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From Research to Reality: Building a Peer-Led Innovation Ecosystem in Higher Education

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From Research to Reality: Building a Peer-Led Innovation Ecosystem in Higher Education

Abstract

In 2020, first-year honors students conducted a Course-based Undergraduate Research Experience (CURE) to examine how innovation could be more effectively fostered in higher education. Their research concluded that while coursework builds technical competence, an innovative mindset thrives through peer-driven, co-curricular engagement. The students proposed a framework emphasizing experiential learning, mentorship, and multidisciplinary collaboration to bridge the gap between academic theory and professional practice.

Building on this foundation, a college of engineering institution partnered with students to translate this research into reality through a comprehensive leadership initiative known as IGNITE. Now in its third year, the initiative has demonstrated significant measurable success in scaling a peer-led ecosystem. In its second year, the program generated 1,824 student engagements and reached 844 unique students across 73 events. By the third year, the model achieved greater operational stability, recording 1,005 engagements in a single semester with an average attendance of 33 students per event. Notably, 27% of participants became repeat attendees, and digital engagement surged to over 690 Slack members and 1,100 Instagram followers, signaling the emergence of a sustained innovation community.

The resulting student organization leads all experiential programming under faculty guidance, coordinating initiatives in creativity, industry immersion, outreach, and venture incubation. Supported by external endowments and industry partnerships, the model provides a sustainable pathway for student-led growth. This case study analyzes the three-year evolution of the initiative, examining the effectiveness of the peer-led model and the structural adaptations required to survive leadership turnover and institutional complexity. By discussing iterative lessons learned regarding leadership continuity, organizational documentation, and mission buy-in, this paper offers a scalable, data-backed blueprint for institutionalizing innovation through student leadership.

1. Introduction

Innovation is a critical competency for engineers and students across disciplines [1]. While many institutions have introduced innovation courses [2], developing an innovative mindset requires sustained engagement across the full student experience [3]. Consequently, innovation learning often exists in isolation from broader academic experiences.

In Spring 2020, first-year honors students examined how to effectively foster innovation in higher education. Through literature review, benchmarking, and interviews, they found innovation learning is best supported through peer-driven, co-curricular engagement [4], [5]. Based on these findings, they proposed a framework emphasizing experiential learning, mentorship, and multidisciplinary collaboration. Although coinciding with the COVID-19 onset, the research execution was not significantly constrained.

However, the framework was not immediately implemented as a unified system. Pandemic conditions limited sustained in-person engagement [6]. With peer mentorship restricted, faculty-led pilots established structure and content, transitioning to student leadership as conditions allowed. Early lessons informed subsequent governance and scaling.

These efforts were formalized within the college of engineering. A student organization now leads experiential programming under faculty guidance, coordinating initiatives in creativity, industry immersion, seminars, and venture incubation. This phased approach allowed the framework to evolve while maintaining student leadership.

This paper presents the research proposal, outlines the framework's implementation over 2.5 years, and reflects on lessons learned.

2. Background and Motivation

The Engineering Innovation Institute was created to foster innovation among faculty, students, and staff through both educational and experiential efforts. Its mission views innovation as a continuum—from creative exploration to real-world impact—aimed at preparing technically strong, adaptable engineers.

However, supporting this goal across a college of over 10,000 students presents challenges. While innovation courses provide depth, enrollment limits, degree requirements, and faculty capacity make it unrealistic to reach every student through coursework alone. Consequently, only a portion of the student body engages with formal innovation education, prompting the Institute to explore scalable, interdisciplinary alternatives.

An opportunity emerged through a partnership with the Center for Undergraduate Research. The Institute leveraged a required honors research course to explore how innovation could be better supported. Although these first-year students had limited exposure to upper-division programs, their position provided a relatively unbiased starting point for inquiry.

To mitigate their limited experience, the researchers relied on interviews with upper-division students, alumni, and faculty to identify gaps in innovation learning. This approach gathered perspectives from experienced individuals while maintaining a holistic view. Combining a "clean slate" perspective with stakeholder input reduced assumptions and reinforced the value of student voice.

This partnership benefited both groups: the Institute gained student-informed insights to guide future initiatives, while students gained applied research experience. This collaboration positioned undergraduates as active contributors to shaping innovation education rather than passive participants.

3. Student Research Design, Methods, and Findings

3.1 Course Context and Structure

The research was conducted as a Course-based Undergraduate Research Experience (CURE) in Spring 2020. The cohort consisted of four first-year engineering students (two female, two male) from different majors (computer science, computer engineering, digital arts and sciences, and industrial engineering). Their status as first-year students provided a fresh perspective, minimizing preconceived assumptions about upper-division programming while relying on external perspectives to inform their work.

The author served as the primary instructor, meeting weekly with students to guide methodology and facilitate design thinking sessions for problem framing and synthesis. The Institute's director served as a faculty mentor, providing strategic feedback approximately six times during the semester. Although the course transitioned to remote instruction midway through the term due to COVID-19, the research scope remained intact. Deliverables included a final report, a leadership presentation, and a symposium poster, which served as the foundation for subsequent program implementation [7].

3.2 Research Objectives and Guiding Questions

The primary objective was to explore how innovation is supported beyond formal coursework and to propose scalable implementations for a large college of engineering. A secondary objective was to identify barriers to participation, such as awareness, access, and time constraints.

The research was guided by open-ended questions regarding current student engagement, gaps in offerings, the role of peers and mentors, and opportunities for multidisciplinary learning. These objectives positioned the work as both exploratory and applied, focusing on translating insights into actionable recommendations.

3.3 Research Methods

The student research employed a qualitative, exploratory approach centered on two primary data sources: a structured literature review and semi-structured interviews. Together, these methods were used to understand how innovation is currently taught, perceived, and supported within engineering education, and to inform the development of ideas that could be implemented within a large college of engineering.

3.3.1 Literature Review

The team conducted a structured review to analyze methods universities use to cultivate innovative culture among engineering students. The scope focused specifically on student learning rather than general pedagogical techniques.

Two primary questions guided the review:

1. How is innovation culture fostered at the university level among engineers?
2. How can extracurricular activities and technology enhance this culture?

Databases including ProQuest Engineering, Academic Search Premier (EBSCO), Web of Science, and IEEE were searched using the phrase "engineering students learn innovation." Results were limited to journal articles published from 2016 to April 2020.

The initial search returned 1,135 results. Using the PRISMA method [8], screening by title and abstract reduced this to 178. After removing duplicates and conducting full-text reviews, 89 articles remained. These were categorized into five groups: faculty, curricular, extracurricular, technology-related, and multidisciplinary approaches.

The team focused on extracurricular and technology-enabled initiatives, excluding curricular-focused articles due to the difficulty of modifying standardized curricula. This narrowed the final set to 20 articles for full review and synthesis.

