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UCF I-Corps: The Effects of Entrepreneurial Education on
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Self Efficacy Research Report- Spring 2016

UCF I-Corps: The Effects of Entrepreneurial Education on Entrepreneurial Intentions

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Abstract – The purpose of this study is to investigate the effect of entrepreneurial education on entrepreneurial intentions. We examine the following factors: self-efficacy, learning perception, risk-taking behavior and entrepreneurial intentions of participants of an entrepreneurial education boot camp that follow the Lean Launchpad methodology - UCF I-Corps Site. The methodology of this study uses the pre and posttest technique. The analysis of the pre and posttests includes correlation and multiple regression analyses with a sample of 9 I-Corps participants, at The University of Central Florida. The results of the study show that participants' entrepreneurial self-efficacy level and learning perception are two significant predictors of entrepreneurial intentions. Another finding shows that risk taking behavior is positively correlated with participants' entrepreneurial self-efficacy level.

Introduction

One of the hottest topics in the United States is entrepreneurial education, and it is a growing interest for research areas in business education. According to Hills, in 1988 entrepreneurship education was in its embryonic stage when universities started to offer entrepreneurship courses. Currently researchers are still focusing on the effectiveness of the entrepreneurship education. Students' interest increased as the United States entered the entrepreneurship era. The demand for learning how to launch

a business resulted in having an increase of the entrepreneurial education classes and programs that are currently provided (Fiet, 2000b). The number of schools providing education on new-venture and similar courses are more than 1,600 (Solomon, et al., 2002; Katz, 2003). The increase of interest on entrepreneurship consequently increased the number of entrepreneurship teachers (Hytti and O’Gorman, 2004); this increasing demand of entrepreneurship helped to spread entrepreneurial education rapidly.

The literature search of entrepreneurship education brings out the discussion of nurture vs. nature. The question usually formulated as follows. Are people born as entrepreneurs or can entrepreneurship be learned over time and experience? As Fiet (2000a) suggested there is still a debate about whether students can be taught to be entrepreneurs. A study that focused on the risk-taking of an investor behavior of twins conducted by Barnea et al. (2010) showed that genetic factors affect one third of the variance in stock market participation and asset allocation behaviors. Even the twins who grew up in different environments showed similar investment behaviors. However there is little evidence to support that nature – biological factors have an effect on being a successful entrepreneur. On the other hand, studies on nurture show that being an entrepreneur can be learned and taught. Role modeling and imitation learning processes allows children who have entrepreneurial family role models to show more of a chance to be entrepreneurs in the future (White et al., 2007). Drucker (1985) states “The entrepreneurial mystique? It’s not magic, it is not mysterious, and it has nothing to do with the genes. It’s a discipline. And, like any discipline, it can be learned”.

Furthermore, as entrepreneurship education develops, one of the main concerns of researchers is to define who and what constitutes an entrepreneur. Decades of research have been conducted, but there is still limited understanding of the factors that lead an individual to become an entrepreneur

(Markman, Balkin, and Baron, 2002). Unfortunately in the leading management and psychology journals there are not enough published research studies, looking at the relation between individualistic differences and entrepreneurship. According to Brockhaus and Horwitz (1985) there is no generic definition of an entrepreneur. In their study they also state that there are no significant differentiating features between entrepreneurs and small business owners. Even though there is not a direct definition of a good entrepreneur; there are studies that show the common characteristics of entrepreneurs. These studies help to enlighten the important specifications for being a successful entrepreneur. For example, a study by Koh (1996) focuses on MBA students in Hong Kong. The results of their study show that students who tend to be entrepreneurs have greater innovative, greater tolerance of ambiguity, and higher propensity when compared to students who do not display tendencies in being entrepreneurs.

An important aspect that is believed to be effective on being an entrepreneur is the self-efficacy of an individual. Self-efficacy is one's belief in their own capabilities to execute behaviors that are necessary to accomplish specific performances (Bandura, 1997). One's judgment of their own self-efficacy determines how much effort that they are willing to persist while facing an obstacle or an aversive experience (Bandura, 1982). In other words, when people are faced with obstacles, the ones who are certain about their capabilities show greater effort opposed to those with doubts about their capabilities, as they give up easier (Bandura, 1982). It is known that self-efficacy influences personal goal settings. People who have stronger self-efficacy tend to set higher goals and challenges with a higher commitment to reaching them (Bandura, 1991). Believing in self-capabilities is also an important predictor for motivation and learning as well. The students with strong self-efficacy are able to undertake difficult and challenging tasks more readily, compared to the students with lower self-efficacy; also strong self-efficacy beliefs provide motivation in their learning through goals (Zimmerman, 2000).

