

Adopting a Mentoring Program for Female Faculty in STEM at a New Campus and the Factors Determining Success: A Literature Reviewⁱ

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This paper was written as part of an ADVANCE Partnership for Adaptation, Implementation and Dissemination (PAID) program award to a consortium of Florida state universities, the AAFWCE (Alliance for the Advance of Florida's Academic Women in Chemistry and Engineering). The National Science Foundation's (NSF) created the ADVANCE program to increase the representation and advancement of women in academic science and engineering careers. In support of the ADVANCE program, Virginia Tech (VT) maintains a portal website, which collects information about the work of grant recipients in one location. Among the resources available on the VT ADVANCE portal is an annotated bibliography containing readings that support the argument about women and minorities in science and engineering. The motivation for the project whose results this paper reports was the observation that the reading lists from the VT ADVANCE portal annotated bibliography did not contain material more recent than 2007. The objective of this project was to collect reading material, not included in the VT ADVANCE portal, related to the topic of senior female Science, Technology, Engineering, and Mathematics (STEM) faculty mentoring junior female STEM faculty.

RefWorks

<https://www.refworks.com/refworks2/default.aspx?r=authentication::init&groupcode=RWUnivFlorida>
Subscriber Group Code* = RWUnivFlorida
Login Name = STEMWomenMentor
Password = advance

ADVANCE Portal

<http://www.portal.advance.vt.edu/>

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This review examines literature describing a variety of mentoring programs. In reviewing the literature, it became clear that a variety of styles of programs exist. The goal of much of the literature describing these programs is to report their success so other universities interested in creating similar programs on their campus will have an idea of which strategies work. An important aspect of these reports is that every mentoring program exists in a unique campus environment which has a role in the success of the program. It will be beneficial to universities that are in the process of beginning a mentoring program on their campus to understand how mentoring programs are tailored to be successful in each university's unique campus environment. With this end in mind, this review compares three different mentoring programs to try to determine the role that each university's campus environment plays in the success of each program. The programs that are examined are those at the University of North Carolina (UNC), Charlotte, Stevenson University (SU), and the University of Washington (UW). University of North Carolina, Charlotte attempts to address the challenges identified in a needs assessment by changing the career planning habits of associate professors. The mentoring program at Stevenson University is a more comprehensive approach because, in addition to changing the habits of professors, this program incorporates supportive policy changes in science departments and the university. The University of Washington adopts a group mentoring strategy to assist female professors, attempting to achieve a critical mass of female STEM leaders to increase the representation of women in STEM. By comparing these varied mentoring programs, this review attempts to examine how universities cater their mentoring programs to be successful in the unique climate that exists on campus. The lessons that can be drawn from this comparison may be useful when academic leadership adapts a successful mentoring program to a new academic environment.

Buch et al. (2011) present the results of a needs assessment at University of North Carolina, Charlotte, identifying career challenges facing associate professors. The result of the needs assessment

was the identification of the following challenges by male and female associate professors: lack of attention to career planning by associates, lack of institutional and departmental attention to and support for the career-development needs of associates, lack of career-development opportunities for associates, disproportionate service demands/ administrative duties for associates that interfere with progress toward full professor, lack of transparency and clarity regarding promotion criteria, and a need for more flexible and inclusive “paths to professor” that recognize a broader range of contributions (Buch et al., 2011). The proffered explanation for the neglect of the career development of associate professors is that universities focus disproportionately on the needs of junior faculty. Buch et al. (2011) develop a mentoring program to help the university bolster its support for associate professors. One conclusion that can be drawn from the needs assessment is that the challenges facing associate professors are not gender specific. There is a difference, however, in the amount of time it takes women and men to reach the rank of professor, despite facing identical challenges. The reason for this difference is that these challenges prevent or delay promotion for women more often than for men.