3.3.2 Interviews

Semi-structured interviews captured perspectives on how innovation is perceived and taught, providing a holistic understanding of how innovation is communicated to students and where gaps exist.

In total, 22 interviews were conducted with engineering faculty (including department heads and program directors), students, and external entrepreneurs and faculty from other universities. These interviews exposed students to diverse interpretations of innovation and alternative approaches. Together, the literature review and interviews provided complementary perspectives, combining prior evidence with lived experiences from stakeholders.

3.4 Data Analysis

Data analysis focused on translating evidence from the literature review and interviews into actionable insights. Findings were discussed weekly to identify recurring themes, common gaps, and points of alignment regarding how innovation is supported.

Literature was grouped by theme, with particular attention to extracurricular and technology-enabled learning. This analysis identified common strategies across institutions, as well as gaps related to multidisciplinary engagement and scalability within large colleges.

Interview data were analyzed collaboratively to identify shared patterns across stakeholder perspectives. By comparing viewpoints from faculty, students, and entrepreneurs, the team identified how innovation is communicated and what barriers limit student participation.

Facilitated ideation sessions served as the bridge between data analysis and proposal development. Using a design thinking process, students translated insights into opportunity areas, refining concepts based on feasibility and institutional constraints. Through this iterative process, the students moved from analysis to a definitive set of proposed ideas and a guiding framework intended to direct future innovation programming and implementation.

3.5 Research Results

3.5.1 Literature Review Results

The literature review identified six themes essential to innovation learning in engineering: realistic immersion, learner variations, tool usage, innovation spaces, multidisciplinary engagement, and technology-enabled approaches. Collectively, these underscore the necessity of experiential, flexible, and student-centered environments.

- **Realistic Immersion:** Innovation learning is most effective when students engage in authentic, open-ended problem solving rather than abstract exercises. Project-based and community-engaged activities facilitate "learning by doing" through iteration and reflection [9]–[13].

- **Variations of Innovative Learners:** Students engage with innovation through diverse motivations from hands-on experimentation to leadership. Inclusive environments must support multiple entry points and roles rather than a "one-size-fits-all" model [13]–[15].
- **Tool Usage:** Prototyping and digital fabrication tools enable rapid iteration. However, tools are most effective when embedded in experiential contexts supported by mentorship and peer interaction [16]–[18].
- **Innovation Spaces:** Makerspaces and studios foster creativity and self-directed exploration. The literature suggests that the underlying culture and accessibility of these spaces are more influential than the physical infrastructure itself [19]–[21].
- **Multidisciplinary Engagement:** Collaboration across disciplines enhances problem framing and creativity. While difficult to scale within formal curricula, these interactions are successfully sustained through co-curricular and project-based initiatives [22]–[24].
- **Technology-Enabled Innovation:** Digital platforms and simulation tools facilitate efficient prototyping and testing, particularly in hybrid settings. Technology serves best as an integrated social learning mechanism rather than an isolated tool [25]–[28].

The literature establishes that engineering innovation is a socio-technical process requiring more than just technical proficiency. It thrives at the intersection of authentic context, supportive physical environments, and collaborative diversity. While literature identifies these six themes as theoretical pillars, there remains a gap in understanding how these elements are operationalized within specific institutional constraints. This sets the stage for the following interview results, which explore how faculty and students navigate these themes in practice.

3.5.2 Interview Results

Interviews revealed a substantial disconnect in how innovation is defined, valued, and operationalized across faculty, students, and stakeholders. This lack of a shared understanding emerged as a central barrier, forcing different groups to engage with innovation in fragmented and often contradictory ways.

- **Definitional Misalignment:** A primary finding was the lack of a shared definition. Innovation-focused faculty described it as a mindset or process (creativity and problem-framing), whereas students and external faculty associated it with outcomes or events (startups and hackathons). Consequently, many viewed innovation as peripheral or optional—reserved for specific subsets of students—rather than a core engineering competency.
- **Curricular Tension:** Both faculty and students highlighted a conflict between rigid engineering curricula and the open-ended nature of innovation. Faculty cited accreditation and time constraints as barriers, while students reported that high-stakes grading discouraged the risk-taking necessary for creative exploration. This reinforces the perception that true innovation exists primarily outside the formal classroom.
- **Fragmentation and Access:** Resources were described as siloed across units with limited coordination. Students often relied on informal peer networks to navigate this ecosystem, as fabrication spaces and programs were frequently perceived as inaccessible or exclusive to specific disciplines.
- **Early and Multidisciplinary Engagement:** Despite structural barriers, there was a consensus on the value of multidisciplinary collaboration for holistic problem-solving. Interviewees also emphasized that early exposure is critical; introducing innovation

frameworks in the first or second year builds creative confidence and provides a better context for later technical coursework.

Collectively, the interview results suggest that interest in innovation is high, but progress is hindered by a lack of shared language and coordinated support. Bridging these disciplinary boundaries requires a shift from fragmented, exclusive programming toward a cohesive, faculty-supported approach that normalizes innovation as a foundational element of the engineering student experience.

3.5.3 Data Analysis and Ideation Framework

Following the literature review and interviews, the team utilized the Double Diamond framework, a structured model of alternating divergent and convergent thinking, to move from problem exploration to solution development [29], [30].

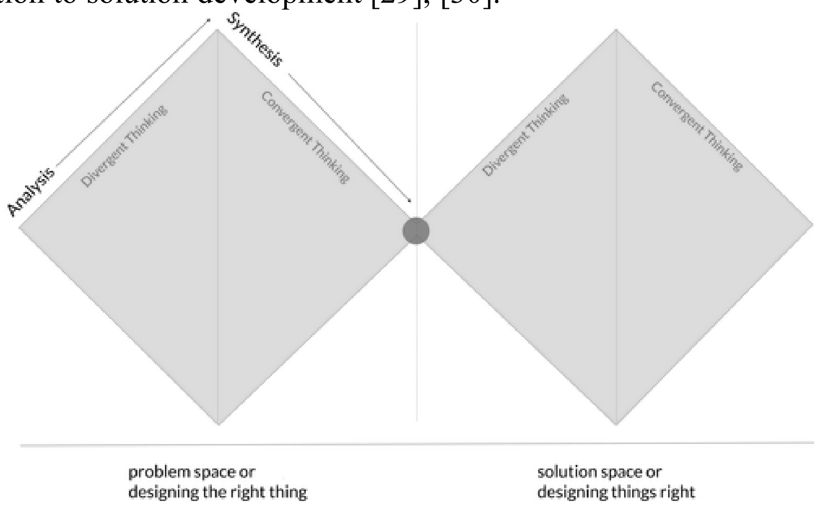

Figure 1: Double Diamond framework illustrating the iterative divergence and convergence used to guide data analysis and ideation (adapted from [29]).

