

FACULTY DIVERSITY IN ENGINEERING AND SCIENCE: HOW HARD CAN IT BE?

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INTRODUCTION

Faculty diversity is an expressed need and desire among the great majority of US institutions of higher education. For research universities, it is of particular concern. Research provides the grounding for both teaching and technological development, associated theories and practical applications, and gives strength to educational and curricular foundations. The value-added benefits of faculty diversity in higher education have been explicated in several educational arenas. Despite its touted merits, however, ethnic and gender diversity among the faculty in engineering and science is especially low.

The most often cited explanations for the disparity of people of color and Caucasian women in the engineering and science professoriate include (1) the absence of enough qualified individuals from these groups and (2) the small number of Ph.D. students in the pipeline. While education statistics reveal a measure of truth in these explanations, some important questions remain insufficiently pursued. Beyond race and gender, what obstacles pose the greatest challenge to increasing faculty diversity in engineering and science? Once identified, are institutions prepared and/or willing to mount the necessary efforts to minimize or eliminate these obstacles? What are the Ph.D. students themselves telling us about the issues they face and what serves to inhibit their transition to faculty ranks? Once on the faculty, what defies the faculty of color and Caucasian women faculty in their pursuit of tenure? How hard can it be for institutions to address these concerns effectively?

These are among the questions we reflect on at MIT as we begin the groundwork for a program designed to increase diversity in the engineering and science professoriate. The dual focus of this new program will be the pipeline of graduate students, as well as the corps of practicing faculty. Our search is for the lessons that we may learn in preparing graduate students for the range of potential academic careers, and for the understanding we may develop in order to create a more conducive atmosphere for junior faculty success. To address these and other questions, we have begun our efforts with a review of existing studies pertaining to practicing faculty in engineering and science. Additionally, we are engaged in specialized collection of current data. This includes conducting a national study, which follows an instructive pilot done on a much smaller scale.

The Pilot Study

Part of the foundation of our work involves conducting a national study of what faculty view as some of the key factors that influence diversity in the engineering and science professoriate. In preparation for a national survey, in January 1996 we conducted a pilot study at two major research institutions with very different characteristics in terms of size, location, and campus culture. Our aim in this pilot was to insure that the survey we are developing for national dissemination will cover key issues that are pertinent to faculty diversification in engineering and science. Additionally, we conducted interviews with twenty-two of the faculty respondents from the two campuses. From these interviews, we learned whether these faculty felt strongly that there were additional key issues that were not dealt with in the pilot, but that should be included in the national study.

Description of the Pilot Study

The pilot survey contained 75 questions in five broad areas relating to (1) personal data; (2) the respondent's work in general; (3) his/her job/position; (4) his/her involvement in mentoring of students and in mentoring by/of other faculty; and (5) his/her views on certain issues or practices that govern the size of their ranks and influence their level of job satisfaction. The rationale behind these question categories was that they solicited information fundamental to how productive the faculty feel they are or could be, based on how satisfied they are with their work, their environment, and their relationships. We used white male respondents as our control group, because of the fact that they dominate the engineering and science professoriate. Their historic predominance has also set the performance standards by which most other faculty are measured in their bid to join a particular faculty and/or to obtain tenure. Therefore, we wanted to determine whether there were any notable differences between the way white male faculty answered particular questions on our pilot survey and the way the white female and faculty of color responded to those same questions. Any notable differences might prove instructive to us in our efforts to structure a national survey that would indeed solicit useful information for the purposes of the program we will mount.

Targeting the engineering and science areas, we distributed the survey to all of the white women faculty, all of the faculty of color, and to a randomly selected, equal number of their white male colleagues. A total of 266 surveys were distributed on the two campuses. We received a combined total of 104 survey responses, or a 39% return. Along with the insights shared by the twenty-two respondents who were interviewed, the answers to many of the survey questions offered some food for thought regarding some of the challenges to achieving faculty diversity.

Before presenting our preliminary observations from the pilot study, we hasten to caution that (1) this was only a pilot; it will be used to inform the development of our questionnaire for national dissemination, and that (2) this pilot involved only two institutions. Rather than try to generalize the results of this pilot to the population of research institutions across the country, we simply regard it as a possible indication of the kinds of responses we might expect from our national study. Our quest was for instructive information that would guide MIT ultimately in structuring a strong faculty diversity program that will be useful and effective in research institutions where faculty diversity is an important goal. It is our hope and intent to construct a program that can be replicated on a national scale.

