



Examination of faculty development in the Departments of Civil & Mechanical Engineering and Geography & Environmental Engineering at the United States Military Academy

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Abstract

This study is submitted as part of a special joint panel session between the Environmental Engineering Division and the Faculty Development Division on innovative development for tenured/tenure-track faculty and professional faculty. This study presents findings from an institutional-level evaluation of professional faculty development practices. The United States Military Academy (i.e., West Point)'s unique faculty composition consists of professional military faculty, permanent military faculty, and civilian faculty is known as the "blend of excellence". The majority of West Point faculty (~55%) are military officers serving for a two-to-three-year period. These military faculty are professional faculty members serving in a capacity similar to adjunct faculty or non-tenured teaching faculty at other universities. Each type of faculty member brings unique skills and talents to the faculty team that contribute to the overall development of West Point's undergraduates who serve as military officers upon graduation. In spring 2019, West Point faculty members were asked to share their thoughts and perspectives on the faculty development of junior civilian (defined as instructors or assistant professors) and rotating military faculty. Areas queried included developmental approaches and best practices, developmental areas (e.g., research, teaching), and defined developmental outcomes. This study subsets responses from two departments, Civil & Mechanical Engineering and Geography & Environmental Engineering, providing a focused examination of faculty development methods applicable and beneficial to civil and environmental engineering programs that have adjunct and/or non-tenure track faculty. Response rates were similar for each department (24% and 34%). The study identified three major findings that are generally applicable to all universities: (1) institutions can benefit from discussion and shared understanding regarding the definition and intent of faculty development; (2) our faculty prefer to handle development of more junior faculty at the department-level while leveraging university-level resources; (3) several distinct practices were most beneficial to professional faculty development, to include: a structured on-boarding program, unstructured mentorship throughout the academic year, and classroom observation with feedback. While West Point is somewhat unique in mission and faculty composition, the finding from this study can be beneficial to all institutions with non-tenure track professional faculty.

1. Introduction

The American Society of Engineering Education (ASEE) Environmental Engineering Division (EED), in a special joint panel discussion with the Faculty Development Division, sought papers on practices or opinions (based on research) regarding *Innovative development for tenured/tenure-track faculty and professional faculty (adjunct, non-tenure track such as teaching and research faculty)*. This study presents a subset of the results and discussions of a faculty development survey implemented at an institution with a predominately junior adjunct faculty population. The findings may be beneficial to all institutions with a substantial non-tenure track professional faculty population.

The United States Military Academy (USMA), commonly referred to as West Point, has a unique faculty model called the “blend of excellence”, which can be described as “committed faculty with diverse backgrounds and experiences who are uniquely able to inspire the education and development of its [students]” [1]. To that end, our faculty includes both civilian and military faculty, which provide a wealth of knowledge and diversity of experience that support our institution’s unique purpose to educate, train, and inspire leaders of character that will serve in the military. Specifically, the university’s faculty composition can be broken into three categories: permanent faculty military officers (~18% of faculty), tenured/tenure-track civilian faculty and professional civilian faculty (serving as adjuncts and non-tenure track positions) (~25%), and rotating military faculty on 2 to 3-year assignments (known as junior military faculty, which can be considered professional faculty) (~55%). Within the “blend of excellence”, senior faculty are charged with providing military and academic leadership and mentorship to the junior faculty. Meanwhile, rotating junior faculty provide fresh perspectives and valuable insights from recent military experiences.

To better understand the “Blend of Excellence” model in practice, we initiated a survey in spring 2019 to all West Point faculty (n=720) asking for thoughts and perspectives on junior civilian (i.e., instructors or assistant professors) and junior rotating military faculty development. Areas queried included developmental approaches and best practices, developmental areas (e.g., research, teaching), and defined developmental outcomes. The faculty response rate was ~22% (n=159) providing a robust data set for examination. The purpose of this study was to subset responses from two departments, Civil & Mechanical Engineering and Geography & Environmental Engineering, to identify faculty development approaches applicable and to engineering programs that have professional (i.e., adjunct and/or non-tenure track) faculty.

2. Methods

The principal mechanism used in this study was a comprehensive survey issued to all West Point faculty (n = 720) in spring 2019. Faculty queried were members of the Dean’s Office and all 18

different academic departments or independent research centers at West Point. The survey was issued on-line through our university's secure website and consisted of four major parts. Part 1 was demographic information (4 questions). Part 2 was the main survey consisting of 33 questions. Topics surveyed in the main survey included: efficacy and structure of department-level developmental programs, responsibilities for faculty development, developmental areas, developmental best practices, frequency of mentorship, time allocated to mentorship, junior faculty developmental goals, Academy-level knowledge repositories, mentorship in the five faculty domains, classroom observation, scholarship, course directorship, and academic promotion. Parts 3 and 4 were two separate "follow-on" surveys that asked questions regarding faculty recruitment, new faculty integration and training, and more specific questions concerning topics found in the main survey. Most questions asked respondents to provide answers using a Likert scale (1-5). Many questions also allowed respondents to provide written comments. The survey questions are available from the authors upon request.