The first phase of the diamond focused on synthesizing the broad data gathered from interviews and literature into a narrowed set of priority issues. This convergent phase was guided by feasibility, potential impact, and the structural realities of a large college of engineering.

A critical outcome of this phase was the deliberate decision to bypass the modification of required engineering coursework. While the data underscored the importance of embedding innovation into the student experience, the interviews revealed that departmental curricula are heavily constrained by disciplinary priorities and accreditation requirements. The team concluded that attempting to influence every departmental curriculum would require a scale of coordinated change far beyond the resources of a small institute. Consequently, the team focused on extracurricular and technology-enabled pathways that could reach students across disciplines without the friction of formal curricular reform. This strategy aligns with literature trends that emphasize the effectiveness of co-curricular environments for fostering innovation mindset.

The second expansion phase of the diamond involved generating concepts to address the identified lack of centralized guidance and the fragmented nature of the existing innovation ecosystem. The team identified that while resources existed, they were often siloed, leaving students feeling overwhelmed and disconnected.

To bridge these gaps, the team developed a framework centered on community-building and guided engagement. Proposed solutions included networking events and site visits designed to lower barriers to entry and foster a sense of belonging early in a student's academic career. Furthermore, the team recognized that providing access to tools was insufficient on its own. Drawing on the "realistic immersion" theme from the literature, the resulting framework prioritizes long-term, open-ended projects that pair resource access with mentorship. This approach ensures that students are not just using equipment, but are actively practicing the iterative, creative thinking required for innovation.

Together, the outcomes of this process formed a peer-led, experiential framework that informed the phased implementation of the innovation programming described in the subsequent sections.

3.5.4 Student Recommendations

Based on the synthesis of the literature review and interview findings, the student team developed a set of actionable recommendations aimed at strengthening innovation engagement across a large college of engineering. These recommendations were intentionally designed to be feasible at scale, operate alongside existing curricula, and address the fragmentation, accessibility, and cultural barriers identified through the research.

Rather than proposing curricular reform, the students focused on peer-led, co-curricular strategies that could reach students across disciplines and academic levels. The recommendations emphasized visibility of opportunities, early and sustained engagement, experiential learning, and community building. While some ideas were developed for near-term implementation and others identified as longer-term opportunities, all recommendations were grounded in evidence from both the literature and interviews. Every proposal is grounded in the evidence collected during the discovery phase and is summarized in Table 1.

Table 1: Summary of Student Recommendations for Strengthening Innovation Engagement

Recommendation Area	Student Recommendation	Intended Purpose
Peer-Led Engagement	Establish a peer-led Innovation Ambassadors program to serve as a visible, student-facing entry point into innovation opportunities	Lower barriers to participation and normalize innovation engagement
Resource Visibility	Develop a centralized virtual hub consolidating innovation-related programs, resources, and events	Improve awareness and reduce fragmentation
Student Outreach	Use peer-to-peer mentoring, tabling, and targeted outreach to engage students at different stages	Increase accessibility and early engagement
Community Building	Host workshops, guest speakers, networking events, and informal innovation activities	Foster relationships and strengthen innovation culture
Experiential Learning	Create structured, open-ended opportunities for students to work on real-world problems outside formal coursework	Support hands-on innovation learning
Makerspace Engagement	Develop structured pathways for student access to fabrication tools through training or certification	Encourage effective use of physical innovation resources
Student-Led Making	Establish a student-led makerspace club to support low-stakes experimentation and peer learning	Build a sustainable community of creators

Faculty Engagement (Future)	Offer faculty workshops focused on shared definitions and approaches to innovation	Improve alignment and consistency across programs
Multidisciplinary Activities (Future)	Develop multidisciplinary competitions or challenges	Promote cross-disciplinary collaboration

4. Implementation Framework and Program Design

This section describes how the student generated recommendations were translated into practice. Implementation required adaptation to the institutional context and available resources. The following subsections outline the decision-making process, the resulting peer led organizational structure, and how early pilot programs informed the formal launch of the initiative.

4.1 Translating Recommendations to Results

Following the student research phase, the institute evaluated each recommendation for feasibility and alignment with existing structures. While the student work provided the guiding framework, implementation was adapted to account for jurisdictional boundaries and faculty capacity. Recommendations were either implemented directly, expanded, or deferred based on these institutional realities. As work progressed, the peer led model proved essential for scaling experiential programs through student leadership. Table 2 summarizes how these recommendations informed specific implementation decisions.

Table 2: Mapping Student Recommendations to Implementation Decisions

Student Recommendation	Implementation Decision	Rationale
Peer-Led Innovation Ambassadors	**Implemented (Expanded and Renamed)**	Implemented as a peer-led student organization overseeing the institute's experiential learning initiatives.
Centralized Virtual Hub	**Adapted through Alignment**	Shortly after the student recommendations, a university-wide, grant-funded initiative was launched to serve as the central connector for innovation and entrepreneurship. Rather than duplicating efforts, the institute aligned programming and outreach through partnership with this initiative.
Makerspace Development	**Deferred and Referred**	Makerspaces across campus were managed by units outside the institute's authority. Findings were shared with appropriate college stakeholders. Given safety, staffing, and oversight considerations, the institute did not pursue independent makerspace development.
Student Outreach and Events	**Implemented**	Student outreach and experiential events became a core function of the student organization. Seminars with guest speakers and outreach activities were piloted prior to the formal launch and later transitioned to student leadership.
Student-Led Makerspace Club	**Adapted (Concept Integrated)**	While a fabrication-focused club was not created, core elements of the recommendation—peer-led learning, student mentorship, and startup-oriented collaboration—were integrated into the student organization without a makerspace-specific focus.
Faculty Workshops	**Deferred**	Faculty workshops were not implemented due to limited faculty capacity within a small institute serving a large college. This recommendation remains a longer-term consideration.
Multidisciplinary Competitions	**Partially Implemented**	Initially, the institute supported student preparation for existing campus competitions and partnered on collaborative, multidisciplinary offerings aligned with this recommendation. Recently, it has started hosting its own competitions with industry partners.

4.2 Implementation Constraints and Adaptation
Translating the student generated framework into practice required navigating institutional scope, faculty capacity, and external constraints. While the Institute maintained autonomy over experiential programs, it operated outside the academic department structure. Departmental curricula and required coursework remained outside its jurisdiction, which shaped which recommendations could be implemented directly versus those requiring adaptation.

Staffing and Scale: At the start of implementation, the institute was supported by only two full time instructional faculty. A third faculty member contributed half their time until 2023. This small team served a college population exceeding 10,000 students. Given this scale, broad curricular reform across individual engineering departments was not feasible. While elective courses supported innovation learning, embedding these mindsets into every required curriculum would have necessitated departmental coordination beyond the capacity of the institute.

