SMART START: Designing Impact-Driven Projects

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***Abstract*—The FIE conference has throughout its history emphasized work at the frontiers of education. This pre-conference workshop reflects a policy shift at the National Science Foundation, Department of Education, and Department of Defense, and others who have adopted the I-Corps™ model to extend the longevity and the value of initially funded projects. This cutting-edge workshop introduces the core features of the Lean Startup 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, program or service)—all of which have been identified as essential for maximizing the longevity and impact of research projects and products. SMART START resonates with the conference theme – Educating Our Future, Honoring Our History – honoring the tradition of excellence in engineering innovation while exploring a new paradigm that strives to build impact into earlier stages of research. The workshop will provide participants (a) a framework to think about how to discover customer requirements, (b) how to sustain and scale STEM education innovations, (c) exposure to the NSF I-Corps™ program, and (d) an opportunity to connect and engage with peers interested in the increasing the impact of their research.**

Keywords—impact; entrepreneurship; innovation

I. Introduction

SMART START is based on the Innovation Corps for Learning (I-Corps™ L), which 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, and Tufts University. I-Corps™ L applies the highly successful principles of NSF I-Corps™ to educational innovations. I-Corps™ L teaches the Lean Startup strategies used by successful startups to build entrepreneurial skills in the engineering and scientific communities.

The full iteration of I-Corps™ L is a 7-week course, admission to which is based on a competitive application process. The I-Corps™ L course has been through four iterations and the Smart Start authors, Smith, Chavela Guerra and Korte, have been involved throughout the process as Principal Investigator and Lead Instructor, Logistics Team Lead, and Core Teaching Team member, respectively. The full I-Corps™ L has received strong ratings from, and has had significant impacts on participants. Extensive quantitative and qualitative evaluation data suggest that participants develop an entrepreneurial mindset about their research. Beyond pursuing a startup venture, 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 faculty development--promoting the goal of increasing the impact of STEM education research.

SMART START is a means to promote the Lean Startup approach to a broader cross-section of the STEM education ecosystem. This workshop will be the first time that I-Corps™ L will be introduced in a half-day format. The primary goal is to awaken an entrepreneurial spirit among researchers, so they consider early in their projects the core needs their work will address across a broad spectrum of the population.

II. Workshop Description

A. Intended Audience

This workshop is designed for researchers and innovators who want to deepen the impact of a project, product, or program to improve STEM education at any level in both formal and informal settings.

B. Goals

The workshop will provide participants (a) a framework to think about how to discover customer requirements, (b) how to sustain and scale STEM education innovations, (c) exposure to the NSF I-Corps™ program, and (d) an opportunity to connect and engage with peers interested in the increasing the impact of their research

C. Expected Outcomes

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

- Describe the Lean Start-Up process
- Identify key elements of the Business Model Canvas and the Value Proposition Canvas
- Explain the attributes of a strong Value Proposition – Customer Segment alignment ("product-market fit")
- Clearly articulate what their innovation does and for whom
- Apply principles and strategies of effective interviewing for Customer Discovery
- Make an informed decision as to the suitability of applying for the NSF I-Corps™ or I-Corps™ L program

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III. Workshop Agenda

The workshop is structured as follows:

- Introduction of session and facilitators (5 min)
- Introduction to SMART START and I-Corps™ for Learning (15 min)
- Participant research-based innovations (30 min)
  - Individual reflection
  - Pair/share
  - Report out
- The Lean Startup process (20 min)
  - Business Model Canvas
  - Customer Discovery Process
  - Agile Engineering
- Customer Segments (CS) and Value Propositions (VP) Exercise (30 min)
  - 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
- Customer Discovery Exercise (30 min)
  - Overview and recommendations for effective interviews
  - Interview role-play
- Customer Discovery Practice (30 min)
- Next Steps (10 min)
- Workshop Wrap-up (10 min)

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