



# The Effects of Collegiate Entrepreneurship Education on Post-Graduation Startup of New Ventures: A First Look

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**Abstract.** The questions related to why some individuals choose to start a business while others do not are often studied in Entrepreneurship literature. While extensive research has been performed regarding when, why, and how individuals identify potential opportunities, this study brings together many of the factors previously studied in the literature in one model, including self-confidence, networking, and education. In particular, the study examines whether the number of collegiate entrepreneurship courses taken is associated with the post-graduation startup of a new firm. The results present, among other things, that taking additional collegiate entrepreneurship courses increases the probability an individual will start their own firm and adds to literature concerning the interaction of risk attitudes and start-up of new firms. Practical implications include suggestions based on the results for how educators may be able to identify those most likely to start new firms and improve the education of nascent entrepreneurs.

**Keywords:** entrepreneurship, education, self-confidence, networks, risk.

## 1. Introduction

These then are the folks that are the target audience for this kind of educational or fresh educational approach that says your goal in life is not to settle for whatever the world deals you. Your goal is to create something that you are excited about, energized by and committed to.

Alan Webber, Co-Founder of *Fast Company*, discussing who could benefit from entrepreneurship education (Gendron, 2004)

Entrepreneurship education at the collegiate level has been expanding rapidly. The first known collegiate entrepreneurship course was taught to MBA students at Harvard in 1947 (Katz, 2003) and, as of 1970, there were only twenty-five known entrepreneurship programs at colleges and universities in the United States (Dana, 1992). The number increased to twenty times that size by 1992, with the

number of entrepreneurship programs being offered reportedly reaching 500 (Dana, 1992). As of 2003, there were over 1,600 schools offering entrepreneurship courses (Katz, 2003). This growth in entrepreneurship and small business programs is expected to continue (Solomon, Duffy, & Tarabishy, 2002).

According to Kuratko (2005), one possible explanation for this growth is the desire of a younger generation to become entrepreneurs. A recent survey found that more than sixty percent of eighteen to twenty-nine year-olds would like to own their own businesses (Tulgan, 1999). Charney and Libecap (2000) suggest the link provided among the business and academic communities by entrepreneurship and the way development of business plans provides an opportunity for the integration of other disciplines such as marketing and accounting have contributed. Entrepreneurship education has been proposed to provide many benefits, including introducing additional potential entrepreneurs to the field (Ronstadt, 1985), producing higher earnings for the self-employed (Robinson & Sexton, 1994), and helping revitalize the economy of communities that have lost jobs (Bender & Meli, 1990).

As entrepreneurship education has expanded, researchers have debated whether or not entrepreneurship can be taught and whether entrepreneurship education has any effect on entrepreneurs (Chell & Allman, 2003). The introductory quote suggests one possible way entrepreneurship education can have an impact on students. This view is countered by David Birch, founder of Cognetics and winner of the first International Award for Entrepreneurship and Small Business Research, who was quoted as saying, "If you want to teach people to be entrepreneurs, you can't" (Aronsson, 2004). However, much of the recent literature suggests that it is possible to teach entrepreneurship. DeTienne and Chandler (2004) found that students could be taught to identify more business opportunities and to be more innovative. In light of studies like this, it has been expressed that at least certain aspects of entrepreneurship can be taught (Kuratko, 2005).

While the debate about whether entrepreneurship can be taught continues, determining what type of impact an educational program may have on entrepreneurs can be even more problematic (Chell et al., 2003). Is the expansion of the availability of entrepreneurship courses actually increasing the number of entrepreneurs or making those already in existence more successful? What is the impact of the large amount of resources being expended to offer more and more entrepreneurship courses and programs? Are students who take additional entrepreneurship courses more likely to start a new firm than those who take fewer? This research seeks to provide some initial answers to these questions.

Empirical work examining the effect of taking entrepreneurship courses on the startup of new businesses has been rare. It is hoped that this study will serve as a starting point for additional research into the impact of formal education on entrepreneurship. While the main focus is the effects of formal college

entrepreneurship courses, some additional aspects such as access to resources and self-confidence will also be examined. The primary question to be examined in this study is whether or not there is a significant relationship between taking formal college entrepreneurship courses and pursuing a new venture following graduation. This research may help determine education's place in our understanding of this topic. The results of this study could provide educators and administrators additional insights into how education may be affecting whether or not students start businesses following graduation.

Several key findings and contributions result from our logistic regression of survey data from former entrepreneurship students at a Midwestern-U.S. university. First off, it appears that the number of entrepreneurship courses taken does seem to matter for the start-up of new ventures. The results also provide additional support for the positive impact of self-confidence and attitude towards risk that has been explored previously in the literature.

The next section of the paper will review some of the entrepreneurial education research. Following the literature review, a framework is proposed and several hypotheses presented regarding the effects of several factors on the decision to start a new venture. Next, the paper presents the methodology and results from the empirical study of college students who took entrepreneurship and small business courses. Concluding thoughts are offered along with possible implications in the final section of the paper.

## **2. Entrepreneurship Education Literature**

While many individuals may identify what they feel is a business opportunity, a major area in the literature is what aspects of the situation or attributes of the person cause the potential entrepreneur to actually initiate a new venture (McMullen & Shepherd, 2006). Education is one such aspect discussed in the literature. The first of three categories of literature to be reviewed studies the effects of entrepreneurship education as it relates to various entrepreneurial outcomes and the effects of education in general on potential entrepreneurs and development of new ventures (i.e., do entrepreneurs appear to have more education in their background compared to non-entrepreneurs). Second is the literature surrounding the question "can entrepreneurship be taught or is it something a person is born to do?" The final category involves research into how education may be used to develop more potential entrepreneurs, including various methods and techniques developed and suggested in the literature for use in the education of entrepreneurs.