Pandemic and Physical Space: The timing of implementation was further shaped by the COVID 19 pandemic. Remote and hybrid instruction periods limited in person engagement and mentorship. Consequently, early initiatives were piloted under faculty leadership with the goal of transitioning ownership to students once on campus engagement resumed. Physical space also influenced these decisions. While the institute gained control of a classroom and a student incubator, makerspaces and fabrication resources remained under the authority of other campus units.

Professional Development and Funding: Faculty development represented an additional boundary. Responsibility for faculty training typically resides at the department level, and limited staffing made it impractical to sustain workshops alongside student initiatives. Finally, external funding through industry partnerships and alumni donations shaped priorities. Because donor intent often specified program goals or timelines, the institute prioritized scalable, student led experiential programs that could adapt as funding opportunities evolved.

4.3 Formalized Program Design
The proposed initiative was designed to launch a peer-led Innovation Ambassador (IA) program under the guidance of a university-based engineering innovation institute to foster a culture of innovation across campus. Central to the design was the recognition that students engage with innovation at different points in their academic journeys and with different goals. As such, the program was intentionally structured to be welcoming and valuable to students ranging from those newly becoming aware of innovation to those actively pursuing ventures or applied problem solving, while maintaining the development of an innovative mindset as a shared outcome.

Rather than positioning innovation as a singular activity or outcome, the proposed model emphasized progression. Drawing from prior research on student innovation pathways, the program identified three categories of student engagement: students becoming aware, students in training, and students serving as peer leaders. The title *Innovation Ambassador* was intentionally designed to be earned, signaling a student's sustained engagement with innovation programming, experiential learning, and mentorship rather than a role assigned at entry.

The IA program was designed to operate alongside existing curricular offerings while focusing primarily on co-curricular and experiential learning. Students could engage through workshops, guest speakers, industry site visits, mentorship, and a culminating social innovation project. These experiences were intended to help students connect classroom knowledge to real-world contexts, build confidence in open-ended problem solving, and develop habits associated with innovative thinking regardless of whether their long-term goals involved entrepreneurship.

A defining feature of the proposed design was its emphasis on peer leadership and community-building. Innovation Ambassadors were envisioned as visible points of contact for innovation-related opportunities, responsible for outreach, mentoring, and program coordination. Faculty involvement was positioned as guidance and continuity, while day-to-day engagement and peer support were led by students. Regular faculty–student town halls were incorporated to encourage open dialogue, increase transparency around resources, and reinforce a shared sense of ownership over the innovation ecosystem.

Table 3 summarizes the core programming elements proposed within the Innovation Ambassador model and illustrates how these activities supported students at different stages of their innovation journey.

Table 3: Proposed Innovation Ambassador Programming and Student Progression

Program Element	Primary Audience	Purpose and Role in Student Progression
Innovation Ambassador Training	Students	Structured pathway guiding students through awareness, skill development, experiential learning, and action. Completion signified readiness to serve as a peer leader and mentor.
Guest Speaker Series	Students, Faculty	Exposure to real-world applications of innovation and entrepreneurship; supports early awareness and contextual understanding across disciplines.
Industry and Community Site Tours	Students	Help students connect coursework to professional practice and explore how innovation operates in diverse organizational settings.
Student Workshops	Students	Skill-building sessions focused on ideation, prototyping, stakeholder engagement, and venture translation; primarily support students in the training phase.
Mentorship	Students	Connects students with faculty, alumni, and community experts to support personal innovation goals and experiential projects.
Social Innovation Experiential Project	Students	Multidisciplinary, open-ended project addressing a real-world problem; serves as the culminating experience for students earning the Innovation Ambassador designation.
Faculty–Student Town Halls	Students, Faculty	Open forums to surface barriers, share perspectives, and strengthen community-wide engagement with innovative efforts.

4.4 Adaptation and Rollout of the Peer-Led Model

The formalized program design was not implemented through a single launch. Instead, elements of the framework emerged incrementally in response to student needs and external conditions. This section outlines the phased rollout of experiential programming, beginning with efforts that predated the student led initiative and continuing through the transition that necessitated a formal structure.

4.4.1 Pre-COVID and COVID-Era Experiential Learning

Prior to the pandemic, the institute supported several multidisciplinary efforts including the Innovation Fellows program. This initiative paired engineering and business students for early stage startup exploration and applied problem solving under faculty guidance. In parallel, faculty provided startup mentoring and connected students to the regional innovation ecosystem through local nonprofit board involvement.

The onset of COVID 19 significantly altered these efforts. The Innovation Fellows program was paused while startup mentoring continued as the primary form of engagement under remote conditions. Student involvement in community-facing activities and peer mentorship was limited by a reduced on-campus presence. During this period, programming relied almost entirely on faculty leadership without a unified student facing structure. These early efforts demonstrated a sustained demand for multidisciplinary opportunities but also highlighted the limitations of a faculty driven model regarding long term scalability.

4.4.2 Immediate Post-COVID Transition and Program Expansion

As campus operations resumed, the institute faced sustained instructional demand and a renewed emphasis on experiential learning. Enrollment remained high, and the institute retained a flipped course structure that paired asynchronous lectures with in-person team sessions. While this supported deeper classroom engagement, it concentrated faculty effort on instruction and limited capacity for broader program planning.

To manage this, the institute launched the Innovation Mentors program. These students served as near peer subject matter experts embedded within classrooms to guide teams and model innovation practices. This role eventually expanded to include workshops and student advising. Many of these mentors later transitioned into leadership roles within the student led initiative which reinforced continuity between academic and experiential pathways.

The institute also prioritized industry engagement through a donor supported internship program. Initially virtual, this program expanded to include in person internships at startups and mid-sized companies within two regions of the state. Additionally, a new seminar series focused on innovation in industry launched in Fall 2022. This series aligned with research recommendations for guest speakers and functioned as a bridge between formal coursework and co-curricular engagement.

Despite this momentum, programming remained decentralized. Multiple initiatives operated concurrently but coordination relied heavily on faculty and staff oversight. As responsibilities grew, it became difficult to sustain this reactive approach. These conditions underscored the necessity for a coordinated student led structure to support the scalability and intentional growth of the innovation ecosystem.

4.4.3 Formal Launch of the Student-Led Initiative

Following several years of pilot programs, pandemic-driven adaptations, and incremental experiential offerings, a formal student-led initiative was launched in Fall 2023 to unify and scale innovation-related experiential learning across the college and broader university community. Prior to this point, no experiential programs operated under a single brand or coordinated student leadership structure. Programs were developed reactively in response to student needs, donor-funded initiatives, and faculty capacity, often operating independently of one another.

