

Case Study: Summer Faculty Development Workshops to promote Entrepreneurial Mindset Learning Across Domains

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Abstract

This evidence-based practice paper covers a summer topical faculty development workshop built on the Kern Entrepreneurial Engineering Network (KEEN) Entrepreneurial Mindset Learning (EML) framework. This workshop was open to all engineering and STEM faculty. The topic for the KEEN Summer 2024 workshop was EML for lab and design courses. This workshop was unique in that participants did not incur costs to attend the workshop but were required to develop a “final project idea” to present to the organizers. Completing the workshop and final presentation made them eligible to apply for a mini grant (about \$5,000) to implement a “next-level” project with a colleague or a small team that utilized the same ideas and skills developed at the workshops. For the workshop, faculty participants were selected through an application process from KEEN partner schools. The first part of the workshop had participants learn theory through targeted sessions. Each session of theory was followed by a chance to implement and work with peers to develop their ideas. By the end of the workshop, participants presented their work to the other participants and organizers to receive feedback. After the workshop, organizers hosted “office hours” to further hone and improve their ideas in preparation for presenting their final project idea in order to apply for a mini grant. The “final presentations” were given virtually, and afterwards, several faculty were awarded a mini grant to implement a “next-level” project. This paper analyzes post-survey data about participants’ experience in the workshop as well as the impact the mini grants made as a main motivator for faculty development. With this framework in mind, other engineering faculty developers and faculty will be able to successfully motivate and implement effective faculty development at their universities.

Introduction

Faculty development is critical for enhancing the teaching effectiveness of faculty and fostering professional growth among educators. Steinert (2025) emphasizes that the rise in faculty development initiatives is partly due to the recognition that many faculty members are often unprepared, particularly regarding the teaching aspects of their roles. As a result, the need for structured faculty development is more important than ever.

One effective way for faculty to develop their skills is through workshops focused on curated topics. Workshops are generally well-received because they offer a hands-on approach to active learning and are often flexible enough to accommodate varying schedules (Steinert, 2025). Evidence shows that such workshops can be particularly effective across a range of disciplines, including liberal arts (Xie & Rice, 2020), information literacy (Blocksidge et al., 2025), healthcare (Steinert, 2025; Alexandraki et al., 2021), education (Zenni & Turner 2025), and engineering (Domínguez et al., 2025; Ross et al., 2019; Strong et al., 2019).

In engineering education specifically, faculty development workshops have been shown to promote active learning and student-centered pedagogical change (Domínguez et al., 2025; Rillero & Rillero, 2024). Large-scale initiatives such as Ross et al. (2024) demonstrate that evidence-based programs can significantly improve teaching practices when supported by institutional resources.

Similarly, Strong et al. (2019) found that workshops at Hispanic-serving engineering institutions led to measurable changes in faculty engagement and teaching approach. These examples highlight that well-designed workshops can bridge the gap between traditional lecture-based methods and more inclusive, interactive teaching approaches in technical disciplines.

Additionally, there are several notable faculty development programs. First, the Kern Entrepreneurial Engineering Network (KEEN) provides faculty development resources and promotes participation into collaborative efforts to integrate an Entrepreneurial Mindset (EM) into STEM education. It does so through its primary platform, Engineering Unleashed (KEEN, n.d.), where KEEN faculty can connect and share ideas. As a result, these faculty learning communities have been shown to promote meaningful interactions (Mallouk, et al., 2025) and curricular and instructional change (Morin, et al., 2023). Second, the National Effective Teaching Institute (NETI) program provides a series of workshops on information and hands-on practice to effective teaching with guidance from research-based best practices and opportunities for networking with other faculty (NETI, 2026). Third, the American Society of Civil Engineers (ASCE) Excellence in Civil Engineering Education (ExCEED) program curates a community of faculty and workshops about improving the teaching abilities of faculty members and enhancing the learning experience for students (ASCE, 2026).