## 2.1. Effects of Education on Entrepreneurs

What is the impact of education on entrepreneurs? Prior work in the literature has provided a variety of insights into this question. In dealing with the impact of entrepreneurship education specifically, Clark, Davis, and Harnish (1984) found support for a relationship between entrepreneurship courses and the creation of new ventures. Although their study could not provide an interpretation of cause and effect in the relationship, their work is important in that it shows there is a relationship worthy of further study. In their evaluation of the entrepreneurship program at a major university, Charney and Libecap's (2000) results showed that graduates from the entrepreneurship education program were personally more successful, having a twenty-seven percent higher income than those who did not graduate from the entrepreneurship program. Additionally, small firms employing entrepreneurship graduates achieved higher performance, measured as a greater growth in sales when compared to competitors. This result is significant because it suggests an application of entrepreneurship education to those who do not necessarily become entrepreneurs. It provides a broader perspective and suggests that even individuals who do not intend to start their own firm can benefit from the education provided by entrepreneurship curricula.

Clouse's (1990) study sought to determine if taking an entrepreneurship course would actually affect the decisions and choices made by entrepreneurship students in a simulated situation. The results showed that the entrepreneurship course had a statistically significant impact on the decision process for the majority of students, based on the criteria they used when making decisions about new ventures. The decisions were simulated and the study did not examine the effects of the course on actual startup of new firms, only whether or not the students could be taught to think differently about the scenarios. Even considering the simulated nature of the study, it is a significant finding that courses in entrepreneurship do have an impact on the thought processes of those taking them. Taken together, these studies provide a small sample of the impacts that entrepreneurship education can have, not only on potential entrepreneurs, but also on the general student population. A wide variety of people who may be interested in entrepreneurship education have been identified in the literature, including managers and those who are not interested in entrepreneurship for themselves but wish to support entrepreneurship within their society (Alberti, Sciascia, & Poli, 2004).

Extant work on education and entrepreneurs has not been limited to the entrepreneurship curriculum, with the effects of education in general having also received attention in the literature. In one of the first studies examining education and entrepreneurship, Douglass (1976) found that entrepreneurs were better educated than the general population. However, no relationship was found between the amount of education and the eventual success of the entrepreneur. This is an important finding as it suggests that while individuals with higher levels

of education may be more likely to start a firm, they will not necessarily be any more successful than their less educated counterparts. The findings of Reynolds (1997) also support entrepreneurs tending to be more educated, noting that nascent entrepreneurs were more likely to have at least some education beyond the high school level. Davidsson and Honig (2003) found each additional year of education increased the likelihood that an individual would be a nascent entrepreneur.

The difficulties noted in the entrepreneurship literature that result from the variety of definitions offered for entrepreneurship (Low & MacMillan, 1988; Shane & Venkataraman, 2000) also apply to the work on education. Due to these difficulties, the relationship between self-employment and education has also been a popular topic of study. Robinson and Sexton (1994) used earnings as a measure of success in their research. They found a positive correlation between years of education and earnings in a self-employment situation, suggesting that additional education may lead to more favorable outcomes. Additional education also increased the likelihood of people becoming self-employed as opposed to entering wage and salary employment. In contrast, de Clercq and Arenius (2006) discovered additional education was present in entrepreneurs only to a certain point in their study. Secondary education was found to lead a person to be more likely to start a business as opposed to those who were less educated and no impact was found for more advanced degrees. These results present that there may be a point at which additional education does not have an impact on the likelihood of an individual becoming an entrepreneur. At the very least, the different results presented here for the impact of education on success and likelihood of starting a new business encourage further study in this important area.

While all of the aforementioned studies were performed in the United States, it is important to also examine this relationship across other contexts. A variety of studies have examined entrepreneurs and education in other contexts and how this relationship generalizes across borders. Autio et al. (1997) studied education and the relationship with entrepreneurial intent across university settings in the United States, Finland, and Thailand. The results of the study showed a supportive university environment positively affected the conviction of respondents towards entrepreneurship, which was then positively related to the intent of the student to start working for their own firm within one year. The contribution of this study was not only to show that education could impact intent, but that the context within the university where the education was provided could also have a major impact. Indonesia and Norway provided the context for another study, which included education effects on intentions (Kristiansen & Indarti, 2004). Kristiansen and Indarti found no correlation between the educational backgrounds of university students and their intention to become an entrepreneur. This was an important finding as it suggests the aforementioned impact of

education on intent found in many US samples does not necessarily hold in other cultures.

Lee, Chang, and Lim (2005) also found differences in the impact of entrepreneurial education due to culture. Their study of how entrepreneurship education impacted a variety of factors found differences between American and Korean university students. For many of the factors, the Korean students displayed lower initial levels in their responses. They benefited more from entrepreneurship education when compared to their US counterparts, reaching similar levels on many of the factors following the completion of entrepreneurship courses. This unique contribution demonstrates the importance of considering how the culture may have influenced students before they take entrepreneurship courses. Some students may be predisposed to entrepreneurship education due to how entrepreneurship is viewed in their culture. Different instructional methodologies across cultures could also be considered as having an impact when examining this relationship. For example, Dana (1992) observed several differences in the methodology in entrepreneurship education between Europe and the United States, such as the greater focus in Europe on practical aspects.

However, some studies have found similarities across cultures in regards to entrepreneurship education. A study including a variety of variables did not find a significant difference among American and Chinese students' entrepreneurial orientation (Parnell et al., 2003). Brockhaus (1991) reviewed and compared the entrepreneurial education environment in a multitude of countries including Japan, Egypt, South Africa, Korea and many others. Several common factors were identified, such as the need for the private sector to provide more jobs and the recognition that entrepreneurship can help to provide this (Brockhaus Sr, 1991). The variety of findings with regards to similarities and differences across contexts serves to underscore the importance of considering the environment in which studies have been conducted and examining whether or not those results can readily generalize.

## 2.2. Can Entrepreneurship Be Taught?

Another area of the entrepreneurship education literature relates to whether or not entrepreneurship can be taught. This discussion is based upon the larger issue of whether entrepreneurs are made or born (Henry, Hill, & Leitch, 2005). If entrepreneurs are born and the ability to become an entrepreneur is inherently present, then it is likely that education will be ineffective and further studies in the area would be suspect. Adding to this issue is the difficulty evaluating entrepreneurship education due to a lack of common methods or criteria. An example of this that was previously noted is that the methodologies used in entrepreneurship education can vary from country to country. Based upon

literature stressing the importance of opportunity recognition as an essential capability of entrepreneurs, DeTienne and Chandler's (2004) study sought to empirically study if teaching opportunity recognition was possible. Their study found that potential entrepreneurs could be taught to generate more ideas and education can help those ideas to be more innovative.

