Work in Progress: Self-Starter Faculty Learning Community to Implement Entrepreneurially-Minded Learning (EML) Micromoment Activities

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ABSTRACT

This is a work in progress (WIP) paper. Engineering education has called upon a need for student-centered learning approaches to help broaden skills and transform students into lifelong learners. One way to help support faculty using these approaches is through a Faculty Learning Community (FLC) program, which could be a practical approach to supporting professional development opportunities toward teaching and learning. The activities are typically faculty led including a process of learning, reflection, and support by colleagues. One way in which it can be effective for faculty to acclimate is by doing small implementations through micromoments. Micromoments are rapid and easy active learning implementations that encourage students' learning. These activities can help support faculty who often struggle with competing demands and lack of time, limiting improvement in teaching aspects. This work-in-progress paper shows the authors' reflections and suggestions to engage faculty in promoting micromoment activities in lecture-based teaching.

At the University of Dayton - an R2 university, the lead engineering faculty started a FLC to support the integration of entrepreneurially minded learning (EML) using the KEEN Framework. EML promotes curiosity, connections, and creating value strategies, known as the 3C's. The FLC consisted of four bi-weekly one-hour meetings inviting lecturers, faculty-of-practice, and tenured/tenure-track faculty. The FLC meetings' primary purpose was to keep faculty engaged in active sessions related to EML micromoments. The first session consisted of a brief introduction to micromoments to emphasize the need to develop students' entrepreneurial mindset, followed by sessions exclusively devoted to one of the 3C's. The lead faculty provided a list of EML micromoment implementations and examples for each of the 3C's to the faculty participants at the beginning of the sessions. During the follow-up meetings, each faculty member was encouraged to discuss and review potential interventions they did or could do in the classroom. Furthermore, the lead faculty utilized the University of Dayton learning management system (LMS) to develop a website with additional resources and information available to all the faculty participants.

While the FLC approach and the list of EML micromoment activities seemed attractive to many faculty members, several challenges emerged. Examples include time conflicts with other activities, lack of additional stipends, and a rapid modification to their planned lectures. Despite these constraints, a small faculty cohort (n = 7) met, when possible, throughout the semester during three different sessions to share their micromoment implementations, suggestions, and students' response to the micromoments. All the participants suggested and encouraged future professional development sessions related to these implementations. This paper provides more detailed recommendations for future EML micromoment learning activities for faculty members and potential FLC groups with limited funding [The authors prefer a lightning talk for this work-in-progress paper].

1. Introduction

Entrepreneurially minded learning (EML), supported by the Kern Entrepreneurial Engineering Network (KEEN), promotes curiosity, connections, and creating value strategies, known as the 3C's. Several resources and implementation activities are easily accessible through the Engineering Unleashed platform for faculty members in the form of "cards"[1]. The online platform also includes multiple activities, course implementation, research activities, or industry-university partnership interactions related to EML [2]. At a national level, KEEN provides various workshops, annual meetings, and support to many universities and faculty members to infuse EML in students through educational opportunities. Over 50 partner universities use various activities to implement EML, and no universal or unique implementation guide leads to multiple faculty engagement opportunities as each institution is different.

Since 2008, the University of Dayton (UD) has been a KEEN partner promoting and supporting EML course integration through the School of Engineering, the College of Arts and Sciences, and The School of Business (REF). KEEN Program Coordinator, Dr. Ken Bloemer, implemented several initiatives, including the KEEN fellows' program, seminars featuring external speakers, and faculty development workshops. These initiatives have benefited faculty members at various career stages, from adjunct faculty to tenured professors. Most faculty engage and become EML practitioners for at least one semester when support or funding is available. Long-term faculty engagement, however, is a challenge.

Several limitations exist for keeping faculty engaged in implementing EML activities throughout their lecture or laboratory courses through multiple semesters. Besides the predominant research vs. teaching demands and expectations, previous studies confirmed that time commitments, training, and incentives are the three main barriers limiting faculty from improving their teaching styles [3]. Additionally, several institutions emphasize students' teaching evaluations as a measurement instrument to assess teaching efficacy. This leads to avoiding implementations of novel teaching pedagogies and the continuous use of traditional lectures [4]. Hence, overcoming these barriers to enhance teaching practices at all levels is essential in promoting EML and long-term faculty participation and engagement.

