AC 2010-1554: ISU ADVANCE – TRANSFORMATION ACROSS THE UNIVERSITY HIERARCHY TO ENHANCE RECRUITMENT, RETENTION AND ADVANCEMENT OF WOMEN FACULTY IN ENGINEERING

Kristen Constant, Iowa State University

Kristen Constant is an Associate Professor in Materials Science and Engineering at Iowa State University. She serves as the College of Engineering Equity Advisor with the NSF-funded ISU-ADVANCE program.
ISU ADVANCE – Transformation Across the University Hierarchy to Enhance Recruitment, Retention and Advancement of Women Faculty in Engineering

Abstract

ISU is in the 4\textsuperscript{th} year of a 5-year NSF funded ADVANCE grant. In accordance with the intent of NSF’s “Institutional Transformation” grants, the focus of this work is not on the individual professional development of women, but instead, on changing the academic environment in which they work. The goal of the ISU ADVANCE research program is to investigate the effectiveness of a multilevel collaborative effort to effect institutional transformation that results in the full participation of women faculty in STEM fields in the university. Our approach focuses on transforming departmental cultures (views, attitudes, norms and shared beliefs), practices (what people say and do), and structures (physical and social arrangements), as well as university policies, through participation of individuals at all levels of the university. There are several embedded change agents (faculty and administrators) that work within the existing culture at the departmental (ADVANCE Professors), college (Equity Advisors) and university (ADVANCE PIs and Provost Fellow) levels. These individuals work together to identify and combat the sources of systemic gender bias while distributing the responsibility for progress (thereby increasing ownership) among constituents and stakeholders. In addition to collaborative transformation work in ‘focal departments’, other efforts include educating targeted groups such as department chairs and search committees, but also providing learning opportunities for all faculty. Dissemination of results and training has taken various forms including workshops, web-based resources, formal presentations, informal discussions and even ‘Readers Theater’ presentations.

Introduction

Iowa State University of Science and Technology is a land grant institution with strength in science and engineering. The university, with about 27,000 students and 1,700 faculty, has 8 colleges, the second largest of which is the college of engineering with a faculty of 190 and student enrollment of over 6,000. Iowa State’s faculty is 28\% women in tenured or tenure eligible positions, but the College of Engineering (COE) has only 10.6\% women faculty.\textsuperscript{1} Additionally, the attrition rate for ISU women faculty in STEM fields (Science, Technology, Engineering and Mathematics) is significantly higher for women as compared to men (especially in the first three years).\textsuperscript{2} Despite the fact that these numbers are less favorable than national averages, ISU has demonstrated a strong commitment toward improvement of diversity of the faculty and has invested significantly in various campus climate surveys and other studies to better understand faculty satisfaction and the factors that differentially impact women and minorities.\textsuperscript{3} Indeed, the demonstration of an environment conducive to change was one of the factors influencing the National Science Foundation’s decision to award ISU the ADVANCE grant in late 2006.
Program Description

ISU is in the 4th year of this 5-year NSF-funded ADVANCE Institutional Transformation Grant. A brief description of the goals, approach and strategies is included here. A more complete program description has been previously reported.  

*Four Program Goals:* The focus of the work of this grant has been towards meeting four program goals. The first goal is to overcome *known* barriers to the advancement of women faculty in STEM disciplines. These known barriers include lack of transparency and consistency in hiring practices, tenure and promotion, and work assignments. The second barrier is isolation of women faculty. The third is inconsistencies in quality and/or lack of mentoring both for assistant professors and associate professors, and the fourth barrier is difficulty in the management of work/life issues and lack of faculty flexibility. The second goal is to identify and eliminate department-specific barriers to the advancement of women faculty in STEM disciplines. The program seeks to do this through a process called collaborative transformation (CT) that involves detailed study of a particular ‘focal department’ climate through guided discussions with faculty. The third goal is to increase the representation of women and underrepresented minorities at senior faculty and leadership ranks. Finally, the fourth goal is to institutionalize positive change across the university so the work of ISU ADVANCE can be sustained beyond the life of the grant. Note that while some of the goals are directed toward barriers that are specific to women, (e.g. unintended bias) many are related to issues that are common to all faculty, but differentially affect women (e.g. work-life balance, and transparency in promotion and tenure expectations).

