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Influence of Entrepreneurship Education on Entrepreneurship Development in Post-secondary Education

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Abstract

Entrepreneurship education programs have expanded across post-secondary education in the past thirty years, leading to an increased need to further understand the impact entrepreneurship education has along the construct of entrepreneurship development. Three related studies comprise this research and were conducted to investigate the effect entrepreneurship education has on entrepreneurship development. Students, existing entrepreneurs, and alumni were surveyed in these three studies to compare differences between participants and non-participants in educational experiences. The present research builds upon the existing body of knowledge and seeks to provide research and psychometric contributions to the field by studying specific educational interventions and modifying a survey instrument designed to measure the constructs of Entrepreneurial Intent, Entrepreneurship Self-Efficacy, Entrepreneurship Outcome Expectations, and Goal Directed Activity. In reviewing the literature, the researcher identified areas in which additional exploration was needed to further explore how an individual develops in the area of entrepreneurship. To address gaps in the literature, the present research refines scales used to measure entrepreneurship development, investigates changes individuals experience through entrepreneurship education, utilizes robust statistical methods and draws from a diverse sample of current students, existing entrepreneurs and alumni of an entrepreneurship education program.

Introduction

With the rise of global economic competition, evolving business markets and international economic uncertainty, the United States and many other nations have looked for solutions to stabilize fiscal conditions. One approach has been to focus on entrepreneurship as a means of building sustainable business models upon which new ventures will flourish. With growing trends towards innovation as an economic driver, entrepreneurship has become a commonly referenced term in the popular as well as academic press and has been identified by policy leaders as a crucial element to America's future in the global marketplace. Approximately four million new businesses are created annually contributing the majority of new jobs to the economy (Haltiwanger et al, 2009) as an illustration of the impact entrepreneurship has on economic development. In the United States, an increased emphasis has been placed on educating the current and future workforce in aspects of entrepreneurship as a means of remaining globally competitive. Business and government officials have called upon post-secondary education to help address the need for entrepreneurs and to develop the knowledge, skills and abilities individuals require to successfully implement new business ventures.

Katz (2003) provides a chronological historical context for the rise of entrepreneurship education, from the earliest courses found in 1876 to focused efforts at Harvard beginning in 1947 and an increase in programs being offered in the 1970s. Today, over 1,600 institutions of higher learning offer entrepreneurship-related courses with more than 275 endowed faculty positions and close to 50 refereed journals dedicated

to the field of entrepreneurship (Katz, 2003). Accrediting bodies such as the Association to Advance Collegiate Schools of Business (AACSB) have begun placing an emphasis on

entrepreneurial education as an aspect of accreditation (Kuratko, 2005). Despite the growth in entrepreneurial education programs, little has been done to measure the impact of entrepreneurship education on entrepreneurship development. According to Thursby and Thursby (2007), an increasing number of academic institutions are engaging in entrepreneurial activities driven by events such as the growth in biomedical research in the 1970s, the passage of the Bayh-Dole act in 1980, shifts in research funding from government sources to increased industry financing, and changes in university guidelines and behavior to reward entrepreneurship.

Drucker (1959) wrote of the knowledge economy and emphasized the need for advanced educational programs to prepare the knowledge worker of the future. Elected and business leaders have continuously called for increasing the number of entrepreneurs and programs enhancing entrepreneurship development. Building upon the work of Drucker and others, Florida (2002) emphasized the role of universities in developing an educated workforce, including the next generation of entrepreneurs. The ability for an individual to learn entrepreneurship skills has been questioned in the popular and academic literature. Wasserman (2012) argued, "founders of startups clearly believe they can learn" and Torrance (2013) held that it is not <u>if</u> entrepreneurs can be taught, but <u>how</u> to teach entrepreneurs. It has been shown that education relates positively to the economic performance of start-ups (Gimeno et al., 1997) yet the role that entrepreneurship education plays in entrepreneurship development remains a nascent field of research.

