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Culturally Responsive Leadership Development for HBCU STEM Faculty

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This year-long leadership development program was designed to enhance the cognitive, affective, and behavioral dimensions of leadership self-efficacy of HBCU STEM leaders to broaden the participation of African American undergraduates in STEM. Learning outcomes guided the development of curricular resources including on-line learning, multi-day residencies, individual leadership assessment, and an action learning project. Mixed-method evaluation showed significant gains on all learning outcomes, with the highest post-test ratings in application of leadership skills, leading faculty in STEM teaching strategies, leading instructional innovation, developing programs for broadening participation in STEM, and increasing campus awareness of national challenges related to STEM.

Keywords: *academic leadership, HBCU, STEM*

LEADERSHIP DEVELOPMENT FOR HBCU STEM FACULTY

The Center for the Advancement of STEM Leadership (CASL) was established, with funding support from the National Science Foundation to document leadership approaches at the nation's historically Black colleges and universities (HBCUs) that have led to their national prominence in broadening participation of African Americans in the science, technology, engineering, and mathematics (STEM) fields. This initiative is expected to build a cadre of national thought leaders who can effectively contribute to counteracting depictions that have systematically highlighted institutional deficiencies at HBCUs (Freeman, 2010; Stanfield, 2003), without underscoring their unique institutional contexts and systems of leadership that have successfully supported broadening participation in STEM (Cantor et al., 2014).

In this article, the authors present an evaluation research study of CASL's pilot Leadership Fellows Program, which consists of an innovative year-long professional development effort that relies upon integration of the cognitive, affective, and behavioral domains of leadership through the HBCU lens. This program, unlike many other leadership development programs, foregrounds the underlying substance, or *soul*, of HBCU leadership while also promulgating research-based evidence of leadership practices at HBCUs that broaden participation of African Americans in STEM.

FOUNDATIONS OF THE LEADERSHIP FELLOWS PROGRAM

While professional development has been recognized as critical for the effective practice of leadership (Day et al., 2014), and is especially needed for STEM academicians (Leiserson & McVinney, 2015), only a few professional development programs have focused on advancing leadership to broaden participation in STEM (see next section), and even fewer have situated

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professional development in the context of HBCUs. CASL developed the Leadership Fellows Program based on CASL's core values and conceptualizations of leadership, assessment of similar programs, and its preliminary research on HBCU campuses.

Leading with soul, first characterized by Bolman and Deal (2011) as the spiritual dimension of leadership, is a core value and topic of inquiry for CASL and creates the context for the Leadership Fellows Program. Rather than a single definition for the soul of leadership, the authors relied on conceptions extending from Frederick Douglass's seminal statements grounded in liberation theology (Carson, 1992) and the Black Social Gospel (Dorrien, 2015) to those of W. E. B. Du Bois (1903) in his noted work, *The Souls of Black Folk*. CASL extends these ideas to broadening participation, positing that leadership in service to broadening participation not only liberates others in their pursuit of STEM, but also liberates the leader. As context for the CASL Leadership Fellows Program, the concept of the soul of leadership, for CASL, may be described as the inner spirit, values, and passions associated with community, spirituality, legacy, and resilience that arises from and is shaped by the African American experience in the United States—an attribute that permeates many African American-centric organizations, including HBCUs.

Beyond the foundational value of leading with soul, CASL sought a framework for leadership that would be efficient and strategic, given the vast research and practitioner literature on leadership. Illustrative of this challenge, the *Encyclopedia of Leadership* (Goethals, Sorenson, & Burns, 2004) contains entries from over 300 scholars and is nearly 2,000 pages in length. The list of leadership readings and resources on Amazon is in the tens of thousands. Given this context, the primary text on academic leadership was *Reframing Academic Leadership* (Bolman & Gallos, 2011), which applies the four-frames model (structural, political, human resource, symbolic) of organizational leadership, introduced by Bolman and Deal in 1984 (Bolman & Deal, 2017). This resource was selected for several reasons, the most important of which is the model's longevity as a proven approach to effective leadership within organizations. Also, these four frames synthesize many different theoretical perspectives, research, and topics on leadership. Furthermore, they have been applied in many organizational contexts, including higher education (Bolman & Gallos, 2011; Fleming-May & Douglass, 2014; Lyon et al., 2014; Thompson, 2000). Finally, the four frames were used to define several of the learning outcomes as shown later.