Preliminary Observations

From our pilot study, we wanted to distill key issues that would inform the questions to be asked in our national study. We also wanted to receive ideas that would feed our preliminary thoughts on the structure and content of the program we will build. By comparing the answers from white female respondents and from faculty of color with those of their white male colleagues, we wanted to see whether there emerged major differences in their experiences, observations, and views. We would use the differences we found to reflect on what issues may exist, and what measures might be suggested to take, in developing an institutional environment of faculty equity that is conducive to maximum productivity, creativity and job satisfaction. Following are highlights of the responses we found particularly instructive. We present them in the aggregate from the two campuses, and group them into the categories of (1) white men, (2) white women, (3) minorities, and then regroup them to show the responses of (4) all men and (5) all women. We present the responses of all faculty of color as a group ("minority") to protect the small number of respondents whose identities might otherwise be discerned if we reported responses by individual ethnic group.

Demographics

Male faculty (n=61) represented 59% of the respondents in our pilot. They ranged in age from 31 to 70 years old, notwithstanding that 10 of them did not indicate their ages. The female faculty (n=43) were 41% of our respondents, ranging in age from 27 to 65 years old. All but one of the women indicated their age. Disregarding that four Asian men and the one Caucasian woman did not indicate their ages, at least 60% of the white women and at least 60% of the respondents of color had not yet reached their 40th birthday. Notwithstanding that six of the white males did not indicate their age, 65% of them had reached their 40th birthday and beyond. There were many more white male faculty than participated in our pilot. We randomly selected only a number of them that was equal to the number of white female and faculty of color. If, however, the observations of the demographics of age by gender and ethnicity that we made in our pilot survey recur in the national study, this would raise some important questions:

- By the time the white males now 45 or older retire, what planning strategies will higher education institutions have implemented to sustain research and teaching goals?
- What mechanisms will departments put in place to insure the junior faculty's professional productivity, regardless of their gender or ethnicity?
- What do institutions see as their role in the development of the graduate student pipeline of future faculty?
- What lessons can we draw from the experiences of current faculty that will guide the institutions in preparing graduate students who may be attracted to the range of academic careers?

Personal Data

Discussions with faculty in various institutions over time have indicated that the greatest impact on a faculty member's productivity and job satisfaction stem from personal/home circumstances and/or the individual's work relationships. Circumstances at home (or involving specific family members or someone else significant) can represent a source of stress by demanding a considerable amount of time and/or energy that the faculty member might otherwise have devoted to his/her work in the institution (research, teaching, or other aspects of the position). Respondents in our pilot study noted such issues as care of small children, care of other family members, and personal health concerns. Only a few male faculty indicated that they dealt with such issues. In most instances, the circumstances seemed to have the greatest impact on the female faculty. In some cases, the personal/home circumstances dictated that a couple maintain separate residences because of job locations, referred to as "the two body problem." Concern for productivity and performance leading to tenure, particularly of women faculty members in the institution, sometimes influenced the decision as to when, or whether, to have children. Comments written on the survey and made verbally during some of the interviews indicated that this concern was a major one for junior women faculty. The concern was shared by senior women faculty who were concerned for their junior colleagues, as well as by a few of the men concerned that their spouse or colleague have an equal opportunity to progress in her field.

All 38 of the white men responding to our survey indicated that they were married or in a partnership. Although 53% of them had children under 18 years of age living with them, only 2 indicated having child care concerns that might harm their progress toward tenure, and one male respondent of color (n=23) indicated this concern. Three of the men feared their progress might be slowed because of care for other family members. In the interviews, one man described the care demands of a child with a long-term illness that resulted in the wife having to quit her job, slowing progress toward her own professional aspirations. The respondent assumed some of the responsibility of care-giving for the couple's children, despite the fact that his research activities were drastically impaired, which--he felt--damaged his progress toward tenure. Another male respondent we interviewed simply stated that being a good father and husband was more important to him than tenure. For the most part, however, child bearing and child care concerns seemed to be treated as the purview of the women faculty, of whom 40% feared this would harm their progress toward tenure. They felt that as actual or potential wives and child bearers, they were less well regarded as scientists and engineers by the male faculty.

From comments written on the survey and made verbally in the interviews, we received much insight into the issue of what many respondents referred to as "the two-body problem" and its possible impact on faculty diversity. About 60% of the 43 women faculty indicated not having a partner, spouse, or relative in the same institution. Written and spoken comments from some of them described considerable inconvenience resulting from separate residences. Some have had to deal with a long-distance commute in order for them and their husbands/partners to spend time together. Some described the personal pain and/or stress of separation (or divorce, in some instances) that was a consequence of separate residences due to job locations. This issue was much more strongly emphasized by the women than by the male respondents in our pilot. Of the 61 male faculty respondents, 11 (or 18%) had a spouse or partner employed at the institute; however, of these 11, only 2 (18%) considered this a key factor in their accepting their current positions. Whereas, 40% of the women respondents had a spouse or partner employed by the institution. For 71% of them, this was a key factor in their accepting their current position.