Engineering education has called upon a need for student-centered learning approaches to help broaden skills and transform students into lifelong learners [5]. For instance, a recent study implementing EML highlighted the need for training faculty instead of students to reach a much larger student population, particularly at large universities [6]. One way to help support faculty using these approaches is through a Faculty Learning Community (FLC) program, which could be a practical approach to supporting professional development opportunities toward teaching and learning [7]. The activities are typically faculty-led, including a process of learning, reflection, and colleague support [8].

In this WIP study, we tested if a self-starter FLC approach to promoting EML implementations is possible through rapid EML micromoment activities training. First, the paper shows the rationale for promoting EML micromoments in the FLC. Next, we discuss the implementation utilized to train and incentivize faculty, surveys and success stories from faculty, and lastly, we provide an

analysis and overview to improve self-starter learning communities related to EML micromoments in the future.

2. EML micromoments

Traditionally, EML implementations connect to semester-long, large-scale projects or senior design courses where students apply concepts learned in multiple classes to a "real-world" problem. The timing of senior design in the final year of undergraduate studies makes it challenging to develop an entrepreneurial mindset [9]. One way it can be effective for faculty to acclimate to EML is by doing small implementations through micromoments. Micromoments are rapid and easy active learning implementations that promote students' learning, emphasizing the 3 C's: curiosity, connections, and creating value. Instructors can deliver these micromoments in a class period, with implementation times varying from 2 – 30 minutes [10].

EML micromoment implementations can help support faculty who often struggle with multiple competing demands and lack of time, which limits improvement in teaching aspects. Previously, 25 micromoment activities were developed and piloted at UNC-Chapel Hill and other universities [10]. The complete list of micromoment activities emphasizes different implementations for each of the 3C's and is available online [11].

3. EML micromoments: Developing a self-starter FLC

The KEEN community catalyst program recruits faculty to facilitate EML communication and collaboration. The lead author, who was part of this program and previously published work related to EML [12], recognized the potential of EML micromoments as a unique pathway to (1) improve teaching, (2) engage and motivate students during class, and (3) facilitate mini-workshops for faculty who are also motivated with EML implementations and in improving their teaching efforts. During the Fall 2022 semester, the administration and UD KEEN coordinator promoted the workshop series for micromoment implementations, and the program ran. The School of Engineering also provided refreshments (coffee + donuts) to all participating faculty members during the sessions.

A successful FLC program should be "highly integrated, supported, resourced and structured," as noted by Pulford et al. [13]. Integration between EML, the KEEN program at UD, and a lead faculty was first obtained. Faculty memberships and incentives were challenging for this self-starter program. The recruiting approach involved a series of e-mails from the Associate Dean and the lead FLC faculty to all faculty, regardless of rank or position type, in the Engineering School at UD. In addition to the lead faculty member (Associate Professor), a small faculty cohort (n=7) was recruited, including one faculty of practice, three lecturers, two assistant professors, and one full professor. Four different engineering departments were represented within this FLC.

A meeting time structure was provided, giving some flexibility to class schedules, and a series of four meetings were scheduled. Additionally, all lecture material was available through a course site (the list of EML micromoments) in the UD learning management system (LMS). Each session had a one-hour duration, and four topics were covered throughout the semester during bi-weekly meetings, as shown in Table 1. First, the KEEN Framework [14] was introduced to all the

registered attendees, regardless of their previous experience or involvement with KEEN at UD. Some of the more involved faculty did not attend this introductory session but were highly involved in the remaining sessions, focusing on the 3Cs implementations with micromoments. Note that some micromoment activities were exemplified during some workshops; however, in some sessions, faculty members preferred discussing their implementations or additional teaching concerns in the classroom.

Table 1. Four FLC sessions related to EML micromoment activities with examples provided to faculty participants during the Fall 2022 term.

Session	Topic	Micromoment Activities Used
1	Introduction to Micromoments and EML	Question Frenzy
2	Connections: Implementations & Tools	Concept Mapping
3	Creating value: Implementation & Tools	Discussion only
4	Curiosity: Implementation & Tools	Question Formulation Technique (QFT)

Accountability is also crucial for successful FLC, and in this case, weekly checklists were given to all attendees during each session tab in the LMS. However, due to class conflicts, a few participating faculty could only attend two sessions throughout the semester, making it challenging to keep everyone accountable. Moreover, due to a lack of economic incentives or buyouts from teaching, the sessions were optional and were advertised as drop-in sessions. Although the open nature of the drop-in sessions allowed for some flexibility, it was difficult to track everyone's involvement throughout the semester. Therefore, a survey was passed to all the participants to summarize the findings of this work in progress.

