EMPOWERING THE NEXT GENERATION: TRANSFORMATIVE IMPACT OF FACULTY DEVELOPMENT PROGRAMS IN CONSTRUCTION MANAGEMENT AND ENGINEERING

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The ongoing improvement of teaching abilities among faculty is recognized as essential across various academic disciplines. Within the Construction Management and Engineering (CME) field, there's a notable need for such professional development. Our study looks into a specific program designed to bolster the teaching capacities of new faculty in foundational construction topics. The central aim was to understand the opinions of CME faculty regarding these development initiatives and their potential benefits. During the summer of 2022, we introduced the program to 15 early-career faculty members. These individuals participated in educational sessions led by experienced construction educators. To gather feedback, we collected personal reflections and insights from participants, aiming to understand their perceptions and the impact on their teaching and mentoring skills. The feedback highlighted areas for improvement in current CME teaching practices and affirmed the value of such development programs. This research provides guidance for those in CME looking to design educational tools to better prepare graduate students for academic roles.

Keywords: Education, Universities, Teaching improvement, Academia, Early career faculty.

1 INTRODUCTION

Although research remains a crucial aspect for new faculty, institutions now recognize the strategic importance of providing faculty development to stay competitive in the expanding field of education. Given the prevalent labor shortage in construction studies, the attraction and retention of the next generation of construction engineers become pivotal in addressing this issue. Consequently, there is a need to prepare new faculty members to effectively educate the upcoming generations of engineers. Although educational institutions often facilitate and empower students to secure internships, the preparation of future civil and construction faculty is lacking. In other words, graduate construction programs do not fully take advantage of the expertise of senior faculty in transferring pedagogical knowledge to potential future instructors, despite pursuing a faculty job being a probable career path for graduate students (Quadrate et al. 2005). The primary goal of this study is to provide graduate construction engineering students with a Construction Engineering and Management (CEM)-tailored faculty program and explore the various core teaching areas that they encounter. The feedback of participants is recorded after
their participation, illustrating the benefits of the program and offering suggestions to enhance future endeavors.

2 LITERATURE REVIEW

The history of faculty development in U.S. Higher Education began with a focus on developing scholarly expertise, specifically research skills, in the 1950s and early 1960s. In the mid-1960s to 1970s, there was a shift to also include improving teaching effectiveness through new programs and centers. Subsequently, there was a further institutionalization of faculty development units and roles. The 1990s brought a major paradigm shift from a focus on teachers to a focus on student learning and active pedagogies. Over time, the scope of faculty development expanded from just building research skills to also enhancing teaching and learning (Gillespie et al. 2010).

2.1 Previous Efforts in Faculty Development Programs

Preparing efficient teachers in higher education has become a priority, as quality instruction is crucial for student learning and preparation for professional roles. Various processes are involved in the role of a teacher, including teaching, assessment, research, and addressing managerial and administrative issues. Research potential exists to enhance the processes associated with each duty in a teaching role (Abdulghani et al. 2015). Implementing faculty development programs serves as a potential solution for enhancing early-career instructors’ capabilities in various aspects (Abdulghani et al. 2021). Review studies recommend implementing faculty development programs in various forms, from individualized approaches to committee-based initiatives. Faculty development effectively improves perceptions of teaching value, motivation, knowledge, behaviors, and skill dissemination (Lancaster et al. 2014).

Previous studies on faculty development programs in various fields have demonstrated improvements in pedagogical skills, confidence, and the adoption of learner-centered approaches (Gillespie et al. 2010). Additionally, research indicates that faculty development programs contribute to enhanced competence, active learning, and effective feedback delivery (Kamel 2016). For example, a year-long study revealed that participants in a faculty development program exhibited a shift toward more student-focused and conceptual change approaches to teaching. This conclusion was drawn from junior faculty members' teaching reports and interviews conducted after the program, illustrating the benefits associated with faculty development programs (Light et al. 2009). In a case study at the University of Cincinnati, grants were provided for individual instructors, faculty groups, and departments. A survey of all faculty members revealed anticipated impacts, such as upgraded pedagogical skills, and unexpected benefits, including increased cross-disciplinary collaboration (Camblin Jr. and Steger 2000). Similarly, the University of Tennessee implemented a complementary faculty development program, with 18 participants providing positive feedback. Preliminary data indicated increases in scholarly activity and teaching quality (Boucher et al. 2006).