In addition to these sources, the CASL Leadership Fellows Program is grounded in the principles of action learning and program evaluation, which emphasize self-reflection and continuous improvement in support of leadership self-efficacy (Bandura, 1986). Action learning is a well-documented strategy for leadership development (Leonard & Lang, 2010; Webster-Wright, 2009). This approach is consistent with the well-established proposition that experiential learning contributes to the personal development, learning, and consciousness of adult learners (Kolb & Kolb, 2009) and, thus, contributes to a transformative leadership development experience. As described more fully, CASL Leadership Fellows developed Action Learning Projects (ALPs) that combined principles of organizational change and program evaluation (McClintock, 2004), and linked these to leadership for broadening participation in STEM within the unique settings of HBCU campuses.

During the design phase of the Leadership Fellows Program, CASL inquiry reinforced the fact that many higher education leadership development curricula are variable in content, duration, and learning modality, and often focus narrowly on administrative topics, such as strategic planning, resource allocation, and conflict management. Others focus on the leadership challenges of particular roles such as department chair, chief academic officer, or president (e.g., Harvard Institutes for Higher Education, 2020). Still others are targeted toward groups who are underrepresented within leadership and upper professorial ranks in the STEM disciplines, such as women and racial/ethnic minorities (e.g., Engerman & Luster-Reasley, 2017). Most programs are residential ranging from two days to two weeks; while a few have a longer duration of several months up to a year and combine online and residential learning.

In planning CASL's Leadership Fellows Program, the authors examined dozens of efforts from around the United States. As a result, elements were drawn from several that were most relevant to CASL's objectives including the Opportunities for Under Represented Scholars (OURS) Program

at Fielding Graduate University to empower women of color in the STEM disciplines at HBCUs and Tribal Colleges and Universities (Engerman & Luster-Teasley, 2017); Project Kaleidoscope (PKAL), supported through the Association of American Colleges and Universities to inspire undergraduate STEM reform (Kezar & Elrod, 2012; Mack, 2017); and the Higher Education Resource Services (HERS), which is dedicated to sustaining a community of women leaders to achieve equality and excellence in higher education (Hornig, 1978). CASL's program is distinctive in its focus on leadership self-efficacy in the HBCU context to broaden participation in STEM while drawing on features of other programs such as a blend of in-person and online learning and a 360-leadership assessment.

COMPONENTS OF THE CASL LEADERSHIP FELLOWS PROGRAM

Based on the review of these and other leadership development programs, along with CASL's conceptual foundations and preliminary research findings from HBCU leaders, the authors designed a one-year program with an academic phase and an action phase, along with four multi-day residencies. Learning outcomes were derived by combining three psychological domains of leadership (cognitive, affective, and behavioral) with three leadership perspectives intended to broaden participation in STEM: (a) framing academic leadership in the HBCU context, (b) transforming HBCU campus and faculty culture, and (c) evaluation of change. Table 1 shows examples of learning outcomes for each of the resulting nine outcome categories. Given prior evidence that short-term approaches to professional development have limited effectiveness (Yoon et al., 2007), the year-long duration was deemed necessary to achieve the desired learning outcomes.

Table 1

Curricular Leadership Learning Outcomes in Relation to Broadening Participation in STEM Programs on the HBCU Campus

Residency Objective	Cognitive Domain	Affective Domain	Behavioral Domain
Framing the Structural, Political, Human, and Symbolic Dimensions of Leadership in the HBCU Context	Analyze ways of framing STEM leadership in relation to institutional structure, politics, human needs, symbolism, and campus culture (C1)	Assess how emotional aspects of leadership style are related to the legacy and future of HBCUs (A1)	Apply leadership style strengths to action learning projects (B1)
Transforming the HBCU Campus and Faculty Culture to Broaden Participation in STEM	Identify factors that influence transformation of campus culture in relation to diversity and inclusion in STEM programs (C2)	Apply personal history to leadership challenges in relation to diversity and inclusion in STEM programs (A2)	Present examples of STEM-related campus culture transformation initiatives and their success factors (B2)
Creating and Evaluating Change Through Action Research	Describe the use of evaluation and action research methods for assessing the success of change projects to broaden participation in STEM programs (C3)	Assess the role of emotional intelligence in leadership for campus change that broadens participation in STEM programs (A3)	Create evaluation methods to assess the impact of your STEM campus change project (B3)

