

BUILDING ENTREPRENEURIAL SELF-EFFICACY THROUGH HONORS EDUCATION

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ABSTRACT

The honours college at East Carolina University (ECU) has recently revamped its first-year experience. The objective was to provide students a unique opportunity to build life skills rather than focus on narrow discipline-based content. Today's graduating students face an ever-changing, competitive job market. Technological advances are creating novel career opportunities. Specific skills for these future careers are, as a result, missing from university curricula. Exposure to entrepreneurship is viewed as a modality for encouraging the development of these skills. The primary purpose of this article was to assess the effectiveness of a first-year curriculum designed to enhance entrepreneurial skills. Results and directions for future curriculum development are discussed.

Keywords: Entrepreneurial Self-efficacy, First-year Experience, Honors Education, Lean LaunchPad®.

INTRODUCTION

Honors colleges and programs provide a unique testbed for pedagogical innovation. The combination of high-achieving students and engaged faculty has led to a wide range of cutting-edge curricula and student experiences (Sederberg, 2008). The honors college at East Carolina University (ECU) has recently revamped its first-year experience. The objective was to provide students a unique opportunity to build life skills rather than focus on narrow discipline-based content. Over the course of their first two semesters, students learn human-centered design principles (IDEO.org, 2015) and Lean LaunchPad® methodologies (Blank, 2010). The students are pushed to think innovatively both about their own life goals and self-identified “wicked” problems (Rittel & Webber, 1973). These problems are identified as difficult multi-factor societal problems without easy answers. These can exist at many scales from the campus environment to the entire globe. Within large teams, students use entrepreneurial tools to explore and prototype solutions all with the aim to instill an entrepreneurial mindset that will serve as a general resource for their future endeavors.

In order to evaluate the impact of this educational intervention, a pre-post design was utilized to assess the change in students over their first year relative to a wide range of factors, including entrepreneurial self-efficacy and their understanding of the role of universities within the larger community.

BACKGROUND

ECU is in rural eastern North Carolina with an enrollment of approximately 29,000 students. Almost 800 of these students are members of the honors college, which is located at the center of campus. The college accepts approximately 200 students each fall. All students who are accepted into the program as freshmen receive scholarships that range from nearly full cost of attendance to half in-state tuition.

During Academic year 2018-19, approximately 200 honors college students participated in a 2-semester educational intervention. Over the course of the five-semester-hour course sequence students were challenged to think about themselves and their personal goals using “*Designing Your Life: How to Build a Well-Lived, Joyful Life*” (Burnett & Evans, 2016; Byers, et al., 2016). Using this resource, the students were exposed to the idea of using design principles, the engineering method, and the use of experience and interviewing to think deeply about themselves and their personal goals. The exposure to these methods then dovetails with their learning the principles of human-centered design (IDEO.org, 2015) to think innovatively about larger problems. Student teams then used the methodologies of human-centered design to identify wicked problems (Rittel & Webber, 1973) and prototype solutions. A subset of promising projects was then selected, and larger teams coalesced around these projects. These teams used Lean LaunchPad® (Blank, 2010) methods including the Business Model Canvas® to explore the issues encompassed by the project and develop minimal viable products for testing (Blank, 2010). Throughout this process, students received “*relentlessly direct*” feedback (Beyers, Newell, Felter, & Blank, 2016) from instructors about their projects. Student teams were encouraged to learn from their failures and to pick themselves up and pivot to new strategies (Chaney et al., 2020).

Today’s graduating students face a job market, unlike any in human history. Technological advances are creating novel career opportunities whose skillsets are yet to be defined. Specific skills for these future careers are, as a result, missing from university curricula. The future of work will likely favor those that are able to adapt to an uncertain and ever-changing conditions (Rainie & Anderson, 2017). Exposure to entrepreneurship is viewed as a modality for encouraging the development of adaptability. The ability to develop novel skills as they become required in an ever-changing work environment requires an adaptable mind-set (Haynie et al., 2010).

According to the Network for Teaching Entrepreneurship (NFTE), an entrepreneurial mindset is comprised of skills and behaviors that include:

“Initiative and self-reliance; flexibility and adaptability; communication and collaboration; creativity and innovation; critical thinking and problem solving; future orientation; opportunity recognition; and comfort with risk” (NFTE, n.p., 2019).

