Toward A Systematic Review of the Preparing Future Faculty Program Initiatives

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Abstract

Preparing Future Faculty (PFF) Programs were established with the basic premise that participation in program initiatives would produce assistant professors who are better prepared for their faculty roles than their non-participatory counterparts. Despite their establishment in 1993, there is a paucity of literature that summarizes the impact and learned outcomes of these programs. The present study sought to perform a literature review that synthesizes existing documentation on PFF program initiatives. Data was gathered via searches of academic databases and non-academic search engines, with the intent to provide an understanding of existing PFF programs and their components; to better identify program commonalities and differences; and to report on the benchmarks and outcomes serving as key indicators of success. Findings show that reports on program efficacy are not plentiful, and that much of the reporting is with regard to operational best practices and program inputs (as opposed to program outcomes). In spite of this, there are a few published reports that amplify the notion that PFF alumni have positive attitudes and experiences and report changes in their knowledge, attitudes, and skills sets regarding institutional expectations of new faculty, experiencing an easier transition from graduate student to faculty member, and being better prepared for the rigors of the professoriate as compared to their non-participatory counterparts. Moving forward, the authors propose the undertaking of a more rigorous systematic review that evaluates published and unpublished studies, and develops a conceptual model for framework of evaluation of programmatic strategies and targeted audiences, and not solely reported programmatic impact, benchmarks, and key indicators.

Introduction

Preparing Future Faculty (PFF) Programs were established in 1993, in partnership with the Council of Graduate Schools (CGS) and the Association of American Colleges and Universities (AAC&U) [1], with the basic premise that participation in program initiatives would produce assistant professors who are better prepared for their faculty roles than their non-participatory counterparts. Specifically, as with many future faculty development programs, it sought "three transformative outcomes: (a) [to improve] the quality of undergraduate education by enhancing the pedagogical skills of program participants; (b) [to provide] training to doctoral students that better reflect[ed] the full range of faculty responsibilities; and (c) [to change] the culture and practice of graduate preparation" [2]. The hallmark of this program was that participants were given opportunities to observe and experience academic teaching (responsibilities) at a variety of institutions with different missions, student bodies, and expectations for faculty [1]. Participants were introduced through:

- A collaboration of a "cluster" of schools or departments, including a doctoral degree-granting university, a community college, and a liberal arts college, to provide various experiences such as teaching opportunities, working with faculty committees, or attending faculty development activities at partner institutions;
- Training with regard to the full range of faculty roles and responsibilities, including but not limited to teaching, research, and service; as well as an understanding of how these roles may differ according to institution type;
- A bevy of mentors to provide reflective feedback on teaching, research, and service activities.

During its heyday, from 1993-2003, PFF programs were implemented in more than 45 doctoral degree-granting institutions, collaborating with nearly 300 partner institutions in the United States. In 1998, the PFF program entered Phase 3 (1998-2000) in which 19 clusters were chosen to form alliances with disciplinary associations in the Sciences and Mathematics to design and develop departmentally-based programs based on the reported best practices and learnings from the Phase1 and 2 programs [3].

Over the years, the PFF paradigm has been modified to fit the goals and objectives of sponsoring institutions and departments; many of which have developed programs devoted to increasing diversity and inclusion within the professoriate, and addressing the prominent need to increase and broaden the participation of underrepresented minority (URM) faculty members [4-5]. Specifically, African-Americans and Hispanics constituted approximately 28% of the 2006 U.S. population [6], yet few of the top 100 departments of science and engineering have more than one URM faculty member [7-8]. Similarly in 2006, while the numbers of women engineering faculty has grown incrementally over the years, there still exists a disparity compared to those of their male counterparts, with 7.2% and 17.3% women faculty in tenured and non-tenured positions, respectively [9]. PFF program involvement of universities with missions focused on serving URMs and women indicates an attempt to address this disparity. During the decade of active funding, PFF clusters included: 16 historically black colleges and universities (HBCUs); 23 Hispanic-serving institutions (HSIs); 10 women's colleges; and 4 tribal colleges [3].