Note. A1-3 are labels for learning objectives 1-3 within the Affective domain; B1-3 are labels for learning objectives 1-3 within the Behavioral domain; C1-3 are labels for learning objectives 1-3 within the Cognitive domain.

The authors used four delivery modalities to achieve learning outcomes associated with broadening participation, expecting that the CASL Leadership Fellows would vary in their receptiveness to different forms of content and drawing upon elements of similar programs as noted.

Modality 1: Asynchronous Learning

The Moodle open-source learning platform (https://moodle.org/) for scholarly readings, instructional videos, case study analyses, and discussion forums was used. The Bolman and Gallos (2011) resource was supplemented with additional material centered around each of the three leadership perspectives as shown in Table 1.

Modality 2: In-Person Residencies and Webinars

A second modality for the Leadership Fellows Program consisted of four multi-day residencies, along with several live online webinars. During each residency, we hosted guest presentations from HBCU presidents and mid-to senior level administrators, other higher education leaders and scholars, and members of the CASL leadership team. The authors also conducted seven live webinar sessions on evaluation, individualized leadership assessment, and mindfulness in leadership. These sessions were attended live, recorded, and placed on the Moodle platform for those who could not attend at the scheduled time.

Modality 3: Leadership Assessment

A third modality for achieving learning outcomes was the use of the EQi 360 leadership assessment (https://www.mhs.com/MHS-Talent?prodname=eq360) focused on emotional intelligence (Parrish, 2013). Fellows completed self-assessments and obtained additional ratings from peers, subordinates, and superiors in their workplaces. They then received a two-hour coaching session from a consultant who was certified in the EQi 360 assessment tool.

Modality 4: Action Learning

The fourth learning modality involved ALP that offered the opportunity for CASL Fellows to translate their learning and self-reflection into actionable projects that would broaden participation in STEM on their campuses. The ALP utilized an "evaluability" framework, which emphasized structured project planning to facilitate strong evaluation of the impact that would be publishable (McClintock, 2004). CASL prepared an *ALP Guide* containing a template, timelines and deliverables, steps to get started with campus partners, and examples of potential projects that were organized by the four frames of leadership from Bolman and Gallos (2011).

We paired each of the CASL Fellows with a campus coach (usually a senior administrator) to assist in conceptualizing ALPs, navigating campus bureaucracies, facilitating collaborations for implementation, and providing periodic feedback and check-ins. Campus coaches received training in evidence-based coaching—a curriculum designed by Fielding Graduate University's accredited Evidence-Based Coaching Program—that provided an overview of coaching theory, key practices, and coaching leaders for broadening participation in STEM.

EVALUATION OF THE LEADERSHIP FELLOWS PROGRAM

CASL used an external evaluator to conduct a comprehensive evaluation of the Leadership Fellows Program using formative and summative data from three sources: responses to a self-report survey instrument comprised of measures of the intended learning outcomes administered before and after participation in the year-long program, materials from Fellows' Action Learning Projects (ALPs), and post-residency feedback questionnaires. This article discusses the pre-post survey findings and the ALP materials.

Sample

All 16 Fellows were invited to complete both the baseline and follow-up assessment instruments. Using participant-generated identification codes, responses to the pre- and posttest were matched to calculate changes in scores (Kearney et al., 1984; Yurek et al., 2008). Matched data are available for 13 (81%) of the 16 Fellows and represent the analytic sample for this study. Respondent characteristics are provided in Table 2. While the full cohort comprised 9 women (56%) and 7 men (44%), women are slightly overrepresented in the analytic sample (62%) because two men and one woman did not respond to the posttest. Complete ALP data are available for 12 Fellows who submitted both their draft and final project reports.