Students that hone these skills and develop an entrepreneurial mindset are better able to create value and be innovative. This innovation is necessary for students that will need to navigate a job market that may be filled with complexity and uncertainty (Duval-Couetil, 2013). These professional skills and behaviors can be learned and honed. NFTE argues that these skills

and behaviors are also life skills. Enhancing these life skills was a key focus of the educational intervention deployed at ECU's honors college. The intervention was assessed for its effectiveness using the entrepreneurial self-efficacy scale. Entrepreneurial self-efficacy refers to an individual's belief in their capability to perform tasks and roles aimed at entrepreneurial outcomes (Newman et al., 2019).

Entrepreneurial Self-Efficacy

The current educational intervention incorporates aspects of entrepreneurship education, which involves a team-based approach for solving “*wicked problems*” identified by an interdisciplinary team of students (Rittel & Webber, 1973). Specifically, entrepreneurship education allows students to be exposed to contemporary challenges that entail creative and professional solutions, while also requiring individual and team efforts to contribute to the overall productivity of the group for solving problems. Students acquire critical business-related skills, knowledge, and competencies for applying entrepreneurial concepts and strategies for addressing real-world problems in an effective way. The usefulness of entrepreneurship education is not limited to business students. Prior research supports that entrepreneurship education better prepares students of all majors for a competitive job market that, at times, could be comprised of periods of self-employment (Duval-Couetil, 2013). Therefore, this type of education is perhaps more relevant for training current students than ever before as new types of jobs continue to emerge due to technological advances and societal changes (UNDP, 2018).

Intentions to engage in entrepreneurial action are influenced by an array of personal attributes, one being entrepreneurial self-efficacy (ESE). Research suggests this is an essential antecedent for the initiation of new venture ideas (Barbosa et al, 2007; McGee et al., 2009), and is a measure of an individuals' belief in their capability to successfully accomplish an entrepreneurial task, activity or new venture (McGee et al., 2009). Furthermore, ESE is thought to be enhanced by specific education and training, which could, in turn, elevate entrepreneurial action and the overall rate of entrepreneurial activities (Zhao et al., 2005; Florin et al., 2007; McGee et al., 2009).

To measure ESE, a 26-item instrument, consisting of six dimensions, was utilized. The subscales are tailored to the process of entrepreneurial action and consistent with Bandura's (1986) recommendation for domain-specific self-efficacy measures (De Noble et al., 1999). The scale specifically measures self-efficacy related to: 1) developing new product and market opportunities, 2) building an innovative environment, 3) initiating investor relationships, 4) defining core purpose, 5) coping with unexpected challenges, and 6) developing critical human resources. The subscales within the instrument are based on a 5-point Likert scale, with 1 indicating “*strongly disagree*” and 5 indicating “*strongly agree*” and data produced from the instrument have demonstrated sound psychometric properties (De Noble et al., 1999). Higher scores indicate a higher level of ESE within each self-efficacy domain.

University Specific Outcomes

Only 16% of the U.S. population believes that a college education prepares students “*very well*” for employment in today's economy. This, even though a college education clearly holds advantages for people in the workforce with college graduates (ages 25-32) making on average \$17,500 more annually than those with only high school diplomas (Pew Research center, 2016). Moreover, questioning the value of a college education for individuals extends to the

questioning of the role of higher education in society (Pew Research Center, 2017). Institutions of higher learning bear the responsibility to communicate the value and place of higher education in our society. Ways of conveying this information to students are critical as they can become life-long ambassadors for the value of colleges and college educations.

Higher education plays a significant role in serving the public good through supporting research with implications for improving society, educating future leaders to serve and engage with their communities, enhancing economic development, and assessing public policy (Kezar et al., 2005). Incorporating the university's civic and community engagement mission into the institution's educational goals can be a challenge; therefore, these elements of the institution might not be apparent to students (Matthews, 2012). In order to work toward the mutual interests of both the institution and students, it is important for faculty, staff, and students to be aware of the university specific outcomes related to all aspects of higher education at the institution (Quaye & Harper, 2015). Faculty implementing the current educational intervention incorporated the overall mission of regional transformation through economic development and community engagement of both the university and the honors college into the educational process in order to enhance students' understanding of these specific outcomes. Discussions of the role of the university happen naturally as a result of the fact that students are operating as emissaries of the university in engaging with the larger community in their quest to better understand the wicked problems they have identified and the possible solutions to those problems.