*Agents of Change:* To work toward these goals, there are several embedded change agents (faculty and administrators) that work within the existing culture at the departmental (ADVANCE Professors), college (Equity Advisors) and university (ADVANCE PIs and Provost Fellow) levels. In the program, there are 9 focal departments in 3 colleges including 3 in the college of engineering. Within a particular focal department, collaborative transformation is facilitated by ISU ADVANCE researchers and a liaison professor who is a member of the department faculty (called an ADVANCE professor) through focus group discussions with departmental faculty at all ranks. Researchers process the data collected identifying salient themes, and deliver it back to the faculty for consideration and development of action items. At the college level, the ADVANCE Equity Advisor serves to coordinate ADVANCE activities and efforts between departments – both focal departments and those not directly involved in ADVANCE research and also serves to coordinate with other existing groups at the college level (e.g. the COE Diversity committee) and the university level. The Equity Advisor also works closely with ADVANCE PIs and the University level administration to coordinate activities and report progress.

*Program Elements:* In addition to the collaborative transformation research in selected departments, there are a number of other program components, some designed to target key constituents (e.g. department chairs, search committee members, promotion and tenure committees), and others developed for the broader University community. Programs targeting department chairs are considered to be of critical importance, as our research and previous research have shown that the department chair is one of the key determinants of faculty
satisfaction.\textsuperscript{12,13} Topics for chair workshops have included cognitive errors in evaluating faculty, unconscious bias in mentoring and promotion and tenure decisions, faculty flexibility and work-life balance and mentoring associate professors toward promotion. Workshops for search committees on avoiding cognitive errors and unintended bias in evaluating candidates were also held. In the College of Engineering, the equity advisor and grant PI (the Associate Provost for Faculty Advancement and Diversity) presented to and had conversations with the members of three department chair search committees. The purpose of this effort was not only to motivate a broad search to identify a diverse candidate pool, but also to discuss best practices in identifying candidates with commitment to supporting and expanding diversity on the faculty. Other targeted activities include college specific meetings and networking events for women faculty in each college, for example, a breakfast meeting for women faculty in the College of Engineering designed to combat isolation. (Most engineering faculty women are one of few in a department and rarely meet others within the college). Activities directed toward educating the larger University community (and beyond) range from hosting a national conference to individual one-on-one meetings. These events and activities are usually either designed to disseminate results of our collaborative transformation efforts, or to educate faculty and administrators on a particular topic important to enhancing participation of women. To broaden our impact and learn from other experts, ISU ADVANCE hosted a National conference on increasing flexibility in faculty careers (in October, 2008). To broaden the reach of ISU ADVANCE within ISU, Equity Advisors from each of the three colleges spoke to non-focal department faculty in their college (usually at a departmental faculty meeting) to discuss ISU ADVANCE activities and efforts in other departments and colleges – focusing specifically on how they can make use of the results of research in their own departments. A number of electronic resources have been developed (in Web and sometimes CD-ROM format). Topics include best practices for faculty searches\textsuperscript{14}, faculty flexibility\textsuperscript{15}, and the pathways to promotion\textsuperscript{16} (mentoring associate professors). Figure 1 depicts the relationship of program elements across the university hierarchy.

Results (Successes and Challenges)

Results are achieved both through collaborative transformation research efforts in specific departments (related to Goal 2 – department specific barriers) and through other program elements.
elements (which address Goals 1, 3, and 4, related to known barriers, advancement and leadership of women and sustainability).

Results with respect to the four program goals: Results of research conducted early in the program are used to steer future efforts. For example, one such result led to a focus on the mentoring of associate professors – now the theme of the 2009-2010 year for ISU-ADVANCE. As a result, the Office of the Executive Vice President and Provost and several deans are examining and redesigning the mentoring program to include mentoring through to the promotion to full professor.