Self-efficacy is one of the most important explanatory variables of determining strength of entrepreneurial aims where those aims turn into entrepreneurial actions (Boyd and Vozikis, 1994). The study that was conducted by Markman et al. (2002) shows that individuals who are actively involved in new business formations have higher self-efficacy levels compared to the individuals who are non-entrepreneurs. Also it was found that non-entrepreneurs had higher regrets with their career and educational decisions. The distinct characteristic of an entrepreneur is the self-efficacy. According to Chen and colleagues' (1998) study, results shows that, students' confidence in their capability to perform entrepreneurial roles and tasks successfully is positively correlated to students' intentions for starting their own business. From the given studies it can be concluded that nature, nurture and self-efficacy have an effect on being an entrepreneur.

Entrepreneurial Education Programs

As the interest in entrepreneurial engagements increases the entrepreneurial education has become important for industrial policy and educational policy (Hytti and O'Gorman, 2004). An understanding of entrepreneur education can be a solution for the development of having successful entrepreneurs. Currently there are different types of entrepreneurial education that are being provided by universities and companies. Some of these programs are provided through master's degrees; some of them are included in the curriculum of alternative business and management schools. The other programs that are being provided are extra curriculum programs. Also, there are startup companies which support entrepreneurs with education as well. The small business management and entrepreneurship education have enormously grown in the United States (Solomon, 2005). Entrepreneurial education is not only supported in North America but also in Europe as well. To develop a link between students, industry and higher education institutions; in 2004 the "National Council for Graduate Entrepreneurship" was

introduced to the United Kingdom (Pittaway and Cope, 2007). The entrepreneurial education that is given in Europe is called 'Enterprise Education'. Programs such as: high technology entrepreneurship programs at Innovation Centre, Limerick, Ireland; Students' Entrepreneurship Program in BSC, Lyon, France; and High Technology Startup Program in ESADE, Spain; are technology and knowledge based programs (Garavan and O'Conneide, 1994). The education that is being provided to the students, future entrepreneurs aim to increase the awareness and understanding of the new venture initiation process, understanding of the interrelationships between the business functional areas (Hills, 1998)

In The United States one of the entrepreneur education endeavors is being done by the National Science Foundation (NSF) Innovation Corps (I-Corps). The aim of NSF I-Corps is to create commercially successful products from promising technologies which allows transferring work from laboratories to the marketplace (Robinson, 2012). In Florida; University of Central Florida (UCF) has been selected by NSF as first to implement an I-Corps Site. The UCF I-Corps Sites requires each team to submit a business model with a mentor. The mentor is expected to be an experienced entrepreneur or a venture capitalist. The teaching team of the program consists of professors and a teaching assistant. The courses are focused on theoretical understandings of business models, cold calls, business meetings, and interactions with possible partners and investors. The courses take 10 – 12 weeks which each meeting lasts three hours. The core classes are assigned as homework which is presented through the Business Model Canvas – LaunchPad Central. Students are expected to watch each session and take a short quiz after each session. The grading system contains of four basic criteria. These are being evaluated with the following percentage: Individualistic participation, 15%, Out of the building Customer Discovery Progress, 40%, Teams' Weekly "lessons learned" presentations, 20%, and Teams' final "lessons learned" presentation and video, 25%. In six months it is expected that each team will use the new information that is gained from I-Corps and develop a revenue model,

partnership strategy, and marketing effort on the product. I-Corps enables students to practice specific skills to become competent entrepreneurs. Establishing a student-approved system like this is the most effective method for making students become skilled in theory-based competencies (Fiet, 2000b).

This paper will focus on the University of Central Florida's I-Corps Site cohort in the Lean LaunchPad course which was started late January, 2015 and ended in early April, 2015. The I-Corps Site at The University of Central Florida was structured in a way such that the sessions took place for 10 weeks. The sessions were not only presented by the LaunchPad Central, but also face-to-face. The teaching team consisted of seven members. The teaching team members were professors at The University of Central Florida (UCF) who are highly regarded in their fields. Each teaching team member supported the face-to-face class time with presentations which were related with the week's topic. All of the team members were required to follow the face-to-face classes either by attending the class or online. For the team members who could not attend the classes, class presentations were provided through LaunchPad Central.