In Spring 2023, the institute identified a student leader to serve as the inaugural director of the organization. This student had previously participated in multiple innovation programs, including Innovation Fellows and Innovation Mentors, providing continuity between earlier pilot efforts and the formal launch. Over Summer 2023, the student director worked closely with the primary faculty advisor to design the organizational structure, draft coordinator roles, and map existing and planned programs into a cohesive framework. This process included reviewing the institute's mission, assessing ongoing donor commitments, and determining what was feasible given Following several years of pilot programs and pandemic-driven adaptations, a formal student-led initiative launched in Fall 2023 to unify innovation-related experiential learning. Prior to this point, no experiential programs operated under a single brand or coordinated leadership structure. Instead, programs were developed reactively in response to student needs, donor-funded initiatives, and faculty capacity.

In Spring 2023, the institute identified a student leader to serve as the inaugural director. This student provided continuity between earlier pilot efforts and the formal launch due to their previous participation in multiple innovation programs. During Summer 2023, the director worked with the primary faculty advisor to design the organizational structure and map existing programs into a cohesive framework. This process accounted for the institute's mission, ongoing donor commitments, and faculty bandwidth.

The formal launch established a tiered, peer-led model where leadership roles were earned rather than assumed. The student director oversaw distinct programs led by paid student coordinators. This structure allowed the organization to support students at different stages of their innovation journey while maintaining a manageable oversight model for faculty. Table 4 summarizes the initial programs included in the 2023–2024 academic year.

Table 4: Initial Program Structure of the Student-Led Innovation Organization (2023–2024)

Program	Purpose	Primary Mode
Creativity Program	Develop creative skills through interdisciplinary and artistic engagement	Workshops, community projects
Immersion Program	Connect students with industry through experiential exposure	Site visits, internships
Innovation Competency Development	Explore tracking of innovation-related skills	Research, tool evaluation
Innovation Fellows	Multidisciplinary team-based innovation experience	Startup-sponsored projects
Seminar Series	Expose students to innovation in practice	Weekly speakers
Outreach	Build campus and community innovation connections	Events, partnerships
Spark Program	Support student startup development	Incubation, mentoring
Innovation Mentors	Provide peer support in coursework and programs	Near-peer mentoring

5. Results and Lessons Learned

This section presents the outcomes of the student-led experiential learning initiative following its formal launch. It emphasizes how programs evolved through iterative implementation under real institutional constraints. Rather than treating results and discussion as separate phases, this section adopts a practice-informed approach that integrates outcomes, challenges, and lessons learned. Results are organized chronologically to highlight iteration across academic years.

5.1 Year 1: Formal Launch and Initial Implementation (2023–2024)

The 2023–2024 academic year marked the first formal launch of the unified, student-led experiential learning initiative under a single organizational identity. While several experiential programs had existed previously within the institute, this was the first time they were intentionally coordinated under a shared leadership structure, mission, and student governance model.

The primary goal of Year 1 was exploratory and formative: to determine whether a student-led model could feasibly oversee multiple experiential programs, support peer learning at-scale, and extend the institute's reach beyond coursework. As such, the emphasis during this year was placed on program development, leadership structures, and operational feasibility rather than optimization or long-term sustainability.

5.1.1 Year 1 Results

The student-driven initiative, known as IGNITE, formally began operations in September with the hiring of 11 student leaders. By the end of the academic year, IGNITE coordinated 65 events, workshops, and experiential offerings. This rapid pace of implementation reflected the high demand for centralized innovation programming.

Across all programs, IGNITE recorded 1,187 total student engagements. These interactions included creativity-focused workshops, industry immersion, multidisciplinary project teams, and startup mentoring. External engagement was also a significant component of Year 1 activity. Student leaders coordinated participation in four state-wide innovation conferences and engaged 33 alumni as speakers, mentors, and site hosts. These interactions supported the goal of building sustained connections between students and the broader innovation ecosystem. Table 5 summarizes the core programs and representative highlights from this first year.

Table 5: IGNITE Program Outcomes and Highlights from Year 1 of Operation (2023–2024)

Program	Focus	Year 1 Outcomes
Creativity Program	Interdisciplinary creative skill development	Five artist-led workshops with 27 average attendees; social project addressing local waste; informed faculty research on creativity
Immersion Program	Industry engagement and experiential exposure	Four startup site visits for 40 students; established partnerships with 10 companies; hosted resume workshops
Innovation Competency Development	Skill development and tracking	Partnership with undergraduate research office; five first-year honors researchers conducted a literature review and 19 interviews; evaluation of potential platforms to support skill development tracking.
Innovation Fellows	Multidisciplinary, team-based innovation	Four startup-sponsored projects were completed; 20 students participated across engineering, business, liberal arts, and medicine.

Seminar Series	Industry innovation in practice	Seventeen speakers hosted with a weekly average of 37 students; peak attendance reached room capacity at 77 attendees
Outreach	Community building and cross-campus engagement	Ideation Expo hosted for 42 students; year-end celebration with 60 attendees; sustained social platform engagement
Spark Program	Student startup incubation and venture support	Initial framework developed; opening of dedicated startup space in Spring 2024; 10 student teams actively engaged by year's end.
Innovation Mentors	Near-peer mentoring and instructional support	Five mentors supported nine courses; hosted office hours in startup space; developed training materials for future leaders

In the Spring semester, IGNITE launched a general body to broaden access beyond paid leadership roles. This group held four meetings and 17 workshops aimed at community-building. While interest was evident, participation levels were lower than anticipated. This highlighted the challenge of launching new student organizations mid-year when extracurricular commitments are already established.

Following the opening of the student incubator in Spring 2024, coordinators and mentors held regular office hours in the facility. This provided consistent, peer-led support and established the space as an accessible entry point for student ideas. While this increased visibility, it surfaced operational challenges regarding the tracking of student interactions and balancing open access with intentional engagement. Overall, Year 1 demonstrated that IGNITE could successfully activate a multi-program ecosystem at scale while revealing the need for stronger leadership continuity and accountability structures.

5.1.2 Year 1 Challenges and Lessons Learned

The first year of IGNITE demonstrated that a peer-led innovation ecosystem could be implemented at-scale. However, it also revealed structural, organizational, and cultural challenges that informed subsequent iterations. Several overarching lessons emerged.