Given that opportunity recognition has been presented as a vital part of the entrepreneurial process (Shane et al., 2000), evidence that these aspects can be taught is an important finding. De Faoite et al. (2003) present that portions of entrepreneurship could be considered an "art" while other portions are a "science". Utilizing work by Jack and Anderson in 1998, De Faoite et al. (2003) suggest that the "art" portion of entrepreneurship (the creative and innovative aspects of entrepreneurship) cannot be taught, but the "science" portion (the business and management functional skills) can be taught to potential entrepreneurs (De Faoite et al., 2003). Alberti et al. (2004:454) also provide a similar view, stating 'we cannot make a person another Branson, but the skills and creativity needed for being a successful entrepreneur could nevertheless be anyway enhanced by entrepreneurship education.' Taken as a whole, these findings are very encouraging for future research on entrepreneurship and education, suggesting that this work is not in vain and that individuals can be taught important skills involved in becoming an entrepreneur. Solomon and colleagues (2002) present that this debate is now obsolete and the focus should move towards what should be taught and what approaches should be taken.

### 2.3. Entrepreneurship Education Approaches

Entrepreneurship education programs and methods in higher learning institutions have been a popular topic in the literature as well (Charney & Libecap, 2000; Collins, Smith, & Hannon, 2006; Hanke, Kisenwether, & Warren, 2005). There are a wide variety of approaches, as evidenced by the overview of those recognized by the United States Association for Small Business and Entrepreneurship (USASBE) provided in Kuratko (2003). Collins et al. (2006) developed and tested the effectiveness of what they termed a "synergistic" approach to teaching entrepreneurship based on collaborative learning among people at different stages in the entrepreneurial process. This method involved collaborative learning experiences amongst nascent entrepreneurs, existing entrepreneurs, and facilitators in which the participants learned from and with each other. A problem-based learning approach to entrepreneurship education is presented by Hanke et al. (2005). In this approach, the students develop solutions to problems rather than learning exclusively from lectures. Students in a class utilizing this approach displayed a higher tolerance for ambiguity and more entrepreneurial self-efficacy following the course as opposed to those students involved in a more traditional course.

Due to the need to adapt in an entrepreneurial situation, a contingency-based method for teaching business planning has also been proposed (Honig, 2004). In this method, the focus is on tacit knowledge and the dynamic management of knowledge assets. Honig develops this method as an alternative to teaching entrepreneurship through business plans, which he feels have not been shown to provide any benefits to students who choose to pursue an entrepreneurial opportunity or even teach students the important aspects of entrepreneurship. However, other research regarding the effectiveness of business plans has shown a positive influence of such plans on the development of new firms. Delmar and Shane (2003), in their response to previous criticisms of business planning, study the impact on venture organizing activity, product development, and the decision to stop pursuing a new venture. The results of their study presented that business planning reduces the chances of a new venture disbanding, increases product development, and increases venture organizing activity. Verduyn and Jansen (2005) implemented a narrative approach in an entrepreneurship course, having students read a biography of an entrepreneur and then analyzing it in several steps. While the limits of their study (all of the students showed intent before the course) prevented a conclusion with regards to impacts on intent to start a business, they did discover that the students gained a more critical understanding of the subject of the biography and displayed more imaginative and critical thinking following the course.

The work by Honig (2004), Collins and colleagues (2006), and the others mentioned above are representative of an important trend in the literature, identifying the unique aspects and challenges inherent in entrepreneurship and approaching the education thereof in ways that take this into account. For example, Hanke et al. (2005) seek to better prepare students of entrepreneurship for the uncertainty they will face, while Honig (2004) recognizes the rapidly changing situations potential entrepreneurs may encounter. Gibb (2002) seems to support such notions, stating that entrepreneurship education should be more about learning “for” becoming an entrepreneur rather than learning “about” entrepreneurship and should pursue an interdisciplinary approach. This sentiment is echoed by Verduyn and Jansen (2005:230), in their previously mentioned study, in defining teaching “for” entrepreneurship as ‘making students (more) enthusiastic about entrepreneurship as a career option and we want to appeal to and develop the kind of thinking that is intuitive, lateral, and unconventional.’ This becomes even more important following research by Edelman, Manolova, and Brush (2008) that found only 26% of activities with a high prevalence among nascent entrepreneurs receive a high percentage of coverage in entrepreneurship textbooks. They also found textbooks currently do not provide enough emphasis on the activities that increase the probability of starting a new venture.

Several challenges that still lie ahead for entrepreneurship education are noted in the literature. Some of these include a lack of PhD trained educators,



potential negative effects of the dotcom failures, and overuse of the word “entrepreneurship” to describe other fields (Kuratko, 2005). Bechard and Gregoire (2005) note that, due to the current state of entrepreneurship research in general and its focus on theory development and legitimacy among other paradigms, the educational applications and aspects of research are sometimes overlooked. They echo Kuratko’s sentiment that there is a lack of entrepreneurship training in PhD programs. Another concern is raised by Solomon et al. (2002), whose study found that entrepreneurship educators did not seem to be taking full advantage of the new technologies available that would enhance entrepreneurship education. These are all important concerns of which researchers should be aware. By being aware of such shortcomings, future research and actions can be more effectively aimed at minimizing and overcoming these challenges in the hope of improving the field.

Many of the studies previously discussed examine the effects of entrepreneurship education on the thought processes of potential entrepreneurs or their intention to start a new business. However, few study the effects on actual start of new firms. As noted by Honig and Davidsson (2000) in their review of how human capital affects startup of new firms, there has been little work done on the effects of such factors as taking specific courses. Additionally, Gorman and Hanlon (1997) suggest that more work on the effects of multiple courses in entrepreneurship is a worthwhile pursuit for future research. The lack of research which includes education and other exogenous factors (such as attitude towards risk) in an examination of the pursuit of starting a new venture has also been noted in the literature (Luthje & Franke, 2003). This study seeks to add to the research addressing some of these gaps in the literature.

