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Progress on the Pathway to Instigating a Revolution of Additive Innovation



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vision

making our
revolution



We are focused on **empowering faculty to be agents of change** to expand project-based learning pedagogy throughout the mezzanine engineering fundamental courses and upper division concentration area disciplinary courses.

Attending to the larger **ecosystem of people and organizations** within which change happens and by using evidence-based methods, we seek to make **revolutionary advances** with our engineering program at ASU.



NEXUS: realizing mindsets

The NEXUS is to develop interventions that engage faculty to:

- **realize additive innovation mindset** to promote sharing
- **propagate culture of risk taking** and innovative culture

NEXUS activities such as our **faculty-led affinity groups** have been guided by our synthesis of evidence-based literature to develop a working set of best practices:



objectives

- 1 **characterize ecosystem:** establish foundation for enacting faculty change, impacting students stakeholders
- 2 **realize additive innovation and risk taking mindsets:** promote sharing, scaling, sustainability, & propagation of unique understandings within our community
- 3 **understand our culture & dynamics:** assess catalysts and barriers to establishing a culture that is risk seeking
- 4 **implement administrative structures:** support radical cultural change & remove perceived barriers that may inhibit innovation



research questions

How do **faculty development programs & administrative changes** influence faculty teaching practices?

What types of **administrative structures** lead to a **supportive ecosystem** to realize change?



What is the **culture of the school faculty**, and how does **culture evolve** in response to our RED activities?

What **influence** do changes have on **students' outcomes and experiences** in the classroom?

What are the **catalysts and barriers** faculty identify to **help or hinder changes** to teaching practices?

measuring risk taking



An instrument to measure **faculty pedagogical risk taking** was developed and is being validated. It uses an **Expectancy Value framework** to investigate faculty **attitudes and behaviors** around risks in their teaching practices.

tracing impact

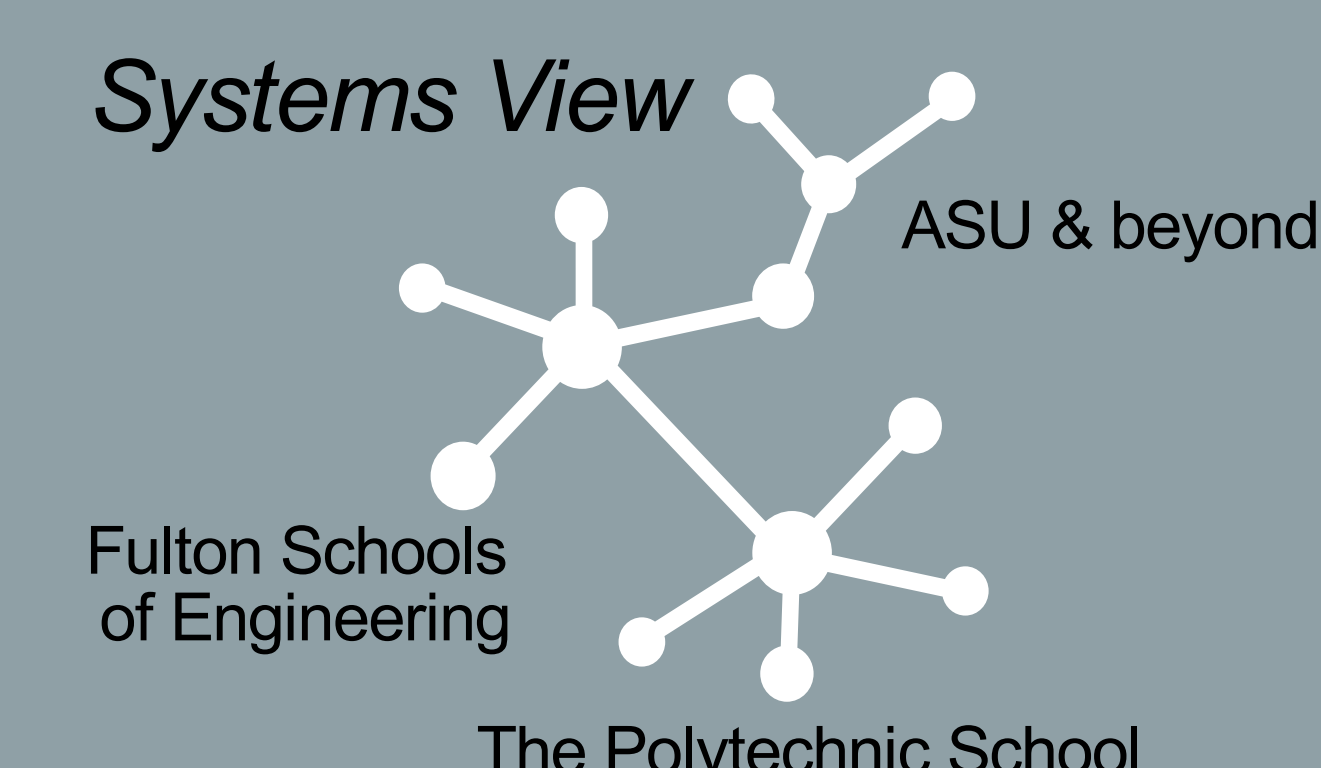


Exploring the impact of our research project **beyond our local context**. Nearly 20 other institutions requested and received our RED proposal. Our response read, in part, *"By sharing proposal, we are advancing 'additive innovation'."*