The response to the challenges identified in the needs assessment, was the development of a six-step “mid-career planning process” that was the focus of a vertical-dyad mentoring program for women in STEM and both informal and formal peer mentoring programs for men and women within and across disciplines (Buch et al., 2011). In the vertical-dyad mentoring program an associate professor was mentored by a full professor in the same department where possible. The six steps of the “mid-career planning process” were: requiring mentees to articulate their career goals, understand promotion criteria, conduct a self assessment of their career trajectory, strengths, and weaknesses, write a mid-career plan, discuss their plan with their mentor and the chair of their department, and implement their plan (Buch et al., 2011). Examining the steps of the “mid-career planning process,” it becomes apparent how these steps were designed to address the challenges identified in the needs assessment. To assist associates in paying proper attention to career planning, associates are required to articulate their career goals, assess their own skills, and write a career plan. To create transparency and clarity regarding promotion criteria, associates are required to understand promotion criteria. To provide institutional and departmental support, associates are required to discuss their career plan with a mentor, preferably in the same department, and with the chair of their department. Discussing a career plan with a mentor and the department chair can also help to create transparency and clarity regarding promotion criteria. It is not clear, however, how the “mid-career planning process” is meant to alleviate disproportionate service demands/ administrative duties for associates or to create more flexible and inclusive “paths to professor” that recognize a broader range of contributions.

Despite a failure to address all of the challenges identified in the needs assessment, the six-step “mid-career planning process” and the accompanying mentoring programs were successful in eliminating the gender differences in the number of associates identifying certain career challenges and expressing the sentiment that these career challenges were preventing or delaying promotion that was present prior to the implementation of the mentoring programs (Buch et al., 2011). It is important to make a distinction between the two categories of challenges identified by the needs assessment. UNC, Charlotte was able to address many of the challenges identified by the needs assessment with the six-step “mid-career planning process.” These challenges shared the common characteristic that a change in the habits of associate professors and not the policies of their departments or the university were required to address the challenge. The other category included those challenges that required policy changes by departments or the university. Significantly, although the “mid-career planning process” and mentor programs were unable to address challenges in this category, the mentor programs reduced the gender difference in the

response to survey questions inquiring whether challenges in this category were preventing or delaying promotion. The success of the mentoring programs in this regard suggests that the detrimental effect of challenges which cause associates to believe that departments or universities need to change their policies can be ameliorated by changing the habits of associate professors. This revelation suggests that requiring departments and universities to make policy changes to support mentoring programs is not always necessary.

The mentoring programs at Stevenson University, in contrast to UNC, Charlotte, do incorporate policy changes in departments and the university. The ability to incorporate policy changes is due to the transformation in which the university was engaged at the time of development of these programs. The mentoring programs reported by Gorman et al. (2010) were implemented at a time when the institution that had been Villa Julie College for 60 years was being reclassified as Stevenson University, following decades of program development, curricular expansion, enrollment increases, and growth in the size and scope of the campus (Gorman et al., 2010). The purpose of the Gorman et al. (2010) case study is to learn lessons from a model that has been successful in increasing representation of women in science for adaptation to other institutions, but no consideration is given to whether the SU model can be adapted to other institutions given the university's unique circumstances. No mention of the frequency of institutional reclassification from a college to a university is given nor is any strategy for implementing policy changes at a university that is not being reclassified proposed. It is difficult to understand how the SU model can be adapted without accounting for the role of a massive institutional change that is not primarily driven by faculty retention or advancement.

Another important consideration in the case of Stevenson University is its status as a private school and the fact that the university did not become a co-educational institution until 1972. Both of these characteristics further separate Stevenson University from UNC, Charlotte and the University of Washington and contribute to Stevenson University's unique circumstances. Any institution seeking to adopt the SU model would have to further account for the role of these characteristics in determining the success of SU's mentoring programs. Although it is unlikely that it is the only consequence of Stevenson University's status as a private school and short history as a co-educational institution, these characteristics may make it easier for SU to incorporate policy changes in departments and the university to support its mentoring programs. Similar to the reclassification of SU from a college to a university, Stevenson University's private status and short history as a co-educational institution may prevent adoption of the SU model by institutions that do not share these characteristics.