### **3. Hypotheses and Framework**

In this section, we draw upon the available prior work to develop testable hypotheses regarding how these areas may interact in an attempt to further understanding about the process inherent in the question “what effect does taking college courses in entrepreneurship and small business have on the startup of new firms?”

#### **3.1. Effects of Education – Is More Better?**

Block and Sandner (2008) note that the role of formal education has been a significant part of the analysis of human capital and entrepreneurship. Formal education is seen as providing the necessary cognitive skills to adapt to environmental changes (Hatch & Dyer, 2004). Education is a source of knowledge, skills, discipline, motivation, and self-confidence (Cooper et al.,

1994). Highly educated entrepreneurs may be better able to deal with complex problems. They may also leverage their knowledge and the social contacts generated through the education system to acquire resources to identify and exploit business opportunities (Arenius & De Clercq, 2005; Shane, 2003).

Human capital theory maintains that a higher stock of knowledge provides individuals with a higher cognitive ability, which then leads to more productive and efficient activity. As a dimension of human capital, education can be a source of both knowledge and motivation (Cooper et al., 1994), two essential ingredients which Shane (2003) identifies as important for entrepreneurial opportunity recognition. Hao et al. (2005) found that formal education would lead to greater entrepreneurial intentions and Delmar and Davidsson (2000) found that education has been generally accepted as having an effect on the decision to start a new business. Hence, individuals with more entrepreneurially-related knowledge or with a stock of knowledge of higher quality are better at perceiving and exploiting entrepreneurial opportunities than are entrepreneurs with less human capital (Davidsson & Honig, 2003; Shane, 2000).

While entrepreneurs and non-entrepreneurs do not differ in the level of their education (Robinson, Stimpson, Huefner, & Hunt, 1991), research suggests that education specifically related to venture creation can affect an individual's decision to start a business. Clark et al. (1984) discovered taking an entrepreneurship class had a significant effect on the motivation to actually start a venture. In the study, taking an introductory entrepreneurship/small business course was important in the decision of 67% of those who advanced from intending to start a small business to actually opening the venture. Moreover, studies have shown aspects such as opportunity recognition and innovation can be taught effectively in a course (DeTienne & Chandler, 2004). In this study, all the students took at least one entrepreneurship course. We assume their decisions to take more than one is related to their belief that "more is better." We thus present the following hypothesis:

**Hypothesis 1a:** There is a positive relationship between the post-graduation startup of a new firm and the number of entrepreneurship courses taken.

A recent meta-analysis by Van der Sluis et al. (2005) found that the level of education influences the propensity to become self-employed and that, as suggested by Calvo and Wellisz (1980) and Lucas (1978), education enhances managerial ability, which increases the probability of entrepreneurship. Van der Sluis et al. (2005) further find that an additional year of schooling raises enterprise income for new firms in developing economies by an average of 5.5 percent. This result was similar to those in the United States, where the average return to schooling in entrepreneurial pursuits is 6.1 percent. Related to this, Bates (1995) found that post-graduate education was strongly associated with those who had chosen to be self-employed and Crant (1996) found that MBA students displayed

higher entrepreneurial intentions than undergraduates. Evidence suggests that graduate students are more likely to start new ventures than their undergraduate counterparts, leading to the following hypothesis:

**Hypothesis 1b:** The positive relationship between the post-graduate startup of a new firm and the number of entrepreneurship courses taken by college graduates will be greater for graduate students than for undergraduate students.

### 3.2. Self-Confidence

Self-confidence is defined as a person's conviction about his or her abilities to execute a given task within an identified context (Moreno, et al., 2007). According to Neill (2005), self-confidence is a combination of self-esteem and general self-efficacy and refers to belief in one's personal worth and likelihood of succeeding. In a study of Indonesian and Norwegian students, Kristiansen and Indarti (2004) found that self-efficacy, a dimension of self-confidence, had a significant positive relationship with intent to start a firm. Self-efficacy moderates the relationship between entrepreneurial intentions and entrepreneurial action (Boyd & Vozikis, 1994) and individuals with greater self-efficacy are more likely to pursue an identified opportunity (Chen, et al., 1998). In light of the difficulty of the required tasks, Cooper and Lucas (2006) note it is not surprising that a high level of confidence is central to starting companies. Self-confidence is important to make the vision that is an entrepreneurial opportunity actually happen (Ensley, Carland & Carland, 2000). If a person is not confident that he/she is capable of success, he/she will not act (Krueger Jr & Brazeal, 1994), leading to the following hypothesis:

**Hypothesis 2:** There is a positive relationship between post-graduation startup of a new firm and a student's entrepreneurial self-confidence.

### 3.3. Willingness to Accept Risk

Risk and entrepreneurs has been the subject of much scrutiny. While a recent study discovered risk-taking propensity to have a substantial influence on attitude towards entrepreneurship (Luthje and Franke, 2003), most prior research indicates that those who become entrepreneurs do not differ in their risk propensity from non-entrepreneurs (Brockhaus, 1980; Low & MacMillan, 1988; Norton & Moore, 2006). A growing number of recent studies, in fact, are beginning to question whether risk is the best measure of what entrepreneurs must deal with (Alvarez & Barney, 2005; McMullen et al., 2006; Wu & Knott, 2006), offering uncertainty as a preferred alternative.

For this study, we argue that, from a practical standpoint, it appears that perceived risk is a significant aspect of how entrepreneurs evaluate available ideas and make a decision to act (Brouwer, 2000). Every enterprise has to have a level of risk that is accepted in order to do business. We posit that risk represents both an opportunity to make profit and the potential to make losses in any decision between becoming self-employed and becoming a wage earner. What is important is risk acceptance – the ability to balance the opportunities against the potential losses and be willing to act. As Kliem and Ludin (1997) note, people with a risk acceptance orientation view risk as neither good nor bad, but a fact of life. They accept risk as it arises and prepare for the most likely cases. Their risk management has a balanced, even optimistic, perspective. We expect that nascent entrepreneurs who start firms may be more willing to accept the risks than those who do not and thus present the following proposition.

**Hypothesis 3:** There is a positive relationship between post-graduation startup of a new firm and a student's willingness to accept the risks involved.