Measuring University Specific Outcomes

To measure specific outcomes related to community engagement of the university and the honors college, four items were modified from Matthews (2012). The items are based on a 5-point, Likert scale from "*strongly disagree*" to "*strongly agree*", and rates respondents' ability to 1) describe how community engagement related to the university's mission, 2) how community engagement is different from community service, and 3) how the honors college supports community and economic development. Higher scores indicate better student understanding of the university-specific outcomes.

METHODS

The study protocol was reviewed and approved by the Institutional Review Board (UMCIRB 18-001253), and participants were freshmen students enrolled in the required course sequence (HNRS 2000/3000) during the fall 2018 and spring 2019 semesters. In addition, comparison data were collected from freshmen students in a required undergraduate personal health course (HLTH 1000) during the fall 2018 semester, in order to assess baseline differences among honors students and the general student population. Study intervention components were incorporated into all HNRS 2000/3000 course sections (n=207), and the inclusion criteria required for enrollment involved being at least 18 years of age, enrolled in the HNRS 2000/3000 course sequence, and/or enrolled in HLTH 1000 personal health course for the baseline comparison group. Participants received course credit for engaging in the data collection procedures; however, participation was voluntary, in that students could opt-out of participating in the study at any time. These options were provided to students in the required informed consent information prior to study agreement.

Data Collection

A pretest-posttest design was employed to gather information from the enrolled participants on the impact the educational intervention had on student competencies related to entrepreneurship self-efficacy and university-specific outcomes. Data were collected from enrolled honors students at baseline in fall 2018 and again at the end of the spring 2019 semester. Additionally, cross-sectional data were collected from students enrolled in the comparison group (fall 2018) on the same measures to compare differences at baseline between the honors students and a representative sample of students from the general, college freshmen population. Specifically, pertinent information on six entrepreneurial self-efficacy dimensions and university-specific outcomes were assessed using 30 items on a larger survey administered via Qualtrics®, online survey software, which provides secure responses to items.

Consent information was provided on the first page of the survey, once the link was opened on students' personal phones and/or laptops. The consent information provided participants with all aspects of the research study, and their rights as potential participants. Students were assured that their participation was voluntary and there was no expectation they participate in the study. Additionally, the responses were not tied to names or student IDs, as students were given a unique ID number to input into the survey system for matching pretest and posttest data. Students were provided the survey link in class and via email to their university-administered email account. The survey did not collect any identifying information and respondents were informed that their decision to complete or not complete the survey would not impact their status or relationship to the university and/or their class instructor(s); students could opt out with no penalty.

Measures

To measure entrepreneurial self-efficacy, a 23-item scale, consisting of six subscales, was used. Collectively, the scale measured:

1. Developing new product and market opportunities (seven items),
2. Building an innovative environment (four items),
3. Initiating investor relationships (three items),
4. Defining core purpose (three items),
5. Coping with unexpected challenges (three items), and
6. Developing critical human resources (three items).

The measurement of items was on a 5-point Likert scale, with 1 corresponding to “*strongly disagree*” and 5 corresponding to “*strongly agree*”. Measures for each dimension and overall entrepreneurial self-efficacy were assessed as continuous variables, calculated as sum scores from the Likert scale items. Higher scores represented better outcomes on each dimension. Entrepreneurial self-efficacy was calculated as a sum score of each dimension, divided by the total number of items, resulting in a final score, ranging from 1-5, with 5 representing higher levels of entrepreneurial self-efficacy. Observed internal reliabilities (Cronbach's alpha) for the six subscales were 0.91, 0.71, 0.79, 0.74, 0.70, and 0.75.

University specific outcomes were measured with four, Likert scale items on a 5-point scale, ranging from 1 (strongly disagree) to 5 (strongly agree). A continuous variable was calculated as a sum score from the four items, and higher scores (maximum of 20) represented

better student understanding of university specific outcomes. Observed internal reliability (Cronbach's alpha) for the scale was 0.70.