Purpose

The previous studies show that (Zhao et al, 2005) entrepreneurial experience, risk propensity, and entrepreneurial self-efficacy are predictors of the entrepreneurial intentions. Our study focuses on the impact of entrepreneur education and other factors on entrepreneurial intentions. We assume that the presentation of entrepreneurship education will positively relate with the level of entrepreneurial self-efficacy and entrepreneurial intentions. This will present information showing if there is a change in individual self-efficacy and intentions after they have received entrepreneurial education.

Hypothesis 1: The completed I-Corps entrepreneurial course will be positively related to entrepreneurial self-efficacy.

Therefore we expect that member's participating in the UCF I-Corps cohort 1 program (entrepreneurial education) will be positively related with their entrepreneurial self-efficacy levels. The UCF I-Corps face-to-face class program creates an opportunity for members to see successful role models, learn from case studies, discuss their thoughts, gain more insights from other's experiences, develop and improve their ideas on their products. LaunchPad Central (Business Canvas Model) helps to enhance member's self-efficacy levels by evaluating member's work, monitoring their steps and mentoring them in their path. These two opportunities support member's to improve their own abilities and performance levels. We assume that these opportunities will increase self-efficacy levels.

Hypothesis 2: The entrepreneurial intentions will be positively related to entrepreneurial self-efficacy level.

Chen and colleagues' (1998) study provides results that show a positive relation between entrepreneurial intentions and self-efficacy levels. In our study we wanted to support their idea by our findings.

Hypothesis 3: Risk-taking behavior will be positively related to entrepreneurial self-efficacy.

Risk-taking behavior is one of the individual difference factors. Various studies show that there is a direct relation between entrepreneurial intentions. These studies state that individuals with high risk taking behaviors are more likely to have an entrepreneurial career. Having less anxiety for having an entrepreneurial career may cause higher self-efficacy levels. Therefore we expect to see a positive relation between self-efficacy level and risk-taking behavior.

Hypothesis 4: Self-Efficacy levels in the pre-test will be positively related with the self-efficacy levels in the post-test.

We assume that as those who receive the I-Corps entrepreneurial education will have reported self-efficacy results in both tests and they will be positively correlated with each other. We believe that this positive relationship will be due to the education provided such as what we was previously stated in our first hypothesis; one's self-efficacy level will be related with the learning perception.

Hypothesis 5: Entrepreneurial self-efficacy will be positively related with self-efficacy levels and learning perception.

Our study assumes that the self-efficacy level of results from the pretest and from taking the I-Corps course (learning perception) will both be predictors of self-efficacy levels on the posttest.

Hypothesis 6: Entrepreneurial intentions will be positively related with self-efficacy level and learning perception.

Previous studies have shown that self-efficacy level and learning perceptions are the predictors of many entrepreneurial intentions. Therefore we expect to see that self-efficacy and learning perception will both have a positive significant relationship.

Hypothesis 7: Entrepreneurial intentions will be positively related with learning perception.

In our study, we propose that I-Corps courses will have an effect on entrepreneurial intentions. To measure this effect of the I-Corps courses, we have used the learning perception questionnaire.

Method

1) Participants

The first UCF I-Corps program Cohort 1 took place in Spring 2015 from January to April. 13 team applicants originally applied for the program. Each team consisted of a mentor, and members. The

application process included: application forms, short presentation and an interview. After the application process, nine teams were accepted. Out of the nine teams, one dropped out due to internal aspects. In total, there were eight teams which created a total of 34 participants. Out of 34 participants eight of them were mentors and 26 were team members. The pretest was answered by 20 participants and posttest was answered by 13 participants. From pre and posttest we have received 9 matched responses from participants.

2) Measures

The method that was used in this study was a pre-posttest design. The data was collected by self-reported surveys. The members were presented with one set of questions in the study. The pre-test set was presented to the team members before they started their classes. The post-test set was presented to the members after the last class. The survey included self-efficacy questions, risk taking behavior questions, learning perception questions, and entrepreneurial intentions questions. The survey was presented through an online survey program; the members were not obligated to fill out the questionnaire.

2.1) Learning Perception Questionnaire

The participants were presented with a survey to measure how much they had learned in the 10 weeks of entrepreneurial education. There were six questions and for each question the responses were determined by perceptions on a five point Likert scale (Appendix A) ranging from 1 = Not at all true to 5 = Exactly true.

