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Faculty Development for Faculty Development – Taking Entrepreneurially Minded Learning Faculty Development to Your Campus

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Dr. Douglas Melton serves as a Program Director at the Kern Family Foundation, working with the Kern Entrepreneurial Engineering Network (KEEN), a collaborative network of universities focused on

fostering an entrepreneurial mindset in engineering students. KEEN emphasizes curiosity, making connections, and value creation as essential habits for engineers.

In this role, Dr. Melton helps support initiatives like the Engineering Unleashed Faculty Development program, which equips faculty with resources and strategies to incorporate entrepreneurial thinking into their teaching and research. The goal is to prepare students to approach real-world challenges with innovative and value-driven solutions.

Before joining the foundation, Dr. Melton spent 17 years as a faculty member in the Department of Electrical & Computer Engineering at Kettering University. He also worked as Director of Research & Development for Digisonix Incorporated, where he contributed to the development of active sound and vibration control technologies used in various industries.

Through this work, Dr. Melton continues to support efforts to integrate entrepreneurial thinking into engineering education, helping students develop the skills and mindset needed to create meaningful impact in their careers.

Faculty Development for Faculty Development – Taking Entrepreneurially Minded Learning Faculty Development to Your Campus

Abstract

This evidence-based practice paper presents a comprehensive faculty development program designed to equip teams of faculty with the necessary tools to create and implement entrepreneurial mindset (EM) initiatives at their home institutions. Integrating EM into courses and curricula has been shown to enhance student experience. Faculty from institutions within the Kern Entrepreneurial Engineering Network (KEEN) have been actively sharing successful examples, practices, and research relevant to these efforts, contributing to a growing body of knowledge in this area.

To meet the increasing demand for scalable faculty training, we launched a new train-the-trainer workshop in January 2022. This innovative workshop emphasizes the importance of institutional change to effectively integrate entrepreneurially minded learning (EML) across entire engineering and computer science programs. The workshop, *Integrating Curriculum with Entrepreneurial-mindset II (aka ICE2)*, has been offered three times, with each iteration incorporating valuable feedback and adjustments to improve the overall experience and effectiveness.

The workshop consists of a three-day intensive in-person meetup that covers critical topics, including theories of university change, motivations for faculty, a comprehensive overview of existing training programs, opportunity mapping, program assessment techniques, and the creation of actionable work plans. Participants engage in four coaching sessions during the workshop, providing dedicated development time and culminating in action-plan presentations for each institution.

In the year following the workshop, participating faculty teams receive ongoing coaching, with the coaching model evolving based on insights gained from each offering. To date, thirty-seven institutions have participated in this initiative, resulting in the creation of workshops, learning communities, faculty retreats, and various other initiatives aimed at embedding EML practices into their educational frameworks.

This paper/presentation details the tools and techniques used to develop the faculty training program and highlights exemplary initiatives from participating institutions across the three workshop offerings. We discuss the challenges encountered by various teams and conclude with recommendations from the facilitation and coaching team that may be valuable to those interested in implementing similar initiatives.

1. Introduction

Faculty development is a cornerstone of higher education, providing essential support for educators to grow professionally and adapt to the ever-changing academic landscape. It equips faculty with tools to enhance their teaching, improve student outcomes, and align with institutional goals. By fostering innovation, collaboration, and inclusivity, faculty development programs help educators respond to diverse student needs, adopt effective teaching methodologies, and contribute to a culture of continuous improvement. This ongoing investment in faculty not only benefits individual instructors but also strengthens the overall quality and impact of education within institutions [1].