To date, numerous assessments and evaluations have been used to establish good practices in the operations of PFF programming and the value PFF alumni place on program participation [10-14]. However, there is a paucity of literature that summarizes the impact and learned outcomes of PFF programs geared toward engineering disciplines, or documents the impact PFF initiatives have had on the ascension of women and URMs into the professorate. The goal of this work, then, is to begin to address this gap in the literature by performing a review that synthesizes existing documentation of PFF Program initiatives to better understand the efficacy of individual program interventions. It addresses the following question:

Which PFF interventions have demonstrated the most success in future faculty development?

By doing so, it is the intention of the authors to provide an understanding of existing PFF programs and their components in order to identify program commonalities and differences as well as report on the benchmarks and outcomes serving as key indicators of success.

Methods

All relevant literature about PFF programs was searched; beginning with the implementation of the first PFF Program initiatives as sponsored by the AAC&U and CGS. Four databases (ISI Web of Science, Engineering Index, ERIC—Education Resources Information Center, and Academic Search Complete) were searched using a combination of search terms, including "preparing future faculty," "engineering," "faculty development," "teacher education," "faculty," and "program effectiveness" for publications appearing from 1993 to present. Searches using Google and Google Scholar were also considered for those publications not included in our search engines or not submitted for peer review.

Lastly, reference lists of work initially identified by our search were reviewed. Publications to broadly assess PFF programs and analyze initiatives, not limited to science or engineering, or focused on diversity and inclusion, were included. No intervention type (workshops, short courses, seminars, etc.) or program model or format (original or modified PFF paradigm, short-term, or brief activity, etc.) was omitted.

Results

The current work is based on the review of 30+ current PFF programs, with 25 being reported at this time. Information regarding these programs was primarily gained from program websites and data and publications secured as a result of the Google and Google Scholar Searches. As a first pass, the chosen programs were ones in which Google Search Engine Optimization (SEO) algorithms positioned within the first 4-5 pages of the search under "preparing future faculty". This search mostly yielded general information regarding the PFF initiatives and program websites; though much of the information was with regard to university-wide programs as opposed to discipline- or department-specific results. Preliminary exclusion criteria were limited, with inactive programs being omitted from discussion (but not necessarily from evaluation). This section is addressed in two main components: 1) program commonalities; and 2) ease of discovery of published programmatic outcomes.

Description of data
A master spreadsheet (not included in this review) was devised to house individual program data, with rows representing sponsoring organization and columns detailing information such as program type, duration, partnering institutions, represented departments, interventions, and requirements for program completion. Tables and figures are presented to summarize the results of the data review.

Program commonalities

Program characteristics
Programs reviewed were categorized into four (4) program types: cluster, non-cluster, department- or discipline-specific, and short-term. As the nomenclature indicates, cluster

programs are those having established (PFF) collaborations with partner institutions; non-cluster programs have no formed collaborations; discipline- or department-specific programs are embedded within a specific college or department; and short-term programs are characterized as intensive one-time activities, such as conferences or training meetings. Figure 1 illustrates program commonalities with regard to program duration, target groups, department- or discipline-specificity, and exposure of participants to teaching and mentoring at other institutions via formed partnerships and collaborations. The participant selectivity of cluster programs, the longest in duration—often lasting up to two years, is solely based on membership in targeted groups, such as having PhD-student or postdoctoral researcher status, and not on specific affiliations. Through their partner affiliations, these programs can expose participants to teaching or mentoring opportunities at other universities. In contrast, short-term programs tend not to expose participants to teaching or mentoring at other universities (low on the scale for collaborations with partner institutions) and selectivity is highly-based on membership in targeted groups and department or discipline affiliations.

Non-cluster programs have a wider range in duration, with mean duration of three semesters. These programs are generally non-specific with regard to affiliations but do consider targeted audiences. Department- and discipline-specific programs may run two-to-three semesters in duration, and selectivity is highly focused on targets and their named affiliations. For both program types, teaching and mentoring experiences are limited to the sponsoring institution, discipline, or department.

