty Scholars (cohorts 1-3) from fall 2015–June 2020.

Table 2

Milestones of ADVANCE IT Faculty Scholars

Scholarly Product	Cumulative Total
Grants – Funded (From a total of 73 grants)	\$18,410,600
Proposals - Submitted	108
Books or Book Chapters - Published	7
Publications/Conference Proceedings - Accepted/Published	134
Publications/Conference Proceedings - Submitted/ Under Revision	61
Professional Conferences - Attended	210
Presentations Provided	319
Promotion to Full Professor	2
Promotion to Associate Professor with Permanent Tenure	3

Note. Based on scholar self-reporting and review of curriculum vitae as of June 10, 2020.

Outcome 1: Representation of Women in STEM/SBS

During AY 2019–2020, 35.9% of all STEM/SBS faculty (all ranks) were women. This indicates a 31.0% increase since 2014–2015 when the ADVANCE IT grant was awarded. The number of women tenured and tenure-track faculty in STEM and SBS departments had a percentage increase of 14.5% from 2014–2015 (N=62) to 2019–2020 (N=71).

Outcome 2: Promotion and Representation Across Ranks

Since the inception of the Project, we examined the movement of STEM/SBS women faculty up the ranks from assistant to full professor. From AY 14–15 to AY 19–20, the number of women *STEM/SBS full professors* increased by 25% (2014–2015 N=12, 2019–2020 N=15). Over the last six academic years (2014 to 2020), the number of women *STEM/SBS assistant professors* had a percentage increase of 35% (2014–2015 N=20, 2019–2020 N=27). Between AY14–15 to AY 19–20, the number of women *STEM/SBS associate professors* declined slightly by 3.3% (2014–2015 N=30, 2019–2020 N=29) (see Table 3).

Table 3

Number of Tenured/Tenure-track STEM/SBS Women Faculty (2014–2020)

	Academic Year					
	2014- 2015	2015- 2016	2016- 2017	2017- 2018	2018- 2019	2019- 2020
Full	12	12	14	16	13	15
Associate	30	28	32	33	32	29
Assistant	20	20	18	19	22	27

Outcome 3: Establishing and Sustaining Research Productivity

STEM Women's Writing Retreat. From 2015–2019, more than 100 STEM and non-STEM women faculty/staff participated in the 4-day off-campus residential writing-intensive event. During this timeframe, there have been six (6) grants awarded to six (6) IT Faculty and non-IT Faculty Scholars who participated in the proposal writing track. Also, twelve (12) IT

Faculty and non-IT Faculty Scholars who self-selected the publication track during the 2015–2019 writing retreats generated eighteen (18) peer-reviewed publications (see Table 4).

Table 4

Awarded Grants and Publications from STEM Women's Writing Retreat Participants (2015–2019)

	Retreat Year				
	2015	2016	2017	2018	2019
Grants Awarded	-	-	-	5	1
Peer-Reviewed Publications	1	2	5	7	3

Note. Based on participant self-reporting as of June 10, 2020.

Overall, participants (scholar and non-scholar) in the ADVANCE IT Program (IT scholars, Writing Retreat, and Boot Camp participants) demonstrated statistically significant increases in submitted and funded proposals from 2015–2019. In fiscal year 2015, 22% of ADVANCE IT program participants received grant funding, and by fiscal year 2019, 33% of participants received grant funding. Repeated Measures ANOVA analyses indicate a statistically significant increase in proposal submissions funded proposals across all participants. The partial eta squared for both analyses indicate a medium effect (Data not shown).

Analyses of Individual Activities. When analyses were conducted across individual activities, the activity that demonstrated the largest impact was the ADVANCE IT 2018 Scholars program-cohort 3. Results indicate that on average ADVANCE IT 2018 scholars (cohort 3) funded proposals increased following participation as cohort 3-2018 IT Scholars, Wilks' Lambda = .38, $F(2, 10) = 7.96$, $p < .05$. The partial eta squared value of .61 indicates a

large effect. In fiscal year 2015, none of the ADVANCE IT scholars 2018 cohort (0%) had grant funding, whereas by fiscal year 2019, fifty-eight percent (58%) of the ADVANCE IT scholars 2018 cohort-3 had funding.

