Implementation of a Future Faculty Development Program: Impact and Evaluation of Years 1 & 2

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Abstract

Diversifying STEM faculty proves to be an increasing challenge for research universities. This conference paper will discuss the outcome of a future faculty discovery and development program. This program is a two-day program designed for underrepresented minorities (URM) doctoral and post-doctoral scholars interested in an academic career in engineering and within 1-2 years of seeking a faculty position. Participants experience structured presentations and discussions/dialogues with department chairs, deans, and early career faculty members. Participants are expected to gain greater awareness of how to navigate recruitment and interviews, cultures of research, teaching, mentoring, service, support opportunities, and tenure and promotion. The program also initiates early exploration and discussion of career prospects with school of engineering department chairs. The present study will discuss evaluation surveys from the first two years of the future faculty discovery and development program (2018, 18 participants, and 2019, 10 participants) and outcome/current placement of participants. The evaluation included feedback on workshops, content presented, impact on desire to transition into the professoriate, and impact on envisioning a successful career at the hosting university. This study will compare our future faculty development program with outcomes from other future faculty programs with intention to develop a conceptual framework to evaluate programmatic strategies with the targeted audiences.

Introduction

With the increasing number of PhDs, the competitiveness of faculty positions increases, and availability of faculty positions decreases. Furthermore, with the competitiveness and decrease in availability, we have yet to see significant increases in URM faculty within STEM departments. In general, we still have low matriculation into and retention of URM in STEM fields. In 2018, a review was published stating “despite large numerical increases for Hispanic and Black students, these two groups along with American Indian/Alaska Native and Native Hawaiian/Pacific Islander students remain significantly underrepresented in engineering at the undergraduate and graduate level” [1]. Similarly, another study found that while URM faculty hires are increasing, there is a significant disproportion to those earning doctoral degrees in STEM fields [2]. These authors and others have identified that there remain challenges in recruitment, retention, and promotion of URM faculty [2,3]. Indeed, Black/African American (6%), Hispanic/Latino (3%), Asian American (11%), and American Indian (<1%) are significantly underrepresented in the professoriate compared to both 4-year and 2-year undergraduate university students as depicted by data from the National Center of Education Statistics [4].

In doctoral programs, the focus is always on research capabilities (particularly at R1 institutions), but professional skills are the elements that separate those who maintain successful academic careers, and those who are not retained. While many will argue there are challenges faced by anyone, regardless of the representation, it is important to recognize that there are additional factors/challenges faced by graduate students of color who are qualified to pursue these endeavors.

Contributing Factors (in addition to competitiveness that may result in small URM pools):

1. ***Lack of community/sense of belonging/validation of experiences.*** Academic identity for URM students is greatly affected by contextual experiences during their tenure in higher education. That is, the desire for a student to continue in academia and serve as a future mentor in the professoriate can be influenced by their experiences as a student. A study found that students were more likely to maintain a strong level of interest in university careers when they have a same-race mentor in their department [5]. The importance of URM senior faculty mentorship was also outlined in another study, which described the role these mentors played in helping early-career URM faculty through academic politics and providing a supportive environment [6]. Due to the already small community of underrepresented faculty, more emphasis must be placed on building allies to develop a better community and institutional culture for underrepresented faculty. The critical mass theory states that roughly 30% of people are required to create an influential body for policy changes [7].
2. ***Lack of strategic planning for early-career faculty towards coping with the demands of the academic career based on informed/realistic expectations*** [8]. There are many unsaid nuances to obtaining and keeping faculty positions, and due to implicit bias, and culture, sometimes it is difficult to know what to ask, whom to ask, or how to ask to get the information required for success.
3. ***Lack of encouraging URM into the professoriate.*** The “presence of science and engineering minority faculty is a crucial factor in encouraging and ensuring the continued interest of young minorities in science and engineering” [9, 10]. While there has been a steady improvement in the racial and ethnic diversity of the student population, there has not been similar diversification of the engineering faculty. Their presence is equally important to attract some of those students to the professoriate to serve future generations of students.