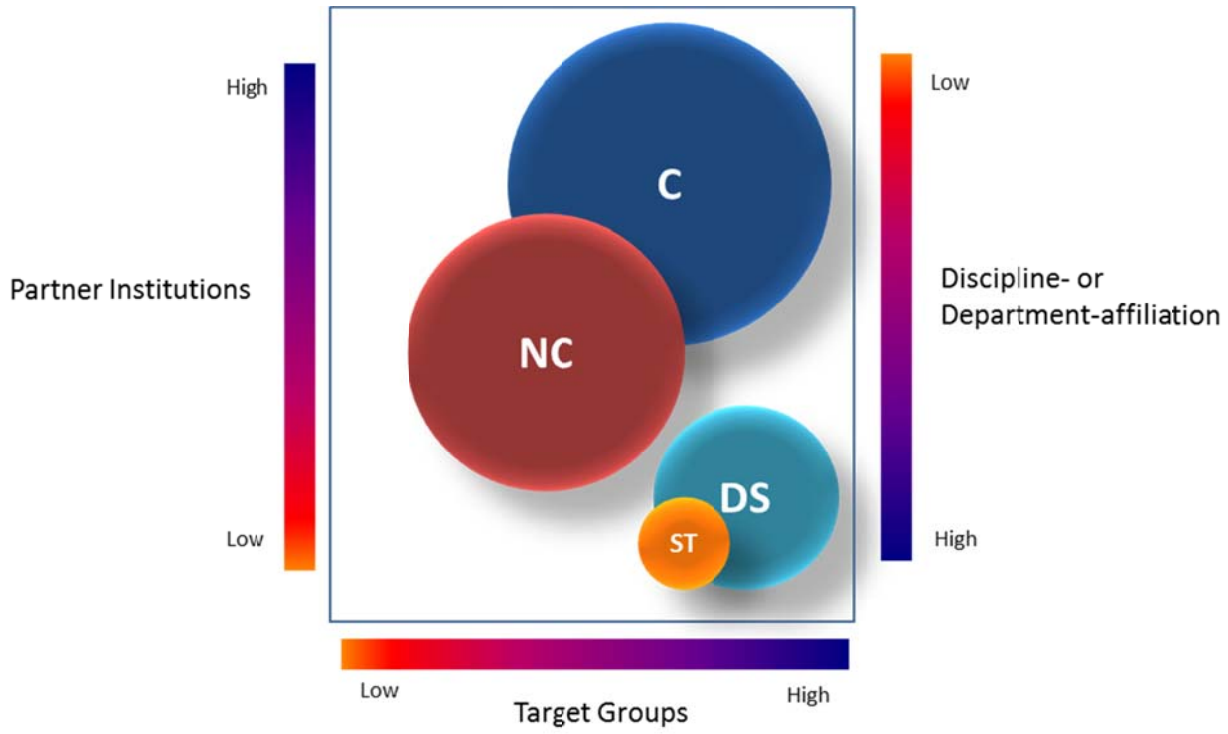

Figure 1: Overview of program characteristics for four program types: cluster (C), non-cluster (NC), department-specific (DS), and short-term (ST); with regard to program duration (circle size), target groups (Low-High; includes PhD students, postdocs, or others), department- or discipline-specificity (Low-High), and exposure of participants to teaching and mentoring at other institutions via partnerships (High-Low).

Program interventions
Eight intervention types persisted amongst the PFF programs evaluated:

- Formal mentoring
- Formal networking experiences
- Formal courses, with received credit towards program completion or certification
- Short course or seminar
- Workshops
- Reading and writing assignments, as characterized by group participation and completion of reflection submissions
- Teaching practicum as characterized by structured formal teaching experiences
- Research mentoring practicum

Table 1 provides a generalized descriptor of named interventions and popularity among participating PFF programs. Figure 1 provides a pictorial illustration of the use frequency of these interventions across multiple programs, and indicates the median number of interventions per program is 2 (mean = 2.09; mode =1), with the most-used intervention being the *Workshop*.