Table 2

Characteristics of Analytic Sample

Characteristic	Percentage
Gender	
Female	62%
Male	39%
Country of origin	
U.S. born	77%
Foreign born	23%
Race/ethnicity	
Asian	8%
Black or African American	77%
White	15%
Institutional type	
Baccalaureate institutions	46%
Comprehensive/ master's institutions	39%
Research universities	15%
Academic discipline	
Sciences	62%
Mathematics/math education	23%
Professional or interdisciplinary fields	15%
Faculty rank	
Research associate/lecturer	8%
Assistant professor	15%
Associate professor	46%
Professor	31%
Administrative role held	
Program leader/director	39%
Department chair	23%
Assistant or associate dean	15%
Vice president/provost	8%
None	15%
Experience as PI or Co-PI on an NSF-broadening part	
Yes	62%
No	38%

Note. PI = Principal Investigator; NSF =National Science Foundation.

Survey Findings

Based on the broad learning outcome categories shown in Table 1, a mixed-method instrument was created to collect self-report quantitative and qualitative data from the Leadership Fellows. The instrument contains 20 items, assessed on a 10-point 'end-labeled' scale of perceived self-efficacy/confidence (0 represents "not at all confident" and 9 represents "completely confident"), and was completed by the Fellows at the beginning and end of the program. Additionally, open-ended questions assessed Fellows' perceptions of all aspects of the leadership program.

There were statistically significant increases in scores (explored using matched-sample *t*-tests on means) and large effect sizes (measured in standard deviations using Hedge's g for all 20 items, providing strong evidence that the learning outcomes for the Fellows Program were met (Table 3). On the posttest, Fellows showed highest confidence in the following learning outcomes:

- applying leadership skills to their Action Learning Projects (#5),
- leading instructional innovation for broadening participation in STEM (#15),
- developing programs for broadening participation in STEM (#17),
- leading STEM faculty in development and implementation of STEM teaching strategies (#13), and
- increasing campus awareness of national challenges related to STEM (#18).

Looking at changes within individual items, the evidence suggests where learning was strongest. For example, two of the items on which Fellows had the lowest average scores on the pretest (Item #9: Describe the use of evaluation and action research methods . . . and item #20: Demonstrate systems thinking) had the highest average change from pre- to postscore, despite their average posttest scores being relatively low compared to other items. The finding that Fellows expressed low posttest confidence in evaluation (Items #9–11) is not surprising given that Fellows are from STEM fields and not typically trained in the kind of social science research methods that underlie program evaluation (Malyn-Smith et al., 2013; National Research Council, 2003). Each of these items showed significant increase from pre- to post-assessment, suggesting that CASL's efforts to prepare Fellows to engage confidently in these activities made a positive difference. Similarly, item #20 showed high pre-to-post change, suggesting that CASL's efforts to prepare Fellows to recognize and be mindful of connections within systems made a positive difference.

As noted earlier, the design of CASL's Fellows Program included an emphasis on the affective/emotional intelligence aspects of leadership. Items #3 and #4 showed comparatively large increases from pre-to-post scores regarding confidence in assessing the role of emotional intelligence in broadening participation in STEM in the HBCU environment. Similarly, item #7 shows significant increase from pre-to-post score in confidence exemplifying emotional intelligence in leadership. Taken together, the results in Table 3 provide strong evidence of the attainment of CASL's Leadership Fellows learning outcomes.

The open-ended posttest questions asked about aspects of the Fellows Program that were most useful in leadership development related to broadening participation in STEM fields, as well as those that required reconsideration for future leader cohorts. Fellows spoke highly of various aspects, such as the variety of leaders. One participant noted, "All of it was valuable. Hearing from a variety of leaders about the challenges they faced and how they dealt with them was particularly helpful and inspiring." Fellows also described the usefulness of the residencies and activities, with one stating "All of the sessions and activities as a whole, were very useful to me. I liked the concepts of 'Residencies,' where learning communities are formed." The value of forming relationships and peer learning communities was stressed by another participate who offered "meeting others in the CASL cohort (networking)" as being one of the most important aspects of the experience and another who said, "The opportunity to interact with my peers was wonderful." Fellows also found value in the EQi 360 assessment of emotional intelligence, with one noting that "Doing the 360 Evaluation to learn about my emotional IQ and seeing how that is reflected in my leadership style . . . gave me an opportunity for personal growth." Others offered the value of "Expanded awareness of need, self-discovery, how to access tools, resources and supports, better understanding of campus dynamics pertaining to change" and "Learning about my leadership