However, there are several barriers to faculty fully participating and benefiting from these faculty development workshops and programs. First, many institutions face budgetary constraints that limit their ability to invest in faculty development programs as shown by Al-Musawi (2008). Funding for professional development often takes a back seat to more immediate operational needs, resulting in a lack of access to crucial training resources. This financial hurdle can prevent faculty from attending workshops and other development opportunities. Next, faculty members are often burdened with multiple responsibilities, including teaching, research, and administrative duties. Several studies highlight that the demands of these roles can make it challenging for faculty to find time to participate in development programs (O'Meara & Jaeger 2016; Lowenthal et al. 2013). Without dedicated time for professional growth, even well-designed workshops may not yield the desired outcomes. Third, effective faculty development requires strong institutional backing. As noted by Lindholm et al. (2025), without a commitment from leadership and administration, faculty may not feel motivated to engage in development activities. When institutions fail to prioritize professional growth, faculty members can become discouraged and less likely to participate. Fourth, even when faculty acquire new skills and knowledge through development activities, the application of this knowledge in the classroom is not guaranteed. Borda et al., (2020) argues that a lack of resources—such as access to teaching assistants, technological support, or materials—can hinder the effective implementation of learned strategies. Furthermore, Kitto et al., (2025) indicate that faculty often require follow-up support or mentorship to successfully integrate new practices into their teaching. Together, these barriers prevent faculty and students from fully reaping the benefits of these workshops.

Therefore, this evidence-based practice paper covers a summer topical faculty development workshop for engineering faculty. This workshop is unique in that it addresses the four challenges described before. First, to reduce financial barriers, the participants did not incur costs to attend the workshop but were required to develop a “final project idea” to present to the organizers. Second, faculty participants were selected through an application process from KEEN partner schools. This application process made it so only faculty who were willing to dedicate time and effort to professional development were allowed to participate, rather than a model that allows

anyone to participate. Third, the workshops were backed by KEEN, which provided institutional support that encourages faculty to participate. Fourth, completing the workshop and final presentation made faculty participants eligible to apply for a mini grant (about \$5,000) to implement their project idea in their classes. This grant provides faculty with a way to apply what they learned in the workshop into their classes. By addressing these common challenges, this workshop provides a novel workshop setup.

Therefore, this paper investigates the following research question: How does reducing financial barriers, a selective application process, institutional backing, and the opportunity for a mini grant to implement a teaching project affect the effectiveness of a faculty development workshop? To evaluate this effectiveness, post-survey data about participants' experience were analyzed as well as the impact the mini grants made as a main motivator for faculty development. This innovative faculty development workshop setup that will allow other engineering faculty developers and faculty to be able to successfully motivate and implement effective faculty development at their universities.

Methodology

KEEN Summer Workshops

During the summer, KEEN hosts a **week-long** faculty development workshop focused on bringing Entrepreneurial Mindset Learning (EML) into a certain topic. Participation in these workshops are solicited from engineering and STEM faculty at KEEN partner universities. Recent workshops have focused on EML for computing, lab and design courses, and AI. The goal of these workshops is to build out a course, module, or exercise that faculty can deploy in their teaching. These workshops were unique in that participants did not incur costs to attend the workshop but were required to develop a “final project idea” to present to the **organizers. Throughout the week, participants learn and develop new teaching concepts implementing instructional seminars** as well as have the time for independent work and coaching. Then, at the end of the week, each participant presents an idea based on the new principles they have learned and receive feedback from peers. This idea will continue to be developed. After the workshop, participants continue weekly coaching with workshop faculty organizers and build up their idea into a final presentation. If a final presentation was given, then participants were allowed to apply for a small \$5,000 mini grant to aid in the implementation of a “next-level” project with a colleague or a small team that utilized the **same ideas and skills developed at the workshops. To win the grant, participants pitched their idea virtually to workshop organizers. Participants** were also encouraged to develop a KEEN card to document and share the content they developed. A final “card deck” was then assembled around the workshop and participants. Additionally, follow-up surveys were circulated for continuous improvement of the workshop.