Overarching Lessons Learned

- **Timing and onboarding matter.** Although student leader applications opened in August, many coordinators were not fully onboard until September. This compressed the fall semester and delayed meaningful program development. The lag between hiring and execution limited what could be accomplished in the first term and created early pressure on student leaders.
- **Program development outpaced community development.** Year 1 prioritized launching multiple programs simultaneously which led to high activity levels but a weaker sense of organizational identity. Students often engaged with individual events without identifying with IGNITE as a unified initiative. This reinforced the importance of building a student community in parallel with program development.
- **Student leadership requires clear structure and authority.** While student autonomy was a core goal, unclear hierarchies occasionally undermined peer leadership. In several cases, students bypassed coordinators to seek guidance directly from faculty. This highlighted the need for clearer role definitions and visible faculty support of student authority.
- **Ambiguity is not inherently empowering.** Many student leaders struggled to distinguish long-term goals from short-term tasks. Coordinators often focused on daily execution

without articulating broader objectives. While a weekly reporting system improved visibility, the absence of formal performance frameworks limited accountability.
- **Sustainability requires intentional leadership pipelines.** By the end of the year, most student leaders were graduating, leaving only two returning members. This revealed the need to intentionally develop future leaders through a pipeline rather than assuming continuity.

Program-Specific Lessons Learned

- **Creativity Program:** Students struggled to connect creativity to engineering practice. Artist-led workshops were successful individually but attracted different subsets of students each time, which limited long-term engagement.
- **Innovation Competency Development:** This program proved too large in scope for a single student coordinator. When the coordinator stepped down, the program was restructured as a course-based research project to align better with faculty oversight.
- **Innovation Fellows:** The transition to student-led oversight surfaced communication challenges. Students occasionally bypassed the coordinator in favor of faculty, underscoring the need for stronger alignment between faculty and student leaders.
- **Immersion Program:** Coordinators with prior internship experience enabled a smoother launch. However, logistical challenges related to travel and company engagement proved more complex than anticipated.
- **Outreach:** Responsibilities were too broad for a single coordinator and often shifted to the student director. This led to the realization that outreach should be distributed across multiple roles in future iterations.
- **Spark Program:** Development progressed slowly without consistent accountability. Performance concerns required increased faculty intervention, reinforcing the importance of treating student leadership roles as professional commitments.
- **Innovation Mentors:** Mentors brought valuable continuity from prior years but required clearer integration into the leadership structure to balance classroom support with organizational duties.

5.2 Year 2: Transition, Expansion, and Organizational Recalibration (2024–2025)

The second year of IGNITE represented a transition from pilot validation to organizational scaling. While Year 1 focused on whether a student-led innovation ecosystem could function, Year 2 tested its sustainability through leadership turnover and increased institutional complexity. Because of limited returning leadership and the introduction of several new initiatives, much of this year served as a recalibration phase rather than a linear continuation.

5.2.1 Year 2 Results

During Year 2, IGNITE expanded its activity, reach, and organizational footprint. The initiative generated 1,824 student engagements across 73 unique offerings, reaching 844 unique students. A team of 15 paid student leaders supported nine experiential programs in collaboration with 30 alumni and industry partners.

Programmatically, Year 2 was defined by refinement and the evolution of isolated offerings into a cohesive portfolio. Key developments included:

- **Accelerator Transition:** Innovation Fellows shifted from a project-based program to a structured student startup accelerator featuring micro-grants and defined milestones.

- **Startup Success:** Venture growth within the Spark incubator and Innovation Fellows led to significant student success in university and local business plan competitions.
- **Industry Integration:** The launch of an industry-sponsored scholars program piloted a design-thinking framework for multidisciplinary teams solving real-world challenges.
- **Capacity Growth:** Immersion programming expanded to include internships, co-ops, and research placements, building on earlier virtual efforts.
- **Strategic Outreach:** Marketing and recruitment functions were separated to improve campus engagement and organizational identity.

These developments proved that the peer-led model could support both broad campus-wide engagement and deep venture support. To highlight how programs evolved in response to institutional constraints, Table 6 summarizes the resulting structural adjustments.

Table 6: Program Adaptations and Structural Adjustments in Year 2

Program	Year 2 Focus or Change	Constraint Encountered	Resulting Structural Adjustment
Director	Organizational leadership including oversight of coordinators, alumni engagement, and internal governance structures such as bylaws and probation systems	Director lacked prior year involvement leading to a steep learning curve. This gap plus coordinator turnover and limited documentation forced a reactive management style	Identified the need for earlier onboarding and clearer role definitions. This led to Year 3 efforts to formalize leadership transitions and balance operations with planning
Creativity	Shift toward high-visibility events emphasizing peer-to-peer learning	Difficulty engaging engineers due to abstract framing of creativity	Emphasized interdisciplinary showcases to demonstrate relevance through student examples
Innovation Fellows	Operation as a student startup accelerator with funding and milestones	Increased need for authority, consistency, and mentor alignment as venture stakes increased	Formalized accelerator milestones, mentor expectations, and faculty oversight
Immersion	Expansion of internships, co-ops, and industry engagement	Leadership turnover at a key partner incubator disrupted planned opportunities	Diversified partner base and reduced reliance on single external organizations
Industry Scholars	Launch of an industry-sponsored design thinking pilot	Complexity in managing sponsor engagement and administrative workflows	Treated as a proof-of-concept to inform future sponsor agreements
Seminar Series	Continued weekly delivery with industry leaders	Minimal constraint due to established format	Maintained as a stable anchor program requiring limited iteration
Outreach	Focus shifted toward growing the student body and strengthening organizational identity	Programs appeared siloed to students, limiting buy-in to the broader mission	Reframed outreach around the overarching mission and cross-program visibility
Spark	Expansion of incubator participation and opening of shared workspace	Ambiguity in shared coordinator responsibilities and accountability	Split into Spark Outreach (recruitment) and Spark Operations (venture support)
Innovation Mentors	Expanded classroom and incubator support	Unclear positioning relative to coordinators and leadership roles	Redefined mentor roles as subject-matter experts within the leadership structure

5.2.2 Year 1 Challenges and Lessons Learned

Year 2 functioned as a second pilot phase rather than a straightforward continuation of Year 1. While the organizational structure was established, the combination of leadership turnover and limited documentation required significant re-learning. These challenges surfaced critical lessons regarding student leadership capacity and the necessary balance between autonomy and oversight.

Overarching Lessons Learned

- **Institutional memory requires robust documentation.** Documentation functioned on an honor system with inconsistent adoption across programs. This limitation became evident when coordinators stepped down mid-semester, forcing successors to reconstruct processes independently. This revealed that student autonomy must be paired with clear operational guardrails and standardized knowledge transfer.
- **Leadership transitions necessitate proactive planning.** With only two returning coordinators and a new Student Director without prior across-the-board involvement, knowledge gaps appeared early. Leadership efforts became reactive, focusing on personnel transitions and operational issues rather than strategic growth. This reinforced the need for earlier onboarding and clearer role delineation.
- **Accountability structures must be formalized.** The introduction of internal governance mechanisms, including bylaws and a strike-and-probation system, improved accountability. However, the year proved that without these formal structures, student leaders often struggle to maintain professional commitments and meet project milestones.
- **Goal-setting is a learned professional skill.** Student leaders frequently conflated high-level strategic goals with daily administrative tasks. Many coordinators, accustomed to traditional academic metrics, struggled with open-ended objectives. This highlighted the necessity of explicit training in milestone development and performance evaluation.
- **Community identity is distinct from program participation.** While effort was devoted to individual programs, students often perceived these offerings as siloed. This made organization-wide identity difficult to achieve and informed the need to strengthen cross-program communication and shared organizational branding.