Outcome 4. Impacts on Policy and Climate

Analysis of the three institutional faculty campus climate surveys indicated that STEM and non-STEM women faculty reported that one of the primary obstacles to career progression for STEM faculty was “opportunities for sabbaticals.” In response to this finding, the university reinitiated a Sabbatical Program for Tenured Faculty effective fall 2021. Through this program, two full-time tenured faculty will be supported to participate in a sabbatical to increase their knowledge, further their research, stimulate their intellectual interests, improve their teaching methods, and strengthen their contacts with the world-wide community of scholars, thus enhancing their ability to contribute to North Carolina A&T State University (A&T) upon their return. The Sabbatical Program/Reassigned Time policy is a strategic university methodology for enhancing faculty career development, as well as the achievement of the university's overall academic and research objectives.

The two primary obstacles to conducting research identified by all faculty in the climate survey, were heavy teaching loads and not enough time due to university responsibilities. Faculty also reported difficulty in understanding expectations related to promotion and tenure, with more than a quarter of women faculty (STEM and non-STEM) describing this challenge. In response to the challenges identified in the climate survey around workload and promotion and tenure policies, our team piloted a novel internal leadership development program called the Gender Equity and Leadership (GEL) Faculty Advocates. The GEL Faculty Advocates are a cadre of faculty appointed to help sustain gender equity and leadership best practices and

strategies from the ADVANCE IT project by sharing and integrating into practices of each college and department. The GEL Faculty Advocates began a project to examine if there is consistency in workload and in the promotion/tenure policies between academic units and to assess if scholarly activities are valued the same between different units.

Discussion

Strengthening women's individual capacity for change, while simultaneously cultivating organizational transformation through psychological and structural empowerment has allowed ADVANCE to foster greater inclusivity of women at all levels of the academy. The NC A&T ADVANCE-IT project is based on an empowerment construct that catalyzes professional gains for women faculty at all levels, but particularly those in the transition from associate to full professor. The activities of our project were based on institutional data and literature on the empowerment of women and women of color in STEM/SBS disciplines and have been strategically designed to meet the needs of women faculty on our campus.

The key strategic approaches that had the greatest impact on scholarly productivity for women STEM/SBS faculty were the STEM Women's Writing Retreat and the ADVANCE IT Scholars Program. The STEM Women's Writing Retreat provided participants with protected time to engage in developing a proposal or publication. In addition, participants had an opportunity to receive assistance with developing their writing product through one-on-one coaching. The ADVANCE IT Scholars, junior and mid-level faculty, were afforded access to professional and writing/research skill development activities and course release time that gave them greater opportunities to consistently engage in scholarly and research activities. The IT Scholars, as a group, in stark contrast to their colleagues, have experienced productivity levels significantly beyond that of their peers. In addition, from our campus climate survey, they

reported greater satisfaction with NC A&T and with the ADVANCE program due to the support provided at the departmental and programmatic levels. In the last two years of funding, we did not establish new cohorts of scholars; however, our leadership team continued to serve as mentors and advocates for all scholars. IT Faculty Scholars were also encouraged to participate in all project activities and continue to receive fast-track acceptance into ADVANCE development opportunities. The scholars also assisted the project in an informal capacity by helping to disseminate information and opportunities shared by project staff to women faculty in their respective departments/college. At an institutional level, the research and writing boot-camp provided by ADVANCE gave faculty from various disciplines an overview of access to funding, statistical analysis, and the processes related to writing grants and manuscripts.

Our findings also demonstrate that intentional multi-pronged, collaborative recruitment and advancement efforts can increase hiring and advancement of women. Our team worked with Human Resources to develop and implement the search committee training and credentialing process, ensuring that university policies and procedures for recruitment and hiring are followed, and that best practices and strategies for mitigating implicit biases are employed. Also, STEM/SBS departments have implemented intentional hiring and retention mechanisms to transition women teaching assistant professors already at the university into tenure-track assistant professor positions, which has positively impacted the number of STEM/SBS assistant professors. Thus, the increase in the number of assistant STEM/SBS women professors can be attributed to project initiatives intentionally focused on mitigating bias and discrimination in the recruitment and hiring process (i.e., search committee training).

The gradual decline that we have seen in associate professors may be attributed to multiple factors such as movement up the ranks to full professor.

Despite our successes, we experienced several challenges. These challenges included changes in university leadership, co-PIs of the grant, and leadership of our faculty senate, as well as a delay in the hiring of a program director.

