Measuring the Impact of NSF ADVANCE Programming at the University of Delaware

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I. Introduction

It is well known that gender disparities exist in many academic STEM disciplines. Women, for example, are well-represented in many life and social sciences but are under-represented in most fields of engineering, math, computer science, and physics (National Science Foundation 2015; Yoder 2016). It is also well known that the STEM pipeline leaks women. Although research suggests that the bachelor to PhD STEM pipeline may no longer leak women (Miller & Wai 2015; NSF 2015; Yoder 2016), it is still the case that women's representation decreases with each increase in faculty rank (Carr 2013; National Science Foundation 2015; Yoder 2016; Cho, et al. 2017). These problems are compounded when one thinks about racial diversity and the interactions between race and gender (National Science Foundation 2015; MIT 2010).

In order to address such disparities, the National Science Foundation (NSF) has a program to support institutions in the development of a more diverse science and engineering workforce. The University of Delaware (UD) currently holds a five-year NSF ADVANCE Institutional Transformation grant (NSF HRD 1409472) that operates with the broad goals of promoting faculty diversity and fostering a climate of inclusive excellence. More specific goals include improving the representation, retention, and advancement of women STEM and social sciences (SS) faculty and women faculty of color at UD. In order to continue and sustain institutional change, our work aims to improve the climate for *all faculty*.

How does one measure the impact of programs such as UD ADVANCE that are geared toward increasing faculty diversity and improving climate? In this paper, we describe how we measure short- and mid-term impact of UD ADVANCE initiatives. We measure their impact in traditional ways, for example by looking at retention and hiring patterns. These measures, while useful, do not tell the whole story. We, therefore, also discuss informal indicators of impact. These are measures that fall outside of formal evaluation but, nonetheless, indicate progress towards institutionalization of change.

II. Background

The UD ADVANCE Institute emerged from previous work under a UD NSF ADVANCE Partnership, Adaptation, Implementation and Dissemination (PAID) grant (2008-2013), awarded to the College of Engineering (COE) and the College of Arts and Sciences, Natural Science (CAS, NS). Products from that grant include recruitment and mentoring workshops presented by faculty for faculty. These workshops incorporate data-driven research on implicit bias, the institutional value of diversity, and best practices in faculty recruitment and retention. The figure below (figure 1) indicates progress at UD in the area of recruitment and retention since the PAID grant. The PAID grant seeded opportunity to engage in more extensive efforts around institutional change and played an important role in the development of the current NSF Institutional Transformation (IT) grant.
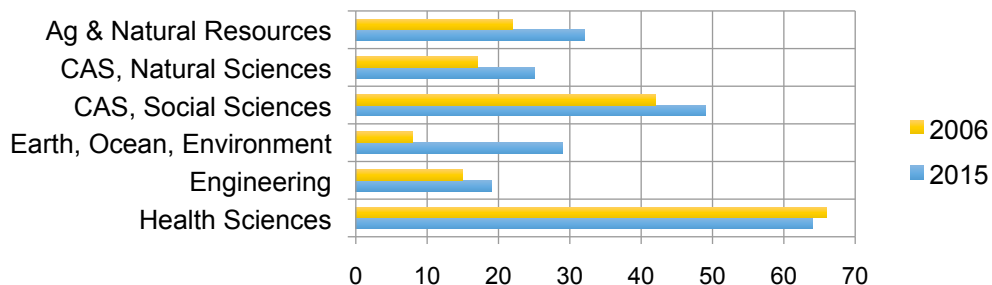
Figure 1. Percentage UD Women T/TT Faculty in 2006 and in 2015

III. UD ADVANCE IT

As the name suggests, the long term goal of an NSF-IT grant is institutionalization. We take this to mean that the strides made in improving faculty diversity and departmental climates over the lifetime of the grant are not only maintained by the institution, but are also strengthened and become standard within UD.

When thinking about institutionalization, and how to get there, it is useful to draw a distinction between first- and second-order change. *First-order change* involves minor adjustments or improvements in a small number of dimensions but does not change the organization's core (Kezar 2001). Progress made in the PAID grant is an example of first-order change. The changes were implemented only in specific colleges (COE and CAS-NS) and focused on two dimensions – best practices in faculty recruitment and mentoring the mentors. Under the IT grant, we are seeking second-order change. *Second-order change* goes beyond the first-order and aims to change the institution's core. Such change is multidimensional (involves many aspects of institutional change), targets a wide audience at multiple institutional levels (such as faculty, chairs, and the upper-administration), and requires connections among the layers (Kezar 2001; Austin, et al. 2011). It must also be recognized that change happens one step at a time and, thus, requires *persistence* (Kezar 2001).