#### 3.4. Resource Availability/Networks

Krueger et al. (1994) presented several questions related to potential entrepreneurs, including how the potential entrepreneur's perception of the availability of resources affects their feelings on the feasibility of the new venture. Using the resource-based view, Chrisman (1999) examined the influence of resource availability on starting a venture and found a positive correlation between resource availability and startup. An additional finding of the study was that those who obtain assistance from others (such as a network) are also more likely to actually start the new venture. It has been suggested that an extensive social network may be viewed by some as necessary before starting a new venture (Reynolds, 1991). In their study, Honig and Davidsson (2000) determined the entrepreneur's network has a strong and positive effect on several steps taken towards starting a business.

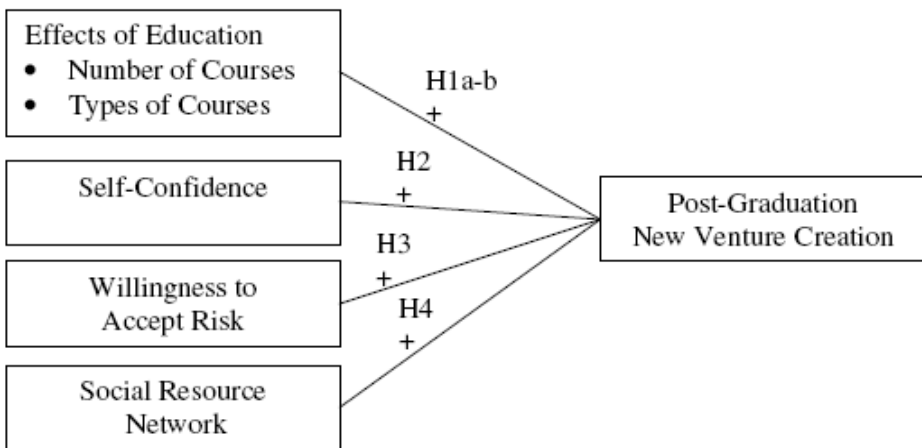
Networks can provide many benefits to the entrepreneur such as access to resources (financial, knowledge, emotional support etc.) and reduced perception of risk (Reynolds, 1991). Shane and Cable (2002) showed financing decisions were heavily influenced by networks and the information available through social relationships. Likewise, Florin et al. (2003) found a positive relationship between networks and access to resources. Other benefits of networking, such as the support available from family and friends, have also been identified (Honig et al. 2000). Given the referenced work, we offer the following hypothesis:

**Hypothesis 4:** There is a positive relationship between post-graduation startup of a new firm and a student's social network.

### 3.5. Framework Development

Figure 1 presents the guiding framework for the study. Entrepreneurial action is defined in the framework as the actual startup of a new venture. The framework presents the nascent entrepreneurs’ attitudes towards risk, self-confidence, perceived resources and the network available to the individual as having a direct effect on the formation of new firms. Finally, the number of entrepreneurship and small business courses taken is expected to be directly related to start of new firms with MBA courses having a greater effect than undergraduate courses.

Figure 1: Framework



## 4. Method

### 4.1. Sample and Procedure

The sample selected for the survey was every student who had taken an entrepreneurship or small business course at a major public Midwestern university in the United States over the life of the entrepreneurship program, a time span of 14 years. At this university, all entrepreneurship courses are taught by current or former business operators, 60-70% of which were consistent over the time that students in the sample attended the university. This provided an initial sample of 1,304 former students. All of the members of the sample were contacted by e-mail (including an invitation to participate, a link to the online survey instrument, and a completion deadline) to request their participation in the survey. The online survey link outlined the purpose of the survey and presented a consent form and the survey instrument itself. Two hundred and three of the e-

mails were returned as undeliverable or account closed, leaving 1,101 possible respondents. Of these, 148 completed the survey. Only 131 provided all of the data necessary for a useable response. Some of the individuals in the sample started firms before taking courses and were dropped from the analysis due to the difficulty in determining causality. This resulted in a final sample of 124 (response rate of 11%).

The mean age of the respondents was 28 (standard deviation=5.563) and the majority were male (61%). Most of the respondents (75%) had obtained a Bachelor's degree, followed by Master's degrees (19%) and PhDs (7%). The mean number of years since graduation for the sample was 3.93 with a standard deviation of 2.7. In addition, respondents had taken an average of 1.5 entrepreneurship courses (standard deviation=.72). The mean number of undergraduate entrepreneurship courses taken was 1.2 (standard deviation=.848). The mean number of graduate courses taken was .27 (standard deviation=.583). As for majors, Management was the most common major (29%), followed closely by Business Administration (26%). Appendix A provides additional demographic data regarding the respondents.

Based on a literature review of prior research examining similar constructs, questions for the survey instrument were developed or adapted from previous works to study the following constructs. Specific sources for the questions in the survey are discussed with the appropriate construct in the following section. Following development, the survey was submitted to and approved by the two appropriate research boards for the university where the study was performed. A pilot test was conducted following approval by providing the survey to six members of the entrepreneurship field. After the pilot study participants had reviewed the survey, they were contacted and their opinions regarding the survey instrument provided useful feedback, leading to the modification and elimination of some questions.

#### 4.2. Measurement and Constructs

This section briefly defines the constructs used in the study and discusses the development of measures used in the survey instrument. Most items were obtained through self-report measures on a five-point scale, ranging from strongly disagree to strongly agree.

*Entrepreneur's Startup.* We define entrepreneurial action in this study as the actual startup of a new venture. We specified startups that occurred after graduation. Respondents to the survey were asked "Since graduation, have you ever started your own entrepreneurial venture?" Those who started a firm before graduation were not included in the analysis as having started a new venture.

*Education.* A list of all graduate and undergraduate courses in entrepreneurship and small business available at the university where the study

took place were provided in the survey. Respondents were asked to indicate the courses they had taken. These results were then used to tabulate the total courses taken for each respondent by course level (undergraduate or graduate).

