ELEVATING CONSTRUCTION GRADUATE STUDENTS' PEDAGOGICAL PROWESS THROUGH FACULTY DEVELOPMENT INITIATIVES

SAEED ROKOOEI¹, ALIREZA SHOJAEI², and EHSAN TAVAKKOL³

¹Dept of Building Construction Science, Mississippi State Univ, Starkville, U.S.
²Myers-Lawson School of Construction, Virginia Tech, Blacksburg, U.S.
³Celeria Labs, Irvine, U.S.

Faculty development programs improve the performance of academic scholars and instructors by providing up-to-date teaching and research management tools and methods. The overall objective of this research was to organize a pilot faculty development program for recent graduates of construction programs in which participants could improve their teaching capabilities and further prepare for their classes. The overarching question of this research was to investigate the perception of participants about different aspects of a program and factors that impact the program outputs. A program was designed and developed around the main topics in construction curricula. The eligibility criterion for participation was being a Ph.D. student in the last stage of the study in a construction program. A cohort of eight students from different construction schools participated in the program in April 2023. A cross-section survey was designed and distributed to participants during the program in which they evaluated the impact of various factors on their teaching preparedness and improvement. The analysis of the data revealed that the importance and necessity of faculty development programs in the construction was greatly felt. In addition, participants indicated positive effects of the program on the course design and management process. The findings of this study provide a pilot structure for administrators and scholars in construction to design and develop general or specialized faculty development initiatives for junior faculty members who join construction schools without prior ample teaching experience.

Keywords: Education, Teaching excellence, Construction program, Mentorship.

1 INTRODUCTION

Faculty development programs play a major role in enhancing the practical knowledge of faculty members in teaching and research areas. Academic programs develop and offer faculty development initiatives to bring their research and instructional members up to speed and maintain the experiential knowledge required for effectiveness. In addition to current faculty member improvement programs, higher education institutions provide faculty development programs to graduate students as future faculty population. While this approach is practiced in many areas and majors, construction schools fall short in providing faculty development workshops and programs. The need is especially discerned with graduate students in construction who will be required to take charge and perform in the role of new faculty members, while a considerable portion of them were not at the helm of class management independently. To address this need, a program was designed and developed to enhance the non-technical knowledge of graduate students in construction.
Following the preliminary review of the literature and content, the structure of a two-day workshop was designed, and outlines were identified. To teach construction topics, nationally renowned educators were identified, and the content was developed. Simultaneously, the bulletin of the event was distributed through the construction professional network for recruitment. The main search question was to evaluate the perception of participants in this workshop about the program's efficacy and layout. A survey was designed and administered to collect participants’ feedback and perceptions. A descriptive statistical analysis was performed to present the data and reveal potential associations. The contribution of this paper is to provide feedback and perceptions of a sample of construction students, as participants of a faculty development program and supports construction educators and scholars by offering a sample faculty development program.

2 BACKGROUND

Faculty development aims to enhance educators' skills in administration, teaching, and research, contributing to improved work performance (McShannon et al. 2006). Originating with sabbatical leaves at Harvard University in 1810, the concept of faculty development has been significantly improved to address the needs of faculty (Steinert 2014). Research trends in faculty development have been explored through empirical reviews focusing on specific disciplines (Cook and Steinert 2013) or geographic regions (Phuong et al. 2015). Phuong et al. (2018) categorized faculty development programs by design foci, activity formats, cooperation, learning theories, and development levels. Formal and typical training programs, such as mentoring, seminars, and workshops are frequently utilized (Phuong et al. 2015), while self-paced learning processes and activities, though less reported, have shown significant impact on professional development (Cook and Steinert 2013).

Faculty in the realm of higher education, particularly in STEM fields, often begin their careers without formal pedagogical training, relying instead on informal methods like reading, discussions, and workshops to improve teaching skills (McShannon et al. 2006). Addressing the STEM workforce shortage requires comprehensive faculty training to improve research, service, and teaching potential. Various U.S. scientific societies offer specialized STEM workshops for new faculty. The American Chemical Society, for example, holds the Cottrell Scholar program covering work-life balance, mentoring, and teaching strategies (Baker et al. 2014). The National Association of Geoscience Teachers provides guidance in teaching, research, and work-life balance (Hill et al. 2015), while the Mathematical Association of America's Project NExT focuses on improving math teaching for Ph.D. students (Mackenzie 1997). The American Association of Physics Teachers emphasizes updated teaching methods (Henderson 2012), and the American Society for Microbiology's ASM Conference enriches biology teaching (Washington and Primm 2012).

In Civil Engineering, prominent faculty development workshops like the Excellence in Civil Engineering Education Teaching Workshop (ExCEEd) (Estes et al. 2019) and the National Effective Teaching Institute (NETI) (Felder and Brent 2009) provide comprehensive training covering various teaching aspects. Institutions like the United States Air Force Academy and Utah State University have adapted these models, integrating student involvement and practice lessons (Womack et al. 1994). However, a notable gap exists in similar programs within Construction Management and Engineering.