The difference between the approaches of the mentoring programs at UNC, Charlotte and SU is apparent in the ways that each university addresses the challenge of the lack of transparency and clarity regarding promotion criteria. This difference highlights the focus of UNC, Charlotte on changing the habits of associate professors whereas SU had the flexibility to make policy changes to support mentoring programs. To create transparency and clarity regarding promotion criteria, SU created a faculty job description and documents that delineate expectations for faculty at each rank (Gorman et al., 2010). Faculty members in each department were given the opportunity to create their own drafts of these documents and their input was taken into consideration during the revision process (Gorman et al., 2010). Additionally, the final versions of these documents were adopted by faculty vote (Gorman et al., 2010). The SU model contrasts with the mentoring program at UNC, Charlotte which merely required faculty to understand promotion criteria. By allowing faculty members to contribute to the process of formulating faculty job descriptions and rank expectations, SU is able to address the additional challenges of disproportionate service demands/ administrative duties for associates that interfere with progress toward

full professor and a need for more flexible and inclusive “paths to professor” that recognize a broader range of contributions because the documents that outline these responsibilities are flexible in the SU model. It is important to note that the challenges identified by the UNC, Charlotte needs assessment are specific to associate professors. These challenges do not necessarily apply to other ranks; however, they are useful in comparing the capabilities of mentoring programs and evaluating their effectiveness.

There are no significant differences between the Faculty Mentoring and Evaluation Committee (FMEC) at SU and the mentors assigned to faculty at UNC, Charlotte. At SU, faculty members who are eligible for promotion are required to have an FMEC, although all faculty members are encouraged to form one (Gorman et al., 2010). The FMEC is comprised of the faculty member’s department chair and two peer faculty members, including one from a different department in the School of the Sciences (SOS) (Gorman et al., 2010). The UNC, Charlotte “mid-career planning process” also requires faculty members to discuss their career plan with their department chair. Both programs combine mentoring and evaluation. Additionally, the New Faculty Orientation Program helps introduce new faculty to the procedures with which they will have to be familiar at SU and practice filling out and submitting paperwork (Gorman et al., 2010). The mentoring program at UNC, Charlotte is focused on associate professors and, consequently, has no element comparable to this program which is designed to assist new professors.

Comparison between the mentoring programs at UNC, Charlotte and Stevenson University reveals a possible explanation for the success of SU at increasing the representation of women in science fields at the professoriate level. The mentoring programs at Stevenson University have an advantage over those at UNC, Charlotte because SU is small and as a private school has some autonomy, and is able to more easily incorporate policy changes to support its mentoring programs. This additional capability of the mentoring programs at SU allows the university to address challenges identified by the UNC, Charlotte needs assessment that UNC, Charlotte was unable to address with its own mentoring programs. The Advance Mentoring-for-Leadership Lunch Series at the University of Washington presents an alternate explanation for the success of the SU mentoring programs. The Advance Mentoring-for-Leadership Lunch Series is a monthly lunch for STEM women faculty who have expressed an interest in pursuing leadership positions (Yen et al., 2007). Each lunch features a speaker who spends 20 minutes sharing her personal experiences and her philosophy on leadership (Yen et al., 2007). The purpose of the Mentoring-for-Leadership Lunch Series is to expose female STEM faculty to a critical mass of female leaders, a factor which has demonstrated importance to female achievement (Yen et al., 2007). The importance of exposure to a critical mass of female leaders demonstrates the role the female majority of STEM faculty and the all-female Leadership Team at SU may play in the success of the university’s mentoring programs.