To support URM doctoral and post-doctoral scholars interested in an academic career, we implemented a future faculty development program at the University of Pittsburgh Swanson School of Engineering. This type of programming took form in 1993 when the Council of Graduate Schools and the Association of American Colleges and Universities established Preparing Future Faculty Programs in collaboration with multiple universities [11]. ***We established our program in 2018 with the primary objective of building a pipeline for future faculty by establishing significant relationships with underrepresented populations at the advanced PhD or post-doctoral stages in participants’ STEM careers throughout the country and to contribute towards critical mass of allies for underrepresented faculty.*** This two-day expense-paid program is designed to foster the growth of post-docs and under-represented students nearing the completion of their doctoral programs to increase their motivation for academic careers in research institutions and maximize their potential in the areas of teaching, research, and service, while achieving the faculty diversity goals of the school. This workshop also serves as a foundation for creating a network with future URM faculty and assists our institution in identifying and potentially recruiting URM faculty. In addition to attending sessions on preparing for and applying to faculty positions, preparing application materials, faculty responsibilities, understanding university power, and preparing for the tenure process,

participants have the opportunity to present their research to faculty at our school to obtain, not only feedback, but also a network within the various engineering departments.

The goal of this paper is to share attendee feedback from the first two years of implementation of our future faculty development program. This includes those sessions attendees' thought were the most important, the usefulness of each session, and impact on future career options. Our intention is that the feedback we report will assist others (including ourselves) in improving or developing their own faculty development programming.

Methods

Future Faculty Development Program - Recruitment

Our program is advertised within our institution and across peer institutions. We also advertised through word of mouth, departmental emails, and interactions through recruitment visits. Interested applicants are asked to apply via an online program application. Participants are selected based on how close they are to completing their PhD (or post-doc within 1-2 years of seeking faculty position), whether they exhibit an academic and research career that aligns with our school's departments and programs, and whether they demonstrate how their inclusion in this program can contribute to our school's diversity and inclusive excellence.

Future Faculty Development Program - Program Agenda

Table 1 below details the agenda of our program.

Table 1. Agenda for Future Faculty Development Program

Day 0	
All Day	Participants arrive and check in at hotel
6:30 - 8:00 pm	Opening reception & welcome/program overview
Day 1	
8:10 - 8:15 am	Welcome address
8:30 - 12:15 pm	Presentations/Workshops: 1) Application and interview process 2) Employment start-up and negotiation 3) Obtaining research funding 4) Teaching 5) Peer review publishing 6) Balancing service obligations
12:30 - 1:40 pm	Working lunch with Office of Diversity

2:00 - 3:30 pm	Department tours and participant research presentations
3:30 - 4:30 pm	Return to hotel
5:00 - 6:30 pm	Networking dinner and distinguished speaker
6:30 - 7:30 pm	Panel discussion with newly recruited faculty members
Day 2	
8:00 - 8:30 am	Breakfast
8:30 - 9:30 am	Interactive session with program host(s)
9:30 - 11:30 am	Campus tour
11:30 am	Departure

Assessment Methods

At the completion of the program, attendees completed a post survey to obtain information such as why they attended, how useful each session was, impact of the program on future career choice, and comparison of our program to others if they attended multiple faculty development programs. Of the 18 attendees from 2018 and 10 from 2019, we received surveys from 17 and 9 participants, respectively. Furthermore, attendees from the first FFDP in 2018 were surveyed again via e-mail to request their current placement one year after attending the program.

Qualitative Content Analysis

Two open-ended questions on the post survey were content-analyzed for recurring or notable themes/categories by a PhD-level analyst who engages in engineering education research [12]. Questions were selected to capture attendees' perceptions of the strengths of the study abroad program. The goal was to potentially triangulate findings from these questions with quantitative survey findings.

The two questions and their respective coding schemes are provided below.

Question 1. *What was the primary appeal of the Future Faculty Discovery Development Program? Why did you apply?*

The coding scheme was developed in an emergent manner by the analyst after reading through all student responses and identifying categories of interest [12]. The coding scheme consists of five categories and is shown in Table 2.

Table 2. Coding scheme for primary appeal of program.

Code	Definition
Professional Development	Developing professional skills such as interviewing, communication, or networking
Faculty Application Process	Expectations for applying, learning about the process, or how to find positions
Faculty Life	Navigating faculty expectations, learning about tenure process, understanding academic politics
Required	Attendance was required by home program
Interest in an Academic Career	Interest in applying for an academic position at hosting institutions or other institution

Question 2. *What ways (if at all) did your experiences this weekend impact your decision to pursue faculty positions in the future? Did this experience further enhance or deter you from pursuing the professoriate? Please explain:*

The coding scheme for this question consists of six categories, as shown in Table 3.