Theoretical Basis

The existing literature within the area of entrepreneurship education explores individual development along various dimensions including the Theory of Planned Behavior (Ajzen, 1991), Theory of Planned Action (Katz, 1992), Social Cognitive Career Theory (Lent, Brown, and Hackett, 1994), and Human Capital Theory (Lau, Chan and Man, 2000). In reviewing these theories, related constructs of intent, self-efficacy, outcome expectations and goal directed activity were identified by the researcher in order to determine the areas of focus in the present study.

One such construct, self-efficacy, is defined by Bandura (1986) as, "concerned not with the skills one has but with judgments of what one can do with whatever skills one possesses." A second construct, outcome expectations, is described as "anticipation that certain outcomes would follow certain actions, and includes beliefs about extrinsic rewards, self-directed consequences such as pride in achievement, and social consequences such as approval" (Bandura, 1986). The third construct, goal directed activity is presented by Elliot, et al., (1997) as "consciously articulated, personally relevant objectives that lend a sense of purpose and direction to people's behavior." These three constructs will be further investigated in this study to expand upon previous inquiries into an individual's entrepreneurship development. A description of these constructs is provided in the literature review that follows.

Social Cognitive Career Theory

Researchers have studied entrepreneurship development along a number of psychologically-based theories as a means of further understanding individual intentions, behaviors and motivations. Social Cognitive Career Theory (SCCT) holds that an

individual's occupational considerations are partially a function of self-efficacy beliefs and an individual's intent, expected career outcomes and goals. As put forth by Lent, Brown, and Hackett (1994), SCCT describes interrelated and dynamic models of career and academic interest development, choice, and performance. This theory is based upon Bandura's (1986) Social Cognitive Theory. The present research is grounded within SCCT and focuses on the area of entrepreneurship upon which an individual develops along the constructs of Entrepreneurial Intent, Entrepreneurship Self-Efficacy, Entrepreneurship Outcome Expectations, and Goal Directed Activity.

Social Cognitive Career Theory hypothesizes that environmental and personal factors such as socioeconomic status, genetics, and personality play an important role in determining the availability of academic and career-related experiences. The theory offers that, through repeated activity, modeling, and feedback from others, individuals develop their self-efficacy and outcome expectations for academic and career-related tasks. It is held in this theory that one's self-efficacy and outcome expectations influence the development of unique academic and career-related interests.

This theory holds that the constructs of Self-Efficacy, Outcome Expectations, Intentions, and Goal Directed Activity are expected to mediate the relationships between an individual's inputs and behaviors, as well as between one's background environmental factors and behaviors. Specifically, it is proposed that an individual's inputs, such as demographics and background factors (i.e., environmental influences), shape self-efficacy beliefs and outcome expectations. These variables then affect the development of an individual's intentions and interests, which impact the goals, actions, and performance

attainments that an individual pursues (Lent and Brown, 1996; Lent, Brown, and Hackett, 1994; Lent et al., 2002; Schwab and Tokar 2005).

Researchers have begun to explore the applicability of Social Cognitive Career Theory in understanding the role education plays in entrepreneurship development. The present research seeks to expand upon early studies to further investigate the use of this theory through a study involving current students, existing entrepreneurs and alumni of an entrepreneurship education program. The psychological grounding for SCCT offers measurable constructs to assess one's development and influences to pursue an activity such as entrepreneurship. Further explanation of the four core constructs of Entrepreneurial Intent, Entrepreneurship Self-Efficacy, Entrepreneurship Outcome Expectations, and Goal Directed Activity is provided in the literature review that follows. Based upon previous research and indications of the utility of this theory, SCCT will be used as the foundation for this research. Further evidence will be gathered from this research, and the use of SCCT will be evaluated and the core constructs of the theory will be assessed within the context of entrepreneurship development.

Research Questions

In investigating entrepreneurship development, the following research question serves as the fundamental pursuit of the present inquiry: "Does participation in an entrepreneurial educational experience (curricular or co-curricular) increase an individual's development and likelihood to pursue entrepreneurial ventures?" Table 1 outlines the main research questions for each of the studies comprising the present research. Data gathered from these studies provides insight into ways in which entrepreneurship education impacts an individual's development by comparing those who

participated in an educational experience and those who did not and adds to the existing literature in further investigating the application of SCCT to entrepreneurship education by modifying measurement scales.