UD's IT grant is larger than the PAID grant and has a broader range of objectives and activities. Its objectives include improved departmental climates for all faculty; improved recruitment, retention, and advancement of women faculty, especially women faculty of color and women STEM faculty; and increased numbers of women in leadership positions. Progress towards these goals relies on systematic collection and reporting of institutional data and a social science research program.

The departmental climate is an important factor in professional satisfaction and success (Hurtado and Figueroa 2013). Guided by research that underscores the importance of leaders for establishing a positive work climate, we have developed a number of activities targeted at supporting chairs, deans, and provosts (Rocque and Laursen 2007; Bilimoria, et al. 2008; Ackelsberg, et al. 2009; Bilimoria, et al. 2012). We are on the provost's calendar every other week to collaborate on institutional diversity initiatives. We support discussions with "talking points – viz., research-based easily digestible facts, figures, and best practices for diversifying the faculty. Talking points are also presented regularly to deans and chairs at regular

administrative meetings. We also have a number of chair mentoring activities such as chair workshops, networking, and policies & procedure support.

Retention and advancement of women faculty requires more than informed and involved administrators. Faculty, themselves, must also be informed (Bolman & Deal 1991; Bilimoria, et al. 2008; Buch, et al. 2011). To improve the transparency of the promotion and tenure (P&T) process, for example, we offer promotion and tenure panels for advancement to associate and to full professor. We are currently working with the faculty senate in the development on an enhanced formal mentoring policy. Specifically for women faculty, we offer mini-grants for leadership development, leadership workshops, and we host a variety of networking events. The strategies employed above focus on change at the individual level by working to make faculty and administrators more informed and proactive. Institutional transformation also requires changes to the institutional structure itself (Bolman & Deal 1991). This starts with systematized and readily accessible data on UD faculty diversity and satisfaction. Products include up-to-date demographic data on representation, retention, promotion, etc.; a biannual faculty climate survey and report; faculty exit interviews; faculty satisfaction interviews; and associated social science research products.

A second type of structural change that we employ focuses on institutional policies, procedures, and practices that effect faculty satisfaction and professional success. Examples include, but are not limited to, P&T, mentoring, and family friendly policies such as stop-the-clock, dual career, and parental leave. Practices and policies are reviewed for clarity and equity; we develop resources to increase their transparency; and, we work with institutional leaders to enhance policies and procedures in need of improvement.

To support a climate in which diversity is valued and respected, UD ADVANCE takes steps to coordinate and draw attention to actions and discussions of faculty diversity. Members of the social science research team publish their results in academic journals and, along with members of the leadership team, present research results at national and international conferences. We also disseminate UD faculty diversity data, diversity efforts, and best practices for inclusive excellence to the campus community via a variety of formats (e-newsletters, brochures, bookmarks, workshops, etc.). We have established a canvassing committee to build awareness of, and to take steps to improve, gender disparities in research honors and awards. We organized and hosted a national research conference, "Women of Color in the Academy: What's Next?", to share research results, highlight women faculty of color, and to seed networking relationships among faculty of color in the region. We also sponsor or co-sponsor a variety of other types of diversity events on campus.

IV. Measuring impact

In order to achieve institutionalization, Universities and ADVANCE-institutions can devise programs and initiatives aimed at changing the core structures and norms of the institution. But how does one measure progress in this regard? The UD ADVANCE Institute has two evaluators, one internal and one external to UD, who help to assess our programmatic impact.

The most clear-cut measures of institutionalization are those that demonstrate achievement of, or significant progress towards, long-term outcomes. For example, in the long term, we expect to see significant increases in the representation, retention, and advancement of women faculty, especially women STEM faculty and women faculty of color. We also expect to observe improved departmental climates and work environments for all faculty. However, neither the NSF nor the UD ADVANCE project leadership expects that the long-term outcomes will be achieved during the lifetime of the grant. In this context, long-term outcomes are those that can take up to 10 years to achieve and the grant funding is only for 5 years (six, if one adds a one year no cost extension). It often takes more than 5 years for significant improvement in areas such as increased diversity in faculty representation, retention, and advancement. Additionally, progress is often not linear (Austin, et al. 2011). Sometimes things get worse before they get better -- and institutional changes such as changes in university leadership or in the university's budget model may cause back-tracking and slow-down progress (UD Diversity Task Force 2009; UD AAUP 2013; UD Faculty Senate 2013). Thus, even if the grant is moving in the right direction, it may be hard to see significant growth during the lifetime of the grant.

In the meantime, one can rely on short- and mid-term impacts as indirect measures of progress. For example, although we do not expect to see a significant improvement in the representation and advancement of women faculty in three to five years, we do expect women to report greater access to networking and professional and leadership development opportunities. We also expect that faculty and administrators will report increased awareness of implicit bias, increased reliance on best practices in faculty evaluation, increased transparency in policies and practices, and greater access to faculty mentoring.