Table 3. Coding scheme for question on impact of program on future career choice.

Code	Definition
Motivation	Increased desire to pursue professoriate
Awareness	Increased knowledge of the application process and faculty life
Networking	Developing a rapport with faculty or other attendees at program
Confidence	Increased confidence in self as a prospective applicant to professoriate
Intimidation	Aware of the challenges in starting as faculty or navigating academic ladder in preparation for applying
Exploration	Openness to exploring other types of academic positions

Results

Reason for attending program

A content analysis of participants' reasons for attending the program showed that the most important reason for attending is to learn about the *faculty application process* (summarized in Table 4). As defined in Table 2, this includes learning about expectations for applying, learning about the process, and how to find positions. The application process was mentioned 65% of the time. This was expected since the attendees all shared a mutual interest in either applying for a faculty position or were interested in learning more about joining the professoriate. As one participant noted, "I was attracted to this program in order to demystify the academic career and learn more about the pathways to becoming a professor and starting a successful career as one." Twenty-seven percent of the responses explicitly stated *interest in an academic career* as a reason for attending, of which some specifically mentioned interest in working at our institution.

Professional development and *faculty life* were other common responses (23% and 27%, respectively) suggesting that participants were looking for other ways to develop their professional skills (such as communication or networking) and learning about life as a junior faculty member. An exemplar comment by a participant summarizes this, "I applied to gain more insight into life in academia. I wanted to learn more about the responsibilities required of faculty members and what the first few years of being a faculty member look like that we as students don't get to see in our interactions with professors." Lastly, one participant mentioned that the program was *required* to attend (4%) as part of their degree requirements.

Table 4. Coding Results: Reason for Attending Program

Code	% of Responses (n=26)
Professional Development	23%
Faculty Application Process	65%
Faculty Life	27%
Required	4%
Interest in Academic Career	27%

Survey Feedback

Survey results are provided for participant perceptions of the most important aspects when choosing a location for career and the usefulness of each session. We asked each participant to rank the following from least important (being 1 on our scale or purple in the graph) to most important (being 8 on our scale or brown in the graph) based on which factors were most important to each participant: 1. resources for research, 2. department climate, 3. city/location, 4. university ranking, 5. diversity within department, 6. diversity within university, 7. ability to balance work-life, and 8. start-up benefits. Figure 1 depicts the feedback received regarding the most important factors for the participants.

Figure 1. Most important factors for future faculty applicants. Most important factor to participants is depicted on the left of the bar graph (purple) and least important on the right (brown).

In addition, we also asked each participant to provide feedback on the usefulness of each of the sessions during the program. Survey data using a 5-point Likert scale rating each session as not at all useful to extremely useful is depicted in Figure 2. As Figure 2 denotes, participants deemed the Faculty Panel most useful. As a caveat, we note that this may not necessarily reflect interest or lack thereof in a topic but may reflect how the topic was delivered.

Figure 2. Usefulness of each session during the program.

Overall impact of program on future career choice

A content analysis of participants' perception of the overall impact of the program on their future career choice showed the most frequent response to be *motivation* (summarized in Table 5). As defined in Table 3, motivation refers to an increase in desire to join the professoriate. Sixty-five percent (65%) of the responses indicated some increased desire in joining the professoriate. Alongside, 62% of the responses indicated increased *awareness* of the application process and faculty life, which we hope allowed the participants to make a more informed decision on their potential future career choice. As one attendee noted, "This experience has made me want to pursue faculty positions because it broadened my knowledge on situations I was unsure of when going through the entire hiring process." In fact, because of this program, one attendee (4%) mentioned openness to exploring other academic careers such as those at a teaching institution. Of important note, 23% of the participants mentioned that attending the program has increased their confidence in themselves as professoriate candidates and 12% felt that the program increased their network. Interestingly, 12% of the responses indicated that the program increased intimidation due to learning about the challenges that new faculty face. This was captured by the comment, "The program was incredibly informative and I was left both encouraged and intimidated by the process of becoming a professor. The program did an honest and transparent job of detailing the life/responsibilities of a professor."

