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Sustaining Faculty Engagement in the Scholarship of Teaching and Learning (SoTL): Long-Term Impacts of an Engineering-Focused SoTL Accelerator

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Lessons Learned: Long-Term Impacts of the Engineering-Focused SoTL Accelerator

Abstract: As engineering education increasingly emphasizes evidence-based teaching and curricular innovation, faculty development programs that build capacity for the Scholarship of Teaching and Learning (SoTL) play a critical role in sustaining this transformation. This paper examines the long-term outcomes of a professional development initiative designed to train engineering professors to (1) develop new curriculum, (2) assess the curriculum's impact through scholarly inquiry, and (3) disseminate results through peer-reviewed conference proceedings. The program engaged 30 engineering faculty from diverse institutions across the United States. Using a mixed-methods, longitudinal design, this study explores participants' sustained engagement in SoTL-related activities one to two years after program completion, including continued curriculum innovation, dissemination practices, collaborations, and institutional leadership roles. Findings reveal patterns of persistence and diffusion, illustrating how initial professional development experiences can yield lasting cultural and scholarly impacts within engineering departments. Implications are provided for designing faculty development programs that foster sustainable growth in SoTL engagement and scholarly teaching practices.

1. Introduction

Engineering doctoral programs are designed primarily to cultivate deep disciplinary expertise and research capability, often with limited attention to preparing future faculty for the complex work of teaching [1]. As a result, many engineering professors begin their academic careers with little formal training in the scholarship of teaching and learning (SoTL), limiting their ability to design evidence-based learning experiences, assess student understanding, and respond effectively to diverse learner needs [2, 3]. This lack of pedagogical preparation can contribute to challenges with student engagement, retention, persistence, and completion in engineering programs [4-6], where rigorous content intersects with high workload and often opaque expectations.

The SoTL Accelerator was developed as a structured response to this gap in faculty preparation [7-15]. Organized into three phases, the program guides engineering professors through the full cycle of scholarly teaching: developing SoTL-informed instructional interventions, implementing those interventions in their own courses, and disseminating findings through scholarly outlets and communities of practice. By framing teaching as an ongoing, evidence-driven inquiry process, the SoTL Accelerator aims to build sustainable capacity for high-quality instruction and educational innovation within engineering departments.

From a longitudinal perspective, a central challenge is how to ensure that gains from professional development persist, evolve, and diffuse rather than remaining as isolated, one-off changes in a single course or semester [16-18]. Sustainable professional development tends to require multi-year structures—such as ongoing learning communities, mentoring networks, and repeated cycles of implementation and reflection—that support faculty as their roles, courses, and institutional priorities change over time. Long-term impact is also influenced by institutional culture and reward systems: when departments recognize and reward scholarly teaching, provide continuity of resources, and embed pedagogical innovation into regular evaluation and leadership

expectations, new practices are more likely to be maintained, scaled to additional courses, and transferred across faculty generations.

The work described in this study is guided by a central research question: **What are the long-term impacts of implementing the SoTL Accelerator for engineering faculty and their students?** This question focuses not only on immediate changes in instructional practice, but also on enduring effects such as sustained use of evidence-based strategies, continued scholarly dissemination, and improvements in student learning outcomes, retention, and progression through engineering programs. For the purpose of this study, data collection occurred one time (Summer 2024) after delivery of all four semester-long cohorts (Spring 2022, Fall 2022, Spring 2023, Fall 2023).

2. Methods

2.1 Overview

The SoTL Accelerator was created to provide a clear framework that fosters accountability, sustained progress, and meaningful peer mentorship. It is grounded within Ambrose and colleagues "Motivation to Learn" theory [19], which posits self-efficacy, seeing value, and a supportive environment as key drivers of motivation which results in behavioral change. While the model was initially tested with engineering faculty, its three foundational phases and six practical tools are adaptable across disciplines. The structure is flexible and can be tailored to align with evolving institutional priorities and the needs of faculty, research students, staff, and academic leaders.

The SoTL Accelerator, funded through the Kern Entrepreneurial Engineering Network, mentored engineering faculty to develop, implement and assess, and disseminate findings related to a new curriculum intervention integrating the entrepreneurial mindset, bio-inspired design, and STEAM. For instance, mechanical systems and dynamics courses used photovoice and bio-inspired design projects to deepen design thinking, while first-year engineering offerings employed open-ended socio-technical challenges and biomimicry to boost early engagement. In areas like programming industrial robots and IoT systems design, project-based approaches strengthened technical and entrepreneurial skills, and in manufacturing and supply chain courses, faculty integrated assessment tools and project work that foreground entrepreneurial thinking. Other work explored STEAM-based strategies in biomedical physiology and redefined how sustainability and entrepreneurship are taught, showing the breadth of contexts where these pedagogical innovations have taken root.

