Integrating the Entrepreneurial Method in Post-secondary Agriculture Coursework

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Introduction

The world stands now less than 30 harvests away from the point at which we will need to sustainably feed over 9 billion people (Godfray et al., 2010). Students in today's agriculture classrooms will face this challenge in their lifetimes, and they will need to be prepared with a new and radical toolkit of skills and dispositions to equip them to tackle both global and local problems in partnership with others. Agriculture education leads the way in integrating the scientific method in basic and applied formats in multidisciplinary classrooms (Baker et al., 2015; McKim et al., 2017; Stubbs & Meyers, 2015). Another method, however, is needed that integrates the innovative, collaborative, and creative problem-solving approach the world's most successful entrepreneurs employ (Sarasvathy, 2008). This approach does not assume inheritance of land, wealth, or technology; it leverages the creativity and resourcefulness of the agriculture student in action with her or his community. The entrepreneurial method consists of four effectual principles that can be integrated into multidisciplinary contexts in the agriculture classroom to build the knowledge practices and dispositions in students to act to create the future (Sarasvathy & Venkataraman, 2011).

How it works

The author-created *Integrative Effectuative Framework for Entrepreneurial Educators* leveraged four frames identified by Saras Sarasvathy in her research that entrepreneurs use when faced with uncertainty to make decisions. These frames include: (1) "bird-in-the-hand": self-efficacy, (2) "affordable loss": risk management, (3) "crazy quilt": collaborative communication, and (4) "lemonade principle": opportunity identification. For each frame, several knowledge practices and learner dispositions were offered to clarify the threshold concept as a measurable trait. Sarasvathy describes how expert entrepreneurs act in an iterative process through the entrepreneurial method continually acquiring new means through partnerships with stakeholders and redirecting toward new ends (2008). She terms this process of the entrepreneurial method, *effectuation,* and juxtaposes it to the process of causation which has been the dominant theory within traditional agricultural business coursework. The difference between effectuation and causation is that "causation processes take a particular effect as given and focus on the means to get that effect", whereas, "effectuation processes take a set of means as given and focus on selecting between possible effects that can be created with the given set of means" (Sarasvathy, 2001). The liberation of this theoretical shift enables students of diverse backgrounds, knowledges, and inheritances to act in unique and collaborative ways to tackle problems as opposed to feeling constrained by limited resources facing an increasingly uncertain future.

A threshold framework was used to backward-design a series of agricultural economics, management, and agroecology courses situated in two-year agricultural programs in a community college to the entrepreneurial method. Threshold concepts were first identified by Meyer and Land (2003) as generative concepts accessed within and across disciplines to transform the internal view of the subject matter through critical experiences of the learners (Meyer et al., 2005). Using the threshold concepts of the entrepreneurial method provided the means to structure unit-level learning experiences around the knowledge practices the students would employ. The instructor designed learning activities to meet the original course learning competency but would use the aligned entrepreneurial knowledge practice in the process. Metacognitive learning logs were introduced to allow the student to practice reflection on how and what they were learning. Also, self-assessment knowledge surveys were used to allow the students to reflect on their growth in learning course competencies and acquisition of entrepreneurial disposition.

The four frames of the entrepreneurial method were practiced independently and in teams with a focus on active learning directed by the instructor around critical events such as an interview with a mentor or the proposal for a monitoring plan to a local producer as central learning foci. In addition, learning was demonstrated primarily through artifact-mediated results such as team concept maps or project management plans and budgets.

Results to date

In developing an assessment plan for this program-level redesign, three questions structured the inquiry. How does the integration of the entrepreneurial method into agricultural courses impact students: (1.) course learning outcome attainment, (2.) engagement in course content and course collaborative experience, and (3.) development of entrepreneurial effectuative knowledge practices and dispositions? Using course outcome knowledge surveys, students were provided the opportunity to rate their confidence and competence with course learning knowledge on a 3-point scale. These surveys were administered within the first week of the course and at the end of the semester with questions representing every learning competency for the course. These paired measures of competence and confidence have demonstrated to be effective and accurate ways to measure student knowledge and learning (Watson et al., 2019). The results of these surveys showed growth in learning across all learning outcome areas, as well as provided feedback in gap areas in course design where learning could be improved.

Students also completed surveys on their satisfaction and engagement with the collaborative learning experience in their course. The post-course redesign showed increases in some but not all measures of student collaboration compared to baseline. Also, students completed bi-semester team member collaborative feedback surveys. Qualitative evaluation of anonymous student responses to their team showed little resistance to increased team-based learning and positive and supportive feedback within teams.

Lastly, a survey assessing the student's self-assessment of confidence in the knowledge practices and dispositions directly linked to the author-created integrative effectuative framework traits is in the pilot phases of the application. In future years, the plan is to further validate this psychometric measure as an instrument to assess and promote metacognitive reflection on student learning and offer as a pre/post-test measure of effectuation in multiple agricultural courses.

Future plans

Currently, the practice of the entrepreneurial method falls within the confines of time and resource constraints of the course. Short-duration, community-directed projects have been used to offer opportunities for students to create and solve actual problems with community partners. The long-term goal, however, would be to extend the limits of these constraints to identify partners and projects that may be developed over the length of the two-year degree and beyond as opposed to ending at semester. Also, our program would like to offer further research into entrepreneurial intentions beyond school and support the returning young agripreneur in rural communities after graduation. We predict that establishing and nurturing entrepreneurial learning communities equipped with the toolkit of the entrepreneurial method will lead to more entrepreneurial ventures.

Costs

The innovation employed was an instructor-designed teaching and learning practice that integrated the entrepreneurial method in various courses. The program experienced zero explicit cost to the implementation of the practice and only marginal loss to alternative course content due to the efficiency of integration of the method.

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