

I-Corps™ for Learning: Sustaining and Scaling STEM Education Innovations for Impact

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Abstract— Currently there is a lot of emphasis on engineering education research and innovation. In 2014 NSF funded a pilot implementation of the NSF Innovation Corps for Learning (I-Corps™ L) and additional cohorts have been conducted and are planned. The 7-week I-Corps™ L program uses established strategies for start-ups to scale up and move teaching and learning innovations into broad practice. Participating teams go through a hypothesis-testing, scientific method of discovery to gather important insights and identify issues associated with their projects. Unfortunately, the reach of the program is limited as a maximum of 24 teams can participate in each course offering. This special session provides an opportunity for a broad cross-section of researchers and educators to gain exposure to the Lean Start Up approach and its applicability to STEM education ecosystem. The focus of the session is to introduce the core features of the Lean Start Up process: search for a sustainable and scalable model using the Business Model Canvas, Customer Discovery, and Agile Engineering (i.e., iterate and increment towards an appropriate ‘product’).

Keywords—*Innovation; Research Impact; Entrepreneurship*

I. INTRODUCTION

The Innovation Corps for Learning (I-Corps™ L) is an initiative of the National Science Foundation (NSF) and the American Society for Engineering Education (ASEE) in cooperation with the University of Minnesota, Arizona State University, Colorado State University, and Tufts University to apply the highly successful principles of NSF I-Corps™ towards a culture that will sustain and scale educational innovations. The NSF I-Corps™ program, on which I-Corps™ L is based, uses established strategies for start-ups to build entrepreneurial skills in the engineering and scientific communities that encourage mainstream application of emerging technologies. The overriding purposes of the 7-week I-Corps™ L course are to (1) provide a framework for each of the participating teams (typically 20 to 24 in a cohort) to assess the potential of their educational innovation for sustainability and scalability, and (2) foster an entrepreneurial mindset within the education community so that education products, programs, and services are designed and implemented in ways that promote widespread adoption.

The I-Corps™ L course has been through three iterations and planning is proceeding for the 4th course in July-August 2016. Participating teams go through a hypothesis-testing, scientific method of discovery to gather important insights and identify issues associated with their projects [1, 2]. The principal goal of I-Corps™ L is to foster an entrepreneurial mindset within the STEM education community and to impact the way innovations are designed and implemented.

The course has received increasingly strong ratings, and has had significant impacts on participants; for instance, between 72-82% of Principal Investigators say they will use I-Corps™ L concepts in their research and teaching, while 85%-90% of all participants will use I-Corps™ L in their careers. Based on these findings, the I-Corps™ L effort is a promising strategy for promoting the goal of increasing the value of STEM education research. Yet, its reach is limited as a maximum of 24 teams can participate in each course offering. This special session provides an opportunity for a broader cross-section of STEM educators to learn how the Lean Start Up approach can be applied to their immediate ecosystem.

II. SESSION DESCRIPTION

A. *Intended Audience*

This session is intended for researchers and educators who are interested in developing or strengthening an entrepreneurial or intrapreneurial mindset, and those who seek to sustain and scale the impact of their research. The session is also well suited for those intrigued by the I-Corps™ L program who want to get exposed to the course methodology before applying to participate in the 8-week program.

B. *Goals*

This session will provide participants with an opportunity to develop broad awareness and understanding of the value of an entrepreneurial mindset in sustaining and scaling STEM education innovations by:

- Raising awareness of the importance of sustainable scalability at the early stages of concept/product development

- Discussing and delineating the educational ecosystem surrounding any educational innovation
- Describing metrics for how to define scale, and what is necessary to sustain an educational innovation
- Identifying effective value propositions that align with specific customer segments

The focus of the session is to introduce the core features of the Lean Start Up process; namely, (1) search for a sustainable and scalable model using the Business Model Canvas, (2) Customer discovery, and (3) Agile engineering (i.e., iterate and increment towards an appropriate ‘product’).

C. Expected Outcomes

At the completion of this special session, it is anticipated that participants will be able to:

- Describe the Lean Start-Up process
- Identify key elements of the Business Model Canvas
- Clearly articulate what their innovation does and for whom

III. SESSION AGENDA

The session is structured as follows:

- **Introduction of session and facilitators** (5 minutes)
- **Brief introduction to the I-Corps™ for Learning program** (10 minutes)
- **The Lean Start-Up process** (25 minutes)
 - Business Model Canvas
 - Customer Discovery Process
 - Agile Engineering
- **Customer Segments (CS) and Value Propositions (VP) Exercise** (30 minutes)
 - CS and VP definitions and examples
 - Participants work individually on:
 - Describing their innovation in 1-2 sentences.
 - Identifying one VP for one CS
 - Participants work in pairs to provide feedback and revise their work
 - Pairs share their work with the group
- **Individuals share reflections with the large group, facilitators sum up the session and participants complete feedback forms** (10 minutes)

REFERENCES

- [1] American Society for Engineering Education. (2015, April 25). *I-Corps™ for Learning*. Available: <http://www.asee.org/i-corps/about>
- [2] R. C. Chavela Guerra, K. A. Smith, A. F. McKenna, C. Swan, R. Korte, S. Jordan, *et al.*, "Innovation Corps for Learning: Evidence-based Entrepreneurship™ to Improve (STEM) Education," presented at the ASEE/IEEE Frontiers in Education Conference, Madrid, Spain, 2014.