Table 1

Summary of Present Research Questions

Study	Participants	Research Questions
One	Students	Did the modified items and scales used to measure entrepreneurship development in the instrument used in this research enhance the depth of understanding of the impact of entrepreneurship education? What is the impact of a semester long entrepreneurship education experience along the constructs of Entrepreneurial Self Efficacy, Entrepreneurial Intention, Entrepreneurial Outcomes Expectations and Goal Directed Activity?
Two	Existing Entrepreneurs	Do existing entrepreneurs report higher average scores in Entrepreneurial Intent, Entrepreneurship Self- Efficacy and Entrepreneurship Outcome Expectations than current non-entrepreneurs? Do those individuals with entrepreneurship education experiences have higher average levels of Entrepreneurial Intent, Entrepreneurship Self-Efficacy, and Entrepreneurship Outcome Expectations than those who have not taken entrepreneurship coursework? What impact did an entrepreneurship education intervention have on later entrepreneurial behavior?
Three	Alumni	Do male and female alumni differ in entrepreneurial development by those who participated in an entrepreneurship education experience scores on Entrepreneurial Intent, Entrepreneurship Self-Efficacy and Entrepreneurship Outcome Expectations versus alumni who did not participate in an educational intervention? How do alumni identified as entrepreneurs engage in the advancement of their alma mater?

The present research represents a theoretically-grounded study of the impact of entrepreneurship education on an individual's ability to develop dimensions of entrepreneurship through participation in post-secondary education. Structural definitions of key terms used in this study are established below. This research attempts

to provide insight into the development individuals achieve as a result of entrepreneurship education experiences. Additionally, post-graduation impacts of educational programs were examined through a survey of alumni with exposure to an entrepreneurship educational experience to investigate entrepreneurship behavior following the completion of an undergraduate business program. The existing literature suggests and the present research offers that entrepreneurship can be developed and is worthy of being added to current student developmental frameworks. As described in the literature review, additional quantitative evidence is needed to support the overall conceptualization of the construct of entrepreneurship development specifically focused on the relationship entrepreneurship education has on an individual's entrepreneurship development. The purpose of this research is to modify a measurement instrument along the constructs of Social Cognitive Career Theory to further investigate how one develops through entrepreneurship education. Data collected through surveys of students, existing entrepreneurs and alumni were analyzed to investigate if differences exist between participants and non-participants in entrepreneurship education.

Literature Review

This review establishes definitions for key concepts, presents developmental constructs of interest, references relevant prior work supporting the theoretical grounding for the present research and cites models of entrepreneurship education. Entrepreneurship as an area of development has been previously studied with evidence supporting positive impacts of educational experiences (Kuratko, 2003). The following review of the literature is structured into three sections, definitions and constructs, educational interventions, and research methodology. This review establishes the basis for this research and frames the direction for the methodology upon which the research followed in exploring entrepreneurship education.

Definitions and Constructs

Forming a common definition for the terms of entrepreneur and entrepreneurship is necessary as these concepts serve as the core focus and are discussed throughout this research. The literature provides a series of definitions for these terms but, for the purposes of the present research, the investigator has established a set of definitions to further refine widely-used concepts within the context of this research. Definitions found in the existing literature are presented in this section. Following the conceptual definitions, this section includes a review of related constructs: Entrepreneurship Development, Entrepreneurship Self-Efficacy, Entrepreneurial Intent, Entrepreneurship Outcome Expectations, and Goal Directed Activity. Definitions of key terms as conceptualized by the investigator and used in the present research are provided at the conclusion of this section of the literature review.

Definitions. In the current economic environment, the terms *entrepreneurship* and *entrepreneur* have been widely used in the popular and academic literature. As

institutions of higher education implement new programs in the area of entrepreneurship, it is important to frame how the term is conceived for the purpose of studying the development that individuals experience as a result of participating in entrepreneurship education. A summary of commonly-used definitions found in the existing literature can be found in Table 2. Following the table, definitions used in the present research are provided.