Nonetheless, evaluation of short- and mid-term outcomes is often localized. It can tell us what has worked or what hasn't, for instance, when we run recruitment workshops or whether our mini-grant program is effective. Collectively and over time, these data points provide some information about long-term progress, but that do not tell the whole story. We, therefore, seek additional data points to gauge our progress. In what follows, we discuss several informal indicators that are not part of the program's formal evaluation, but are signs that we are moving in the right direction toward establishing second-order change.

V. Informal indicators of institutional change

The fostering of allies is an important element in second order change, as this type of change requires large numbers of change agents at all levels of the institution. We, therefore, look for evidence of increased interest in and support for our work. We also look for evidence of sustainability and of structural changes occurring as a result of our activities and of increased support. Below we describe five informal measures of progress in these areas.

Ad hoc requests

A seemingly mundane example comes in the form of ad-hoc requests from faculty and administrators who had previously not been involved in UD ADVANCE. These requests take many forms and we find it useful to track them. We note, for example, requests for materials such as our family friendly flier or our dual-career brochure. Likewise, we pay close attention to data requests for faculty diversity and climate survey results. Also important are requests from

chairs and administrators for increased offerings of various types of training such as implicit bias, mentoring, or recruitment training. It may not be possible to accommodate all requests; thus, program leaders must be strategic when deciding what to take on. Nonetheless, they are evidence of increased buy-in from UD administrators.

Key ADVANCE stake-holders rising through the ranks.

We began our ADVANCE work in 2008, with the establishment of a core working group of senior STEM faculty. The group met on a regular basis, read about implicit bias and best practices in faculty recruitment and mentoring, and developed and implemented faculty mentoring and recruitment workshops. Over the years, a good number of these core-faculty have risen through the ranks into senior leadership positions. This is an unintended positive consequence, as it was not in the grant and could not be predicted. That said, when forming working groups, we try to rely on faculty who have shown significant leadership potential. In addition, although the working groups are formed with a specific purpose in mind, they often serve an additional mentoring/networking function. The advancement of ADVANCE core faculty also points towards second-order change, as it helps to create a wider fabric of administrative support.

Provost Working Group on Dual Career

Based on a 2008 study of 9,000 faculty members at 13 research institutions, 40% of female faculty and 34% of male faculty have academic partners. This situation is amplified in STEM departments, where 83% of women scientists (vs. 54% of men scientists) in academic couples are partnered with another scientist. Women are more likely than men to reject a job offer if their spouses cannot find satisfactory employment nearby. Dual career hiring may, therefore, help to advance not only gender equity but also racial/ethnic diversity in higher education (Schiebinger, et al. 2008).

After presenting these data to the provost as a talking point, he formed a dual career working group. This was a university-level group populated with high level administrators from the provost's office, the CAS dean's office, and from HR. It included three key faculty members from UD ADVANCE, AAUP UD, and the University Faculty Senate. The working group has, so far, established a protocol for dual career hiring for new faculty. For transparency, this protocol is spelled out in a Dual Career brochure that is being disseminated to chairs, deans, and faculty. The protocol and the brochure are first steps in what we hope will become a more robust dual career program. Important for our purposes, this is an example of a structural change that has occurred through cross-fertilization of multiple institutional layers. It is, thus, an important step towards second-order change.

Faculty Senate Committee on Diversity and Inclusion

Although the *University Faculty Handbook* has a formal mentoring policy for junior faculty, the results of the UD ADVANCE 2014 and of the 2016 climate surveys indicate a need for more and for improved mentoring. Notably, in 2014, the results indicated that more mentoring in departments targeted by the PAID grant. The results from 2016 reveal that less than 25% of T/TT faculty receive formal mentoring within the department. Results varied tremendously by

college. Under 5% of faculty in one college, and about 50% in a different college, reported receiving formal mentoring in the department.

The University Faculty Senate Committee on Diversity and Inclusion is currently collaborating with the UD ADVANCE to address these issues. The goal is to develop a more robust formal mentoring program by adapting and enhancing existing resources and workshops. This program will be proposed as a Faculty resolution to be adopted by departments. This is an important step in progress towards institutionalization.

Faculty Fellows

At the advice of our External Advisory Board (EAB), and in collaboration with the deans, UD ADVANCE has recently developed what we call a 'Faculty Fellows Program.' This program consists of six senior faculty members, each appointed by his or her dean, who work with UD ADVANCE to support diversity efforts in five colleges. (The College of Arts and Sciences has two fellows, due to its large size.) These individuals have adapted and implemented the recruitment workshops that were developed under the PAID grant. They are currently working, in collaboration with the Faculty Senate and with their deans, on formal mentoring. In the future, we expect them to work with faculty and chairs to learn more about how policies and procedures are implemented in different departments across campus. The ultimate goal is greater transparency of, and consistency in the application of, policies and procedures that affect faculty success. The importance of the fellows for sustainability should be fairly obvious. They are a formally recognized administrative group who are working across levels to put infrastructures in place that will improve faculty diversity.