2.2 Data Collection and Analysis

As shown in Figure 1, the SoTL Accelerator was conducted across four semesters.

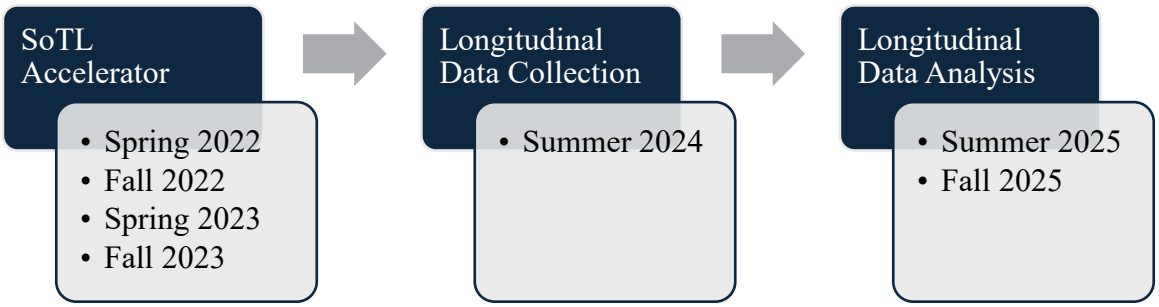

Figure 1. Data Collection and Analysis

From Spring 2022 -> Fall 2023, 30 engineering faculty participated in the faculty development experience which was delivered in a one-semester cohort style. Participants developed new curriculum, implemented and assessed the curriculum, and disseminated the findings as an ASEE conference proceeding [7-15].

In Summer 2024, all participants were contacted and requested to provide an update on longitudinal program benefits. Of the 30 original engineering faculty participants, 22 responded.

Using these responses, in Summer 2025 and Fall 2025, the researchers employed a qualitative coding approach grounded in thematic analysis. The analytic process followed six structured stages [20], including identifying salient excerpts, generating initial codes, clustering codes into broader patterns, refining and interpreting themes, and ultimately constructing a conceptual framework. NVivo 15 was used to organize and code the data. The analysis resulted in four overarching themes.

3. Results

A summary of the themes is provided in Figure 2. Direct quotes are given to corroborate each theme.

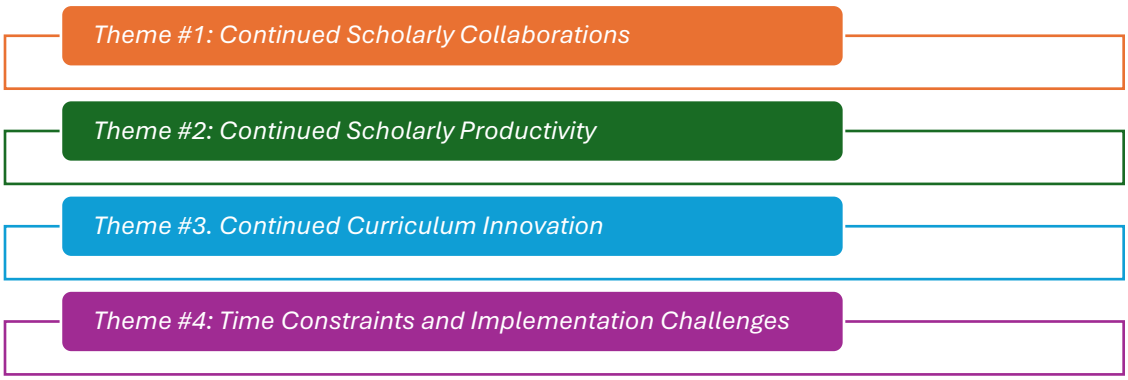

Figure 2. Long-term Impacts of SoTL Accelerator

3.1 Theme #1: Continued Scholarly Collaborations

In general, the SoTL Accelerator program facilitated meaningful partnerships and mutual mentoring among faculty and students, which strengthened research and writing.

Participants describe meaningful, reciprocal collaborations that advanced research and writing: “We worked for about a year together on finishing up the papers, she was an immense help to me, and I believe I was also helpful to her as far as providing a different type of guidance to research and writing.”

Collaboration extended to co-authorship and mentoring students: “Personally, I was able to publish a paper with [Person X].”

Faculty describe forming a supportive community: “I have built a community of practice with other peers where we share insights, challenges, and successes, fostering a supportive and collegial environment.”

Visibility extended to other venues: “I shared and was active in the [Conference X]. During the [Conference X] session, I shared my story and students' success.”

Faculty report using the experience to redesign courses: “Another of my colleagues and I also took inspiration from the program to incorporate entrepreneurial mindset into our energy courses and plan to implement this upcoming academic year.”