With respect to the first goal, known barriers of transparency, isolation, mentoring, and work-life balance, have been addressed in some of the activities and program elements already discussed. The assessment of their impact will be addressed in the following section.

Addressing the second goal, faculty members in each focal department (that has a collaborative transformation study report) collaborated to develop and implement change strategies for addressing issues that are specific to the climate of their own department. Because the program was designed to have a phased research effort, six of the nine focal departments have completed the data collection and analysis phase of the collaborative transformation research, with three remaining to be completed by the end of 2010. Three departments (one in college of engineering) are in their third year of participation, three are in their second, and three are completing their first. The results of the first round departments (including one in engineering) have been published and widely disseminated to the campus both in the form of open workshops and discussions and written reports. While departments each have unique characteristics, there are many commonalities between departments, even across departments that are in different colleges. Rather than attempt to reiterate all the results to date, a selection of success stories demonstrates the breadth of the impact. As a result of the collaborative transformation efforts in focal departments, a number of department chairs that previously had not done so, report that they are having regular informal meetings with assistant professors to discuss progress and expectations. At least one department is examining their current mentoring structure with the goal of improving consistency and inclusiveness. Two of the focal departments have developed guidelines and standard procedures for modifying duties of new parents. (ISU does not currently have a policy beyond sick leave and the family and medical leave act (FMLA) for the arrival of a child). One has taken this further to include an effort to improve transparency in assignment of workloads (including teaching and committee assignments and other service). Another department has provided for childcare assistance for speakers traveling with or caring for infants. All departments have reported that they have had open conversations regarding topics related to ADVANCE issues that were previously not possible to discuss.

The third goal of increasing representation of women and minorities at senior faculty and leadership ranks is one for which progress is difficult to show on a short time scale. However, there has been significant activity and some encouraging preliminary results. In addition to the education programs for search committees detailed above, implemented changes in hiring procedures have been designed to make them more inclusive. For example, in collaboration with partners across campus, the college of engineering Equity Advisor helped develop criteria to evaluate administrative-level candidates with respect to diversity issues. These criteria were then used in the Dean search for three colleges, including the Dean of Engineering, the Dean of Design, and the Dean of Human Sciences as well as the search for the Vice President for
Economic Development. Of these four searches, two white women, one Hispanic man and one white man were hired. While these outcomes are anecdotal and cannot be credited exclusively to ISU-ADVANCE, we hope that they indicate a positive change in campus culture and potential for sustainable progress.

The fourth goal of institutionalization is one that is considered in the design of all program elements. ISU ADVANCE involves participants at all levels and they have been charged with helping to develop and promote policies and structures that are embedded into the university culture. Some collaborative transformation departments report that their faculty has adopted new committee structures and policies as a result of their ADVANCE involvement. College Deans from the three ADVANCE colleges have agreed to support the position of Equity Advisor for three years after the conclusion of the grant. Data collection and analysis to both assess effectiveness and guide future efforts has been institutionalized as part of ISU’s Institutional Research standard practices. The ISU-ADVANCE Council, which includes representatives from university, college and departments involved in ADVANCE has been expanded to include representatives from administration of the two non-ADVANCE colleges that have science faculty (Veterinary Medicine and Human Sciences). Finally, there has been considerable activity in seeking additional funding to carry on some elements of the program.