Although the long-term impacts of faculty development have been reviewed in several non-STEM fields, further exploration is needed regarding the impacts of faculty development programs in STEM fields (Knight et al. 2005). For example, a meta-analysis of previous studies in the medical and health sciences field demonstrated a significant positive impact on faculty's knowledge and professional competence, enriching student learning (Guraya et al. 2019). Graduate students pursuing careers in academia, particularly in STEM disciplines, often encounter limitations in their pedagogical training during their graduate studies. This deficiency in teaching preparation emphasizes the significance of providing teaching development programs for future faculty member (Cherrstrom et al. 2017).
2.2 Programs for Construction Faculty

A conceptual review of the literature on faculty development, encompassing various educational and academic terms, underscores the necessity of more targeted research in specialized fields like construction education to enhance their effectiveness and impact (Amundsen and Wilson 2012). In the Department of Civil and Environmental Engineering at the United States Air Force Academy, a faculty development program is followed by periodic seminars to provide newly recruited instructors with hands-on experiences, team-building exercises, facilitated supervisor and colleague feedback, required course audits, and professional development trips (Pocock and Kuennen 2003). Meanwhile, a program developed at New Mexico State University aimed to prepare instructors to assist with the retention and achievement of students by assessing student learning styles and using appropriate teaching strategies through a feedback-based system (McShannon et al. 2006).

The need for efficient instructors is particularly pronounced within construction management and engineering, where professors often embark on academic careers after industry experience, lacking formal training in university teaching (Nixon 2007). Findings from a structured civil engineering instructor development workshop have highlighted the program's benefits, especially when taught by senior faculty. Moreover, providing junior faculty with opportunities to conduct practice classes and receive evaluations and feedback on their teaching is reported as highly valuable (Quadrate et al. 2005). The curriculum for the 'Undergraduate Teaching Workshop' at Utah State University covers a range of topics, from addressing student concerns to effectively utilizing educational resources and technologies (Womack et al. 1994). The use of new technological pedagogical tools has shown benefits in terms of enhancing construction safety, sustainability, productivity, and more (Rajabi et al. 2022).

The Excellence in Civil Engineering Education Teaching Workshop (ExCEEd) is a faculty development program that familiarizes instructors with students' learning styles, course development, effective communication, relationship building with students, pedagogical technologies, and assessment techniques (Estes et al. 2019). The National Effective Teaching Institute (NETI) is a short workshop similar to ExCEEd, aiming to guide new civil engineering instructors (Felder and Brent 2010). Additional workshops are necessary to thoroughly analyze the impacts of faculty development programs and offer a more comprehensive view of areas for improvement, rather than focusing solely on individual tasks like assessment techniques (Abdulghani et al. 2015). Moreover, considering the unique characteristics associated with construction education, there is a need for further attention to this specific field.

3 METHODOLOGY

The faculty development program was designed and developed by investigators and required approval obtained from the institutional review board (MSU-IRB-22-308). The faculty development workshops were conducted virtually, consisting of four two-hour sessions focused on the topics of project management, cost estimating, virtual design, and class management. Each session was led by an experienced faculty member in the respective subject area. Participants were recruited by emailing graduate programs in construction management and civil engineering across the United States. The call for participation was sent to program chairs and faculty, with a request to forward the opportunity to graduate students in their final year or recent graduates interested in pursuing academia. Fifteen prospective or early-career construction faculty members participated in the workshops. During the workshops, participants engaged in lectures and open discussions facilitated by the experienced faculty presenters.
After completing all of the faculty development workshops, participants were invited to complete a post-event survey, providing feedback and evaluating the program. The post-workshop survey consisted of 10 open-ended questions covering various topics, including the usefulness of tools and methods for developing teaching skills, recommendations for graduate student teaching preparation, key takeaways from the workshop, suggestions for future workshop content, preferred workshop format and delivery modes, satisfaction with each session, willingness to participate in future programs, and whether the workshop met expectations. Out of the 15 early-career faculty members who participated in the workshops, 11 completed the post-event survey, resulting in a response rate of 73.33 percent. A mathematical analysis was conducted on the responses to survey questions. The post-workshop survey provides qualitative insights into participants' experiences with teaching excellence programs and their perceptions of the benefits and areas for improvement of the faculty development program. Future research could benefit from performing follow-up surveys with workshop participants 6 or 12 months after the program to assess longer-term impacts on their teaching practices. The comparison and findings would provide greater insight into the sustained outcomes of the construction education development program.