3.2 Theme #2: Continued Scholarly Productivity

This theme captures how participation led to concrete scholarly outputs and a sustained pathway of future work.

Several faculty connected the program to concrete scholarly outputs: “There is a published ASEE paper as well as an Engineering Unleashed Card that has come out so far from this work. I plan to publish another Card and ASEE paper out of the continuation of this work.”

One person notes influencing a broader writing community: “We used this idea to setup a research writing group in our college to encourage publication. We have had one person from this group publish.”

Others emphasize multiple products and future plans: “I have had opportunities to publish my research on teaching and learning which has contributed to the broader academic discourse on pedagogy and enhanced my scholarly profile. See the following links to Conference papers and KEEN Cards.”

Program participation led to national conference engagement: “My colleagues and I recently presented the paper, which was developed through the program, at ASEE national conference 2024.”

3.3 Theme #3. Continued Curriculum Innovation

Participation spurred redesign of courses and integration of new frameworks such as entrepreneurial mindset into existing curricula. In response, students reported improved learning, engagement, and enriched course experiences as a result of the interventions.

Others describe broader curriculum change: “The SOTL work I did impacted 25 students, resulted in a publication, which I plan to submit to ASEE, and a transformed curriculum for my CHME Transport class.”

Multiple comments highlight positive effects on students: “Impacted students were ~25 last year. I will use it again in a 2024 offering. Concepts were received well and helped student learning.”

Participants explicitly connect the work to improved teaching: “The benefits I got are great and enhanced my way of teaching and students' learning curve.”

Students also described enriched experiences: “Six students who took a course in which the SoTL intervention was implemented expressed a rewarding and enriched learning experience and I have plans to incorporate similar interventions in other courses in the coming semester.”

Longitudinally, faculty emphasize transferable skills: “As far as longitudinal benefits, it is my belief that my participation in the program significantly impacted the way I mentor students by making sure their skill sets are transferable to other industries as well as entrepreneurship.”

3.4 Theme #4: Time Constraints and Implementation Challenges

Despite the benefits, faculty also reported limited capacity and course workload issues that constrained sustained implementation.

Not all participants could fully continue or document their projects: “I recently have too much on my plate and don't want to be overcommitted. I apologize for not being able to contribute to this effort.”

Workload and course demands limited repetition of some activities: “I unfortunately only did this activity once as the overall sentiment from final course reviews were they found this interesting but the workload for the course was too much, etc.”

4. Discussion and Conclusion

The SoTL Accelerator functioned not as a single initiative, but as a catalyst that set multiple currents in motion. Four overarching themes emerged with striking consistency. First, participants described continued scholarly collaborations that extended beyond the formal duration of the program, suggesting that the experience cultivated durable intellectual partnerships rather than short term project teams. Second, the program fostered continued scholarly productivity, with participants advancing manuscripts, presentations, grant proposals, and new lines of inquiry that outlived the structured support period. Third, the SoTL Accelerator

stimulated continued curriculum innovation, as faculty translated their inquiries into redesigned assignments, assessments, and course structures. Finally, alongside these generative outcomes, participants reported persistent time constraints and implementation challenges, revealing the structural tensions between ambitious scholarly engagement and the realities of faculty workload. Together, these themes depict the SoTL Accelerator as both fertile ground for growth and a reminder that institutional ecosystems must be intentionally aligned to sustain it.

These findings provide compelling evidence for different stakeholder groups to reconsider approaches to faculty development. For example, instructional designers can move from episodic consultation toward longer horizon partnerships that support faculty inquiry from question formulation through dissemination. Moreover, institutional centers for teaching and learning may consider embedding structured accountability milestones and post program continuation spaces that preserve momentum after formal training concludes. Faculty developers have the opportunity to intentionally foreground project scoping and time management strategies, helping faculty participants align SoTL ambitions with realistic workload parameters. From an administrative perspective, leaders can signal the value of SoTL through workload recognition, promotion and tenure language, and modest but protected time allocations. In short, if faculty are expected to produce scholarship of teaching and learning that is rigorous and sustained, institutions must design infrastructures that treat it as scholarship rather than enrichment.

Future research aims to extend beyond documenting impact toward refining and scaling the model. Further development will consider the model's transferability to other institutional contexts, stakeholder groups, and STEM disciplines, identifying which design elements are core and which are adaptable. In addition, future scholarship will more explicitly situate these findings within the broader SoTL and faculty development literature, drawing clearer connections between community of practice theory, sustained professional learning models, and institutional change frameworks. Doing so will not only strengthen the theoretical grounding of the SoTL Accelerator but also position it as a replicable, research informed approach to cultivating enduring scholarly engagement in teaching and learning.

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