Program-Specific Lessons Learned

- **Creativity Program:** The abstract nature of creativity continued to hinder student buy-in. This led to a strategic shift toward university-wide, cross-disciplinary showcases that allowed engineering students to engage through visible, peer-led examples.
- **Innovation Competency Development:** This program proved too ambitious for a single coordinator. It was successfully restructured as a hybrid model combining a paid student lead with undergraduate researchers, returning the initiative to its research-driven roots.
- **Innovation Fellows:** Project-based oversight surfaced authority challenges. Students occasionally bypassed student leads in favor of faculty, underscoring the need for stronger visible alignment between faculty and student leadership.
- **Immersion Program:** While coordinators with prior experience enabled a smoother launch, the program remained vulnerable to external organizational shifts. Leadership changes within industry partners disrupted pipelines, highlighting the need for a diversified partner base.
- **Spark Program:** Shared coordinator responsibilities led to ambiguity in decision-making. The program was split into Spark Outreach and Spark Operations to clarify roles across recruitment, milestone tracking, and venture support.

- **Innovation Mentors:** Mentors provided valuable continuity but required better integration into the formal IGNITE leadership structure to balance their classroom support roles with broader organizational responsibilities.

5.3 Year 3: Operational Stability and Community Growth (2025–2026)

Year 3 represents a transition from experimentation and scale-building toward strategic refinement and sustainability. While prior years focused on determining what was feasible and how student leadership could function at-scale, Year 3 emphasized prioritization, structural clarity, and deeper integration with external partners. Several programs were intentionally sunset or restructured, while others expanded significantly in scope and impact.

5.3.1 Year 3 Results Thus Far

During the 2025–2026 academic year, IGNITE transitioned from a phase of recalibration to one of operational stability and community growth. The initiative hosted 31 unique events and promoted or co-hosted 48 total programs, resulting in 1,005 recorded engagements and reaching 685 unique students. Average attendance stabilized at 33 students per event, indicating improved consistency and predictability in student engagement compared to prior years.

Programmatically, Year 3 was characterized by greater stability, stronger external alignment, and clearer student pathways. Notably, 27 percent of participants attended more than one event, signaling progress toward building a sustained community rather than isolated program participation. Digital engagement also scaled significantly, with Slack membership reaching 696 students and Instagram followers exceeding 1,100, reflecting improved branding and earlier planning processes.

Key program-level developments included:

- **Immersion and Industry Alignment:** The Immersion program expanded its reach through partnerships with regional professional organizations and incubators. This reduced the reliance on internally planned events while increasing student exposure to the broader innovation ecosystem. Two new industry partnerships were launched, including a fall industry hackathon where winning teams received guaranteed internship interviews.
- **Creativity and Peer-Led Learning:** The Creativity program scaled its flagship Innovation Summit into a two-day event. This increased cross-disciplinary visibility and emphasized peer-led creative learning across engineering, arts, and business.
- **Stable Programming and Outreach:** The seminar series continued to operate as a reliable anchor, with modest expansion into deeper engagement formats such as extended speaker visits and small-group interactions. Outreach and communications were further refined to ensure consistent messaging across campus.
- **Venture Outcomes and Scaling:** Spark and Innovation Fellows produced strong venture outcomes, with multiple student teams advancing in regional pitch competitions and securing external funding and accelerator placements. This demonstrated that the peer-led model could effectively support high-stakes entrepreneurial development.

Collectively, these results suggest that Year 3 successfully institutionalized the lessons from previous years. The organization moved beyond the reactive management of its pilot phases to focus on intentional community growth and sustainable industry partnerships.

5.3.2 Year 3 Challenges and Lessons Learned

Despite measurable progress, Year 3 surfaced important structural and leadership challenges that informed ongoing iteration. These experiences provided deeper insight into the long-term sustainability of the peer-led model.

Overarching Lessons Learned

- **Alignment of ambition with institutional bandwidth.** A key lesson was the intentional sunsetting of the Innovation Competency Development program as a standalone initiative. It became evident that maintaining a formal certification system required sustained faculty oversight beyond the institute's capacity. By redistributing competency modules into other programs, the institute learned to prioritize high-impact activities that fit within available bandwidth.
- **Managing peer-management tensions.** While increased coordinator retention reduced onboarding friction, it introduced new tensions as former coordinators transitioned into senior leadership roles. This evolution underscored the need for clearer authority structures and formalized succession planning within a peer-led organization to manage internal dynamics effectively.
- **Refinement of the Student Director model.** The Student Director role improved documentation and knowledge transfer because the director had prior experience as a coordinator. However, the role remained heavily reactive due to competing program demands. This prompted exploration of graduate-level leadership models to provide greater continuity and summer preparation capacity.
- **Strategic goal-setting vs. operational tasks.** Year 3 reinforced that students often struggle to distinguish strategic objectives from day-to-day execution. While treating programs like startups provided valuable experiential learning, it also required more structured goal-setting frameworks and feedback loops to prevent student burnout and organizational misalignment.
- **Market-responsive outreach.** The organization shifted away from formal general body meetings after market research revealed that networking and showcase-style events were more effective. Students tended to perceive programs as siloed, and shorter, high-impact events proved better for building a unified organizational identity.

Program-Specific Lessons Learned

- **Immersion Program:** Delays related to industry partner leadership turnover persisted. This reinforced the need to continuously recalibrate expectations around sponsor engagement and build a more resilient partner network.
- **Creativity Program:** Despite scaling the Innovation Summit, consistent student buy-in remained a challenge. This reinforced that creativity remains difficult for engineering students to prioritize without extremely strong contextual framing and industry-linked relevance.
- **Spark and Innovation Fellows:** Both programs experienced coordinator turnover that necessitated increased faculty involvement. This turnover reinforced the critical need for robust documentation and standardized operating procedures to maintain venture momentum.
- **Outreach and Communications:** The transition toward showcase-style events improved student engagement. This shift demonstrated that a decentralized community model often

works better for large, multidisciplinary student populations than a rigid, centralized general body structure.