Data Analysis

Using the Statistical Package for the Social Sciences (SPSS v.25), researchers computed descriptive statistics for an overview of participant characteristics. Independent sample t-tests were conducted to assess mean differences in measured variables between the Honors students and students in the comparison group at baseline. Furthermore, pretest and posttest data from the Honors students were matched via the unique identifier code, and random checks were conducted to ensure accurate data merging procedures were employed. The missing data rate among the paired sample was less than 5% and assumed to be missing at random; therefore, pairwise deletion (available-case analysis) was utilized for handling any missing data for the analyses conducted. Comparisons between the pre-intervention and post-intervention data among the honors students were made using paired-sample t-tests, a two-tailed p value lower than 0.05 was considered statistically significant.

RESULTS

Participants' Characteristics

Out of the 207 students enrolled in the honors course sequence, a sample of 158 students (76.3%) produced matched pretest and posttest data, which was used in the data analysis. The baseline comparison group consisted of 168 freshmen, and these students were compared with the 158 honors students at the baseline data collection point. For the honors student group, 62.7% identified as female, while 36.7% as male, with the remainder identifying as transgender or other gender identities. For the comparison group, 22.6% reported being male and 77.4% reported female. Respondents ranged in age from 18 to 19 years old, with a majority being 18 years old (96.2%). Most participants in either groups identified as white or Caucasian (honors students=86.6%, comparison=77.4%), with 2.5% identifying as black or African American in the intervention group and 11.9% in the comparison group. In both groups, most of the student participants self-reported their major area being in Allied Health (honors=31.6%, comparison=24.4%). However, more of the honors students selected Natural Sciences (23.4%) than the comparison group (12.5%), while more of the comparison group selected Business (22.6%) than the honors students (8.9%). Public health was selected by 15.2% of the honors students and 25.6% of the comparison group, while the selection of Arts, Education, and Humanities resulted in less than 11% in both groups. Additionally, 18.4% of the honors students indicated having more than one major area, while 14.1% of the comparison group self-reported being double or triple majors. See Table 1.

Baseline Comparisons

Independent sample t-tests were computed to examine baseline differences between the honors students being exposed to the educational intervention and the sample of freshmen, representing the general freshmen student population. This was done to assess potential ceiling effects with the honors students on the measured variables. On average, honors students exhibited significantly greater entrepreneurial self-efficacy ($M=97.9$, $SE=0.95$) and

understanding of university specific outcomes ($M=14.4$, $SE=0.19$) than the comparison group ($M=92.7$, $SE=1.15$; $M=13.6$, $SE=0.20$) at baseline. This difference was statistically significant for both entrepreneurial self-efficacy ($t(40) = 3.50$, $p=0.001$) and university specific outcomes ($t(38) = 3.10$, $p=0.002$). These results indicated that the honors students were already at a higher level for all measures, as compared to the general student body, prior to the educational intervention being implemented; therefore, the pretest-posttest design and subsequent analyses were employed to compare the same group of honors students at baseline to follow-up, in order to understand the intervention effects on the honors students.

Pretest-Posttest Analysis

Paired sample t-tests were conducted to assess significant differences between means on measured variables at the two data collection points. Overall means of entrepreneurial self-efficacy ($M=3.02$, $SD=0.50$) and understanding of university specific outcomes ($M=15.81$, $SD=3.79$) resulted in significantly higher scores for the posttest data. The difference between the means of entrepreneurial self-efficacy, from pretest to posttest, was statistically significant ($t(126)=3.59$, $p=0.001$, $r=0.30$), as were the mean differences calculated for university specific outcomes ($t(125)=4.40$, $p=0.002$, $r=0.26$). Moreover, the six dimensions of entrepreneurial self-efficacy were analyzed for mean differences, and the following dimensions resulted in statistically significant mean differences between the pretest and posttest data, with posttest data resulting in higher mean scores:

1. Developing critical human resources ($t(126)=3.90$, $p=0.002$, $r=0.33$),
2. Defining core purpose ($t(126)=2.40$, $p=0.05$, $r=0.21$), and
3. Developing new products and market opportunities ($t(126)=5.07$, $p=0.001$, $r=0.26$).