Faculty development takes on various forms tailored to address the diverse needs and goals of educators and institutions. Workshops and seminars are among the most common formats, offering focused sessions on topics such as teaching methods, technology integration, and curriculum design. Mentorship programs provide personalized guidance, pairing experienced faculty with less seasoned colleagues to foster professional growth. Long-term initiatives, such as learning communities or certificate programs, allow for deeper exploration of themes like pedagogical innovation, research development, and leadership skills. Online courses and webinars have gained prominence, providing flexible, accessible opportunities for professional learning. Faculty retreats create space for reflection, strategic planning, and collaboration, often aligning development efforts with institutional priorities. Additionally, peer observation and feedback programs promote continuous improvement through constructive dialogue among colleagues [2]. These varied approaches ensure that faculty development can be adapted to meet the unique challenges of different academic contexts, fostering a culture of growth and innovation within higher education [3].

In engineering education, faculty development plays a particularly critical role due to the dynamic and applied nature of the field [4, 5, 6]. It ensures that instructors stay abreast of rapid technological advancements, emerging industry practices, and interdisciplinary approaches, enabling them to prepare students for the evolving workforce. Programs focused on innovative pedagogies, such as project-based learning and entrepreneurially minded learning, enhance student engagement and equip learners with skills in creativity, critical thinking, and problem-solving [7]. Faculty development also supports alignment with accreditation standards, such as ABET, ensuring high-quality curricula and assessment practices. More recently, efforts promoting equity and inclusion foster diverse learning environments that empower all students to succeed [8, 9]. Ultimately, faculty development in engineering serves as a driver of innovation, helping educators advance their research, connect academic concepts to real-world applications, and inspire the next generation of engineers to address complex societal challenges.

One impactful example of faculty development efforts in engineering education is the Engineering Unleashed Faculty Development (EUFD) program [10, 11, 12, 13, 14]. This initiative was designed to empower educators to integrate entrepreneurial-minded learning

(EML) into their teaching and institutional practices, ultimately fostering curiosity, the ability to make connections, and value creation in students. By offering hands-on workshops, coaching sessions, and collaborative opportunities, the various workshops within the EUFD program equip faculty with the tools and strategies needed to embed EML across courses, curricula, and entire programs. This program arose from within the Kern Entrepreneurial Engineering Network (KEEN) [15], which focuses on cultivating institutional change to promote the entrepreneurial mindset (EM) of engineering and computer science students. KEEN provides a structured yet flexible framework [16] that enables educators to inspire students to think beyond technical solutions and consider broader societal impacts. Evidence is emerging that the EUFD program not only enhances individual teaching practices but also strengthens the engineering education community by promoting innovation and collaboration.

The growing need for scalable faculty development in EML is evident as more institutions recognize its value in preparing students for modern engineering challenges. Integrating EML into courses and curricula has been shown to enhance the student experience and outcomes. Faculty from institutions within KEEN have actively shared successful examples, practices, and research, contributing to a robust and expanding body of knowledge that underscores the effectiveness of EML. The push to embed these practices more broadly across programs and institutions drives the need for faculty training, as educators must be equipped to implement new approaches effectively and sustainably. By addressing this need, faculty development programs can ensure a transformative educational experience for students and sustain the momentum of EML practices in engineering education. In this work we explore the research question, “In what ways does a train-the-trainer model assist with scaling faculty development on different campuses?”

2. Development of the Train-the-Trainer Workshop

The motivation for developing a train-the-trainer workshop within the offerings from EUFD stemmed from the recognition that the existing workshops, while impactful, could not scale sufficiently to meet the growing demand for faculty training. The core set of EUFD workshops offered only 10 (in 2019) to 20 (during the summer of 2025) sessions annually, each accommodating a maximum of 30 participants, reaching just 300 to 600 faculty members each year. With KEEN comprising over 60 institutions, many of which are incentivized to send an average of five faculty members to these workshops, the traditional workshop model could not address the need for broader participation. This limitation highlighted the necessity of a scalable approach that empowers faculty teams not only to implement EML at their home institutions but also to act as local champions who can train and inspire their colleagues. A train-the-trainer model provides a strategic solution, leveraging the expertise of trained faculty to amplify the reach and impact of EML initiatives across diverse educational contexts.