2.2) Self-Efficacy Questionnaire

For the self-efficacy questionnaire 10 questions were presented to the team members. These questions were from The Generalized self - efficacy survey (GSE) by Schwarzer, R., & Jerusalem, M. (1995). These questions are represented in the Appendix B. The questions were randomly distributed in the survey for each individual and the responses were modified based on the five point Likert scale ranging from 1 = Not at all true to 5 = Exactly true.

2.3) Risk Taking Behavior Questionnaire

The risk-taking behavior questionnaire consisted of five questions which were combined and modified from different surveys. One question was modified from Dahlback's (1990) scale. Another question was modified from a scale that was obtained from Gomez-Mejia and Balkin (1989). Three questions were modified from Dulebohn (2002) to measure the general risk behavior. Each response was measured with a five point Likert scale ranging from 1 = Not at all true to 5 = Exactly true. These questions are represented in Appendix C.

2.4) Entrepreneurial Intentions Questionnaire

For this questionnaire five questions were created. The questions mostly focused on how the participants were interested in engaging in entrepreneurial activities. The responses were based on a five point Likert scale ranging from 1 = Not at all true to 5 = Exactly true. These questions are represented in the Appendix D.

3) Analysis

We conducted correlation, significance analysis and multiple regression analysis by using R (The R Project for Statistical Computing). It is known that correlations do not provide us causality although; they provide statistical relationships involving dependence. To measure the linear correlation, or the

relation between two variables, we used Pearson correlation coefficient. Measuring the effect of each variable was done by the significance test.

Results

Each of the independent variables' mean, standard deviation and correlation with each other is presented in Table 1. The measure of significant direct relationship between each independent variable is shown in Table 1 with a (*) notation.

The results of correlation matrix analysis between each variable – entrepreneurial self-efficacy, risk taking behavior, learning perceptions, and entrepreneurial intentions - in both pre and posttests enabled us to analyze the data. A Pearson product-moment correlation coefficient was computed between each variable. The results showed that there is a positive high correlation between learning perception (I-corps courses) and self-efficacy ($r = 0.71$, $n=9$, $p = 0.03$). Entrepreneurial self-efficacy and entrepreneurial intentions were correlated positively with $r=0.65$, $n=9$, $p = 0.05$. These two results supported our hypothesis 1 and 2 respectively. Hypothesis 3 showed that risk-taking behavior has an impact on self-efficacy level ($r = 0.65$, $n = 9$, $p = 0.05$). Therefore we can state that risk-taking behavior has an indirect effect on entrepreneurial intentions.

The pretest scores of self-efficacy were positively correlated with posttest self-efficacy scores ($r = 0.84$, $n = 9$, $p = 0.004$). We can state that we also supported our 4th hypothesis. We also supported hypothesis 7 that learning perceptions and entrepreneurial intentions will be positively correlated with each other (post-test results) ($r = 0.77$, $n = 9$, $p = 0.01$). Although the first time learning perceptions and entrepreneurial intentions had a negative low correlation, the second (post-test results) displayed there was a high positive correlation between learning perceptions and entrepreneurial intentions. Our analysis showed evidence that; hypotheses 1, 2, 3, 4 and 7 were supported with significant positive

correlations. For the statistical analysis for hypotheses 5 and 6 we used multiple regressions (ANOVA).

Means, Standard Deviations and Correlations of Provided Tests

Provided Tests	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7
1									
) Self-Efficacy (T1)	4.13	0.63							
2									
) Risk Taking Behavior (T1)	2.68	0.41	0.57						
3									
) Learning Perceptions (T1)	4.05	0.59	0.22	-0.12					
4									
) Entrepreneurial Intentions (T1)	4.04	0.61	0.08	0.02	-0.04				
5									
) Self-Efficacy (T2)	4.00	0.64	0.84*	*	0.12	0.20	0.03		
6									
) Risk Taking Behavior (T2)	2.42	0.64	0.65*	0.37	0.52	0.28	0.55		
7									
) Learning Perceptions (T2)	4.09	0.54	0.57	0.09	0.33	0.19	*	*	
8									
) Entrepreneurial Intentions (T2)	4.06	0.65	0.33	-0.33	0.31	-0.21	*	0.38	*

Table 1: Mean, Standard Deviations and Correlation of Provided Tests.

Note. N=9. T = Time. * $p < .05$. ** $p < .01$. Mean max. = 5, mean min.=0.