	Honors Student Group	Comparison Group
	n (%)	n (%)
Age		
18 years old	151 (96.2)	168 (100)
19 years old	7 (3.8)	
Gender		
Female	99 (62.7)	130 (77.4)
Male	58 (36.7)	38 (22.6)
Race/Ethnicity		
Black/African-American	4 (2.5)	20 (11.9)
Asian	12 (7.6)	5 (3.0)
Native Hawaiian/Pacific Islander	1 (0.6)	3 (1.8)
White/Caucasian	136 (86.6)	130 (77.4)
Hispanic	3 (1.9)	4 (32.4)
Other	1 (0.6)	6 (3.6)
Intended Major Area*		
Engineering	27 (17.1)	6 (3.6)
Education	10 (6.3)	19 (11.3)
Natural Sciences	37 (23.4)	21 (12.5)
Arts	13 (8.2)	13 (7.7)
Humanities	15 (9.5)	12 (7.1)
Business	14 (8.9)	38 (22.6)

Allied Health	50 (31.6)	41 (24.4)
Public Health	24 (15.2)	43 (25.6)
*Students could select more than one major area; ~18% of the honors students selected more than one major area and ~14% of the comparison group selected more than one major area.		

DISCUSSION

An interdisciplinary team from across the ECU campus revamped the existing honors college first-year experience in order to create a “*real world*” learning environment for students. The wicked problems that the student teams self-identified were investigated and addressed using human-centered design principles (IDEO.org, 2015) and Lean LaunchPad® entrepreneurial methods (Blank, 2010).

Student teams explored and developed prototype solutions for several issues. One team identified student isolation as a problem that they would like to tackle. After interviewing numerous students, mental health professionals, faculty, staff, and university administrators they developed a platform to match incoming students with organizations that align with their interests. A second team confronted student mental health issues through a partnership with the counselling center to create a student outreach and education group that made the counselling center more approachable for students in need. Another team sought to address issues of sustainability on campus and discovered that ECU did not even know what was being thrown away on campus and what proportion could be recycled. They initiated a “*trash audit*” to create baseline data for their future efforts as a sustainability club. Still another team started off wanting to address food deserts in our area and ended up creating a nutrition curriculum that was delivered in afterschool programs in the community. Other wicked problems addressed by teams included lack of STI testing availability, sexual assault on campuses, drunk driving by students, lack of mentors in underserved populations, physical activity in underage populations, and lack of voter turnout in college students.

While none of the projects that our student teams worked on were necessarily business related our results indicate that aspects of entrepreneurial self-efficacy were positively impacted. It is likely that the skills required establishing a business venture overlap with the skills the students developed in addressing their wicked problems. Of the 6 dimensions of entrepreneurial self-efficacy measured 3 were positively impacted while the remaining 3 did not show significant changes over the course of the educational intervention.

Developing New Product and Market Opportunities

The survey for this factor consisted of the following statements (De Noble et al., 1999):

I can see new market opportunities for new products and services.

I can discover new ways to improve existing products.

I can identify new areas for potential growth.

I can design products that solve current problems.

I can create products that fulfill customers' unmet needs.

I can bring product concepts to market in a timely manner.

I can determine what the business will look like.

At the center of this measure is the perceived ability of a student to recognize opportunities. Opportunity recognition is a dimension of entrepreneurship that is well known and is included in other measures of entrepreneurial self-efficacy (Krueger, 1999; Chen et al., 1998; Chandler & Jensen, 1992). It is not surprising that this measure was impacted. The students spend considerable time in evaluating many aspects of solving difficult problems. They are challenged in class to defend or abandon favorite ideas and then search for or develop novel solutions over the course of the academic year. Both human-centered design and Lean LaunchPad® rely heavily on interviewing stakeholders. These interviews both challenge student assumptions about their solutions and expose them to other possible solutions they had not considered. The crucible of this experience likely provides students with new tools for recognizing and evaluating opportunities, a fact that is reflected in the positive impact for this dimension.

Developing Critical Human Resources

The survey for this factor consisted of the following statements (De Noble et al., 1999):

I can recruit and train key employees.

I can develop contingency plans to backfill key technical staff

I can identify and build management teams.

Integral to the student experience in the two-semester series is the identification of unique skills in their fellow team members that help to push the project forward. In addition, the students identify and recruit faculty, outside experts, and other stakeholders to contribute to the development of their projects. Developing critical human resources, represents the ability of the student to identify, attract, and ultimately retain key individuals as part of their endeavor. It is encouraging that the educational intervention positively impacted this as it has also been reported as a critical skill reported by high-growth entrepreneurs (Eggers et al., 1994).