For several years, as part of faculty development efforts within KEEN, even before the formal establishment of the EUFD Program, we have offered the *Integrating Curriculum with Entrepreneurial-mindset (aka ICE)* workshop to help faculty develop methods to build EM into their pedagogical practices. The details of that specific workshop were shared in a prior ASEE paper [17]. The core team of facilitators running the *ICE* workshops is routinely invited to run on-campus workshops, sometimes as identical offerings or other times custom-designed faculty development sessions. This is often motivated by an eagerness to introduce, train, and engage a broader segment of the campus faculty on the concepts of entrepreneurial mindset, including part-time faculty who might not regularly receive professional development funding to travel and attend training, as well as full-time faculty for whom travel to a multi-day training may not be feasible or not appealing.

With increasing demand to scale the training of faculty at their home institutions, a new workshop was offered starting January 2022 as part of the EUFD workshop offerings. This new workshop, a train-the-trainer model, was to focus on institutional change to infuse entire engineering and computer science programs and assist in scaling the effort to train faculty on EML practices. This new workshop, *Integrating Curriculum with Entrepreneurial-mindset II (aka ICE2),* was offered an additional two times (June 2022 and January 2024), each time with small modifications.

The following description was used to recruit faculty to attend the first ICE2:

> *Adding EM modules to courses (the focus of ICE Workshop) is a great start to developing an EM in our students. However, to make it habitual in our students, we need to build a culture and community of EM at our institutions. This workshop (ICE2) will focus on systematically incorporating EM across thematically related courses or programs. The workshop will take a deep dive into expanding upon your integration of EML by either creating new programs or training you to run your own EM faculty development at your institution. Examples may include (but are not limited to) a seminar series, redesigned existing program, co-curricular program, major, minor or track, workshops or retreats, or certificates. Cohorts will meet throughout the year following the workshop to continue development and to share what is working and what is not.*

The workshop was designed with clear objectives to empower participants to drive EML initiatives at their home institutions. The objectives, as stated for the third offering of the workshop were that by the end of the in-person workshop, participants were expected to be able to:

- Investigate best practices in faculty development for inspiring, mentoring and coaching instructors in the integration of EML in their courses.
- Acquire the tools to design their own EML teaching and learning faculty development opportunity at their institution.

- Draft a preliminary plan for systematically incorporating EM Faculty Development.

The stated expectation of the participants was that by the end of the year following the in-person workshop, they would:

- Write a multi-year robust plan (*) that will diffuse EM throughout your campus/college/department that could be submitted to KEEN.
- Implement parts of the plan as a prototype and publish documentation of the plan on Engineering Unleashed (aka Engineering Unleashed cards).
- Assess the implemented parts of the plan to determine feasibility for the future.

For the first offering, the following statement was included as part of the (*):

(*) The plan you design will be what will be most impactful on your campus and might include (but not limited to): seminar series, redesigned existing program, co-curricular program, major, minor or track, workshops or retreats, or certificates.

Unlike other EUFD workshops, participation in the ICE2 workshop required an application and approval. The application asked participants to describe their EML experience, with the expectation that attendees had participated in the foundational ICE workshop or similar training and had implemented an EM module. Exceptions were made in consultation with the KEEN Program Officers. In addition, the following open-ended prompt was included:

> *Based on the workshop description, for what purpose do you want to attend ICE2? Include in your 250-word response answers to the following questions:*
> 1. *Where have you already applied EML at your institution?*
> 2. *What do you propose to do at your institution?*
> 3. *Where are you in the planning phase of this "new" initiative?*
> 4. *What role will community building play in executing this new initiative?*

3. Workshop Structure

The workshop consists of a three-day intensive in-person meetup that covers critical topics, including theories of university change, motivations for faculty, a comprehensive overview of existing training programs, opportunity mapping, program assessment techniques, and the creation of actionable work plans (see Agenda in Appendix A). Participants engaged in coaching sessions during the workshop, providing dedicated development time and culminating in presentations of action plans for each institution. In the year following the workshop, participating faculty teams receive ongoing coaching, with the coaching model evolving based on insights gained from each offering.

