WIP: Piloting a Comprehensive Needs Assessment to Enhance Engineering Faculty Development

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Comprehensive Needs Assessment to Enhance Engineering Faculty Development

Introduction

The notable increase in student enrollment in engineering courses and attendance at engineering colleges [1] has led to focused attention on student learning and their outcomes [2]. Nevertheless, the faculty engaged with those students often receive less attention regarding their own development. Student success is closely tied to faculty's teaching and mentoring abilities and could potentially add to their stress as they endeavor to fulfill these responsibilities [1]. Consequently, changes in higher education and the growing expectations from faculty members have led to the increased emergence of faculty development offices and initiatives at higher education institutions [3].

Faculty development can be defined as a set of intentional educational activities designed to equip faculty to grow in their professionalism with the result of becoming partners in advancing all segments of their institution's goals and initiatives [4]. Integral to this process are faculty development professionals who assume a pivotal role in supporting faculty in their complex roles while also identifying areas of opportunities for growth. They are expected to preserve, clarify, and promote the different strategies related to faculty development and to network with faculty and institutional leaders to respond to institutional challenges and propose innovative solutions [5].

When introducing faculty development services, the crucial first step is to identify the needs of faculty and to align services with those needs [6]. While this is a common practice in medical education, it is not often documented in non-medical faculty development practices [see 7, 8]. With the numerous changes in higher education resulting from or congruent with the pandemic and recent societal events, there is a need for further exploration in identifying current faculty development support necessary for academic career success.
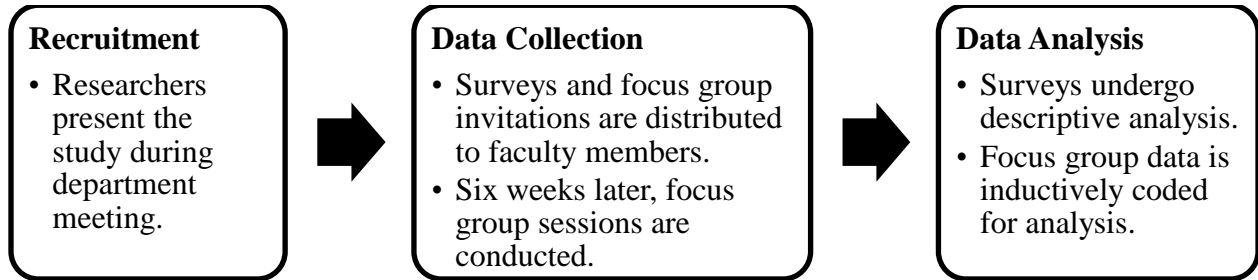
The College of Engineering's Office of Faculty Development and Success (OFDS) at North Carolina State University is expanding its focus in response to contextual factors such as new leadership in the college, staff changes within OFDS, and a notable increase in College of Engineering enrollment by 40 percent. To begin, OFDS is piloting a comprehensive needs assessment in the Civil, Construction, and Environmental Engineering (CCEE) department before expanding to other departments within the College of Engineering. This paper will describe the purpose and methods of the initial pilot, provide lessons learned, and outline how the assessment will progress throughout the entire college.

Pilot Needs Assessment Methodology, Data Collection, and Analysis

Methodology

A needs assessment is a "process of collecting information about an expressed or implied organizational need that could be met by conducting training" [9]. This valuable tool can help university teaching and student learning offices focus efforts to meet the most salient needs relevant to the institutional mission [6]. The purpose of this engineering faculty development needs assessment is to identify faculty development experiences that are most beneficial for

Figure 1. An abbreviated description of the methodology

Recruitment		Data Collection		Data Analysis
• Researchers present the study during department meeting.	→	• Surveys and focus group invitations are distributed to faculty members. • Six weeks later, focus group sessions are conducted.	→	• Surveys undergo descriptive analysis. • Focus group data is inductively coded for analysis.

career advancement; evaluate challenges faced by faculty members in the College of Engineering; and develop programs and initiatives to address these challenges and meet the identified needs.

The proposed comprehensive approach considers the broader experiences of faculty members, whereas a typical needs assessment would focus solely on faculty development needs [10]. The approach includes documenting faculty participation in other development initiatives, current job-related well-being, and personal commitments since these additional factors can impact their work and engagement in faculty development. The data is collected through surveys and a focus group surrounding an overarching question: How can OFDS provide support to faculty members considering the challenges and identified needs within the College of Engineering? The methodology can be described in Figure 1.

Procedure and Sample

The data collection process begins with two project researchers attending the CCEE department meeting where the assessment is being piloted. They discuss its significance in shaping faculty development opportunities by emphasizing intentional growth for both career success and personal fulfillment. This includes initiatives, workshops, and programs like mentorship opportunities and teaching strategies workshops. A survey is distributed to 50

Table 1. Demographics for the study

Demographics	Survey (n=25)	One Focus Group (n=6)
Rank	Full, Teaching Full/Associate, Associate, Assistant	Full, Teaching Full/Associate, Associate
Gender	19 Male, 6 Female	4 Male, 2 Female
Ethnicity	14 White, 7 Hispanic/Latino or Asian/ Pacific Islander, 4 prefer not to disclose	5 White, 1 Asian/Pacific Islander
Yrs. experience	8 with <10 yrs., 14 with 11-35 yrs., 1 with 36+ yrs., 2 who prefer not to disclose	3 with 7-10 yrs., 1 with 11-15 yrs., 2 with 21-35 yrs.

engineering faculty members, which is followed by invitations to participate in focus groups six weeks later. The one-hour discussion guided by a focus group protocol explores faculty experiences at the departmental and disciplinary levels. See Table 1 for demographics.

