Innovative Pedagogy for Employability: Design Thinking and the Development of Problem Solving and Teamwork Skills in an Agricultural Course

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Introduction

College students are seen as lacking the ability to problem solve and work on a team, which are the top two skills employers search for most in employes (National Association of Colleges and Employers, 2020; Wilkie, 2019). If universities want their students to graduate with these desired skills, it is exceedingly important that instructors are concerned with how they can design instruction and activities to fill this gap. Design thinking is a creative problem-solving process for approaching the discovery of solutions to real, wicked problems (Johansson-Sköldberg et al., 2013) and though it has been utilized in other disciplines and beneficial outcomes have been discovered in terms of knowledge, skills, and mindsets (McLaughlin et al., 2022; Wright & Wrigley, 2019), the use of design thinking in other areas like education and agriculture have been slow to adopt.

For this study, researchers gathered data from student reflections about their experience in using the design thinking for engaged learning (DTEL) process in an agricultural leadership course. Students worked in teams to solve wicked problems while being led through the DTEL process by their instructor. The purpose of the course was to give participants practical experience in issues that leaders face, as well as academic grounding for continued leadership skills development.

More research and empirical evidence for this pedagogy is needed to substantiate its benefits for faculty in these disciplines to consider its use in their courses. This study fits the American Association for Agricultural Education (AAAE, 2023) research value of nurturing positive youth development by examining student experiences in using a design thinking structure to identify outcomes related to problem solving and teamwork as a result of working through the DTEL model.

Conceptual Framework

DTEL is a model developed to provide structure for project-based collaborative learning (Donaldson & Smith, 2017). It integrates both a design thinking process and a set of cognitive strategies used by design experts. This model consists of five phases, broken down into ten stages (Jamal et al., 2021). There are ten designerly ways of knowing (cognitive strategies) including: 1) wicked problem framing and reframing, 2) abductive reasoning, 3) divergent and convergent thinking, 4) rapidly changing goals and constraints, 5) working from abstract to concrete, 6) constructing and co-constructing meanings, 7) contextualized thinking, 8) epistemic and relevance exploration, 9) reflection-in-action, and 10) cognitive, affective, and conative empathy (Donaldson & Smith, 2017; Jamal et al., 2021). The DTEL model emphasizes development of problem-solving skills, human-centered design skills, and collaboration skills.

A central focus of this model is the framing and reframing of wicked problems. When engaged learners participate in this process of design thinking it can lead to an increase in elaboration,

flexibility, and formulation of new ideas (Orthel, 2015). It also engages students in abductive reasoning as they continually develop "best guess" frames as they work within the tension between the co-evolving problem and solution.

Methodology

A basic qualitative study (Merriam, 2009) using qualitative content analysis (Bryman, 2012) of 19 student reflections was conducted to examine student experiences in using the DTEL process. Reflections were completed at the end of an agricultural leadership course as part of normal course activities, not for research purposes (Bryman, 2012). There were 23 students enrolled in the course; 19 of them completed the final reflection. Data were analyzed using the ethnographic content analysis approach (Bryman, 2012) where the reflections were reviewed and combined into units, then were compared and categorized into emergent themes used to represent student perceptions of their experience with the DTEL process. Trustworthiness was established through Lincoln and Guba's (1985) transferability, dependability, and confirmability factors.

Results

Two prominent themes that emerged from the analysis pertaining to problem solving and collaboration skills included: changes/outcomes from DTEL, and intentions for future use of design thinking. The theme of changes/outcomes from DTEL included students reflecting about how their mindsets have changed regarding problem solving. Student 1 said "before going through the course, I generally solved problems pretty simply. Fix whatever is causing the problem. However, after the course, I started to ask myself a series of different questions." Some students reflected on how the design thinking process allowed them to experience content from their other courses. This is what Student 4 had to say: "I have gone into depth about the thinking process in my comm classes before, but it was really cool to see it play out as long as it did and allow for us to really dive deep into design processes."

Students' intention for use of design thinking in the future included how they can use the process for problem solving in future careers. Student 4 reflected: "while I might not go through the process of sticky notes and low-fi prototyping for every problem I have, I think this process is a great method for problem solving within whatever job I have one day." Student 14 believed the skill of reflection in action would carry them into their "desired field in the legal career, especially in a courtroom setting."

Conclusions & Implications

The design thinking process is a structured process that helps students develop skills in problem solving and team collaboration. As leadership instructors look for ways to help their students develop skills that employers are searching for, integrating the design thinking process is a great option. Using the design thinking process to help students develop the skills current employers believe they are missing (Wilkie, 2019). From the information gained through this study, it appears that the DTEL model is one that students believe they can utilize in their future careers. Agricultural leadership educators should consider the use of the DTEL model in their courses that utilize teams.

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