4. Evolution of the Workshop

Following the first offering, several refinements were made to enhance the workshop's effectiveness and better align it with its objectives.

One major area of change was the workshop schedule. The first and third offerings followed the standard Engineering Unleashed Faculty Development (EUFD) format of a ½-day session, two full days, and another ½-day. However, feedback from the first offering (January 2022) revealed that starting with a session immediately after travel was challenging for participants, as they struggled to focus after long journeys. To address this, the second offering (June 2022) adopted a new format with three full days of activities, allowing participants to travel the day before and after the workshop. While this change addressed the initial issue, it increased costs (e.g., additional meals and hotel stays) and resulted in participant fatigue due to the intensity of the schedule. Additionally, the flow of activities was less cohesive, leading the team to revert to the original schedule for the third offering.

Another refinement focused on the output from workshop participants. While the application process initially asked attendees to describe their planned interventions, it did not explicitly restrict the focus to faculty development. As a result, some participants aimed to implement initiatives targeting students rather than faculty. In response, the second and third offerings explicitly required a focus on faculty development efforts, with this language incorporated into the workshop objectives.

The workshop also evolved in terms of participant structure. The first offering limited attendance to one participant per institution to maximize institutional representation. In cases where applicants were from the same institution, they were working on different initiatives/plans. However, it became clear that participants needed to collaborate with colleagues to plan effectively. For the second offering, institutions were encouraged to send teams of two participants, and the third offering further expanded to require teams of two or three members working on a single effort or plan, with individual participants no longer allowed. These changes facilitated more robust planning and collaboration during and after the workshop.

Pre-workshop assignments also underwent significant refinement. Initially, participants completed an online Entrepreneurial Mindset refresher (Quickstart online module), developed during the pandemic. For the second offering, the pre-work included mapping the entrepreneurial ecosystem on their campuses, encouraging participants to arrive with a prepared list. By the third offering, the assignment was segmented and explicitly required completion before the semester's end to allow faculty to consult with campus colleagues. See Appendix B for details of the pre-workshop assignment deployed for the third offering. These changes led to improved engagement during the in-person workshop and a stronger focus on entrepreneurial-minded efforts.

Lastly, the coaching model evolved substantially. In the first offering, a clear separation existed between facilitators and coaches, with only one of the three coaches attending the in-person sessions. For the second offering, coaches were more integrated into the in-person workshop, attending reporting sessions either in person or via Zoom. By the third offering, the team expanded to include five facilitators, two of whom had previously served as coaches, and all were available for year-long consultations. This integrated coaching model provided participants with consistent support, enhancing accountability and greater focus on implementing action plans.

These iterative changes improved the workshop's flow, enhanced participant engagement, and strengthened attendees' ability to implement impactful and sustainable faculty development initiatives on their campuses.

5. Outcomes and Impact

Overall, 76 participants representing 37 institutions attended the ICE2 workshop offerings. Table 1 summarizes the distribution of participants and institutional representation.

Table 1: Summary of participants at each workshop offered.

Workshop	# Participants	# of Institutions	# of Projects Proposed
January 2022	27	22	27 (14 focused on faculty development)
June 2022	17	9	9
January 2024	32	11	11

The first two workshops led to some notable implementations, though tracking evidence of their impact proved challenging. Most successes were anecdotal, shared informally by coaches during follow-up sessions, and the majority of participants did not complete Engineering Unleashed (EU) cards to document their efforts. As a facilitating team, we reflected on potential reasons for this limited documentation and engagement, identifying several contributing factors:

- **Lack of Incentive**: Participants in this workshop were not eligible for the Engineering Unleashed Fellowship, which provides recognition and funding to continue their efforts. This could potentially reduce motivation to document or share outcomes.
- **Lack of Alignment**: Some participants' planned efforts did not align with other campus initiatives or priorities, making implementation more difficult.
- **Resource Constraints**: Limited funding at participants' institutions often hindered the execution of planned activities and initiatives.