The all-female Leadership Team in the SOS at SU consists of the dean of the school and the academic administrators of the four departments in the SOS: Biological Sciences, Chemistry & Physical Sciences, Mathematics, and Nursing (Gorman et al., 2010). The collection of female STEM leaders who participate in the Advance Mentoring-for-Leadership Lunch Series can be regarded as a recreation of the all-female Leadership Team at SU. UW does not have the level of representation of women in STEM that SU possesses, so UW is forced to reach across multiple institutions into industry to create a suitable substitution. In contrast to SU, UW’s collection of women leaders does not have the power to enact policy changes and develop mentoring programs at the university. The ADVANCE Center for Institutional Change at UW is responsible for developing mentoring programs for women in STEM, so although the collection of women leaders that the lunch series creates is not involved in this process, the

capability is not lost (Yen et al., 2007). Concerning the ability to enact policy changes, the importance of this factor to the success of SU in increasing the representation of women in STEM is questionable, as the mentoring programs at UNC, Charlotte demonstrate. Another important aspect of the Leadership Team, its function to serve as a peer mentoring group for its members, is similar to the benefit the ADVANCE Mentoring-for Leadership Lunch Series has for the speakers of experiencing a community of women who have all achieved a Ph.D. in a STEM field (Gorman et al., 2010). The female majority in the leadership of the SOS extends to the faculty and student body of the SOS (Gorman et al., 2010). This quality is imitated by the ADVANCE Mentoring-for-Leadership Lunch Series by restricting the lunch to female participants.

The critical mass of female leaders that the Mentoring-for-Leadership Lunch Series attempts to create at UW offers specific benefits, which the mentoring programs at SU can also be expected to offer. The group mentoring format of the Mentoring-for-Leadership Lunch Series creates a sense of belonging among the female faculty who participate by increasing their involvement with the campus community (Yen et al., 2007). Additionally, the Lunch Series provides participants with multiple mentors, an approach which, studies show, offers greater benefit than one-on-one mentoring (Yen et al., 2007). The disadvantage of one-on-one mentoring is that a single mentor cannot always address every need a mentee may have. Multiple mentors may be able to address a greater range of needs because each mentor contributes in a different way to the mentoring experience. It is also worth noting that group mentoring minimizes the demands on the time of mentors because mentees have multiple mentors.

The mentoring programs that are considered in this review have all been successful by the metrics of each study. The variety in the strategies employed by the mentoring programs at each university demonstrates that there is not a single, fixed model for creating a successful mentoring program. The mentoring programs under consideration represent three separate strategies that are demonstrated to yield positive results. University of North Carolina, Charlotte changes the habits of associate professors, Stevenson University changes department and university policy to support its mentoring programs, and University of Washington creates a critical mass of female leaders with the purpose of increasing the numbers of female STEM faculty. These strategies are not mutually exclusive. Stevenson University utilizes all three of the strategies identified in this review, which may help explain the extraordinarily high representation of women in STEM at SU. However, it is important to recognize the characteristics of each university that determine which mentoring strategies will and will not be successful at each particular campus and when a particular strategy will not be necessary. Stevenson University is the only one of the three that was able to change department and university policy due to the process of reclassification that is taking place at SU at the time. The creation of a critical mass of female leaders at UW is necessary at this university and not at Stevenson because UW does not have the overwhelming majority of women in STEM which exists at SU. Finally, changing the habits of professors is the most appropriate strategy at UNC, Charlotte because this university is not in the process of reclassification and is, therefore, unable to make policy changes to accommodate its mentoring program with the ease that Stevenson University demonstrates. This is also the most appropriate strategy because this approach seems to be sufficient to increase the number of women faculty who are successful at promotion and leadership development. This review is by no means comprehensive and cannot be expected to consider every mentoring strategy or campus climate. This review does, however, examine strategies with demonstrated success and, by considering the role of campus environment in these cases, identify some of the factors that should be considered by universities interested in adapting a mentoring program that has been successful at another school.

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