Table 2

Summary of Definitions

Term	Author/Date	Definition
Entrepreneurship	Shane and Venkataraman (2000)	Involves the study of sources of opportunities; the processes of discovery, evaluation, and exploitation of opportunities; and the set of individuals who discover, evaluate, and exploit them.
	McMullen and Shepherd (2006)	The essence of entrepreneurship is action.
	Mars and Rios-Aguilar (2010)	A process of creating and sustaining economic and/or social value through the development and implementation of creative and innovative strategies and solutions that require the identification of opportunity that results from economic (dis)equilibrium, risk-taking and mitigation, and resource allocation and mobilization.
Entrepreneur	Thornton (1999)	Individuals who embrace risks associated with action often going against the grains of normative social structures in established industries and fields in order to advance innovative solutions to specific social and/or economic problems
	Mars and Rios-Aguilar (2010)	Individuals who are not only able to accept and reconcile risk but are also able to track, identify, and act on opportunities for creating value within various social and economic environments.
	Isenberg (2013)	Entrepreneurs as contrarian economic value creators, seeing value where others see none and business opportunities where others see dead ends.

Definitions in the present research. In building upon definitions found in the existing literature, the present research operationalizes the term *entrepreneurship* as an action-based process of creating a venture, which provides market value. Similarly, this study focuses on entrepreneurs as risk-taking individuals engaged in starting new business ventures through creation, invention, and action to meet a market need, rather than individuals who invest or manage start-up companies. For the purpose of this research, the term *entrepreneur* has been framed around actions taken to start a venture and build economic value in the market.

Constructs. A basis upon which to measure entrepreneurship development is necessary as it relates to the theoretical as well as operational aspects of this research. Social Cognitive Career Theory offers dimensions of development within entrepreneurship through which this research will explore the impact education has on entrepreneurship development. The constructs presented here are grounded in Social Cognitive Career Theory and have been selected by the researcher as they offer measurable areas upon which to investigate the hypotheses of interest in this research.

Entrepreneurship development. As important as framing definitions for the key terms above, a framework for the constructs used here is needed to shape the research questions explored in this research. Kuratko (2003) held that "entrepreneurship, or certain facets of it, can be taught…and business educators and professionals have evolved beyond the myth that entrepreneurs are born, not made" (11).

Similar to the study of leadership, early research into entrepreneurship focused on individual traits possessed by successful entrepreneurs. As inconsistency in research findings was detected in both fields, scholars shifted from studying traits and situational

factors to a dynamic learning process through which entrepreneurs engage in an evolutionary process (Kempster and Cope, 2010) and consciously develop their personal and functional capabilities in order to face the challenges of the current business world (Kempster, 2006; Rae 2006; Cope, 2005; Young and Sexton, 2003; Swiercz and Lydon, 2002; Cope and Watts, 2000; Rae and Carswell, 2000). From these findings, one can see that dimensions of entrepreneurship can be developed through deliberate educational interventions. An explanation of the dimensions of entrepreneurship used in this study is provided above.

An examination of the literature illustrates that entrepreneurship can be developed through educational interventions but one model for education does not exist. Scholars have examined curricular and co-curricular activities to determine if entrepreneurship is a discipline and thus can be learned. These efforts have expanded as programs have proliferated with research being done in increasing quantity and quality around the globe (Drucker, 1985; Henry et al 2005; Kuratko, 2005). As entrepreneurship and innovation have been recognized as critical drivers of sustainable economic development and competitive advantage in the U.S. and internationally (Birch, 1987; Sine and Lee, 2009), Katz (2003); Matlay (2008); and Solomon et al. (2002) have made calls to produce and deliver high-quality entrepreneurship education. These studies have assisted in the conceptualization of entrepreneurship as a field of study and led to expanded educational opportunities but further quantitative research is needed to demonstrate entrepreneurship education impacts on future behavior.