There is no obvious preference of intervention type based on program type. However, *Workshops* appear to be the go-to intervention for short-term program formats. Furthermore, intervention focus is relatively consistent across program type. Yet, short-term programs will more heavily focus on the development of teaching portfolios, research statements, networking, and navigation the academic job search. Cluster programs, by contrast, will take advantage of partner affiliations and offer interventions heavily focused on mentoring and highlight the differences in the expectations of faculty at various intuition types.

Ease of discovery of published programmatic outcomes

Description of data
Where the popular (non-academic) search engines rendered generalized data on PFF initiatives and individual programs [15-30], the database search rendered results of scholarly work (peer-reviewed and non-peer-reviewed), op-ed submissions, conference proceedings, abstracts, etc. And, while the Google searches yielded a multitude of hits (roughly 722,000 in 0.5 seconds), the academic databases yielded at best 60 references, not all of which were relevant to the proposed review.

Moreover, of the results of relevant publications, a small subset were other than generalized reports of PFF programming as a whole, with little information regarding specific program impact or intervention efficacy. To circumvent this obstacle, and to take a step back, ease of discovery of desired information, including publications authored by, or about, sponsored PFF programs was assessed. This information is presented in Table 2, and includes details of the program's interventions; a binary determination (Y/N) of a clear pathway to published relevant information, where a tally was made ("Y" indicating ease of discovery) each time a search for reports on a given program did not require a "lengthy search", either with regard to the amount

of time or effort, and if comparable amounts of information could be obtained via several database searches; and an assessment regarding impact on the pathway to published literature.

Table 1: Description of Program Interventions and Popularity among Participating Programs.

Program Intervention	Description	Participating Programs
Formal mentoring	Participants are assigned a mentor, to which s/he is required to plan with, report to, or otherwise consult on the participant's progression through the program. This formal mentor may also be responsible for providing guidance and feedback on participant teaching.	AIChE, University of Cincinnati (CEAS) , University of Cincinnati (CGS), Duke University, The Ohio State University, University of South Carolina, James Madison University
Formal networking experiences	A component of the program includes the required participation in organized experiences and social activities for the sole purpose of formal or informal networking.	AIChE, Duke University
Formal course (with course credit)	Participants are required to register for, and receive, credit for a semester course with PFF designations.	University of Cincinnati, Arizona State University, University of Kentucky, Auburn University, Florida State University, Purdue University
Short course or seminar	Program presents short-term courses (less than a semester-long) or seminars (1-2 hours in length).	University of Maryland, University of Michigan (CRLT), Arizona State University, Auburn University, University of California Berkeley, Florida State University
Workshops	According to program designations	University of Michigan (NextProf Engin), University of Michigan (NextProf Science), University of Buffalo, State University of New York, University of Delaware, Duke University, Arizona State University, Rensselaer Polytechnic Institute, University of California Merced, Florida State University
Reading and writing (group participation)	Participants participate in focus groups or formal reading clubs, and/or other formats requiring the submission of reflective writing.	Duke University, University of Michigan (CRLT), University of South Carolina
Teaching practicum (formal teaching experience)	According to program designations; usually refers to the formal teaching responsibility of leading an entire course, seminar, or workshop.	University of Maryland, University of Cincinnati (CEAS), Rensselaer Polytechnic Institute
Research mentoring practicum	According to program designations.	University of Maryland