3 METHODOLOGY

In this study, the main objective was to examine the perception of graduate students of construction about various aspects of the teaching career preparation process and faculty development programs. To address this question, prior studies were reviewed, and notable factors were highlighted.
quantitative research method was employed to address different aspects of faculty development programs. A survey was designed and distributed to the participants of the Excellent Teaching Excellence program in April 2023. After gathering the data, 10 responses were identified as viable. The data were modeled, cleaned, and coded. Various descriptive analyses were performed to investigate potential patterns and possible associations between variables. The next section, “Results”, provides a summary of analysis, concerning the scope and objective of this paper.

4 RESULTS

Demographic information was covered in the first section of the survey which showed that 70% male and 30% female participants. All participants reported a construction-related degree for their Ph.D. program. Participants were also asked to report if they received their bachelor's degree (undergraduate program) from a U.S. institution or an international institution. Fig. 1 shows the percentage of each category.

![Fig. 1. Participant' undergraduate institution.](image)

Next, participants were questioned about their teaching experiences (semester) as an instructor of record in the next question, in which 60% reported no prior experience, 10% had 1-2 semesters and the rest reported 5-6 semesters of teaching experience. In addition, participants reported their teaching experiences (semester) through non-instructor of record roles including grader, TA, etc. Fig. 2 shows the percentage of each group.

The next section of the question covered participants’ involvement in the fall semester (the immediate next semester after the workshop), and possible options were starting a job as an assistant professor, and continuing the Ph.D. with TA responsibilities and continuing Ph.D. without TA responsibilities, in which percentages were 60%, 10%, and 30%, respectively. Also, participants were asked if they have been involved in various types of teaching activities including “Grading”, “Lecturing”, “Developing new teaching material”, “Student supervision”, and “Lab/workshop”, and the percentages of these options were 11%, 60%, 90%, 8%, and 60%, respectively. In addition, participants reported their preparedness level in teaching a course, if they were required to, with a Likert scale in five levels. The percentage of these levels is shown in Fig. 3.

The next section of the survey was focused on the course development and class management of students, in which participants generally expressed their positive experiences in developing new courses in construction programs, being familiar with the course development process, knowing where and how to find required resources in certain construction courses, and dealing with difficult students.
In the next section of the survey, participants expressed their perceptions about faculty development programs. Half of the participants reported that their departments provided mentorship for teaching. Also, in response to “How useful/essential is a teaching mentorship program for any new faculty in construction?”, 10% stated “Moderate”, 30% selected “High”, and the rest (60%) chose “Very High” and no one selected “Very Low” or “Low” levels. In the next two questions, participants rated the extent to which they felt that the training they received in their graduate programs prepared them well for their role as 1) faculty member to teach and 2) mentor with a Likert scale (Very Low to Very High). Table 1 shows the percentage for each level.

Table 1. Graduate school support for students.

<table>
<thead>
<tr>
<th></th>
<th>Teaching (%)</th>
<th>Mentorship (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Low</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Low</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Moderate</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td>High</td>
<td>30</td>
<td>60</td>
</tr>
<tr>
<td>Very High</td>
<td>20</td>
<td>10</td>
</tr>
</tbody>
</table>

Also, participants were asked to rate, using a file level Likert scale, to what extent faculty development initiatives can provide a useful application in the area of construction education. The pre-determined items were: “Helping with the layout of the course”, “Introducing resources for the course”, “Growing a faculty community network”, “Knowing subject matter experts”,...
“Knowing courses-related lessons learned”, “Providing hints about interactions with students”, “Past experiences in dealing with difficult students”, and “Learning other instructors’ innovative teaching methods”. The percentage of each level is shown in Fig. 4.

![Fig. 4](image)

Impact of faculty development programs.

Finally, participants were asked about the cost and ideal time for construction development programs. A Likert scale with five levels was used to quantify the perception. In response to “the fact that this Construction Faculty Teaching Development Program was free was a factor for me to attend”, 70% selected “Very High”, 20% chose “High”, and the rest selected “Low”. Also, participants rated three possible times to attend the faculty development program. The percentage of each level is shown in Fig. 5.

![Fig. 5](image)

Preferred time for faculty development program.

5 CONCLUSION

The current paper concisely presented a faculty development workshop and its results that was conducted with a group of Ph.D. students in construction in their last semesters of studies. The study’s aim was to explore how teaching qualifications can be improved through a faculty
development program. A set of educational modules was designed and developed by prominent construction scholars in the U.S., and Ph.D. students were recruited from construction schools through various methods. The perceptions and participants were investigated through a quantitative survey during the workshop. The results of the data indicated that there is a gap in participants’ prior teaching experiences which should be addressed through faculty development programs. This need is even more pronounced considering the fact that construction schools do not often provide faculty development programs for their Ph.D. graduate students who aim to continue academic careers. Despite the results derived from the participants’ responses, the findings of this study are not generalizable due to the small sample size of the subjects. Repeated measurements with a larger number of participants will foster the reliability of the results. Also, additional comparative analysis for discerning factors such as gender, school research orientation, and type of prior teaching activities will reveal various aspects of construction faculty development initiatives. The findings of this paper can help construction scholars and educators devise methods and modules to improve the teaching experiences of graduate students and further prepare them for their academic careers.

References


Mackenzie, D., Project NExT Helps New Ph.D.s in the Classroom—and Beyond, Science, American Association for the Advancement of Science, 277(5329), 1031-1032, August, 1997.