- **Limited Support**: Many participants lacked a broader support network or collaborators to help carry out their mission and tasks.
- **Competing Priorities**: Shifts in participants' time allocations or institutional priorities often diverted focus away from their workshop-related efforts.

These insights have informed our ongoing efforts to refine the workshop structure, support mechanisms, and follow-up processes, aiming to better address these challenges and enhance participants' ability to implement and sustain impactful initiatives.

A more systematic effort was undertaken to track the outcomes of participants' initiatives following the January 2024 offering. Among the eleven institutional teams, seven successfully implemented faculty development initiatives as a direct result of their participation in the workshop. Of the remaining teams, two continued supporting existing EM initiatives rather than developing new ones, one reported not pursuing further faculty development efforts on their campus, and one has not provided an update, nor are facilitators aware of any ongoing efforts. Notably, among the seven successful initiatives, only one team documented their work in a standalone Engineering Unleashed card. Several participants mentioned plans to do so over the summer, while two teams facilitated a workshop at the 2024 KEEN National Conference (KNC) specifically focused on advancing faculty development efforts at their institutions.

5. Highlighting Exemplars

Two participants from the January 2022 workshop led a group back at their institution (University of North Carolina at Chapel Hill) in support of their ongoing *Faculty Learning Community* focused on entrepreneurial mindset *[18]*. One of them leveraged the faculty development sessions and workshops to further develop work she had begun in creating *Micromoments,* a set of entrepreneurially minded learning activities that would aid faculty to include EM concepts in any class. The results of her efforts are documented in Engineering Unleashed card # 3080 [18]. What began as an effort to help faculty at UNC Chapel Hill, has now become a common topic of workshops throughout the KEEN institutions.

A participant representing Rochester Institute of Technology (RIT) attended our June 2022 workshop. Their team then developed and deployed a series of faculty development activities aimed at engaging faculty in building EM. Their initial efforts are documented in Engineering Unleashed card #3534 and #3552 [20, 21]. Their institution has established a model for onboarding faculty to incorporate EM into their courses that has proven highly effective; their efforts were captured in a KEEN'zine story [22].

The January 2024 team from North Carolina State University developed and deployed *Microcredentials for Faculty in EM*. Their efforts are documented in Engineering Unleashed card #4627 [23]. Their institutional efforts in establishing a culture supportive of EM integration go far beyond this effort. We note that their team is actively involved in other faculty development

efforts, including coaching for other workshops, facilitating workshops at the KEEN National Conference, and supporting other institutions with their own efforts.

6. Concluding Remarks

The ICE2 workshop initiative has demonstrated the potential of structured faculty development programs to inspire and enable institutional change in engineering education. Returning to the research question, we have examined the ways our train-the-trainer model assisted with scaling faculty development on different campuses.

Through iterative refinement and intentional adjustments, the workshops have evolved to better address the needs of participants, equipping them with the tools, strategies, and confidence to implement impactful Entrepreneurially Minded Learning (EML) initiatives. While early successes have been documented, the journey highlights the importance of systematic tracking, ongoing support, and alignment with institutional priorities to maximize the sustainability and impact of these efforts.

To scale faculty development in EML effectively, several high-level recommendations emerge. First, building scalable models, such as train-the-trainer frameworks, can extend the reach and influence of EML initiatives by leveraging institutional teams as local champions. Second, aligning faculty development efforts with campus-wide goals and providing incentives, such as funding and professional recognition, can enhance participation and long-term commitment. Third, integrating robust follow-up mechanisms, including coaching and accountability structures, ensures continuity and reinforces progress toward transformative change.

Continuous improvement remains critical in faculty development programs. Each iteration of the ICE2 workshop has benefited from participant feedback, enabling the facilitation team to adapt and refine activities, outputs, and support structures. This iterative approach not only enhances the participant's experience but also models the importance of adaptability and innovation in education.