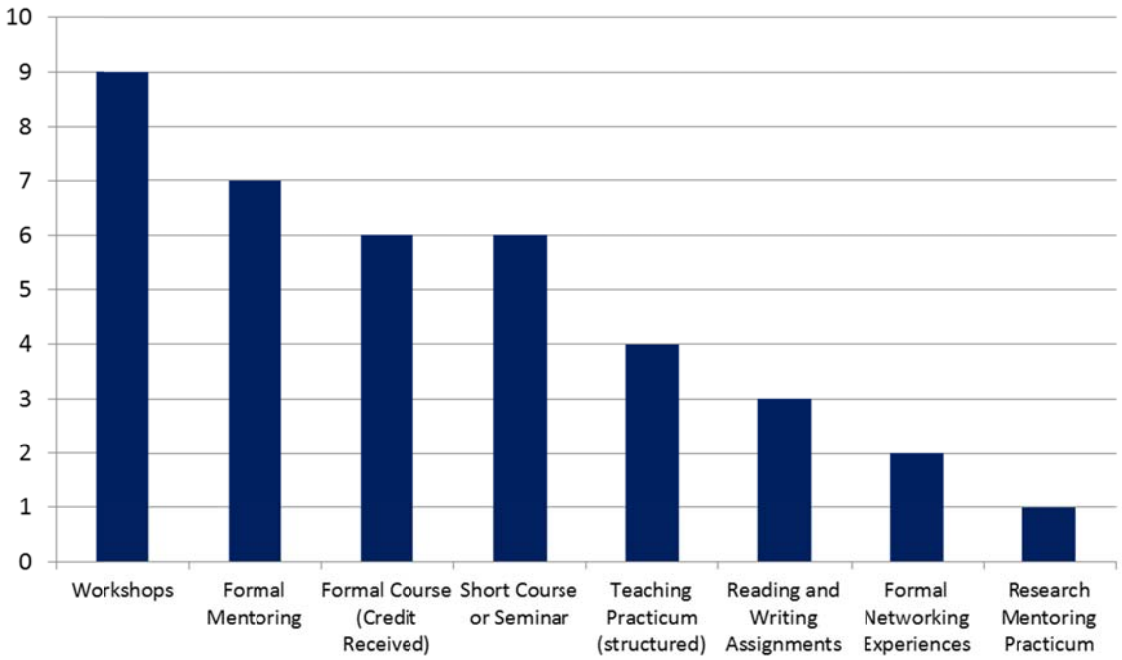

Figure 2: Frequency of PFF Program Interventions. Data is based on the review of n=18 programs; median number of interventions: 2 (mean= 2.09; mode =1)

For the latter, impact was rated *Low*, *Medium*, or *High*; where *Low* indicates instances where information is limited to program details and descriptions, with future participants as the primary intended audience; *Medium* indicates evidence of reporting on programs, including reports with regard to curriculum, outcomes, or program design; *High* indicates highly referenced data and reporting, including program design and outcomes, in peer-reviewed and national publications.

Table 2: Pathways to Published Literature by Program.

Programs	Named Interventions	Clear Pathway to Published Literature (Y/N)	Impact on Literature Pathway (Low/Medium/High)
American Institute for Chemical Engineering (AIChE)	Formal Mentoring, Formal Networking Experiences	N	—
Arizona State University	Formal Course (Credit Received), Short Course or Seminar, Workshops	Y	Low
Auburn University	Formal Course (Credit Received), Short Course or Seminar	Y	Low
Duke University	Formal Mentoring, Formal Networking Experiences, Workshops, Reading and Writing Assignments (Group participation including reflection submissions)	Y	High

Table 2 continued: Pathways to Published Literature by Program

Programs	Named Interventions	Clear Pathway to Published Literature (Y/N)	Impact on Literature Pathway (Low/Medium/High)
Florida State University	Formal Course (Credit received), Short Course or Seminar, Workshops	Y	Low
James Madison University	Formal Mentoring	Y	Low
Johns Hopkins University	Formal Mentoring, Teaching Practicum (structured teaching experience)	Y	Medium
Purdue University	Formal Course (Credit received)	Y	Medium
Rensselaer Polytechnic Institute (RPI)	Workshops, Teaching Practicum (structured teaching experience)	N	—
The Ohio State University	Formal Mentoring	Y	Low
University of California Berkeley	Short Course or Seminar	N	—
University of California Merced	Workshops	N	—
University of Buffalo State University of New York	Workshops	N	—
University of Cincinnati (College of Engineering and Applied Sciences)	Formal Course (Credit received), Teaching Practicum (structured teaching experience)	Y	Medium
University of Cincinnati (College Graduate School)	Formal Mentoring, Formal Course (Credit received), Workshops, Reading and Writing Assignments (Group participation including reflection submissions)	Y	Medium
University of Delaware	Workshops	N	—
University of Kentucky	Formal Course (Credit received)	Y	Low
University of Maryland (A. James Clark School of Engineering)	Short Course or Seminar	N	—