Work-Related Issues

Our discussions with white women and faculty of color have revealed a belief widely held among them that certain types of service can enhance one's tenure candidacy. Included in these important services is membership on strategic committees. The consensus was that the opportunity to serve on such committees is mostly the privilege of white male faculty who network among themselves and receive strategic committee assignments by appointment. We posed questions in our pilot specifically about "faculty policy or governance committees" and whether the faculty came to serve on them by appointment, election, or volunteerism. We then asked about committee work load in general and whether the respondents felt theirs compared as more, the same, or less than that of their colleagues. Of the males serving on policy or governance committees, 66% of the white males did so by appointment. A smaller percentage of white women (40%) and faculty of color as a group (52%) served by appointment on policy and/or governance committees, and all respondents generally felt that their committee work load overall was the same or somewhat more than that of their colleagues.

While the men and women held common views on the benefits of serving on faculty committees, some differences in their responses did occur. Below are a few notable examples of the differences, excerpted from the wide range of male and female responses:

Question: In your opinion, are there benefits to serving on faculty committees? If yes, what do you consider them to be?

*Men: "Good preparation for a potential administrative career."
"Networking with influential administrators."
"Leadership development."
"Power."*

*Women: "Chance to help decide policy and influence the future of the department."
"Visibility in the institution community."
"Sense of being part of the leadership of the school."
"Learn more about how the dept. works and how things are or aren't decided."*

Work/Position-related Issues

We asked what influence respondents felt they had in department decisions, which influenced their level of satisfaction with certain aspects of their work. It is no overstatement to say that academic rank and seniority are associated with policy and decision-making on department issues. Nearly 85% of the white male faculty were at the associate or full professor rank, compared to only 40% of the white female and 52% of the faculty of color. The data by gender showed 75% of the men were associate or full professors, versus only 37% of the women, some of whom are also dispersed among a range of other academic positions that normally do not lead to tenure. About 75% of the female respondents are tenured or on tenure track, versus 92% of the males. This would also explain why nearly 60% of the men have participated in the tenure review of a colleague, versus only 16% of the women faculty. Moreover, most of the white female (83%) and faculty of color (90%) in our pilot have been members of their departments less than 15 years. At least 60% each of the white female and of the faculty of color had completed their Ph.D. degrees within the last 10 years. The same is true of only 24% of

the white male faculty, of whom at least 50% had completed their terminal degrees more than 20 years ago.

If this profile is reflected in the national study, it may suggest that it will be some time before white female and faculty of color acquire the rank and seniority to make policy on the order that the white male faculty currently do. However, this also suggests that a cadre of white women and faculty of color are moving through the ranks, eventually to assume greater roles in the lives of their departments. This would also force the issue of the Ph.D. students and the faculty pipeline, and whether the lessons learned from the experiences of current assistant and associate level faculty (men and women, white and non-white) will be transmitted effectively to prepare more graduates for the range of academic positions. The faculty pipeline was a concern for many of the respondents in our pilot, along with some of the things they consider to be demonstrations of support from the department to its faculty.

Views on Issues

On affirmative action in faculty hiring, we found a lack of a coherence as to what affirmative action means. There was, therefore, considerable diversity of feeling regarding support of affirmative action. Written comments generally expressed appreciation for its usefulness in recruiting in order to assure a pool of candidates, but suggested abandoning it in the final decision and "just pick the best candidate--period." Some of the male respondents, as well as some of the white women and minority faculty, wrote that affirmative action sometimes undermined the confidence of women or faculty of color regarding their ability or performance. They felt that their white male colleagues transmitted the feeling that hiring of faculty of color and white women was a result of their race or gender and not of their achievement or capability.

How Hard Can Faculty Diversity Be? Looking Ahead to the National Study

We found the pilot to be very instructive in helping to insure that the national study will embrace key faculty issues that influence diversity in the engineering and science professoriate. Pregnancy and child care, two-career couples, mentoring, and the pipeline or Ph.D. applicant pool emerged as some of the issues of greatest concern among respondents in the pilot. Additionally, faculty raised a few issues not dealt with in the pilot that we will include in the national survey and in interviews yet to be conducted. A few of these included respect students accord to junior faculty; how junior faculty might identify opportunities to collaborate; and junior faculty confidence in their readiness for faculty responsibilities.

Some of the issues raised do not easily lend themselves to survey treatment, but may be best explored in interviews. A few of these were fairness and effectiveness of the tenure review process; effective affirmative action strategies; child care facilities/services; dual-career issues; and how teaching weighs in in terms of the important, tenure-enhancing activities of the faculty. We have been given invaluable material with which to work as we prepare our national survey and, eventually, to build a faculty diversity program that values the distinct contributions that qualified faculty can make that are enhanced by race and gender. We hope our program will provide insight, information and recommendations that will be useful to all higher education institutions where faculty diversity is a serious goal.