This study was conducted by a diverse team of senior and junior faculty researchers from several academic departments, to include the Departments of Geography and Environmental Engineering, Systems Engineering, Civil and Mechanical Engineering, Social Sciences, Behavioral Sciences and Leadership, and the Department of Military Instruction. The study was sponsored by West Point's center for Faculty Learning, Innovation, Collaboration, and Research.

3. Results and Discussion

3.1. Survey Participation and Demographics

As mentioned, West Point's unique mix of military officers and civilian faculty can be subset into three main categories: (1) senior military officers (~18% of faculty), rotating military officers (~55%), and civilian faculty members (~27% of faculty). These three primary categories can be subset into approximately 10 subcategories based on faculty status. For simplicity and comparison to other universities, senior military officers and civilian associate and full professors equate to tenured faculty (henceforth called "*senior faculty*"), while rotating military officers and term-hire civilian faculty at the instructor or assistant professor level equate to adjunct faculty and non-tenure teaching faculty (henceforth called "*junior faculty*"). All senior faculty have earned a doctoral (or equivalent) degree, while all military junior faculty have earned at least a master's degree. Most junior civilian faculty have earned a doctoral (or equivalent) degree prior to their term-hire. Junior military faculty normally serve two- to three-year tours at our university, while many junior civilian faculty members serve for one- to three-years prior to competing for a tenure track position or moving to another university.

Of the entire faculty population, the survey response rate was ~22% (n = 159 respondents); however, this study focuses on responses from two departments most relevant to the faculty

development panel discussion: the Department of Civil and Mechanical Engineering and the Department of Geography and Environmental Engineering. Table 1 provides the distribution of faculty respondents by faculty category for both departments. Each of these departments had 11 respondents, for a total of 22 participating faculty members. The distribution of responding faculty between junior and senior faculty was approximately the same, as was the percentage of faculty responding to the survey from each department.

Table 1: Distribution of faculty respondents by faculty category within the Departments of Civil & Mechanical Engineering and the Department of Geography & Environmental Engineering.

	Department of Civil & Mechanical Engineering	Department of Geography & Environmental Engineering
Senior Faculty	6	7
Junior Faculty	5	4
Total	11	11
% of Departmental Faculty	24%	34%

3.2. Institutional Support for Faculty Development & Challenges to Implementation

Our university supports junior faculty development through strategic policies and several funded programs. Our university’s strategy over the next five years (2019 – 2024) states that “staff & faculty development” is an enduring institutional commitment and includes language indicating the university’s efforts to provide unique and relevant developmental opportunities for faculty [2]. A second strategic document, published by our Academic Dean, defines our junior military faculty as the “second graduating class”, indicating that the institution develops professional military faculty in such a way that they prepared to excel upon return to industry (i.e., the operational military force) [3]. Further, our Dean’s guidance regarding faculty development is that “faculty should take advantage of opportunities for development throughout their time at [our university] and what best suits their individual talents and interests” [4].

Our university provides a variety of programs for junior faculty development. Specifically, all new faculty participate in a ~6 weeklong initial summer training workshop run at the department level. Here, new faculty are given the opportunity to develop relationships with their faculty cohort as they explore foundational teaching skills. New faculty members also complete numerous events designed to indoctrinate them into our university’s community. Beyond initial summer training, our university maintains the Center for Faculty Excellence (CFE), which

provides numerous faculty development opportunities throughout the academic year. The most intensive CFE offering is the Master Teacher Program, which is a two-year program consisting of teaching-related classes and a required capstone project. To graduate, faculty members must complete a research project and submit a written paper. Additionally, our university has a center for Faculty Learning, Innovation, Collaboration, and Research that is charged with exploring ways to enhance and promote excellence in all areas of faculty development, to include research, innovation, and learning. The purpose of these is to provide new faculty with the resources to excel in the classroom.

When queried whether our institution should develop junior faculty, our faculty nearly unanimously agreed that it was important (only 1 of 159 respondents indicated we should not). However, when asked whether our university places enough emphasis on junior faculty development, only 52.2% agreed or strongly agreed with the statement. Further, survey results suggested that responding faculty had mixed opinions regarding existence of faculty development best practices. Here, 71% of responding faculty disagreed or were neutral when asked if faculty development best practices were available.