4. Faculty participants surveys and success stories

As the semester progressed, the sessions involved more reflection and discussion about strategies to improve faculty involvement with EML micromoments. At the end of the sessions, a brief survey was passed to all participants with the open-ended questions listed below.

1. Please describe the strategies you use to carry out your instruction (prior to this workshop)
2. Please describe the tools and technologies you use or integrate into your instruction (prior to this workshop)
3. Why did you join the KEEN Faculty Learning Community (FLC) on micromoments? What was your motivation to do it? What were your goals?
4. What micromoment activities (connections, creating value, curiosity) did you implement this term? Please describe the activity (activities)
5. What were the most significant successes in implementing the KEEN framework, and EML micromoments in your classroom?
6. What were the most significant challenges in implementing the KEEN framework, EML micromoments in your classroom?
7. Would you recommend this KEEN FLC to another faculty member? Why or Why not?
8. What recommendations do you have to improve future participants' FLC and EML-related faculty development activities?

Four faculty participants (1 Chemical Engineer, 2 Mechanical Engineer, and 1 Civil Engineer) responded to the survey. As this is a work-in-progress, this paper focuses only on some of the responses, successful stories, and suggested improvements for future FLC sessions. Before this FLC, the participants were exposed to different teaching styles, including traditional lectures (e.g., PowerPoints with learning objectives) and using specific technology, such as Excel, in addition to active learning techniques. The faculty members implemented a series of micromoment activities from the set, including Concept Maps, Question Frenzy, Google it, Paper-Prototyping, and Bingo [15]. As we discussed during our sessions, the first time a micromoment activity was run by a participating faculty member was challenging. Through the FLC, the lead faculty and the other participants supported and heard each other's concerns and provided suggestions for future implementations. Encouragement and support to keep micromoment implementations were constantly offered to all faculty. Student engagement was one of the greatest successes in this FLC for rapid EML micromoment implementation. As noted by one participant:

> *"The greatest success was that the activities broke the monotone nature of the lectures; the students seemed more active and engaged during and after the activity. Both activities that I tried, I believe, also helped the students learn the concepts better."*

All respondents agreed to recommend this EML micromoments FLC to other faculty and incorporate micromoment activities in their future courses. One of the respondents concurred that these activities are low effort and can make a significant impact. If multiple classes implement these activities, the students will learn the entrepreneurial mindset in their undergraduate careers.

Due to the lack of economic support, funding, or teaching release, one participant suggested shorter sessions, which could be part of departmental meetings. Time issues and commitments were also significant drawbacks to fully engaging in this FLC activity. Some faculty suggested using short easy-to-check online video recordings explaining the activities with concrete engineering teaching examples. Additional faculty participant quotes are listed below.

> *"I would have preferred a single meeting time."*

> *"I would have it as a subsection of a department meeting.* I *was already doing additional things and would not have had time to come to an additional meeting and implement it within the same semester*."

5. Summary and future implementations

The execution of a Faculty Learning Community (FLC) without economic incentives or teaching release is driven primarily by motivation. In addition to promoting a mindset and skillset, motivation is also pivotal to achieving long-term success for entrepreneurially minded learning (EML). In this study, for example, faculty members who implemented EML micromoments and joined this FLC wanted to improve teaching practices and had the innate desire to prepare better engineers with an entrepreneurial mindset.

The lead author is planning future efforts as the implementation of EML and KEEN involvement are now part of high-level teaching evaluation and performance for promotion and tenure for all faculty members at UD. Developing new technical EML micromoment activities for specific

engineering disciplines and courses, students' opinions or surveys, assessment performance, and improved learning objectives can help assess the effectiveness of implementing micromoments in several STEM courses. From this pilot FLC implementation, we expect to provide faculty members with an updated LMS, including videos or apps for rapid visualization of micromoment activities and specific examples to core courses in various engineering majors. At a minimum, short one-hour workshops could run with support from the Learning and Teaching Center at UD or other universities. A complete four-week or longer FLC commitment will continue only when economic incentives, teaching release, or funding alleviates faculty time constraints.

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