Defining Core Purpose

The survey for this factor consisted of the following statements (De Noble et al., 1999):

I can articulate vision and values of the organization

I can inspire others to embrace vision and values of the company.

I can formulate a set of actions in pursuit of opportunities.

The positive impact over the course of the intervention on the student's ability to define a core purpose was likely a product of the team building component of the projects and the weekly presentations in front of skeptical faculty. Random team members were called on to present weekly in front of the entire class. The pressure of this situation encouraged teams to coalesce around core ideas so that each member was able to articulate these to the larger class. Each team member must be able to convincingly communicate the problem, the potential solutions and the methodology that supported the team's learning/objectives using the Business Model Canvas which is a part of Lean LaunchPad®.

Of the 6 factors of Entrepreneurial self-efficacy, 3 factors showed no significant change of the two-semester intervention: Building an Innovative Environment, Initiating Investor

Relationships, and Coping with Unexpected Challenges. Those survey items are below (De Noble et al., 1999).

Building an Innovative Environment

I can create a working environment that lets people be more their own boss.

I can develop a working environment that encourages people to try out something new.

I can encourage people to take initiatives and responsibilities for their ideas and decisions, regardless of outcome.

Initiating Investor Relationships

I can develop and maintain favorable relationships with potential investors.

I can develop relationships with key people who are connected to capital sources.

I can identify potential sources of funding for investment

Coping with Unexpected Challenges

I can work productively under continuous stress, pressure and conflict.

I can tolerate unexpected changes in business conditions

I can persist in the face of adversity

We suspect that we did not observe significant impacts on these measures for two primary reasons. Building innovative environments and initiating investor relations are longer term aspects of the projects that student teams did not touch on over the two semesters. Teams that continue past the first two semesters may see changes in this measure. We posit that the non-significant impact on coping with unexpected challenges is a result of the observation that these honors students already score high on this measure leaving little room to observe significant upward changes.

University Specific Outcomes

The survey for this factor consisted of the following statements (Matthews, 2012):

I am able to describe how community engagement relates to my university's mission.

I am able to describe how design thinking relates to my university's mission.

I am able to define how community engagement is different from community service.

I can explain specific ways that ECU's Honors College support community and economic development.

Student's views toward these items were significantly impacted in a positive way through the exposure to the curricular changes. ECU has tasked the honors college to become the vanguard in exemplifying the University focus on regional transformation and economic development. The entrepreneurial tools provided to the students in combination with their self-identified project areas acted as a springboard for their engagement in the university and wider community. In acting as change agents for their communities, they likely internalized the service mission of the college leading to the positive outcomes in this measure.

The results presented here are a subset of a larger survey instrument that was administered to these student populations. Anecdotally, we anticipated that we would have broader impacts on other traits such as grit, resilience, teamwork, and creative confidence among others. However, failure to observe significant outcomes for these measures has encouraged the faculty team to re-evaluate research methods and questions moving forward. The fact that honors students already score high for many measures is a real concern in performing research with high-achieving students. In addition, the failure to impact these measures may be due to our incomplete understanding of what is really happening for the students through the course of the two semesters. Perhaps the fast changing and often ambiguous nature the projects are likely to have impacts on adaptability and psychological hardiness rather than grit, which is a measure of how well a person sticks to a hard task. Measures for these traits are found in the literature and could be used to inform future research (Bartone et al, 2013).

CONCLUSION

The educational intervention was focused on creating a real-world learning environment supported by human-centered design and entrepreneurial methodologies. Students tasked themselves to do hard things and were held accountable by faculty. While we expect that students grew in multiple ways, we were able to measure changes in the students. Students were better able identify and develop solutions to problems, identify the skills and people they need to move a solution forward, and be able to articulate the core purpose of their teams. Additional iterations of the curricula in the future will focus on encouraging a team environment that supports innovative ideas and adapts to unexpected challenges. These skills are important beyond the classroom, whether the student is starting a business or solving challenges in their community. In order to prepare today's students for tomorrow's challenges, educators must be willing to design and redesign unique curricula that focus not only on discipline-based skill development, but also on life skill development.

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