VI. Challenges, Changes, and Opportunities

Developing and running an NSF-ADVANCE program is not without its challenges. This is especially true as one looks towards sustaining the program beyond the life of the grant. In this section we will discuss several examples as well as some steps that we have taken, or are taking, to overcome these challenges.

Since the start of UD-ADVANCE, there has been significant turnover in administrative leadership. As noted earlier, changes in leadership can slow progress. It takes time for a new leader to settle into his or her position and to establish priorities. And, of course, priorities can change from leader to leader. ADVANCE leadership must, therefore, work with new communication styles and potentially re-focus efforts. For example, our current provost started his position as we were completing and submitting our IT proposal. Between that time and the time of receiving the grant, the provost had established two new positions in his office: the vice provost for faculty affairs and the vice provost for diversity. These positions brought increased opportunity for collaboration and far-reaching impact, but also challenges. As the two vice provosts were settling into their new jobs, UD-ADVANCE was establishing and staffing an institute and associated programming. Although we meet with the provost's office on a bi-weekly basis, we discovered later that was some doubling of programmatic efforts. Areas of overlap included programmatic activities related to informal mentoring of under-represented groups as well as workshops for department chairs. Though the provost's office took a different angle from ours, efforts could have been streamlined and fortified earlier. These challenges have been

addressed through the development of additional communication mechanisms. All three members of the provost's office are now on our Internal Advisory Board (IAB). Prior to this year, we only had the provost himself. As noted earlier, following one of our dual career talking points, the provost established a commission on dual career faculty that included members of his office, members of the faculty, and members of the ADVANCE team. Members of the ADVANCE team also participate is several other provost committees – such as those surrounding P&T and faculty mentoring. We are also working with the vice provost for faculty affairs with aspects of chair development.

In addition to changes in the provost's office, UD has recently seen change at the presidential level. Our former president left at the end of the 2014-2015 academic year. After having an interim president for one year, our current president took over June 2016. Expected changes associated with this transition include a new budget model, an increase in the STEM undergraduate population from ~2,500 to ~3,500 students, and a doubling of graduate enrollments institution-wide. This could benefit ADVANCE, for example, if it results in increased STEM hiring. One challenge that we foresee relates to changes in the university's budget model. These changes are coming at a time when we are planning our institutionalization structure. Questions that need to be addressed are: where will UD-ADVANCE be housed at the end of the grant; what will be its primary responsibilities; how will it be funded? We are addressing this challenge via communication with all interested parties – including the president, provost's office, and the deans. We are working with these groups to clarify our programmatic strengths and also to delineate what will be needed to sustain the program.

A second challenge that we have faced over the years – i.e., since the start of the PAID grant and in the first 2.5 years our our IT grant – is a relatively low hiring rates in many of our target departments. This, in turn, slows progress towards diversifying faculty in those departments. We have addressed this challenge by focusing on retention and by working with administrative leaders to better understand the factors that lead to faculty retention at UD. Faculty climate survey results and faculty satisfaction and exit interviews are helpful in this regard. When it comes to measuring impact, we observe non-quantitative results as outlined in the paper.

A third challenge is the need for more hands-on support. Running an ADVANCE institute requires significant person-power and it is sometimes difficult to enlist faculty to assist with programmatic elements. Faculty, especially senior faculty, have significant burdens on their time. One approach we have taken to solve this difficulty is to work with the deans and to restructure our grant budget to support our Faculty Fellows program. These fellows have helped to broaden our reach. As discussed above, last fall (2016) the fellows presented workshops tailored for each college to nearly 200 faculty in 6 out of the 7 colleges. These workshops were well-received and will continue. This not only helps with the recruitment of excellent and diverse faculty; it also increases the visibility of our institute. We have also begun work with the fellows to extend our formal mentoring protocol (established under the PAID grant) to all assistant professors and, eventually to associate professors, in all departments. We are working to institutionalize the Faculty Fellows program by working with the deans to make it part of the long-term (post-grant) structure of the institute. In addition to the Fellows program, we are seeking to increase support by restructuring the IAB. The IAB has grown over the course of the grant and has served a largely advisory role. At the recommendation of our EAB and our

evaluators, we are adding a subcommittee structure. These subcommittees will work to help us accomplish targeted goals, such as establishing formal mentoring for post-tenure faculty and a chair networking structure.

VII. Conclusion

Achievement of short-term and mid-term outcomes are indirect measures of progress towards second order change. Also important are informal indicators such as the ones discussed above. Each example, taken on its own, illustrates a small step towards second order change. These steps, with persistence, can add up over time to create large scale changes to the structure and the norms of the system.

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