Table 3

Pre-Post Test Findings from Leadership Fellows Self-Report Survey

Item	Please indicate your degree of confidence in your ability to successfully accomplish each of the tasks	Pre	Post	Change	Tests of significance			
		M	*M*	*M*	*t*	*Df*	*Sig.*	*Hedges g*
1	Analyze ways of framing STEM leadership in relation to institutional structure, politics, human needs, symbolism, and campus culture	4.4	7.4	3.0	6.08	12	0.000	1.6
2	Assess how emotional aspects of my leadership style are related to the legacy and future of HBCUs	5.4	7.7	2.3	3.48	12	0.005	1.3
3	Assess how emotional aspects of my leadership style are related to the implementation of my [ALP] for broadening participation in STEM	4.6	7.9	3.3	4.54	12	0.001	1.5
4	Assess the role of emotional intelligence in leadership for campus change that broadens participation in STEM programs	4.8	7.8	3.1	5.49	12	0.000	1.4
5	Apply my leadership style strengths to my action learning project	5.5	8.2	2.8	5.91	12	0.000	2.1
6	Apply my personal history to overcoming leadership challenges in relation to diversity and inclusion in STEM	4.9	7.5	2.7	3.84	12	0.002	1.4
7	Exemplify emotional intelligence, self-reflection, and spiritual awareness in my leadership	5.8	7.8	2.0	3.23	12	0.007	1.2
8	Present examples of STEM-related campus culture transformation initiatives and their success factors	4.5	7.5	2.9	5.57	12	0.000	1.8
9	Describe the use of evaluation and action research methods for assessing the success of change projects to broaden participation in STEM programs	3.5	6.9	3.4	7.58	12	0.000	1.5
10	Create evaluation methods to assess the impact of my action learning project	3.9	6.9	3.0	4.84	12	0.000	1.1
11	Conduct evaluative or action research in STEM education	4.3	7.2	2.9	4.06	12	0.002	1.1
12	Lead STEM mentoring teams for students with faculty and external scientists	6.1	7.9	1.8	3.49	12	0.004	1.2
13	Lead STEM faculty development & implementation of STEM teaching strategies	6.1	8.1	2.0	3.85	12	0.002	1.2
14	Create buy-in for collaboration across STEM fields and programs	5.5	7.4	1.9	3.24	12	0.007	1.1
15	Lead instructional innovation for broadening participation in STEM (e.g., undergraduate research, active learning)	6.7	8.2	1.5	3.59	11	0.004	1.5
16	Inspire broad (i.e., department or campus-wide) support for broadening participation in STEM	5.9	7.7	1.8	3.18	12	0.008	1.0
17	Develop programs for broadening participation in STEM	6.3	8.2	1.8	3.41	12	0.005	1.3
18	Increase campus awareness of national challenges related to STEM	6.1	8.1	2.0	3.46	12	0.005	1.2
19	Foster cultural competency skills among diverse faculty and staff	5.2	7.2	2.0	4.16	12	0.001	1.0
20	Demonstrate systems thinking	4.0	7.4	3.4	4.88	12	0.000	1.3

Table 4

Pre-Post Comparisons of Nine Leadership Learning Outcome Categories as Coded from Action Learning Projects