At our institution, implementation of the faculty development strategy is primarily executed at the department-level. This result suggests there is a gap between university-level emphasis and execution of faculty development at the department-level. An examination of written comments suggests that a lack of understanding regarding the intent of faculty development may have influenced responses. Further, short answer responses suggested that respondents may define faculty development differently, which impacts whether they thought the level of development provided was appropriate. For example, a respondent with a broad definition identified development as occurring in many different activities:

We get tremendous academic development through scholarship and mentorship with senior faculty, [...] public speaking development by standing in front of [students] and teaching each day, [...] intellectual development (debate skills) through our daily exchanges with similar well read faculty members, [and] our department has a robust [...] development program that helps us prepare for [returning to industry].

Whereas a respondent with a narrow definition of development viewed development as a more formal and rigid activity and does not include the act of teaching, debating, conversing, etc.:

Aside from new faculty workshops during the summer of arrival, there is very little junior faculty development.

These results suggest that our institution could benefit from discussion and shared understanding regarding the definition and intent of faculty development. Additionally, there is much work to

be done in providing faculty developmental opportunities to meet both institutional-level expectations and expectations of faculty members. Further, when queried about our university's emphasis on junior faculty development, many respondents identified barriers to junior faculty development. Beyond aforementioned definitional challenges, identified barriers centered on competing requirements, to include high teaching demands and additional administrative duties, which often take priority over faculty development opportunities. An important resource for faculty members is time to partake in available opportunities.

3.3. Comparison of Faculty Development Practices

This section of the study subsets survey responses for civil engineering and environmental engineering, providing a focused examination of faculty development methods applicable and beneficial to civil and environmental engineering programs that have adjunct and/or non-tenure track faculty. This section briefly describes each department's faculty development program and then discusses three practices common for both departments that can be useful for other universities: structured onboarding programs, unstructured mentorship, and classroom observation practices.

3.3.1. Description of Faculty Development Programs

Both the Department of Civil & Mechanical Engineering (CME) and the Department of Geography & Environmental Engineering (GENE) have established faculty development programs. However, the emphasis of each program differs somewhat for each department. For CME, survey respondents identified a structured program that is sponsored and supported by the Department Head and other senior faculty members. The top three developmental areas that faculty identified were teaching, scholarship, and personal growth. Tenants of CME's developmental program included: 1) a structured onboarding program (i.e., an initial Instructor Summer Workshop); 2) performance counseling; 3) structured classroom observation program; 4) opportunities to lead other faculty when instructing high-enrollment courses with multiple instructors (i.e., course directorship); 5) informal mentorship meetings in social contexts.

Similar to CME, GENE survey respondents described structured junior faculty development program stemming from a culture where senior faculty are expected to mentor junior faculty. GENE junior faculty reported having a strong desire for mentorship in several areas, to include teaching, scholarship, long-term professional development goal attainment, how to excel as a professional officer, student development best practices, and academic service. GENE's developmental program included: 1) a structured onboarding program (i.e., initial Instructor Summer Workshop); 2) strong leader emphasis on department-internal faculty development events; 3) faculty development seminars; 4) strong emphasis on completing the Master Teacher Program; 5) formalized developmental plans; 6) classroom observation programs.

As stated, faculty development programs in both departments have several similarities. Identified strengths for each department's program included: a structured onboarding program, leader emphasis on faculty development, one-on-one mentorship opportunities, course directorship, and classroom observation programs. Identified areas for improvement included the need for refined faculty development goals, outcomes, or objectives at a department-level, and mechanisms for assessing the efficacy of faculty development within each department.

3.3.2. Structured Onboarding Program

Both departments indoctrinate new junior faculty through a focused onboarding program when new faculty arrive to our institution. All new faculty are required to complete their department's program prior to the start of the first semester of teaching. For approximately six weeks each summer, new faculty receive instruction on effective teaching methods for engineering undergraduate courses, observe senior faculty modeling effective teaching, and develop teaching plans. New faculty also have multiple opportunities to teach full classes with senior faculty filling the roles of students. Here, senior faculty provide feedback from both a student and faculty perspective regarding how well the instructional material is conveyed. New faculty are also afforded time to prepare for teaching during their first semester, while also learning the many nuisances of our institution. New faculty are also afforded time to learn administrative procedures, such as how to operate our university's online faculty portal or set-up online courses resources on BlackBoard or SharePoint.