We close with a call to action: the broader engineering education community must continue to champion EML-focused faculty development, fostering habits of constant curiosity, making connections, and creating value among both educators and students. By embracing scalable approaches and innovative solutions, institutions can amplify the impact of EML, transforming the culture of engineering education and preparing students to address the complex challenges of tomorrow.

7. Acknowledgments

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9. Appendices

A. Agenda as deployed January 2024 (Third Offering)

B. Pre-Workshop Assignment

A. Agenda as deployed January 2024 (Third Offering)

Taking Entrepreneurial Minded Learning to the Next Level (aka Workshop2.0)
January 2024 - Tempe, AZ

Day 1 (half day) - January 3
3:00 pm start time

3:00 - 5:30	Intro & Framing (EML @ My Institution Now)
6:00 - 8:00	Networking Group Dinner

Day 2 - January 4
Building a Value-added Program

6:30 - 8:30	Breakfast
8:30 - 10:30	Ways to Think About Change
10:30 - 10:45	Short Break
10:45 - 12:00	Getting Your Program *Going*
12:00 - 1:00	Lunch & Networking
1:15 - 2:15	Panel - "Stories from the Trenches"
2:15 - 3:15	Preliminary Program Building
3:15 - 3:45	Break and Networking
3:45 - 5:00	Development Time & Small Group Work

Taking Entrepreneurial Minded Learning to the Next Level (aka Workshop2.0)
January 2024 - Tempe, AZ

Day 3 - January 5
Workshop Creation

6:30 - 8:30	Breakfast
8:30 - 10:45	Training, Facilitating, & Resources
10:45 - 11:00	Short Break
11:00 - 12:00	Development Time
12:00 - 1:00	Lunch and Networking
1:00 - 2:25	Coaching & Follow Up (include Assessment)
2:25 - 2:45	Re-centering
2:45 - 3:00	Break
3:00 - 5:00	Worktime & Action Items

Day 4 - January 6
Report Outs

6:30 - 8:30	Breakfast
8:30 - 9:45	Report Outs (Round 1)
9:45 - 10:15	Break (and room checkout)
10:15 - 11:30	Report Outs (Round 2)
11:30 - 12:00	Feedback session & Next Steps
12:00	Lunch To Go

B. Pre-Workshop Assignment as deployed January 2024 (Third Offering)

Task #	Pre-assignment Description
1	To get ready for the workshop ... we suggest you reach out to at least two colleagues and ask them: 1. what motivates them to attend a seminar or talk? 2. what attributes of the best training or workshop they've attended? NOTE: If you are attending the workshop as a team, we encourage you to do these tasks individually to collectively gather the most insights.
2	To get ready for the workshop, it is important for you to have a sense of what the entrepreneurial ecosystem is like on your campus. **Take some time to explore and make a list of all the *efforts* that support entrepreneurial development on your campus.** These *efforts may* be programs, offices, activities, stakeholders, etc. As you make your list, keep it broad - you may want to include entrepreneurial mindset and related activities. Make a list that makes sense to you. **We suggest a spreadsheet but really use what works best for you.** Note that we will be using this list (and one that follows) in an activity on the first day of the workshop. You'll get the most out of that if you spend some time beforehand collecting this information. As a team, we encourage you to do these tasks individually to collectively gather the most insights.
3	To get ready for the workshop, it is important to not only know about the EM ecosystem on your campus but where your efforts will add value. We'll be exploring this much more during the workshop. To get ready, **take some time to explore and make a list of all the *efforts* that support faculty development on your campus**. These efforts might include *Center(s) for Teaching & Learning, mentoring, departmental workshops, external workshops, Teaching Excellence symposiums, etc.* As you make your list, keep it broad - you may want to include details such as who is the lead, who is the target audience, etc. **We suggest a spreadsheet but really use what works best for you.** Note that we will be using this list (and the prior one) in an activity during the workshop. You'll get the most out of that if you spend some time beforehand collecting this information. If you are attending the workshop as a team, we encourage you to do these tasks individually to collectively gather the most insights.