Instrumentation

The survey asks demographic information such as faculty rank, gender, race/ethnicity, and years of experience in higher education. The second part of the survey inquiries about faculty satisfaction, experience with faculty development, and the importance and support of faculty development in their department and the college. Further, faculty are asked about more specific details about opportunities for faculty development in research, mentoring, teaching, student engagement, and overall professional growth. The semi-structured focus group protocol includes 14 questions starting with basic information about their role. There is a demographic survey included when faculty decide to sign up for the survey. The goal of the focus group is to gather insights into faculty experiences within the CCEE department, including aspects that they enjoy, challenges faced, and departmental culture.

Data Analysis

The survey is analyzed by using a descriptive analysis of the survey results. The purpose of this analysis is to describe the data through a specific measurement, such as frequency or averages [11]. The benefit of doing this is that it provides insight into potential trends before conducting the focus group protocol. For the focus group transcription, the focus group discussions are inductively coded by reviewing emerging themes [12]. The data is systematically compared to identify connections and themes relevant to workshop topical areas, community groups, and initiative opportunities. This information played a crucial role in revising instruments and protocols. The identified themes not only shape topical areas but also contribute to the strategic plan for OFDS in preparation for the next semester. Additionally, this analysis supplies initial data guiding OFDS and the CCEE department in addressing high priority needs for faculty development in the following semester.

Preliminary Results

In the survey, 13 of 25 participants reported previously attending faculty development and that they strongly believe faculty development is important for their professional growth (M=4.38 with 5=strongly agree, 1=strongly disagree). General recommendations for faculty development facilitation included providing valuable content with quality feedback, structured time, and aligning with faculty interests. Faculty also ranked different topics on a 5-point Likert scale with 5 indicating "most interesting," and 1 indicating "least interesting" within four focus areas: research, mentorship, student engagement, and overall development. See Figure 2 for the top ten. One major theme for the group was the concern for junior faculty members or those undergoing the promotion and tenure process. It's important to note that none of the participants reported currently being involved in this process. One faculty member shared, "I'm at a point in my career (where faculty development) doesn't affect me, but I really worry about our junior faculty. They're very stressed, they're getting mixed information, incomplete information, and they're

Figure 2. Top ten faculty development topics of interest

1. Overall: Leadership development (M=4.08)	6. Mentorship: Graduate student advising and mentorship (M=3.68)
2. Overall: Promoting long-term career satisfaction (M=3.84)	7. Research: Translating research into real-world impact (M=3.64)
3. Student engagement: Enhancing engineering student motivation and interest (M=3.84)	8. Student engagement: Promoting student accessibility and belonging in engineering (M=3.6)
4. Overall: Reducing burnout and stress in your work (M=3.84)	9. Overall: Mental health and work-life balance (M=3.56)
5. Mentorship: Building effective mentor-mentee relationships (M=3.72)	10. Mentorship: Faculty mentoring best practices (M=3.52)

trying to be on the top of the game and everything they're doing." A few participants reported a similar anecdote about the challenges these faculty members faced regarding messaging and support in these processes and recommended it as an area for further exploration.

The second theme was student engagement and the appropriate methods to support their accommodations and well-being. One faculty member shared how they face challenges with providing accommodations with students registered for accommodations for their class. The participant shared: "It falls upon the instructor to provide fairness and then work a room out for a space. And then in the case of a large class, you can have a significant number of students [and] change the way in which we worked out quizzes. We have to be accommodating for all the kids. I don't know that you have a solution for that but that is a stress." The third theme that attracted a lot of discussion is the challenges of submitting proposals and the processes that occur between the university and college levels. Faculty were very engaged in this discussion.

Discussion and Future Work

In the future iterations of this needs assessment, the survey will be conducted in a department meeting and with individualized invitations to participate. When participants were invited in a reminder email, participation increased significantly. The second modification will be to conduct 30-minute individualized interviews by invitation to have a more accurate representation of the faculty demographics and different lived experiences instead of a focus group. Finally, the questions will be adjusted to align more closely with the survey's focus areas. This adjustment prioritizes individual development, facilitates easier scheduling of interviews with faculty members, and allows faculty to be more candid about their needs and experiences.

Even with a few modifications, the pilot study presented an opportunity to improve the tools used to evaluate faculty development experiences, faculty challenges, and potential program areas. These tools will be used with the 11 other departments and 400 faculty members in the College of Engineering. As these tools are developed, OFDS will establish an evaluation method for faculty needs and will lay the foundation for a developmental evaluation approach. These methods and tools will not only benefit OFDS, but also other engineering departments, faculty development centers, and offices.

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