*Self-confidence.* Entrepreneurs will only pursue opportunities if they feel they are capable of successfully exploiting those opportunities (Boyd & Vozikis, 1994). To measure self-confidence in the survey instrument, participants were asked to respond, using a five-point scale, to the question “How confident do you feel that you could have become an entrepreneur and created a business if you had not taken any entrepreneurship courses at the Midwestern university?” with responses ranging from very certain to very uncertain. While issues with using single-item measures have been identified (Churchill, 1979) and we recognize these shortcomings, a single item was used in the survey because the survey was already lengthy and this construct was deemed the best candidate for item reduction. We felt one item could effectively represent self-confidence because, as defined here based on Gist (1987), it is really the question of whether or not the person feels they are capable of successfully completing a task (i.e. starting a new venture).

*Resource Availability/Networks.* Chrisman (1999) found that those obtaining assistance from others were more likely to start a new venture. In addition, there was a positive correlation between resource availability and startup. One question in the survey instrument for this construct was taken from Macke and Markley (2003), while the remainder were developed for the survey. The items were developed to examine both the respondents’ attitude toward networks and the availability of resources through them as well as access to resources through other means. Examples of the items used include “I have the ability to acquire financial capital” and “I have an extensive resource network that I am constantly building.” Two of the items in the six-item scale did not load on the factor and were dropped. The resulting scale had a Cronbach Alpha of .692. While this is slightly below the .7 normally utilized, alpha’s slightly below the .7 level have been utilized in the Entrepreneurship literature (Hongwei & Ruef, 2004) and related fields (Gaski, 1986; Ravinchandran & Lertwongsatien, 2005).

*Risk Acceptance.* As has been noted in the literature, it is commonly accepted that entrepreneurs face risks due to the more variable and less certain rewards they will receive, when compared to traditional wage earners (Cramer et al., 2002). The results of Cramer and colleagues (2002) show that, while causality cannot be determined, those who display less aversion to the risks are more likely to pursue entrepreneurship. We feel this can be construed as the individuals who are less risk adverse are willing to accept the risks inherent in entrepreneurship. Based on this, the items asked if the respondents were willing to accept some of the risks they may face in the startup of a new firm. The survey instrument included two items intended to capture the respondent’s willingness to accept risk associated with starting a new business: “I am willing to take the financial risks involved in starting and managing a business” and “I am willing to take the career

risk of leaving a job to start my own business.” These two items were presented with a five-point scale (Cronbach’s Alpha = .804).

### 4.3. Analysis

The hypotheses were tested utilizing binary logistic regression in SPSS 14. Following Hoetker (2007), this method was chosen as appropriate for a dichotomous dependent variable (started a new venture or did not). Self-confidence, the factor score for resource availability/networks, total undergraduate courses, total graduate courses, and the factor score for attitude towards risk were entered as the independent variables. The data were checked for skewness and outliers. Variables exhibiting greater than .8 for skewness were cleaned by taking the square root of each value. The possibility of outliers was examined utilizing Tukey’s hinges. Those data points found to be outliers were Winsorized and recoded as the lowest or highest acceptable value.

The means, standard deviations, and bivariate correlations for the variables utilized in the study are presented in Table 1. The dependent variable, start-up of a new firm, had a mean of .315, which translates into 31.5% of the respondents in the study having started a new firm. The standard deviation for the dependent variable was .466. The results from the binary logistic regression are presented in Table 2.

*Table 1: Means, Standard Deviations, and Bivariate Correlations*

	Mean	Std. Dev	N	Start	Gen	Age	Yrs Grad	SlfConf	Net	AccRisk	UGRD
<b>Start</b>	0.31	0.47	127								
<b>Gender</b>	0.39	0.49	127	-.22*							
<b>Age</b>	28.10	5.56	127	.18*	-.07						
<b>Yrs Since Grad</b>	3.93	2.71	127	.13	.01	.41**					
<b>SlfConf</b>	3.46	1.10	127	.35**	-.33**	.08	.02				
<b>Network</b>	0.00	1.01	126	.22*	-.20*	.11	-.05	.19*			
<b>AcceptRisk</b>	-0.02	1.01	125	.43**	-.17	.03	-.04	.38**	.59**		
<b>TotUGRDCrs</b>	1.20	0.85	127	.12	-.04	-.45**	-.03	.00	.04	.16	
<b>TotGRADCrs</b>	0.27	0.58	127	.10	-.03	.49**	-.01	.04	.00	-.07	-.55**

\* Correlation is significant at the 0.05 level (2-tailed).

\*\* Correlation is significant at the 0.01 level (2-tailed).



Table 2: Results of Binary Regression - Start/No Start as Dependent Variable

	Start				Model 1			Model 2			Model 3			Exp O
	Predicted		% Correct	Predicted		% Correct	Predicted		% Correct	Predicted		% Correct		
	Start	1		Start	1		Start	1		Start	1			
<b>Observed</b>	0	1		0	1		0	1		0	1			
<b>Start</b>	0	87	0	100	56	31	64	67	20	77	68	19	78	
	1	37	0	0	16	21	56	10	27	73	10	27	73	
<b>Overall Percentage Correct:</b>					62.1			75.8			76.6			
					<b>S.E.</b>	<b>Sig.</b>		<b>S.E.</b>	<b>Sig.</b>		<b>S.E.</b>	<b>Sig.</b>		
<b>Constant</b>					-3.27	1.07	0.04	-5.07	1.58	0.01	-6.53	2.09	0.002	0.001
<b>Age</b>					0.05	0.04	0.17	0.06	0.05	0.2	0.04	0.06	0.49	1.04
<b>Gender</b>					0.98	0.45	0.03	0.53	0.52	0.31	0.5	0.56	0.37	1.65
<b>YrsGrad</b>					0.07	0.08	0.35	0.1	0.09	0.3	0.14	0.1	0.19	1.15
<b>SIFCfd</b>								0.44	0.25	0.08	0.47	0.27	0.08	1.61
<b>Netwrk</b>								-0.24	0.29	0.4	-0.2	0.32	0.54	0.82
<b>RskAcc</b>								1.14	0.34	0.001	1.09	0.38	0.004	2.98
<b>UGRAD</b>											0.98	0.38	0.01	2.67
<b>GRAD</b>											1.894	0.8	0.02	6.65
					<b>Model Summary</b>			<b>Model Summary</b>			<b>Model Summary</b>			
					-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square	
					141.39	0.08	0.11	114.63	0.26	0.36	105.4	0.31	0.44	
					<b>Hosmer and Lemeshow Test</b>			<b>Hosmer and Lemeshow Test</b>			<b>Hosmer and Lemeshow Test</b>			
					Chi-square	df	Sig.	Chi-square	df	Sig.	Chi-square	df	Sig.	
					2.3	8	0.97	9.37	8	0.31	9.13	8	0.33	