Changes in University Leadership

There have been three different provosts, with different levels of commitment and support for the project, who each assumed the role of Principal Investigator as required by the funding agency. The changes in leadership have impacted the project as our institutional transformation goals required our team to strategically align and incorporate ADVANCE initiatives with the goals of Academic Affairs. The interim provost, in place when the grant was written, demonstrated a high level of support for the ideas discussed in the proposal as a vehicle for helping to improve the campus climate revealed through the climate survey and COACHE surveys. The next provost was tasked with leading the restructuring of the academic units on campus, and despite our efforts to demonstrate ways in which ADVANCE objectives could be used to assist the provost in supporting Academic Affairs priorities, ultimately, we were only able to implement ADVANCE programming. We were also able to address university policies on equity and gender-friendliness, however, we had to apply a grassroots effort to share the work of ADVANCE with the campus due to low visibility from the provost office. Our current provost has demonstrated a high level of understanding and support of our ADVANCE IT goals. Under their leadership, our team has been able to increase the visibility and engagement of ADVANCE in relevant university-level conversations, fostered successful collaborations with campus

stakeholders, and helped to support faculty development initiatives aligned with the long-term goals of the university.

Changes in co-PIs of the Grant

During implementation of our project, we transitioned through two co-PI changes. Two of the four original co-PI's left the institution to pursue administrative positions at other institutions. Two new co-PIs were added; a full professor of Chemistry and director of our University Honors Program and an associate professor of Psychology who leads the Social Behavioral Sciences study.

Leadership of our Faculty Senate

Over the funding period, there have been four Faculty Senate presidents. This instability in the leadership of the Faculty Senate has resulted in challenges with consistently partnering with the Faculty Senate to promote policy changes in support of equitable practices. When the ADVANCE proposal was submitted, the Faculty Senate was actively starting to look at equitable practices such as teaching loads, service loads, salary equity, and revision of the Faculty Handbook. The first Senate President was in support of partnering with the ADVANCE team during the proposal development phase of our project. After our grant was awarded, each change in Faculty Senate leadership shifted the focus for the Faculty Senate. As a result, reestablishing a sustainable partnership between ADVANCE and the Faculty Senate has been hindered.

Delay in Hiring the Program Director

During the first two and one-half years of its existence, the NC A&T ADVANCE IT project sought aggressively to hire a project director and an administrative assistant who would be responsible for the day-to-day management of the project. The delay in hiring a project director slowed our implementation of key initiatives and the third-year site visit, especially as members of the co-PI team shifted to other leadership roles within the university. The project

director was successfully hired in year three of the project and was instrumental in implementing targeted intervention activities and developing partnerships with key stakeholders positioning the university for a successful third-year site visit.

Conclusion

It is important to note that the outcomes discussed were prior to the COVID-19 disruption experienced across all academic institutions. At this juncture in our project, we have begun steps to engage in multiple data collection processes to assess the impact of the pandemic on scholarly productivity of women faculty and on our programming outcomes.

As demonstrated by our outcomes, we have successfully begun to move the needle for institutional transformation by our multi-pronged approach. We showed positive incremental changes in the institutional practices and the productivity and advancement of STEM women faculty, especially with the IT Faculty Scholars. In institutional transformation, organizational trust is essential and is gained when the administration fosters transparency around key policies impacting faculty life (Mack et al., 2010). We have been able to foster transparency to cultivate organizational trust around the tenure and promotion process through open conversations between the administration and faculty in the form of a targeted workshops focused on demystifying the criteria and process of promotion and tenure.

Institutional transformation, via an empowerment approach, has positively affected women as well as men faculty across the entire campus of NC A&T. The ADVANCE IT project serves as the change agent that has helped to catalyze sustainable institutional transformations leading to the enhancement of the research and leadership capabilities of all faculty resulting in an increase in their overall professional achievements. In terms of women STEM/SBS faculty, we have successfully built a supportive network through summer writing retreats, in-person, and

virtual writing groups. We have also provided professional development activities that included career coaching, mentoring, and leadership development programs. Most importantly, we have achieved organizational level change through the required implicit bias training component of the Search Committee Certification program and the newly executed interactive theater-based Commitment to Faculty Success workshop series addressing implicit bias in the search and tenure and promotion processes. Also, the project provided a platform for our social and behavioral science team to examine barriers to the advancement of women through an exploration of gender and gender/race intersectionality within HBCUs and majority institutions. Their work in this area has positioned them as experts in the field and has shed light on the racial and gendered barriers women of color continue to face in the academy yet persevering due to implementing strategies to overcome and succeed.

A major lesson we learned along the way is that institutional buy-in is key to program visibility and success. Also, having institutional leadership invested and committed to equitable change in the organizational culture is necessary for sustainable change. Another lesson learned is that while the funding was initially started to address the needs of STEM/SBS women faculty, all faculty were able to benefit from our programmatic efforts and support networks.

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