5.4 Synthesis of the Three-Year Evolution

The three-year rollout of the IGNITE initiative demonstrates a non-linear path toward institutionalizing a peer-led innovation ecosystem. As shown in Table 7, the initiative moved from a fragmented set of pilots to a high-density engagement model. While Year 1 established that student-led programming was feasible, Year 2 and Year 3 proved that the model's growth is driven by a combination of structural scaffolding and the internal motivation of the student leaders.

Table 7: IGNITE Growth and Engagement Metrics (2023–2026)

Metric	Year 1: Pilot	Year 2: Expansion	Year 3: Stability*
Total recorded engagements	~600	1,824	1,005
Unique students reached	~350	844	685
Unique events hosted	52	73	48
Avg. attendance per event	12	25	33
Repeat attendance rate	N/A	18%	27%
Digital community (Slack)	~150	410	696

**Note: Year 3 data represent a single-semester reporting period.*

The Critical Role of Mission Buy-in: A central finding across this evolution is that the quantitative success of the model is deeply dependent on the qualitative buy-in of student leaders. While structural scaffolding provides the framework for operations, the personal commitment of students to the mission serves as the primary driver of programmatic growth. In years and across individual programs where coordinators were highly aligned with the organizational culture, average attendance and repeat participation saw their most significant gains.

Balancing Scaffolding and Autonomy: Conversely, periods of lower buy-in or high turnover immediately increased the burden on faculty oversight and stagnated engagement metrics. Ultimately, the success of the model is predicated on a combination of hidden administrative infrastructure and the intentional cultivation of a shared mission that students feel empowered to lead. This synthesis of "Research to Reality" suggests that the human element is just as critical as the institutional structure in sustaining a campus-wide innovation culture.

6. Discussion and Implications

The three-year implementation of the IGNITE initiative suggests that the longevity of student-led initiatives is closely tied to the quality of the administrative infrastructure. Because student leadership naturally follows a four-year cycle, the primary challenge for such programs is the preservation of institutional knowledge and organizational capacity [31]. The move toward standardized operating procedures and centralized documentation in Year 3 served as a stabilizing force. This allowed the organization to maintain momentum despite coordinator turnover. For other institutions, these findings imply that a student-led model is most effective when supported by a permanent faculty-staff scaffolding that provides continuity and logistical oversight [32].

A significant operational hurdle identified during this transition is the disruption caused by summer breaks. The lack of a consistent presence during the summer months often leads to a loss of momentum and results in delayed impact during the subsequent fall semester. Overcoming this seasonal inertia requires a shift from reactive planning to proactive summer preparation. By utilizing the summer months for strategic alignment and logistical setup, student leaders can ensure that programming begins immediately upon the start of the academic year. This continuity is vital for maintaining student interest and ensuring that the organization remains a reliable fixture of the campus ecosystem.

Data from the project also confirms that students are often more likely to engage with innovation programming when it is facilitated by their peers. This peer-to-peer approach lowers the perceived barrier to participation and makes innovation feel like an accessible social activity rather than a high-stakes academic requirement [33]. By utilizing near-peer coordinators, the institute reached a broader cross-section of the engineering student body. The resulting increase in creative confidence suggests that near-peer mentoring is an essential entry point for diversifying innovation engagement [34].

The challenges faced by student coordinators served as a practical laboratory for professional skill development [35]. These roles provided a T-shaped educational experience, a model where students supplement their deep technical engineering knowledge (the vertical bar of the T) with the broad horizontal competencies required for professional success. By managing budgets, coordinating with industry partners, and resolving internal team dynamics, coordinators developed transversal skills in project management and strategic communication [36]. This combination ensures that students are not only technical specialists but also capable collaborators who can navigate the complexities of a professional organization [37].

7. Recommendations for Practitioners

The following recommendations are derived from the transition of the IGNITE initiative from a research concept to a campus-wide operation. These are intended for administrators and educators seeking to build similar student-led structures.

Governance and Process

1. **Develop Standard Operating Procedures (SOPs):** Do not rely on verbal tradition. Document recurring tasks—such as speaker logistics, room reservations, and reimbursement workflows. This allows coordinators to focus on program quality rather than administrative troubleshooting.
2. **Prioritize Knowledge Transfer:** Require outgoing coordinators to create "transition portfolios." In a university environment, institutional memory is at risk every graduation cycle; formal documentation ensures the next cohort does not have to restart from zero.
3. **Formalize Accountability Systems:** Student autonomy functions best within a professional structure. Clear bylaws, weekly reporting requirements, and defined role expectations help treat leadership positions as professional development opportunities rather than casual volunteer roles.

Leadership and Culture

4. **Prioritize Mission Buy-In over Skills:** When recruiting coordinators, prioritize students who understand and support the initiative's broader goals. Technical skills (e.g., social

media or event management) can be taught, but commitment to the initiative’s core objectives is harder to cultivate.

5. **Establish a Leadership Pipeline:** Avoid a "senior-only" leadership team. Recruit younger students into junior roles early to ensure a steady supply of experienced candidates for senior director or lead coordinator positions in future years.
6. **Bridge the Faculty-Student Authority Gap:** Faculty and staff must visibly back the decisions of student leaders. If students feel they can bypass their peer coordinators to get a "final word" from faculty, the peer-led management structure is undermined.

Strategic Implementation

7. **Lower the Barrier to Entry:** Use accessible language. Frame innovation as a multidisciplinary social activity to reach students who may not yet identify as "entrepreneurs" or "innovators."
8. **Diversify Industry Partnerships:** Avoid over-reliance on a single industry partner or donor. Build a diverse network of alumni and professional sponsors to ensure the initiative remains resilient even if an external partner has a change in leadership or funding.
9. **Focus on Repeat Engagement:** While high attendance numbers are useful for reporting, the "repeat participation" rate is a better indicator of community health. Aim for a "sticky" ecosystem where students return for multiple programs across different years.
10. **Iterate and Pivot Often:** Treat the organization like a live project. Be willing to restructure or sunset programs that do not see consistent student engagement and redistribute those resources into higher-growth areas.

8. Conclusion: From Research to Reality

The evolution of the IGNITE initiative represents the successful transition of a student-led research proposal into a functional, campus-wide reality. Over three years, the initiative moved from a fragmented set of pilot programs to an ecosystem that bridges the gap between academic theory and professional practice. The transition from 2020 research to 2026 reality highlights that while student passion is the engine of the initiative, institutional documentation and faculty-led guardrails are the tracks that keep it moving forward.

The "Research to Reality" trajectory demonstrates that students are not merely passive consumers of innovation education but can be active architects of the institutional culture. By empowering students to lead, the college of engineering has created a scalable mechanism for fostering an innovative mindset across a diverse population. Ultimately, the success of the peer-led model proves that when students are given the authority to lead and structural support to succeed, they can transform the landscape of engineering education from the bottom up.

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