Further research is needed to expand the measurement of developmental constructs. The present research is grounded on the premise that education has an impact

on entrepreneurship development and seeks to advance the quantitative analysis of the impacts of educational interventions. A summary of studies related to the constructs of entrepreneurship development and educational interventions examined in the present research can be found in Table 3 with further detail for each construct following.

Table 3

Type of Entrepreneurship Education vs. Type of Research Construct

	Entrepreneurship Self-Efficacy	Entrepreneurial Intent	Entrepreneurship Outcome Expectations	Goal Directed Activity
Formal Class	Chen, et al. (1998); Lent (2001); Segal (2005)	Lent (2001)	Betz (1999); Lent (2001); Dutta (2010)	Elliott (1997); Lent (2001)
Self-Study	Markman (2002) Morris (2013)	Jones (2010)		Jones (2010)
Formal Program of Study		Segal, et al. (2005); Souitaris et al. (2007)	Lopez, et al. (1997); Gore and Leuwerke (2000)	Vazquez (2010)
Co-curricular activities			Dutta (2010)	
Multiple interventions	Boyd and Vozikis (1994); Chen et al., (1998); Baum et al., (2001); Krueger (2003)	Collins, Hannon and Smith (2004); Geldhoff (2013)	Lopez (1997)	Culbertson, et al. (2011); Hechavaria, et al. (2012)

Entrepreneurship self-efficacy. Building upon the origins of the self-efficacy construct found in social cognitive theory, a significant number of studies have produced evidence that supports entrepreneurial self-efficacy influencing one's pursuit of creating a start-up venture. Wood and Bandura (1989) defined self-efficacy as an individual's cognitive estimate of his or her "capabilities to mobilize the motivation, cognitive resources, and courses of action needed to exercise control over events in their lives." This definition has been used as a basis for developing the construct of entrepreneurship

self-efficacy and serves as the foundation of this measurement for the purpose of this study.

The literature shows self-efficacy as a highly appropriate measure for the study of entrepreneurs. As self-efficacy is a task-specific construct rather than a global disposition, Brockhaus and Horwitz (1986) and Gartner (1989) found self-efficacy theory helps address the problem of lack of specificity in previous entrepreneurial personality research. Additionally, research has indicated that as a belief of one's vocational capabilities, entrepreneurial self-efficacy is relatively more general than task self-efficacy. This more general measurement allows entrepreneurs to modify and develop their self-efficacy through education and interactions with their environment. Also, as self-efficacy is closest to action and action intentionality (Bird 1988; Boyd and Vozikis 1994), it can be used to predict and study entrepreneurs' behavior choice, persistence, and effectiveness. According to Chen, et al. (1998), the relationship between self-efficacy and behavior is best demonstrated in challenging situations of risk and uncertainty, which are believed to be characteristics of entrepreneurs.

According to Bandura (1982), individuals develop and strengthen beliefs about their efficacy in four ways: (1) mastery experiences (or enactive mastery); (2) modeling (observational learning); (3) social persuasion; and (4) judgments of their own physiological states. Boyd and Vozikis (1994) extended Bandura's Social Learning Theory to the study of entrepreneurship development to include the broader concept of self-efficacy in the examination of new venture creation. Their study suggested self-efficacy is instrumental in determining who will be more successful in the process of new venture creation.