The KEEN Summer 2024 workshop focused on EML for lab and design courses. Table 1 shows a schedule of the events during the workshop as well as the project presentation period after the workshop.

Table 1. KEEN Summer 2024 Workshop Schedule

June 10	• Participants arrive.
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	• Orientation Social.
June 11: EM Basics	• 3 C's Quick Start and Open Conversation Engineering Unleashed Module and Meet/Greet • Welcome and Introduction to EM • Faculty Panel and Lunch • EM in Labs • EM in Design • Grainger Tour or Free Time • Dinner
June 12: EM Support	• Open Time • Writing Through an EM Lens • Student Panel and Lunch • Siebel Center for Design Tour or Free Time • The Bridge to Entrepreneurialism • DEI & Access • Small Group Discussions • Dinner
June 13: EM Projects	• Open Time • Using Technology to Support EM • Office Hours • Graduate Assistants/Peer Mentors and Lunch • Project Reporting and Feedback • Center for Teaching and Learning Tour or Free Time • Dinner
June 17 – July 12	Project development and support (Virtual, Required participation weekly) • Mini-presentations related to lab and design instruction • Consultation appointments with workshop facilitators • Open forums for sharing project updates and soliciting feedback • An optional in-person gathering may also be encouraged during ASEE 2024 in late June
Mid July – Late July	Project presentations and workshop conclusion (Virtual)

Each workshop day consisted of a variety of sessions about EML. The first day, June 11, covered EM basics as well as EM for lab and design courses. The second day, June 12, consisted of sessions about EM support with topics such as writing, entrepreneurship, and DEI and access. Meanwhile, the third day, June 13, mainly focused on developing a final project idea through a session on using technology to support EM, office hours, and project reporting and feedback.

This workshop model can be adapted to various contexts and topics within faculty development. For example, instead of concentrating solely on the integration of EM in lab and design courses, the workshop could focus on the application of technical writing or artificial intelligence in civil engineering curricula. Additionally, this particular workshop received external funding from KEEN, which covered participant costs including registration, travel, lodging, and meals, as well

as providing the mini grant funding. By implementing this workshop setup internally within the university, one could significantly reduce participant expenses related to registration, lodging, and travel, which constitute a substantial portion of the funded costs. Furthermore, a smaller project grant could be offered depending on available resources. Alternatively, one could seek additional external funding from organizations such as the National Science Foundation (NSF) or through KEEN again. The aim of this paper is to highlight how this supportive workshop structure serves as a strong motivator for faculty engagement and facilitates meaningful changes across a variety of courses in diverse contexts.

Survey Questions

After each workshop, a follow-up survey was distributed. The survey consisted of a few demographic questions along with questions about participant satisfaction, that specific workshop topic, and reflection.

Table 2 shows the four multiple-choice satisfaction questions. Question 1 focused on the effectiveness and organization of the activities at the workshop, while Question 2 focused on the effectiveness of the facilitators of the workshop. Meanwhile, Question 3 gauged the satisfaction levels of the workshop facilities and atmosphere, and Question 4 determined satisfaction with the workshop quality overall.

Table 2: Satisfaction Survey Questions

Number	Question	Sub Question	Possible Answers
1	The activities of this workshop...	had goals clear to me	1 – Not at all
		seemed properly planned and executed	2 – Very little
		were relevant to me	3 – Somewhat
		helped improving my course content	4 – Mostly
			5 – Completely
2	The facilitators of this workshop...	were prepared and organized	1 – Not at all
		used technology appropriately	2 – Very little
		were able to engage participants	3 – Somewhat
			4 – Mostly
			5 – Completely
3	The setting of this workshop offered...	comfortable facilities	1 – Not at all
		a working and learning atmosphere	2 – Very little
		a suitable environment for teamwork	3 – Somewhat
			4 – Mostly
			5 – Completely
4	This workshop fulfilled my goals and expectations		1 – Not at all
			2 – Very little
			3 – Somewhat
			4 – Mostly
			5 – Completely

Table 3 shows the relevant free response reflection questions. Question 5 focused on the most important thing participants learned during the workshop, while Question 6 aimed to determine the most useful resources provided during the workshop. Question 7 emphasized what areas of the workshop participants thought warranted further development or revision.