Evidence of Program Impact: Summary of two reported studies

Gaff and Pruitt-Logan (1998) [10] discuss two coordinated surveys (1995 and 1996) of PFF program participants that evaluated participant experiences and views regarding PFF programs. During these studies, 371 graduate students from 14 of the 17 cluster programs were queried; in addition, 141 faculty members and 16 administrators. Yet, due to the decentralized manner in which the studies were conducted, and the fact that many of the students surveyed in 1995 were also surveyed in 1996, the 1996 survey results are primarily reported. Students (n=186) were distributed across various fields (English and other humanities; natural sciences; social sciences; mathematics; education and other professional fields); slightly more than half were women; most were within two years of completing the degree; and 75% were white, and of the remaining ethnic minorities, the largest group were African-American. Of the reported motives for participation in the PFF program, the three most common were: to learn about faculty roles; to explore interest in being a professor; and to enhance prospects for an academic job market. The most commonly provided activities were having visited or worked at a partner institution and attending a series of workshops or seminars on teaching or professional development. Common perceived benefits were: understanding faculty roles and awareness of diverse institutions; with the most common difficulties being time (difficult to add PFF requirements into existing heavy schedules) and lack of advisor or department support. Finally, when asked if participants would recommend the PFF program, 99% said they would do so without reservation.

DeNeef (2002) [14] conducted a study to evaluate the central premise of PFF that participating students were better assistant professors than their counterparts with more traditional preparation. The results of this work are based on answers to questionnaire surveys completed by 129 PFF participants (48% response rate) who completed the program, received their doctorate degree, and secured a faculty position. DeNeef and colleagues also conducted, and included in the results, 25 follow-up telephone interviews. There was no control group in this study. Alumni reported (through quantitative assessments) on the value placed on the mentoring relationships, the cluster campus visits, and activities at the home institutions; the extent to which programs increased their knowledge of the academic job search, of the dimensions of faculty roles at different institutions, and of effective teaching; and the overall impact of the program. Qualitative assessments were with regard to their feelings on the role PFF programming played on their choice of academic career path, securing a job, and the initial transition from graduate student to faculty member.

Of the aforementioned categories, alumni reported the most valuable interventions to be the mentoring relationship and PFF interventions organized at their home institutions; site visits to cluster campuses closely followed. Most specifically, of value were the discussions with mentors on the faculty roles and responsibilities, balancing research, teaching, and service, and structures of institutional governance; direct observation of cluster campus courses, faculty meetings, and strategies for teaching diverse student populations; and opportunities and assistance with developing teaching philosophy statements, and assessing one's own teaching. In terms of their graduate training, alumni agree that PFF legitimized conversations about teaching, taught them that their academic networks need to include people outside of their disciplines, and served as a mechanism for helping to acculturate them into the academy. Finally, as it pertains to the academic job search and initial years as a faculty member, alumni report changes in their comfort level with negotiating the job market, thus allowing them to "hit the ground running"; an

increased knowledge about the academy and the variety of institutions types, especially compared to their non-PFF counterparts; and gained a better understanding of how to present themselves professionally and how they fit (and could prosper) in a variety of institution environments. Translated to the initial years as faculty members, these learnings afforded alumni a sophistication that allowed them to relate to interviewers as peers; provided familiarity with a wide range of classroom issues; and helped them to achieve a synergy with teaching and research that many of their non-PFF colleagues, and even graduate faculty advisors, have not.