Chen et al. (1998) examined the construct of entrepreneurial self-efficacy to predict the likelihood of an individual being an entrepreneur. In this study, the authors defined entrepreneurial self-efficacy as the strength of a person's belief that he or she is capable of successfully performing the various roles and tasks of entrepreneurship. Participants in this research included students, existing entrepreneurs, and alumni of a business program and were asked to respond to 26-items measured using a five-point Likert scale to indicate their confidence in performing tasks related to entrepreneurship. From the responses, Chen et al. (1998) developed five factors, "marketing, innovation, management, risk-taking, and financial control" (304) in relation to one's entrepreneurial self-efficacy. From the results, the authors report a Cronbach's alpha of .89, demonstrating the reliability of the scale used in this study to measure self-efficacy with moderate to high reliability with α's ranging from .89 to .65 and correlation of marketing (r = .78), innovation (r = .73), management (r = .77), risk-taking (r = .68) and financial control (r =. 64) to self-efficacy. Results from this research showed scores on entrepreneurial self-efficacy differentiated entrepreneurship students from students of both management and organizational psychology. Additionally, entrepreneurship self-efficacy was found to be positively related to the intention of setting up one's own business. The results of this study indicate the potential of entrepreneurship self-efficacy as a distinct characteristic of an entrepreneur. These results also demonstrate important implications for areas such as entrepreneurial assessment and education, as entrepreneurship self-efficacy can be used to identify reasons for entrepreneurial avoidance. By better understanding why individuals may not engage in entrepreneurial

activities, educators and policy makers can develop programs to increase entrepreneurship self-efficacy as a means of increasing entrepreneurial pursuits.

In a survey of 217 patent inventors, Markman et al. (2002) found self-efficacy distinguished inventors who started a business from inventors who did not. The authors used a general self-efficacy scale measuring an individual's belief about what one can do under different conditions within their skill set. Reliability for this general self-efficacy scale used by Markman had a Cronbach's alpha of .89. Using a MANOVA, the authors found a significant difference between the entrepreneurs and non-entrepreneurs surveyed on three dependent variables (self-efficacy, magnitude of regrets and number of regrets). The variable, magnitude of results, was measured by a seven-point Likert scale upon which respondents were asked to indicate the level of regret they had, ranging from little regret to much regret to investment decisions they had made. These findings support the use of self-efficacy as a measure of entrepreneurial development as non-entrepreneurs differed from entrepreneurs.

Segal et al. (2005) investigated 112 junior and senior level business students' desirability for self-employment as it relates to career intentions. The authors report a Cronbach's alpha of .91 for self-efficacy, indicating internal consistency of this general self-efficacy scale for the study of entrepreneurship. The findings from this research support the use of entrepreneurial self-efficacy as a measure of entrepreneurship development at the undergraduate level and offer an area to expand research to further investigate student Entrepreneurship Self-Efficacy, which can be generalized to a broader audience.

From the review of the existing literature, the measure of Entrepreneurship Self-Efficacy is found to be appropriate and useful in gaining an understanding of educational development. This construct is based upon validated psychological research and offers an area upon which future research can assist educators and policy makers in enhancing programs to support individuals seeking to become entrepreneurs.

Entrepreneurial intent. Researchers have investigated individual intentions to start new business ventures as a construct of entrepreneurship (Bird, 1998; Carr and Sequeira, 2007; Krueger et al., 2000; Webster, 1977; Wilson et al., 2007) and to explore entrepreneurial intentions post-graduation (Galloway and Brown, 2002; Galloway and Levie, 2001). Previous research has indicated entrepreneurial intent to be an important and continuing construct in entrepreneurship theory and research (Carr and Sequeira, 2007; Hmieleski and Corbett, 2006; Wilson et al., 2007). However, Shook et al (2003) found no common definition or measurement of entrepreneurial intent. Autio et al. (1997) stated this construct lacked a psychometrically-validated measurement scale. This lack of a uniform understanding and measurement offers an opportunity for the present research to further investigate the construct as it relates to an individual's entrepreneurship development.

Collins, Hannon and Smith (2004) investigated the construct of entrepreneurial intent by surveying approximately 1,500 undergraduate students from three universities in the United Kingdom. The researchers for this study developed the instrument but did not report reliability for the scales used to measure the construct. From the research, *desire to build something myself* and *desire to make money* each received 27 percent of the responses when asked about the biggest influence on becoming an entrepreneur.

While this study provides limited statistical support of this construct, it does offer areas upon which to further explore student intentions towards entrepreneurship and to measure this scale.