Table 3: Reflection Survey Questions

Number	Question
5	What was the most important thing you learned during the workshop?
6	What was(were) the most useful resource(s) provided during the workshop?
7	What areas of the workshop warrant further development or revision?

Results & Discussion

Table 4 presents the results of the 2024 post-workshop survey, revealing that the average rating for all questions exceeded 4.45. This high score reflects a strong satisfaction among participants regarding various aspects of the workshop, including the activities, facilitators, and overall setting. These results, with an average score ranging from 4.45 to 4.91, not only reflect participant satisfaction but also suggest the effectiveness of the workshop in achieving its educational objectives. This consistent high rating across various dimensions indicates that the workshop was well-received, aligning closely with pedagogical goals centered on active learning and participant engagement.

Table 4: 2024 Post-Workshop Survey Multiple-Choice Results (n = 11)

Number	Question	Sub Question	Average	STD
1	The activities of this workshop...	had goals clear to me	4.55	0.52
		seemed properly planned and executed	4.73	0.47
		were relevant to me	4.45	0.69
		helped improving my course content	4.64	0.67
2	The facilitators of this workshop...	were prepared and organized	4.82	0.40
		used technology appropriately	4.64	0.50
		were able to engage participants	4.64	0.50
3	The setting of this workshop offered...	comfortable facilities	4.91	0.30
		a working and learning atmosphere	4.91	0.30
		a suitable environment for teamwork	4.73	0.65
4	This workshop fulfilled my goals and expectations		4.55	0.52

Participants rated the relevance and execution of activities positively, particularly highlighting the workshop's effectiveness in fostering critical thinking and creativity. This aligns with educational research emphasizing the need for engagement-based learning to enhance student outcomes (Freeman, et al., 2014).

Moreover, participants rated the facilitators highly across engagement, preparation, and organization. This feedback highlights the importance of facilitator quality in enhancing participant satisfaction and achieving educational outcomes. The facilitators' ability to clearly define goals and effectively plan and execute activities further contributed to the workshop's success. Enthusiasm and clarity in delivery are key components of effective teaching, and the feedback suggests that these elements were present in this workshop.

Additionally, participants expressed significant satisfaction with the workshop environment, indicating that a well-designed learning environment significantly contributes to educational success. These high ratings demonstrate that the physical location at the University of Illinois at Urbana-Champaign (UIUC) played a crucial role in fostering an optimal learning experience, reinforcing previous studies that mention comfort and accessibility as important for participant engagement and satisfaction (Arroyo, et al., 2023).

Given the workshop's broad range of topics, it is understandable that not every activity would resonate with all participants equally. This variation may account for the slightly lower average score of 4.45 in comparison to other questions. Participants may have found certain sessions more relevant to their personal or professional contexts, while others may not have met their specific needs. This variance underscores the importance of tailoring future workshops to address diverse interests and objectives among participants, potentially by incorporating feedback mechanisms that allow for personalized learning paths within the workshop format.

Regarding the free response questions, first, Table 5 shows the percent of responses that a topic has appeared in a response for Question 5: What was the most important thing you learned during the workshop?