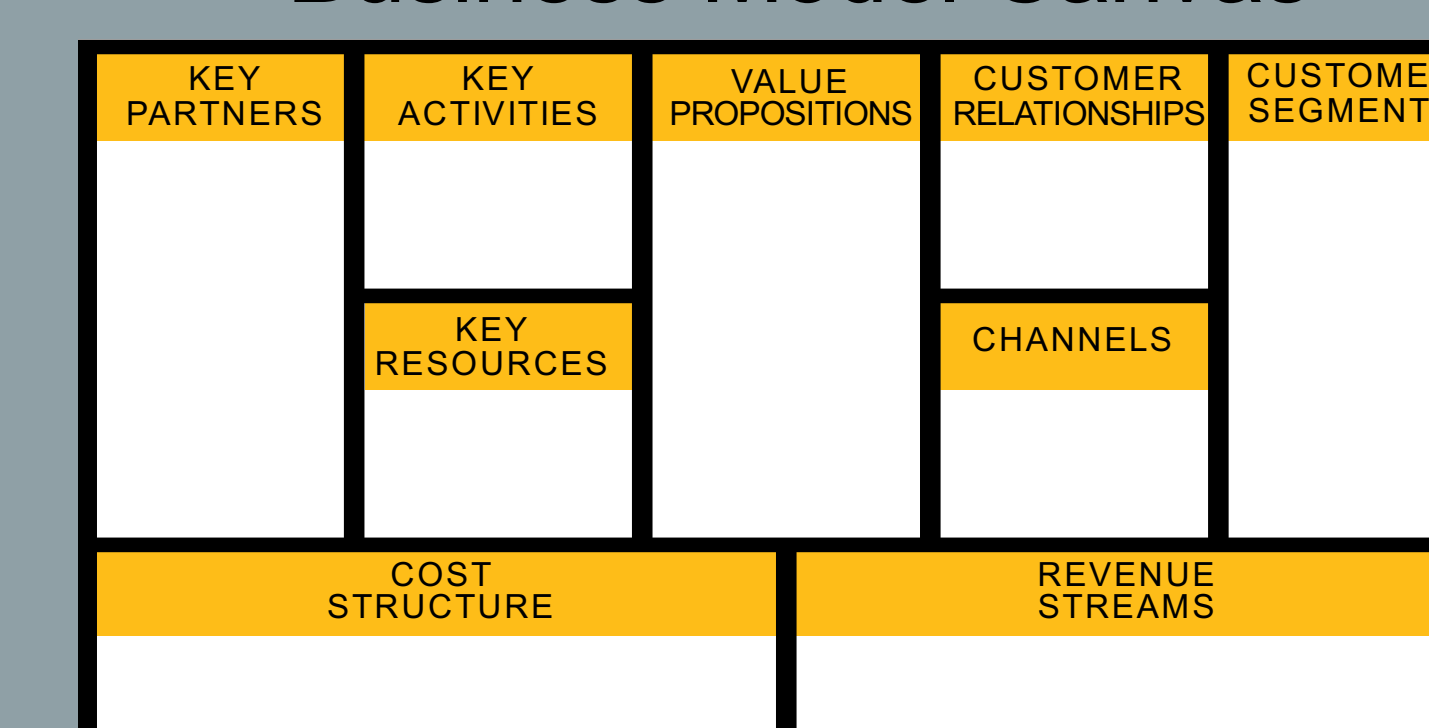
characterizing ecosystem

A **systems and entrepreneurial approach** is used to better understand the variables, inputs, outputs, and influencers of our ecosystem. We use methodology to capture customer segments and value propositions (Osterwalder & Pigneur, 2010)

Systems View



Business Model Canvas



framework for theory of change

Systems framework of influences on faculty and student beliefs & outcomes (adapted from McKenna et al., 2011; Terenzini & Reason, 2005)

faculty ecosystem

student ecosystem



to capture **additive innovation** within curriculum, outcomes, and beliefs in the larger **ecosystem**

capturing culture

Establishing an understanding of the program culture and dynamics is used to assess the catalysts and barriers to fostering a risk seeking culture. We are developing, piloting, and conducting **narrative interviews**.

making in the mezzanine

Characterizing our current fundamental courses through a lens of making in engineering will help understand the starting point for change and **build examples** from faculty that can be used to seed the culture of additive innovation.

related papers at ASEE



Monday

- 11:30am - 1:00pm – Room 155e ERM (M314C)
Social Dialogue on Diversity and Inclusion session
WIP: Progress of the RED Revolution (paper #1)

Wednesday

- 1:30pm - 3:00pm – Room 155b ERM (W414B)
Maker Communities & Authentic Problem Solving session
Exploring Making-based Pedagogy in Undergraduate Mezzanine-level Engineering Courses (paper #6)