The regression was performed utilizing a .32 cutoff point for the reclassification. The cutoff point will determine which group a respondent is predicted to be in based upon whether or not their predicted value in the model is above or below the cutoff point (Hadjicostas, 2006). This will influence the sensitivity and specificity of the classification. In our case, sensitivity is the percentage of individuals correctly classified as starting a new firm. The percentage of respondents correctly classified as not starting a new firm is a result of the specificity of the model (Peng, Lee, and Ingersoll, 2002). The default value for the cutoff is normally .5. However, the cutoff point can also be determined by utilizing the probabilities for the outcomes in the sample (Hadjicostas, 2006). In this sample, approximately 32% of respondents started a new firm. This cutoff can lead to slight alterations in the coefficients generated by the model, but does not alter the significance or direction of the relationships observed. Use of a reclassification percentage is appropriate in cases such as ours where the intent is to classify individuals (Hosmer and Lemeshow, 2000)

#### 4.4. Results and Discussion

Variables were entered into the binary logistic regression in three steps. By analyzing the variables in steps, the contribution of each set of variables can be inferred through the change in overall percent of correct classifications of the respondents who started and did not start businesses and the change in the Nagelkerke pseudo- $R^2$ . The fit of each stage is determined by the Hosmer and Lemeshow test. The first step assessed the effect of three control variables – gender, age, and the time that had passed since the respondents had graduated. While the survey data were collected over only a few months, there were concerns that how recently respondents had graduated could impact the analysis. This variable was calculated by subtracting the year respondents graduated from the year in which the data was collected. The second step involved the addition of personal characteristic variables, self-confidence, access to social networks, and willingness to accept, risk into the model. The two education variables (undergraduate courses and graduate courses) were added in the final step. Table 2 provides the statistics from each step.

As is presented in Table 2, the full regression model obtained a Nagelkerke pseudo- $R^2$  of .432. As noted by Hoetker (2007), this  $R^2$  value does not provide the same information as the  $R^2$  in multiple regression and as such should be interpreted with caution. Reclassification utilizes the model generated by the regression to classify the respondents as to whether or not they would choose to start a business and then compares this to the actual response from the individual. This percentage is one way of examining how accurate the model would be for prediction. The full model does correctly reclassify 73% of those who started businesses and 78% of those who did not, for an accuracy rate of 76.6% for all respondents, which is substantially better than an expected 50% chance classification. In addition, it can be noted in Table 2 that the addition of the personal characteristics improved the classification accuracy and fit of the model and that the full model provided both the best accuracy and the best fit, indicating that the education variables improved the classification accuracy of the model beyond that provided by the personal characteristic variables. Other than in the base model, none of the control variables are significant.

Hypothesis 1a posited a direct relationship between the number of undergraduate entrepreneurship courses taken and the start of new firms. The results of the study support this hypothesis (0.98,  $p=.01$ ). Additionally, the odds ratio (Exp) indicates that the odds of starting a new firm increase by 2.67 for each additional undergraduate course taken. Hypothesis 1b indicated that graduate level courses would also have a positive effect and that this effect would be stronger than the effect of undergraduate courses. This hypothesis is supported. Graduate courses did have a significant positive effect in the model (1.894,  $p=.02$ ). In addition, the effect is markedly larger for graduate courses (1.827) than for undergraduate courses (0.98) in the regression. The difference in the odds

ratios for graduate (Exp=6.265) versus undergraduate (Exp=2.67) courses, indicating the effect of taking graduate courses on the post-graduation start of a business is almost three times greater than undergraduate courses, also supports this hypothesis.

Hypothesis 2 stated a student's entrepreneurial self-confidence would positively affect startup of a new firm. This hypothesis is marginally supported in the binary logistic regression (0.47,  $p=.08$ ). In addition, the odds ratio (Exp) is 1.61, meaning that for each 1-unit increase in self-confidence, the odds of an individual starting a new firm are expected to increase by 1.61. Thus, self-confidence does have a positive impact on the start of a new firm.

The effect of a student's acceptance of the inherent risks on the startup of new firms was the focus of Hypothesis 3. There is strong support for this hypothesis based on the results in the model (1.09,  $p=.004$ ). Those who were more willing to accept the risks are found to be more likely to start a new firm. The odds ratio (Exp) for willingness to accept risk is 2.98. Finally, the fourth hypothesis suggested that possessing a better social network would allow access to more resources and would be positively related to startup. Results of the binary logistic regression ( $-0.20$ ,  $p=.54$ ) indicate this hypothesis must be rejected.

Chi-square tests were conducted to determine if there were statistical differences based on gender. While not significant in the full model, the results for gender in Step 1 suggest there is a relationship between gender and start-up ( $X^2=7.667$ ,  $p=.006$ ), with men more likely to start a new firm than women. Another concern was that those who were more motivated to start a new firm would also be more motivated to take courses, thus leading to endogeneity among the variables. In order to examine this, respondents were asked to assess their motivation, using a five-point Likert scale, "Before you enrolled, how motivated were you to start an entrepreneurial venture?" Motivation to start a new firm before taking entrepreneurship courses is not significantly correlated with the number of undergraduate courses taken ( $r=-0.01$ ,  $p=.993$ ). However, motivation is significantly correlated with the number of graduate courses taken ( $r=0.18$ ,  $p=.05$ ). Motivation prior to taking any courses is also significantly associated with the post-graduation start of a business ( $r=.36$ ,  $p=.00$ ). These results suggest that the motivation to start a business is not the reason undergraduates take entrepreneurship courses (perhaps they desire to obtain the elective credits or the timing fit their schedules). Graduate students appear to more likely to take courses with starting a business in mind. As expected, motivation to start a business is associated with actually starting a business.