Challenges: Several challenges have been identified, many, but not all of them related to the current economic crisis. Much of the normal hiring within the university has been largely halted, reducing the opportunity for diversifying the faculty through hiring. Issues related to benefits (specifically modified duties for new parents) are problematic with respect to identifying supporting funding. Although the University faculty senate has approved a policy on modified duties (with input and support from ADVANCE), there has been an indefinite postponement in presenting it to the state-level Board of Regents for approval because of the current economic climate. Even so, the ADVANCE team has prepared a financial argument for adopting the policy. The business case for retention is very compelling. PIs of the ISU ADVANCE team performed analyses quantifying the cost of retention (through family friendly policies and benefits such as tenure clock adjustments and modified duties compared to the cost of losing and replacing an unhappy faculty member (including search costs, interviewing, start-up, and administrative support) which was presented at the ISU ADVANCE National Conference of Faculty Flexibility. The analysis estimated cost savings for retention (over replacement) ranging from $50,000 to over $300,000 depending on the type of faculty and startup costs. These arguments for future savings (versus current expenditures) are being used to combat the faulty conclusion that providing faculty with flexibility is too costly. Other challenges include coordinating activities and communication among all participants (without overburdening them with meetings). An attempt was made to bring ADVANCE agenda items into already scheduled, standing meetings (for example, faculty meetings or Dean’s Cabinet meetings) to leverage the time spent and broaden exposure. Another challenge has been getting the full participation of male STEM faculty members, which is critical for transforming the university culture. Finally, maintaining momentum through personnel changes in focal departments has been a challenge. All first found department ADVANCE Professors have now transitioned out of the role, resulting in some loss of momentum as their replacement becomes familiar with both the basic literature and ISU context of gender equity issues and the expectations and functioning of the rest of the team. Despite these challenges, the successes are encouraging and the number of people committed to and capable of making positive changes continues to grow.
Assessing the Impact

Both the efficiency and effectiveness of ISU ADVANCE research and other program elements are monitored and improved by the participation of a number of groups including both internal and external evaluators. Internally, a steering committee provides oversight to the program. These teams examine, evaluate and guide both operational efficiency and effectiveness of the ISU-ADVANCE team, but also the effectiveness of the work it accomplishes. Regarding the impact of ISU-ADVANCE work, the team has designed several measures of assessment, but has also leveraged other sources of data available (apart for ADVANCE efforts) from ISU’s Office of Institutional Research.

Engagement: The impact of various program elements is challenging to measure, but there have been several efforts to characterize both the reach of events and their perceived value. Participation in ISU-ADVANCE activities is carefully monitored by event and by college to assess the reach of our programs. Additionally, evaluation forms are distributed at each event. Of the 21 formal events, (excluding the national conference) there have been over 800 participants (some individuals going to several events and others only to one). The national conference included 60 participants from the ISU community including administrators and faculty as well as 60 participants from around the country. Feedback from events is difficult to collect, as there is no practical way to require attendees fill out evaluation forms. That which has been collected is largely positive with the most common suggestion for improvement being to allow more time for discussion. It is clear that, once engaged, faculty are eager to discuss these issues.

The numbers: Representation of women on the faculty in STEM disciplines can also be considered a measure of progress, but is also difficult to assess on a short time scale. The total number of tenured and tenure-eligible faculty decreased at Iowa State for the second year in 2008-2009, which includes a decline in numbers but also in percentage of women. Women in all STEM departments have held between 15.6% and 18.9% of the tenured and tenure-eligible faculty positions in the past 8 years, but the percentage of women faculty in engineering has always been considerably lower, and is currently at 10.6% varying only by a few percent (both up and down) in the past 8 years. However, in the past 5 years, a larger fraction of the women on the engineering faculty are now tenured (either at associate or at full professor rank.) While it is encouraging to see advancement, this also corresponds to a drop in total fraction of assistant professors, which does not bode well for future progress. We will continue to carefully monitor these numbers.

Independent surveys: Three independent sets of survey data have been collected that serve as a baseline set and will continue to provide evidence of impact in the future. A member of the ADVANCE PI team is also the Associate Director of the Office of Institutional Research, which greatly facilitates the tracking and reporting of indicator data. The first data set is an ISU generated survey on University life – assessing a 2005 strategic plan goal of ‘Making ISU a great place to learn and work.” This survey was administered in 2007 and 2009. This survey is limited in scope, but specifically seeks to determine to what extent faculty are satisfied with the work environment at ISU. The second data set is the AAUDE (Association of American Universities Data Exchange) survey, first administered in 2008, and the second has not yet been scheduled. The third is a COACHE (Collaborative on Academic Careers in Higher Education) done in 2005. A second survey was administered beginning October 2009, but the results are not

Page 15.817.7
yet available for analysis). This survey is of non-tenured tenure track faculty (mostly assistant professors). While these surveys are very useful in ‘taking the pulse’ of the campus, they do not provide specific insight into the effectiveness of specific ISU-ADVANCE efforts.

