Moving Toward Convergence Learning while Addressing Institutional Barriers to Educational Innovation

Abstract

While initiatives have been tried to enhance undergraduate education, we must do more to culturally transform universities to support transdisciplinary teaching practices in an effort to better prepare students for pushing boundaries in new/bigger ways. This is important as humanity's problems are not typically discipline specific and require the convergence of competencies to lead to innovative thinking across fields of study. But, the rigidity of academic units/disciplines make moving toward transdisciplinary learning around converging topics, such as human-technology interactions or harnessing the data revolution, organizationally difficult. It then seems necessary to develop a novel structure within higher education that enables faculty/students/staff to more easily converge, accelerate bold new teaching practices, and increase access to learning skills that are limited across academic boundaries. Therefore, this innovation/ideation session will include practical models for convergence learning that spans engineering/technology, liberal arts, and business disciplines as well as concepts for advancing educational innovations.

Background and Significance

Higher education continues to be siloed which makes the authentic teaching of converging topics, such as innovation or data science, difficult. Topics of convergence can be viewed as complex contexts that center around societal needs and require the integration of knowledge, practices, and expertise from different disciplines to explore. These topics then require a new way of thinking when it comes to the structure of higher education to support the implementation of transdisciplinary learning. Transdisciplinary learning, which focuses on supporting one to think across, beyond, and through the academic disciplines to encompass all types of knowledge about an idea, issue, or subject (Ertas et al. 2003), is problematic in undergraduate programs. For example, cross-disciplinary approaches to co-teaching are instantly rejected by the university systems that have been built upon longstanding traditions. This then limits innovations to teaching and also hinders the sharing of important practices across disciplines. Accordingly, the goal of our project was to develop/implement/test a transdisciplinary model focused on democratizing the practice of innovation (involving co-teaching and co-learning from faculty and students across different academic units/colleges spanning multiple semesters). A key focus of this was to identify, as well as uncover ways to address, the institutional barriers toward creating such a cross-college model at a research-intensive public university. The data collected through this research project have highlighted the potential value of cross-college, or transdisciplinary approaches to teaching, specifically regarding the practices of innovation across liberal arts, engineering technology, and business management. But it was found that making headway for broader changes to undergraduate education in this transdisciplinary manner was even more challenging than expected. This challenge was evidenced in the barriers identified related to scheduling courses across academic units, course ownership, faculty credit, and the academic traditions from individual units regarding curriculum approvals, course types, and grading policies. The academic rigidity of individual disciplines/colleges/departments has made adapting to new collaborative teaching ideas daunting. While disciplinary expertise is necessary and one of higher education's strengths, the structures that come along with this can prevent

modifications/improvements to the roles of academic units/disciplines that could better prepare students for the future of both work and learning. The balancing of disciplinary structure with transdisciplinary approaches to solving problems and learning is a challenge that must be continually addressed. These institutional challenges will only continue to limit universities seeking toward scaling transdisciplinary programs and experimenting with novel ways to enhance the value of higher education for students and society. Accordingly, it seems necessary to move toward a more novel structure within higher education that enables faculty/students/staff to more easily converge, accelerate bold new teaching practices, and increase access to learning skills that are limited across academic boundaries. This is where our project connects with the literature related to Communities of Transformation (CoT). As a result, this innovation/ideation session will leverage the project results and the CoT literature to introduce new ideas for a university ecosystem necessary to bridge an academic units facilitate the adoption of new educational structures.

Moving Toward Convergence Learning: Addressing Institutional Barriers to Educational Innovation

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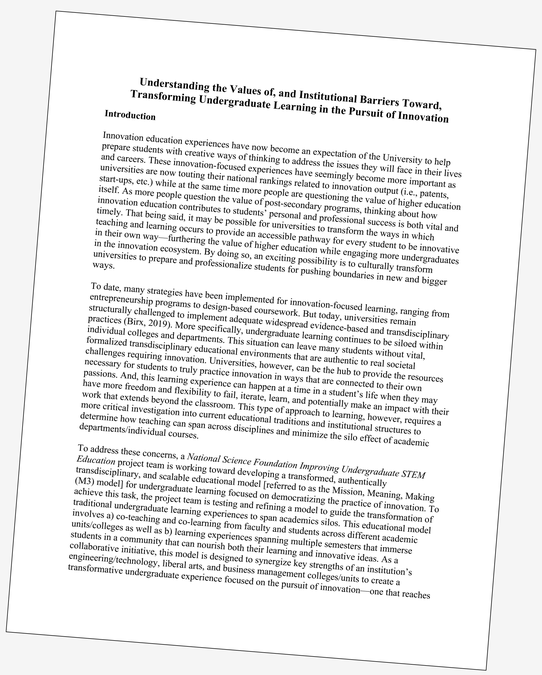
WHAT ARE WE DOING?

Mission, Meaning, Making

WANT TO LEARN MORE?