We conducted two multiple regression analysis with ANOVA to check the dependent and independent variables among our study. The results of the multiple regression analysis of our factors are presented below. The dependent factor in hypothesis 5 was self-efficacy (post-test), and the independent factors were learning perception and self-efficacy (pre-test). The results showed that there was a significant effect of self-efficacy (pre-test) and learning perception on self-efficacy levels, at the $p < 0.01$ level for this condition [$R^2 = 0.78$, $F(2,6) = 10.66$, $p = 0.01$]. Based on these results we can conclude that we have supported our hypothesis 5. Although learning perception and self-efficacy had significant positive correlation with entrepreneurial intentions, we have failed to support evidence for our hypothesis 6. The dependent factor in hypothesis 6 was entrepreneurial intentions (post-test), and the independent factors were learning perception (post-test) and self-efficacy (post-test). According to the multiple regression analysis that we have conducted learning perception and self-efficacy together did not give significant results on predicting the entrepreneurial intentions [$R^2 = 0.61$, $F(2,6) = 4.71$, $p = 0.06$].

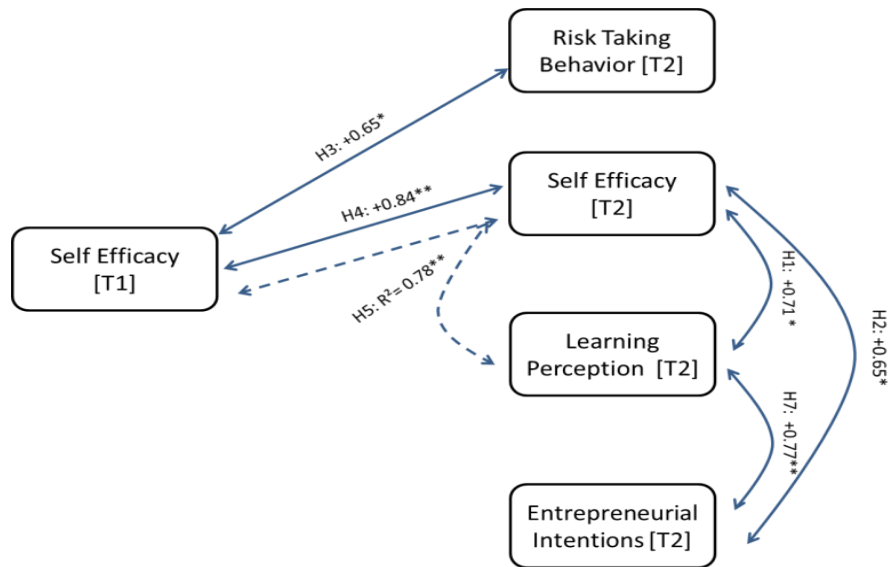


Fig. 1: Final Correlation Model
 Note. N=9. T = Time. * p <.05. ** p <.01. R²= represents the multiple regression.

Conclusion and Discussion

Our study’s findings showed that learning perception and one’s entrepreneurial self-efficacy levels are separately predictors of entrepreneurial intentions. Even though entrepreneurial self-efficacy and learning perceptions were separately predictors for entrepreneurial intentions, we couldn’t find supporting evidence as they are both working together as predictors of entrepreneurial intentions. Another finding supported that; risk-taking behavior is also a predictor for self-efficacy. From that we can conclude that risk-taking behavior has an indirect effect on entrepreneurial intentions. Cartel et al, (2003) suggested to look for other kinds of cognitive factors that affect an individual’s decision in starting a company. As a cognitive factor we chose to focus on entrepreneurial self-efficacy. According to our findings, entrepreneurial self-efficacy is a predictor for both self-efficacy (pre-test) and learning perceptions.

From the results we can conclude that as a cognitive factor self-efficacy is a factor that predicts entrepreneurial intentions. Furthermore, I-Corps courses (learning perception) were also a predictor for entrepreneurial intentions.

It is important to take into consideration that there was a low number of matched responses (N=9). Luckily, the next cohort will take place in Fall 2015. This will enable us to collect more data in hopes to support our hypothesis with more participants. Since UCF I-Corps Site program is a three year NSF funded project we will be able to track down each participant's entrepreneurial activity throughout the program. This will enable us to retest them, and compare the results with their patenting numbers, customer numbers and the development of their company. This comparison can enlighten us more about the effects of self-efficacy and learned I-Corps courses on entrepreneurial intentions.

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