Learning Outcome		Pre	Post	Change	Tests of Significance (pre-post)			
		M	*M*	*M*	*t*	*Df*	*Sig.*	*Hedges g*
C1	Analyze ways of framing STEM leadership strategy in relation to organizational structure, politics, human needs, and campus culture	1.08	4.17	3.08	6.59	11	0.000	2.3
C2	Identify factors that influence transformation of campus culture in relation to diversity and inclusion in STEM programs	1.83	3.42	1.58	5.51	11	0.000	1.6
C3	Describe the use of evaluation and action research methods for assessing the success of change projects to broaden participation in STEM programs	1.42	2.75	1.33	4.69	11	0.001	1.6
A1	Assess emotional aspects of your leadership style in relation to the HBCU legacy, future, and your STEM change project	--	1.92	1.92	3.62	11	0.004	1.4
A2	Apply your personal history to leadership challenges in relation to diversity and inclusion in STEM programs	0.08	0.67	0.58	1.54	11	0.152	0.8
A3	Assess the role of emotional intelligence in leadership for campus change that broadens participation in STEM programs	--	2.42	2.42	4.84	11	0.001	2.5
B1	Apply your leadership style strengths to plans for your campus STEM change project	0.33	3.25	2.92	6.71	11	0.000	2.6
B2	Present examples of STEM-related campus culture transformation initiatives and their success factors	0.17	1.67	1.5	4.78	11	0.001	2.1
B3	Create evaluation methods to assess the impact of your STEM campus change project	1.33	3.17	1.83	6.76	11	0.000	1.4

Note. A1-3 are labels for learning objectives 1-3 within the Affective domain; B1-3 are labels for learning objectives 1-3 within the Behavioral domain; C1-3 are labels for learning objectives 1-3 within the Cognitive domain.

strengths." Finally, Fellows indicated skepticism about the initial perceived benefits of the writing institute while describing its value in their development, as seen in this example: "I have never participated in a writing workshop and was initially skeptical about its potential. It was, however, extremely useful in allowing me the time to focus on a topic and develop it."

Many of the Fellows commented on the powerful impact of their learning using descriptors such as eye-opening, inspirational, and life-changing and noted their increased confidence in being a leader, feeling better equipped to affect change on their campus, new vision for their leadership, and new ability to assess their leadership strengths and weaknesses. One respondent offered, "The fellowship was an eye opening, inspirational life-changing experience. The fellowship has greatly shaped my focus, direction and professional goals for many years to come."

Suggestions for improvements included increased time at residencies for small-group interaction, as seen in this Fellow's comment, "Something I request though is more opportunity to present our project to the group/individuals in the group and receive criticism/feedback. When that happened, it helped me work through technical details and be better able to frame my project in the big picture sense." Additionally, Fellows suggested that valuable aspects could be introduced sooner, such as guidance on assessment ("I believe assessment should be introduced during Residency I and actually every Residency") and access to coaches ("The coaches should be brought in sooner; I think it would help with the projects"). More transparent connections to the Bolman and Gallos (2011) framework and its relevance to STEM leadership at HBCUs was also recommended, with one Fellow noting, "It will also be helpful if speakers identified the framework for their particular leadership style so that we have tangible examples." One Fellow also noted the desire for student perspectives, given the focus on CASL of preparing leaders to broaden participation in STEM, saying, "I would have liked to see more perspectives from students. Would it not be innovative to have a panel of undergrad and grad students to talk to CASL participants in a very direct, frank dialogue on what is needed to improve STEM higher ed at HBCUs?"

Action Learning Project Findings

The ALPs were qualitatively evaluated on the nine leadership learning outcome categories in Table 1. These analyses were conducted on the projects of 12 Fellows who submitted both initial and final versions of their ALPs to assess pre-to-post change in the learning outcomes demonstrated and in the quality of demonstrated understanding and discourse, as judged according to a rubric designed for the project. The rubric was designed for this project and assigned scores for the demonstrated presence and level of understanding for each leadership learning outcome (0: not present; 1: possibly present; 2: present, but underdeveloped; 3: present with demonstrated understanding; 4: present and developed beyond basic understanding; and 5: present with complex understanding).