Table 5: Topic Response for Question 5 - What was the most important thing you learned during the workshop? (n = 11)

Topic	Response Percent (%)
Lab	45.5%
Technical writing	27.3%
Incorporating EML	27.3%
Examples	18.2%
Ideas on research studies	9.1%
Incorporating new technology	9.1%
Sense of community	9.1%
Increased understanding of inclusion	9.1%

For Question 5, participants identified several key topics from the workshop that they deemed significant for their professional growth. A recurring theme was the importance of lab design, with many participants emphasizing the shift toward creating more open-ended labs instead of traditional "cookbook" approaches. This highlights a recognition of the necessity for fostering critical thinking and creativity in students, which can lead to deeper engagement and understanding of scientific concepts. Also, this finding is consistent with research advocating for diverse instructional strategies in STEM education (Thomas, 2000)

Additionally, a number of participants expressed that the lectures on effectively incorporating EML into their labs and courses were particularly valuable. This feedback suggests a growing awareness of the pivotal role that EML can play in enhancing student outcomes. By integrating an entrepreneurial mindset, educators can equip students with the skills to navigate challenges, think innovatively, and apply theoretical knowledge in practical scenarios.

Some participants also highlighted the importance of the technical writing lectures, which aim to equip them with essential skills for communicating scientific ideas clearly and effectively. This skill is critical not only for academic success but also for fostering professional growth in scientific and academic careers.

Moreover, a few participants noted that having practical examples during these lectures significantly enriched their understanding. Concrete case studies and real-world applications can bridge the gap between theory and practice, making complex concepts more accessible and relatable.

While a few individuals mentioned topics such as community, inclusion, technology integration, and discussions of various research studies, these points were less frequently highlighted. This reduced frequency could be due to there only being one session on each of these topics compared to EM for labs and Incorporating EM, which were themes of the workshop. Nonetheless, they indicate a broad interest in fostering a supportive environment and addressing diverse educational needs, which could be explored in future workshops.

For the second free response question, Table 6 shows the percent of responses that a topic has appeared in a response for Question 6: What was(were) the most useful resource(s) provided during the workshop?

Table 6: Topic Response for Question 6 - What was(were) the most useful resource(s) provided during the workshop? (n = 11)

Topic	Response Percent (%)
Examples	27.3 %
Shared resources	18.2%
Integration of EML resources	18.2%
Lab resources	18.2%
Instructors	18.2%
Design cycle resources	9.1%
Writing resources	9.1%
Diversity resources	9.1%
Everything	9.1%

For Question 6, participants identified several resources they found particularly useful throughout the workshop. The most frequently mentioned were the practical examples, which included KEEN cards, various faculty-led initiatives, and illustrations of how other educators have successfully integrated EML into their own courses. These concrete examples served as powerful tools for participants, providing them with tangible strategies and actionable ideas that they could apply in their own teaching contexts.

Participants also expressed appreciation for the shared slides and documents from the presentations. One participant specifically noted the AI lectures as particularly helpful, indicating that the content resonated well with their interests and needs. This feedback highlights the importance of incorporating contemporary topics, such as artificial intelligence, into faculty development workshops to keep educators informed and engaged with current trends.

Resources related to lab development and strategies for integrating EML were also deemed beneficial. Participants found that these materials not only enhanced their understanding of effective lab practices but also inspired them to consider innovative approaches for their teaching. A few participants mentioned that the instructors, especially those from UIUC, served as a “great resource for ideas.” This underscores the value of instructor expertise in enriching the learning experience and providing tailored guidance.

While the feedback primarily centered on widely appreciated resources, a few participants noted more specific items. Only one individual mentioned finding the resources on design cycles useful, while another felt that the materials on writing and diversity provided valuable insights. Interestingly, one participant summarized their experience by stating that “everything” was useful, reflecting a general sentiment of satisfaction across various resources provided during the workshop.

For the third free response question, Table 7 shows the percent of responses that a topic has appeared in a response for Question 7: What areas of the workshop warrant further development or revision?