4 FINDINGS

The thematic analysis of the open-ended survey responses provided insights into participants' perspectives on the utility of the construction faculty development workshops. Several key themes emerged around the benefits gained, suggestions for improvement, and desired future topics. The demographics of the research participants showed an internationally diverse set of future instructors, which included 27% female participants. An overview of the questionnaire feedback revealed an overall lack of awareness and availability of construction-specific teaching excellence programs, with only one individual being aware of ASCE faculty development programs. Despite this, all the respondents expressed satisfaction with the provided workshops and their willingness to participate in similar future initiatives (Table 1).

Table 1. Reported satisfaction with the program sessions (percent).

<table>
<thead>
<tr>
<th>Topic</th>
<th>Very low</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
<th>Very high</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Management</td>
<td>0%</td>
<td>0%</td>
<td>25%</td>
<td>50%</td>
<td>25%</td>
</tr>
<tr>
<td>Cost Estimating</td>
<td>0%</td>
<td>9%</td>
<td>9%</td>
<td>36%</td>
<td>45%</td>
</tr>
<tr>
<td>Technology/ Virtual Design Construction</td>
<td>0%</td>
<td>10%</td>
<td>10%</td>
<td>50%</td>
<td>30%</td>
</tr>
<tr>
<td>Class Management</td>
<td>0%</td>
<td>0%</td>
<td>20%</td>
<td>30%</td>
<td>50%</td>
</tr>
<tr>
<td>The Program in general</td>
<td>0%</td>
<td>0%</td>
<td>20%</td>
<td>50%</td>
<td>30%</td>
</tr>
</tbody>
</table>

4.1 Key Takeaways and Benefits of Program

Respondents reported employing various methods to enhance their teaching. The most commonly mentioned approaches included taking pedagogical courses and certificates offered by graduate schools, serving as a teaching assistant and receiving mentoring from senior faculty, and watching instructional videos and lectures by experienced instructors. Other methods encompassed participating in faculty mentoring programs, completing online teaching courses, attending teaching workshops, soliciting feedback from students, staying abreast of the latest practices and technologies in academia and industry, and reflecting on their own experiences as students. Additionally, engaging in mock teaching sessions and receiving feedback from senior faculty were identified as effective methods. These findings suggest that prospective construction faculty utilize a diverse range of both formal and informal strategies to develop their instructional
skills. Participants acquired practical knowledge applicable to their teaching, including the identification of resources, understanding students' learning needs, implementing and evaluating best practices specific to CEM courses, integrating research elements into classes, managing time as a faculty member, navigating unexpected challenges, adapting courses based on student feedback, adopting technology, and fostering trust and transparency with students.

4.2 Suggestions for Future

Despite the overall satisfaction with the program, respondents offered insights on how to enhance future programs. Several participants suggested keeping workshop materials publicly available for future reference and facilitating collaborations and future events. Additionally, having enthusiastic senior faculty members set an example on improving student engagement was highlighted. Many recommendations focused on sessions discussing efficient approaches to course development, considering students' backgrounds, and aligning with potential career or research paths in Architecture, Civil Engineering, or Management. Other suggestions included discussing approaches to enhance industry collaboration in class projects or through guest speakers, sharing good practices in classroom management techniques, and incorporating advanced pedagogical tools. The most frequently suggested topics for future iterations encompassed student recruitment/mentorship, relationships with senior faculty, communication with students, the advantages of field trips, and the design and suitability of interdisciplinary courses.

5 CONCLUSION

The continuous development and training of new generations of construction program faculties are essential to educate the future generations of engineers. Moreover, the advancement of the field, particularly in technological aspects, necessitates integrating new technology with established pedagogical approaches learned from senior faculty. Recognizing the essential aspects acquired through effective teaching experiences in construction programs, the transition of these learnings to new faculty, and exploring areas for future curriculum and teaching improvement are imperative. This study provided and analyzed a teaching workshop tailored to prospective and early-career construction faculties. Thematic analysis of participant feedback revealed beneficial takeaways like practical knowledge and resources for instruction. Mentoring programs and short training classes, benefitting from senior faculty with diverse teaching and expertise backgrounds, can serve as potential solutions to the lack of experience for those starting a career in construction education. Despite the insights provided by this initial workshop, incorporating participant suggestions in future iterations could further improve outcomes. Additionally, longitudinal follow-up could examine long-term impacts on faculty retention and effectiveness.

References


Kamel, Ashraf M. F., Role of Faculty Development Programs in Improving Teaching and Learning, Saudi Journal of Oral Sciences, 3(2), 61, July, 2016.