Understanding the Values of, and Institutional Barriers Toward, Transforming Undergraduate Learning in the Pursuit of Innovation

Introduction

Innovation education experiences have now become an expectation of the University to help prepare students with creative ways of thinking to address the issues they will face in their lives and careers. These innovation-focused experiences have seemingly become more important as universities are now touting their national rankings related to innovation output (i.e., patents, start-ups, etc.) while at the same time more people are questioning the value of higher education itself. As more people question the value of post-secondary programs, thinking about how innovation education contributes to students' personal and professional success is both vital and timely. That being said, it may be possible for universities to transform the ways in which teaching and learning occurs to provide an accessible pathway for every student to be innovative in their own way—furthering the value of higher education while engaging more undergraduates in the innovation ecosystem. By doing so, an exciting possibility is to culturally transform universities to prepare and professionalize students for pushing boundaries in new and bigger ways.

To date, many strategies have been implemented for innovation-focused learning, ranging from entrepreneurship programs to design-based coursework. But today, universities remain structurally challenged to implement adequate widespread evidence-based and transdisciplinary practices (Birx, 2019). More specifically, undergraduate learning continues to be siloed within individual colleges and departments. This situation can leave many students without vital, formalized transdisciplinary educational environments that are authentic to real societal challenges requiring innovation. Universities, however, can be the hub to provide the resources necessary for students to truly practice innovation in ways that are connected to their own passions. And, this learning experience can happen at a time in a student's life when they may have more freedom and flexibility to fail, iterate, learn, and potentially make an impact with their work that extends beyond the classroom. This type of approach to learning, however, requires a more critical investigation into current educational traditions and institutional structures to determine how teaching can span across disciplines and minimize the silo effect of academic departments/individual courses.

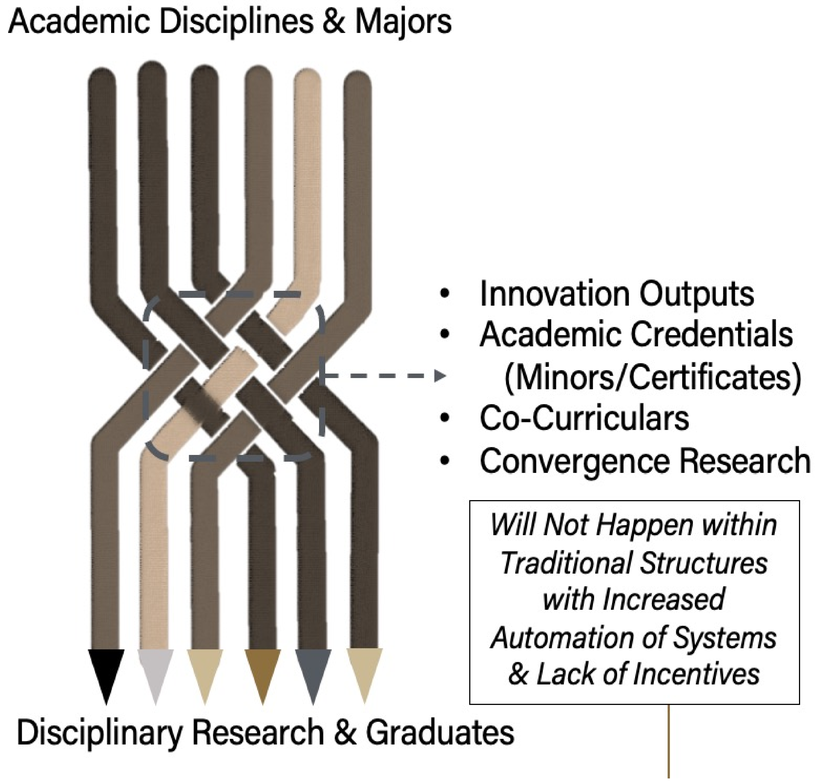
To address these concerns, a *National Science Foundation Improving Undergraduate STEM Education* project team is working toward developing a transformed, authentically transdisciplinary, and scalable educational model [referred to as the Mission, Meaning, Making (M3) model] for undergraduate learning focused on democratizing the practice of innovation. To achieve this task, the project team is testing and refining a model to guide the transformation of traditional undergraduate learning experiences to span academics silos. This educational model involves a) co-teaching and co-learning from faculty and students across different academic units/colleges as well as b) learning experiences spanning multiple semesters that immerse students in a community that can nourish both their learning and innovative ideas. As a collaborative initiative, this model is designed to synergize key strengths of an institution's engineering/technology, liberal arts, and business management colleges/units to create a transformative undergraduate experience focused on the pursuit of innovation—one that reaches

WHAT HAVE WE LEARNED?

Undergraduate learning **continues to be siloed** within individual colleges & departments - ***leaving many students without vital, formalized transdisciplinary educational environments that are authentic to real societal challenges requiring innovation.***

<u>Making headway for broader changes to undergraduate education in a transdisciplinary manner is extremely challenging</u> *(e.g., scheduling courses across academic units, course ownership, faculty credit, and the academic traditions from individual units regarding curriculum approvals, course types, and grading policies).*

Universities can, however, develop and implement new ways to teach innovation while addressing institutional barriers to bring authentic learning to the broader campus community and beyond.



WHAT CAN HAPPEN?

Approaches & Insights Toward:

- Democratizing Innovation
- Establishing Shared Practice & Discourse
- Value of higher Education?
- Rethinking Funding Models to Incentivize Departments
- Recognition/Value
- Novel Structure to Support Cross-Disciplinary Programs