Surveyed faculty were asked to assess the efficacy of their department's onboarding programs in several areas. Results suggested the following onboarding program strengths: clearly defined objectives focused on requisite teaching skills and institutional indoctrination; time to prepare for teaching duties during the faculty member's first semester; a clear understanding of our institution's mission and vision; development of a cohesive faculty team; and shared, defined priorities in each of the institution's faculty development domains (teaching, scholarship, student development, faculty development, and service).

3.3.3. Unstructured Mentorship

Post onboarding, the principal mechanism for faculty development in CME and GENE is an unstructured mentorship. Each department's program varies based on guidance from the Department Head and other senior faculty members. Identified unstructured (i.e., voluntary or not mandated) mentorship activities centered on informal social meetings, ad hoc class observations and subsequent feedback sessions, and brief question/answer sessions between senior and junior faculty on developmental topics.

Senior faculty in both departments agreed or strongly agreed they receive guidance from their immediate supervisors concerning the development of junior faculty members. The senior faculty in both departments also reported spending one to four hours each week providing meaningful mentorship, which we defined as mentorship valuable to both individuals and worth the time invested. Interestingly, the junior faculty in both departments report lower time values for mentorship activities: one to three hours per week in CME, and less than 30 minutes per week in GENE. The most plausible explanation for the difference in opinion centers on the fact that most senior faculty mentor more than one junior faculty member. Other possible explanations may be that some senior faculty mentorship is directed to other senior faculty, or that senior and junior faculty have a difference in opinion on what is meaningful mentorship.

3.3.4. Classroom Observations

The classroom observation programs in both CME and GENE involves two components: 1) senior faculty observation of a junior faculty member instructing students, and 2) immediate feedback in a formal or semi-formal setting. Feedback sessions normally focus on teaching techniques and is often provided in a “sustain” and “improve” format. The feedback sessions normally include significant dialogue between the senior and junior faculty members. Classroom observation can be pre-coordinated or impromptu. Further, some senior faculty may not elect to observe for the entire lesson but instead only stay for the first half of the lesson (or arrive for the last 30 minutes). To facilitate classroom observations, each class reserves a seat near the door of the classroom for the visitor. Instructors normally place a visitor book on the desk, which includes the class syllabus, instructor biography, necessary lesson materials, and forms for feedback.

CME has a structured classroom observation program, where GENE’s program is less structured (i.e., the observation plan is ad hoc and decentralized at the program level). Further GENE does not ask senior faculty to observe other senior faculty, whereas CME’s program includes observation of all faculty at least once during each semester. Survey responses from faculty in CME and GENE reflect these differences in approaches. In CME, 10 of 11 responding faculty (both junior and senior faculty) indicated they were observed by another faculty member at least once during the previous semester. Of responding faculty in GENE, however, only 5 of 11 responding faculty stated they were observed at least one time. Interestingly, of the 5 positive responses in GENE, none were junior faculty members. This result suggests that CME’s more structured classroom observation program increases opportunities for feedback and ensures each junior faculty member is observed. While the efficacy of each classroom observation program was not examined, anecdotal feedback from CME faculty suggests that the classroom observation program enhanced teaching skill and was of considerable value to the department.

4. Conclusion

This study discusses institutional support for faculty development at our university, as well as results of an institutional-level survey concerning faculty development practices. The study identified several areas that can be applicable to civil and environmental engineering programs that have professional (i.e., adjunct and/or non-tenure track faculty) at other universities. First, this study shows that institutions can benefit from discussion and a shared understanding regarding the definition and intent of faculty development. Institutional-level guidance and resources does not necessarily translate into action at the department level. Second, is that leader (i.e., more senior faculty) emphasis on junior faculty development leads to more structured developmental programs. Establishing a departmental culture that views professional faculty members as valued members of the staff deserving of continued development provides immediate and future benefits. Department level management also enables appropriate development and advisement for the specific field of study. Third, a structured onboarding programs can be an excellent method of inculcating and developing new faculty. Specifically, a structured onboarding program can ensure that new faculty members build relationships with senior faculty, that new faculty have opportunities to practice teaching while receiving critical feedback, and that new faculty are fully aware of administrative policies and procedures prior to the start of the academic year. Fourth, unstructured mentorship can be effective as an ongoing faculty development strategy, but the program should likely be paired with a clearly articulated department level developmental strategy that includes a broad definition of faculty development. A useful definition may be along the lines of “enhancing the talents, expanding the interests, improving the competence, and otherwise facilitating the professional and personal growth of faculty members, particularly in their roles as instructors” [5]. Finally, for departments desiring to make changes to their faculty development programs, a simple survey such as the one used in this study can provide a useful initial assessment of existing perceptions.

References

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