Table 5. Coding Results: Impact of Program on Career Choice

Code	% of Responses (n=26)
Motivation	65%
Awareness	62%
Networking	12%
Confidence	23%
Intimidation	12%
Exploration	4%

We also re-surveyed participants from the 2018 Future Faculty Program and asked for their current position (summarized in Table 6). Most of the participants from 2018 were still in their PhD program as fourth- or fifth-year students (6 participants). Three of the participants went on to be postdoctoral fellows and three went into industry. One participant obtained a position as adjunct faculty and five did not respond to the survey request. Of those still in their PhD program and postdoctoral fellowship, all indicated that they were still interested in entering the professoriate.

Table 6. Summary of Current Positions from 2018 Participants

Position	# of Participants
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Postdoctoral Fellow	3
PhD Student	6
Industry	3
Adjunct Faculty	1
Did not respond	5

Discussion

A key objective of our future faculty development program was to help build a pipeline for future faculty by building a relationship and network with underrepresented minority doctoral students and postdoctoral fellows. Most attendees indicated that they were interested in attending our program to learn more about the faculty application process and life as faculty in addition to further professional development and building a network. Our analysis of the open-ended survey questions indicated that the program succeeded in this regard with many participants noting that the program increased their awareness of the faculty application process and life as faculty. In addition, the responses indicated that participant confidence and professional networking improved. Correlated with this finding, we found many of the participants from 2018 still interested in a faculty position and obtaining additional training as a postdoctoral fellow or working towards completing their PhD.

Reflecting on our program and looking for ways to improve, we compared our program with other future faculty programs. Table 7 summarizes activities that other future faculty programs offer. It was interesting to see the diversity amongst various faculty development programs. Our programming primarily involved workshops with a networking session and research practicum. The participants mostly thought the workshops we offered were useful; however, improvement could be made during the networking dinner and poster session. One potential way to improve our networking dinner is to provide more opportunity for the attendees to network with junior faculty in lieu of a keynote speaker. To improve the poster session, participants indicated that they would prefer more in-depth feedback on presentation. For some participants, this was their first time presenting.

Table 7. Future Faculty Program Activities Among some Institutions (modified from [13])

Activity	Does our program offer this?
Individual mentoring	No
Networking experiences	Yes
Course (with credit)	No
Seminar (short course)	No

Workshops	Yes
Reading and writing group	No
Teaching practicum	No
Research practicum	Yes

Participants of our program also indicated that formal mentoring and/or review of their application would be greatly appreciated. Such activities are offered at other faculty development programs. Due to the brevity of our program, adding additional sessions might pose a challenge. If we were to extend our program by one day, we would add a session to review participant faculty application package to our program in addition to including a teaching practicum to allow participants to earn teaching experience. We would also work towards including more faculty and department chair involvement with the program and provide more opportunities for networking.

Since our program has only been implemented for two years, there are many avenues for program growth and development. Programs such as ours play a dual role. On one hand, we provide an opportunity for prospective future faculty to learn more about the process and what being a faculty entail. On the other hand, there is an opportunity for existing faculty that participate with the program to listen and understand the concerns of future candidates. This is an opportunity to educate our junior and established faculty on issues that are important to underrepresented faculty candidates. One of the major challenges for underrepresented faculty at universities is the lack of community or sense of belonging. Our hope is that as more faculty understand the barriers and concerns of future colleagues, more allies of underrepresented faculty will be established.

Conclusion/Future Work

This paper presents the implementation of our future faculty development program that has been in place for two years. Based on the feedback received, our program has had a positive impact on participants' desire to join the professoriate; and we have learned much on the important factors for attendees. For one, program attendees sought feedback on their application material and requested more in-depth feedback on their research presentation. Extending our program would allow us to provide these items and create additional opportunities for networking between the attendees and faculty. In the coming years, we intend to place a larger emphasis on building a network connecting attendees of the program with previous attendees. Since most attendees intend to become future faculty, this will assist in developing strong support network for the future faculty. We also intend to engage with local institutions to develop larger-scale and inter-institution future faculty development programs; hence, creating a better culture and stronger network for underrepresented future faculty.

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