Discussion

The goal of this review was to address *which PFF interventions have demonstrated the most success in future faculty development;* by synthesizing existing program documentation to elucidate efficacy of individual program interventions. The approach was to 1) provide an understanding of existing PFF programs and their components in order to identify program commonalities and differences, and 2) report on the benchmarks and outcomes serving as key indicators of program success. To do so presupposes the existence of data gathered, extracted, and analyzed with the intent to report, on an individual program basis, program impact and/or intervention efficacy. The paucity of such data proved to be a barrier to addressing these questions in their entirety; not only for this current work, but for other work seeking to similarly assess trends in future faculty development program design, outcomes, and impact. The prevalent literature tends to report on operational best practices or provide anecdotal evidence regarding the benefit of PFF programs to alumni. An additional limitation of many of the studies on program impact is the decentralized manner in which programs were evaluated and the small sample sizes that do not add much "hard evidence" regarding program efficacy. Alma Clayton-Pederson et.al [31] notes that "despite considerable advances in assessment [of PFF programs], the forms and types of data gathered tended to be at the input level…rather than at the outcome level". Gaff and Pruitt-Logan assert that "this global endorsement of quite different operational programs suggests that any such effort to inform the graduate students about the realities of faculty life is welcomed, but it gives little guidance to academic leaders seeking to identify which programmatic features are most and least powerful [10]."

Still, despite this limitation, all is not lost. To some extent, program commonalities (and hence differences) may be deduced from general information provided on program websites. Moreover, one can use the same reasoning to draw parallels and conclusions regarding design and focus of named interventions. Furthermore, despite any limited conclusions that can be drawn about outcomes, the literature consistently reports and suggests positive attitudes and experiences of PFF alumni, as well as changes in alumni's knowledge, attitudes, and skills sets regarding institutional expectations of new faculty, experiencing an easier transition from graduate student to faculty member, and being better prepared for the rigors of the professoriate as compared to their non-participatory counterparts. This impact appears universal and is amplified throughout all reports, regardless of sample size.

Conclusions

Strengths and Limitations of the Current Review

In reviewing the literature on PFF programs to answer questions put forth in the current work, a number of challenges were encountered. The following strengths and limitations of this report are noted with suggestions for addressing these limitations in future work:

As a pilot investigation, the current review is a strong start to a systematic review of the PFF literature. The choice to include a comprehensive search strategy that involved searches of named databases, popular search engines, and reported reference lists allowed for a wide net to be cast over reported information. Similarly, the choice to not exclude sources with regard to discipline or program format may elucidate important information regarding the trends of department- or discipline-specific program design and, possibly, impact and outcomes.

Moving forward, a deeper dive into the search for published (and unpublished) data is needed. This will require a change in research methodology to include different, and explicitly defined, inclusion and exclusion criteria, reaching out to individual programs for information regarding assessment (program-wide assessments were a requirement of PFF funding, and done so looking toward the promotion of self-reflection about program effectiveness and sustainability [31]) and the development of a conceptual framework from which to evaluate PFF initiatives.

Additionally, for comparison of program interventions, intervention categories should be better defined to accommodate a specific understanding of intervention formats, and rely less on the non-standardized descriptions of individual programs.

Implications of Current Work

Although we have concluded that the current work needs to be expanded to a full systematic review, the work still holds implications for further research and analysis on future faculty development programs. First, it demonstrates that currently published literature (including websites, op-ed pieces, and other non-peer-reviewed publications) is abundant, but not organized or available in easily searched or evaluated formats. Second, attempts to classify these programs are difficult due to the persistence of limited non-homogenized data. Third, the reporting or determination of program efficacy (possibly where no prior determination exists) may require the development of a conceptual framework as a lens through which to evaluate programmatic strategies and targeted audiences, and not (solely) reported programmatic impact, benchmarks, and key indicators.

Future Work

This review examines and reports on a subset of the existing PFF programs without regard to disciplinary or departmental focus. To broaden its implications, more PFF programs will be reviewed and data analyzed with regard to discipline or department. In addition, a review of unpublished data will be included, as well as conceptual models for framework of evaluation.

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