Key findings for the University Life survey indicate a greater agreement in 2009 than in 2007 with the statement “Iowa State University is a great place to work.” From this survey, there are two strategic plan sub-goals considered to be most important that are very closely related to ADVANCE efforts; “Recruit and retain faculty, staff, and students who are dedicated to individual and organizational excellence and achievement”, “Foster an environment in which all members of the university community can contribute their fullest while pursuing satisfying personal lives.” These sub-goals (out of 7 total) were rated as the “most important” by more faculty in 2009 than in 2007. This suggests that faculty are becoming even more aware of and sensitive to the importance of retention and work-life balance.

The key findings of the AAUDE Faculty Satisfaction Survey include: in general, full professors tended to be the most satisfied while associate professors tended to be the least satisfied. The responses by ISU tenure-eligible faculty to the survey were very similar to responses to similar questions by ISU tenure-eligible faculty in the 2006 COACHE survey. Most of the statistically significant differences (by gender) related to work and life stressors - issues of work/life balance, and tenure clock policies. The most statistically significant differences found by gender and rank were among associate professors. Data from the most recent AAUDE survey and a future COACHE survey will allow us to monitor these gender differences for changes. The currently available data, however, validates our focus on work-life balance issues and mentoring and promotion of associate professors.

In summary, several mechanisms are in place for assessing the impact of ISU-ADVANCE and qualitative data are encouraging, however, a full assessment will require more time. The grant’s focus on institutional change, by definition, is a slower (but presumably a more lasting) process. These results will be disseminated as they become available.

Future Work and Sustainability

Collaborative transformation research has begun in the final three departments with the data collection phase already completed. The other six departments will continue to address the issues elucidated in their collaborative transformation work.

A number of additional education and networking events are scheduled both to targeted groups (especially chairs) and to the greater campus community. Many of these are focused on the 2009-2010 theme of Pathways to Advancement – on supporting the advancement of women to full professor and leadership positions.

The Office of Institutional Research has committed to facilitate participation in future faculty satisfaction surveys and will provide support for analysis and interpretation. The three focal college Deans have committed to three years of additional funding beyond the life of the grant for the position of Equity Advisor. Other changes embedded into policy and departmental culture and practices (as have been presented earlier) are encouraging and we will continue to monitor their persistence and impact.
Although we have made significant progress, we know that sustaining the slow process of institutional transformation will require continued efforts and investment. The ISU-ADVANCE team continues to develop strategies to address each of these challenges and remains both committed and optimistic to positive transformation.

This material is based upon work supported by the National Science Foundation under Grant No. SBE-0600399. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.
References

1. Iowa State University Fact Book, 2008-2009, Office of Institutional Research, Iowa State University, [http://www.ir.iastate.edu/factbk.html](http://www.ir.iastate.edu/factbk.html)
2. Iowa State University Office of the Provost. 2003. Taskforce on the Recruitment and Retention of Women and Minority Faculty Report. [http://www.provost.iastate.edu/faculty/diversity/Iowa State University Website](http://www.provost.iastate.edu/faculty/diversity/Iowa State University Website)
15. Iowa State University’s ADVANCE Website Resources for Work Life Balance [http://www.advance.iastate.edu/worklife/worklife.shtml](http://www.advance.iastate.edu/worklife/worklife.shtml)
16. Iowa State University’s ADVANCE Website Resources for Pathways to Promotion [http://www.advance.iastate.edu/](http://www.advance.iastate.edu/)