## **5. Limitations**

The sample used in the study, students who took entrepreneurship and small business courses, while appropriate, limits the generalizability of the findings to

only this population, leaving us unable to compare those who have taken courses with those who have not. While this limits the causal interpretation, we hope the study can serve as a foundation for another study in the future which addresses this limitation. Noting the small standard deviations of the two course variables, range restriction of the number of courses could also be a limitation of the study. Because the sample was taken from only one university, the generalizability of the results is limited, with the results only being applicable to those institutions with similar programs. The correlations between the motivation to start a business, taking graduate courses, and the post-graduation start of businesses suggest that our inference of a beneficial effect of taking such courses might be small when compared to the greater motivation they have to start a business.

## **6. Discussion and Directions for Future Research**

The results of this study have implications for entrepreneurship education. One implication is that education does seem to matter. While not as conclusive as we had hoped, this study lends support to the body of evidence that education does matter in the startup of new firms. This research appears to support and extend the findings of other researchers, such as Clark et al. (1984) and Charney and Libecap (2000). At the very least, it has implications for future research, suggesting that the relationship deserves additional study. A potential focus on graduate courses and graduate students is another implication. For example, Robinson and Sexton (1994) found years of education to be positively associated with earnings for the self-employed. We feel it important to note however, that because the graduate and undergraduate students are taught concurrently in the institution where the study took place, it is possible that this finding is due to differences among graduate and undergraduate students as opposed to differences in the course level. For example, it may be that graduate students have more work experience that allows them to start their own firm. Another implication relates to self-confidence. This is another study producing results that show self-confidence is important in the startup of new firms. Those educating potential future entrepreneurs should include activities that improve the self-confidence of these individuals and either show them that they have the ability or help them obtain a belief in their abilities. This increase in self-confidence may be one way in which education can impact the individual's decision to start a new firm. A focus on those individuals willing to take the risks of starting a new venture could be another implication. Based on the results of this study, those who are unwilling to accept the risks will be less likely to start a new firm. Thus, programs should be directed to those willing to take the risk in order to be more effective. It is noted that the reverse relationship may also be at work with regards to risk. Those who have taken entrepreneurship courses may feel they are better prepared to undertake the risk, leading them to be more likely to start a new firm. This may

be a way in which entrepreneurship education has an impact on the individual's decision to start a new firm.

We feel it is important to note here that the prior discussion does not necessarily mean that those students who take entrepreneurship courses will necessarily be more effective entrepreneurs than those who do not. Our focus here was on how the number of courses taken impacted the likelihood of starting the new firm. The study did not include data on the performance or success following the start-up of the new venture.

Several future directions for research are available. The first proposal for future research we present is to replicate the study with a different sample. A study with a large sample of potential entrepreneurs, some of which took entrepreneurship courses and some of which did not, would be ideal for such a study. A longitudinal study would be preferable and more effective, thanks in part to the ability to observe effects that occur over time (Brockhaus, 1987; Clouse, 1990). As noted by several other authors who have proposed similar frameworks, we do not claim to have examined all of the possible antecedents, moderators, characteristics, and so on which may be applicable to the relationships being studied (Autio et al., 1997; Luthje et al., 2003; Robinson et al., 1991).

Another avenue for future research would be to identify these other factors, which may lead to a deeper understanding of the relationships studied in this paper. Future research could also examine the causal relationships between some of the aspects considered here (Baum & Locke, 2004; Gist, 1987; Luthje et al., 2003). For example, do individuals who enroll in entrepreneurship courses develop a more positive view of entrepreneurship or do they self-select into courses because they already have a positive view of entrepreneurship. A longitudinal study would be beneficial in determining the nature of these causal relationships (Autio et al., 1997). Adding the performance of the new firm to the picture could also provide beneficial insights on the impact of entrepreneurship education. Future research could consider how the entrepreneurship education of the founder or members of the new venture impact its performance initially and in the long-run.

Since the precursors of intentions are not static, the possibility exists to affect an individual's intent to engage in entrepreneurial activity (Krueger Jr et al., 1993). It may be possible through education to encourage more individuals to consider entrepreneurship as a viable career option. The intent of this paper is to enrich the extant literature that aims to answer the question of why some individuals choose to start a business while others do not. We have synthesized a variety of areas with the hope of providing additional insight into the many aspects involved in why individuals start new firms. We encourage others to continue the development of this often complicated area and look forward to the future insights yet to be revealed.

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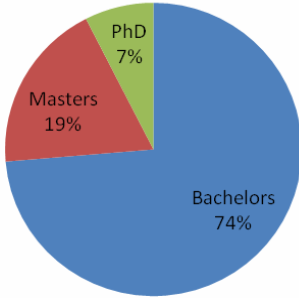


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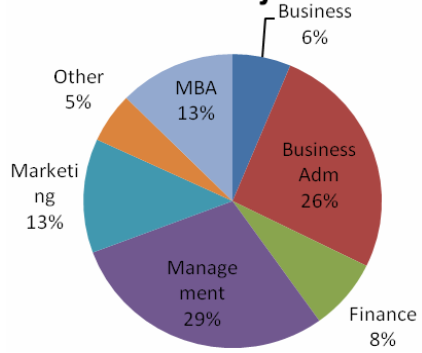
APPENDIX

Appendix A: Demographic Summary

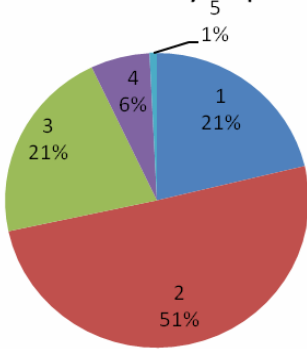
**Degree Obtained**



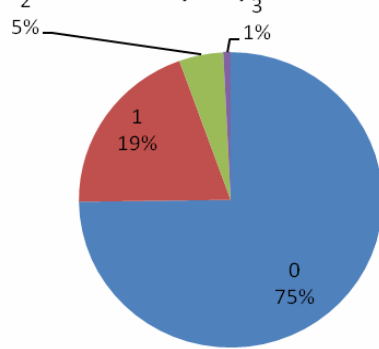
**Major**



**Number of Undergraduate Courses Taken by Respondents**



**Number of Graduate Courses Taken By Respondents**



**Age of Respondents**