Table 7: Topic Response for Question 7 - What areas of the workshop warrant further development or revision? (n = 11)

Topic	Response Percent (%)
More time	27.3%
Replace panels	18.2%
Nothing	18.2%
Not enough detail	9.1%
Preparation instructions for pre-workshop	9.1%
Too introductory	9.1%
Final project not well defined	9.1%

The feedback from Table 7 reveals important areas for improvement in the workshop. First, 27.3% of participants mentioned wanting more time for session activities and final project brainstorming and development, highlighting a perceived insufficiency in the current schedule. One participant specifically mentioned replacing the facility tours with additional workshop sessions. Second, 18.2% of participants mentioned either moving the panels to a non-break time or replacing them altogether with informal networking, emphasizing a preference for engagement over passive experiences.

Additionally, concerns about content clarity surfaced, with 9.1% each noting the need for additional detail, the introductory nature of some sessions, and the vagueness of the final project. One participant even requested preparation instructions prior to the workshop to enhance readiness.

Interestingly, 18.2% felt there was nothing needing further development, indicating satisfaction with certain aspects of the workshop. Overall, focusing on extending activity time, improving content depth, and providing clearer pre-workshop guidelines could significantly enhance participant experience.

The findings from this workshop indicate a significant success, as participant feedback shows that it not only met but largely exceeded expectations. This positive reception underscores the importance of factors such as location, facilitator preparation, and the need for diverse, targeted content to enhance relevance for all attendees. Additionally, the feedback highlights a wide range of important topics that resonated with participants, offering valuable insights for future workshops. There is a strong preference for practical examples and supportive materials that enrich teaching practices, suggesting that incorporating a variety of resources—particularly those based on real-world applications—will be essential. To improve the workshop setup, future workshops could prioritize additional time for activities, enhance clarity in content, and revise the format of sessions (including panels and tours). Ultimately, these insights serve as a valuable guide for planning future workshops aimed at addressing the evolving needs of educators, fostering meaningful learning experiences that empower them in their professional development.

Conclusion

This evidence-based practice paper presents a series of innovative summer topical faculty development workshops designed specifically for engineering faculty, addressing key challenges in professional development. By eliminating financial barriers, requiring participants to create a final project idea for presentation, and implementing a selective application process through Kern Entrepreneurial Engineering Network (KEEN) partner schools, the workshops ensured engagement from faculty who are genuinely committed to their professional growth. Institutional support from KEEN not only fostered participation but also facilitated the potential for faculty to apply for mini grants (approximately \$5,000) to implement a “next-level” project using the learned concepts in their classrooms. The results of this workshop setup indicate substantial success, with participant feedback showing that expectations were not just met but largely exceeded. This positive reception highlights the significance of location, facilitator preparation, and the necessity of diverse, targeted content. Furthermore, the feedback reveals a strong preference for practical examples and resources that enrich teaching practices, pointing to the need for real-world applications in future workshops. Feedback also reveals that for future workshops, it would be beneficial to allocate more time for activities, clarify the content presented, and adjust the session formats, including the structure of panels and tours.

There are two main limitations to this study. First, the simultaneous implementation of eliminated financial barriers, mandatory faculty project presentations, and a selective application process makes it challenging to determine which factor had the most significant impact on faculty engagement. Conversations with workshop facilitators suggest that removing financial barriers is likely the primary reason for high participation. However, future research will include survey questions designed to identify the most impactful factors. Second, no data were collected on participant satisfaction regarding classroom implementations or the student impacts of the project; subsequent studies will address these metrics through surveys.

Overall, these insights provide a valuable framework for designing effective faculty development initiatives that can empower educators and enhance their professional journeys.

AI-Assisted Technologies Disclosure

In this paper, ChatGPT was used to enhance the coherence and flow of ideas presented in the introduction section. This use of AI was limited to improving the connectivity of the text and did not influence the content, interpretation, or conclusions of the research. The final version of this article has been critically reviewed and further refined by the authors, ensuring that the content aligns with the authors' intended scope and scholarly rigor.

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