Table 4 shows statistically significant pre-post increases on eight of the nine leadership learning outcomes where C refers to cognitive, A to affective, and B to behavioral. Effect sizes are large for all items. The largest increases were on C1 (framing STEM leadership in relation to the Bolman and Gallos (2011) four frames), B1 (applying leadership style strengths for the STEM campus change project), and B3 (creating evaluation methods to assess the impact of the STEM campus change project). The A2 category (applying personal history to leadership challenges in relation to diversity and inclusion in STEM programs) did not show significant change from pre-to-post in Fellows ALP projects, although an effect size of 0.8 is considered a large effect. Interestingly, this item is almost word-for-word the same as item #6 from the self-report survey (Apply my personal history to overcoming leadership challenges in relation to diversity and inclusion in STEM), which shows significant improvement from pre-to-posttest. It is possible that the structure of the ALP report was not conducive to Fellows' sharing of their personal history and how it related to their leadership and the implementation of their projects, despite their perceived strengthening of that ability. It is also possible that even among HBCU STEM leaders, dominant frames of whiteness and patriarchy continue to play a significant role in undermining the extent to which the non-privileged lived experience is perceived to matter in leadership for broadening participation. A goal of CASL is to center authentic experiences of leading for broadening

participation in STEM, so the program will continue to explore opportunities for Fellows to connect their personal histories explicitly to their leadership of these efforts.

Leadership Fellows' Perceptions of Change

The posttest survey asked Fellows to comment on whether/how their experience as a CASL Fellow influenced their ability to engage in leadership activities related to broadening participation of under-represented students in STEM fields. Responses were overwhelmingly positive and demonstrated value derived from all aspects of the program. These include better understanding of the 'political frame' from Bolman and Gallos (2011) and how to influence change, as seen in this Fellow's comment, "I certainly feel like I am better equipped to affect change on my campus that could lead to broader participation in STEM, primarily because I have a better understanding of campus politics and how to influence/inspire others to become part of a change initiative." Others talked about their improved understanding of their leadership styles and strengths, "The leadership 360 survey helped me better understand my leadership style and my leadership abilities." Fellows also connected these benefits to increased access to resources that support their leadership, "I definitely have a better sense of what leadership is and how to use my strengths (and improve on weaknesses) to be able to make a difference. I also now have an array of resources to draw upon that I did not have/know about before." One Fellow explicitly connected their changes to aspects of the framing theories behind the program, namely leadership self-efficacy, applied learning, and evaluation/reflection, noting:

> I feel strongly that participation in this program fostered my development as a leader and a scholar. Exposure to the voices/opinions of other fellows, the leaders, and the speakers was enlightening. I have spent time reflecting on everyone's wisdom and feel like my own wisdom has improved as a result. I felt like I was a valuable contributor to the group as well which has increased my confidence in my own ability to lead.

CONCLUSIONS AND FUTURE DIRECTIONS

CASL's Leadership Fellows Program was a year-long undertaking aimed at building and strengthening the leadership self-efficacy and continuous improvement of STEM leaders on HBCU campuses to broaden participation in STEM. Evaluation data showed very positive results for the learning outcomes from both the self-reported survey data and the observed ALP data.

Moving forward, CASL has received new multi-year funding from NSF that will strengthen the leadership research base for future versions of the pilot program described. Based on the data and experience from this initial effort, it is reasonable to speculate that, at a minimum, leadership development programs to broaden participation in STEM should include the following elements:

- a sound theoretical, empirical, and action-oriented foundation in leadership that is developed from the HBCU institutional context
- inclusion of residency speakers who have authentic HBCU STEM leadership experience that has resulted in significant broadening participation outcomes; and
- availability of executive coaches with combined expertise in broadening participation, leadership, and the HBCU institutional culture.

Based on lessons learned from this initial effort, together with data from ongoing CASL research on broadening participation in STEM, the Leadership Fellows Program will continue to evolve with an eye toward building and sustaining the leadership capacity of HBCUs to assume national recognition, authority, and credibility at the center of undergraduate STEM reform. As stated at the outset, CASL is grounded in a modernized conceptualization that foregrounds the lived experiences of African Americans and serves as a platform for fully acculturating non-HBCU and HBCU foreign born STEM faculty who seek to achieve the nurturance and supportive culture that has distinguished HBCUs over the decades. CASL will continue to identify aspects of the *soul* of leadership that can be applied to student success in all of higher education.

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