To address previously identified shortcomings in the definition and measurement of entrepreneurial intent, Thompson (2009) conducted a meta-analysis of existing scales measuring entrepreneurial intent. Of the 26 items on the instrument used in this study, only seven reported reliability:

- Chen et al. (1998) with an alpha of .92,
- Crant (1996) with an alpha of .93,
- Davidson (1995) with an alpha of .84,
- Kennedy et al. (1993) with an alpha of .80,
- Mueller and Thomas (2001) with an alpha of .82,
- Reitan (1997) with an alpha of .88, and
- Singh and Denoble (2003) with an alpha of .86.

While these alpha scores are high, many of the instruments used contained only one to three items. Thompson continued to develop a 10-item scale of entrepreneurial intent, which asks respondents to rate their intention towards specific behaviors on a five-point Likert scale. The Cronbach's alpha for this scale was reported to be .89. Thompson's work to identify existing scales and develop a reliable metric that can further assess an individual's entrepreneurial intent assists in advancing the understanding of a construct that has been identified as important to entrepreneurship theory. The present research modifies Thompson's Individual Entrepreneurial Intent Scale in an attempt to further the measurement of entrepreneurship development.

In examining personal and contextual attributes along with characteristics to predict entrepreneurial intent, Geldhoff et al. (2013) surveyed 3,461 college students enrolled in colleges and universities in the United States using the Entrepreneurial Intentional Self-Regulation Questionnaire. This instrument developed by the authors contains an entrepreneurial intent subscale of four items. Respondents to this survey were asked to indicate how important starting/developing a new business is in their lives with items scored on a five-point Likert-type scale ranging from *not at all important* to *extremely important*. Sample items include, "Start my own business," "Develop my own business," and "Change the way a business or organization runs." The authors concluded that having an entrepreneurial parent positively predicted entrepreneurial intent. Geldhoff et al. held that, while entrepreneurial intent has been found to influence an individual's entrepreneurship development, additional quantitative research is needed to further understand this relationship through longitudinal studies. The present research will explore the construct of entrepreneurial intent together with family influences in current students, existing entrepreneurs and alumni as a means of gathering data related to long-term impacts of education on entrepreneurship development.

Entrepreneurship outcome expectations. The construct of Entrepreneurship Outcome Expectations as it relates to vocational interests was originally put forth in the model developed by Lent, Brown and Hackett (1994) in developing Social Cognitive Career Theory and has been subsequently applied to studying occupational orientation and entrepreneurship development. Self-efficacy has been researched more extensively across academic disciplines than the construct of outcomes expectations, but initial research indicates the potential for broader use in the study of occupational choice. Of

particular interest to the present research is the applicability of outcomes expectations in measuring one's entrepreneurship development. Bandura (2001) defined the construct of outcome expectations as the expected results or outcomes of intentional actions in which an individual chooses to engage. This definition will be extended in the present study to the field of entrepreneurship development in gaining further understanding into the development an individual achieves related to orientation towards entrepreneurial activities and occupational goals.

Lopez et al. (1997) looked to further investigate the role of Entrepreneurship Outcome Expectations in the SCCT framework through a study of 296 high school students. This research produced statistically-significant results in the ability of outcomes expectations to predict academic disciplinary interest. The authors used the Usefulness of Mathematics Scale developed by Fennema and Sherman (1976) and revised by Betz (1977) to measure outcome expectations. Previous research by Lopez and Lent (1992) indicated a Cronbach's alpha of .92 for the scale used in this research and found correlation ($r = .74$, $p < .01$) with math interests and with course-specific self-efficacy($r = .88$, $p < .01$). Although this study was conducted using a small sample ($N = 50$) of high school students, the results demonstrate the applicability of the construct of outcomes expectations in measuring an individual's career intention and offers opportunities for future exploration in how the construct might be utilized in areas such as entrepreneurship development.

Gore and Leuwerke (2000) conducted a study using a sample of 93 college students to explore the relationships among self-efficacy beliefs, outcome expectations, congruence, and occupational considerations to predict an individual's career choice.

Using the Strong Interest Inventory (Harmon et. al, 1994), the authors reported reliability scores ranging from .91 to .96 across the dimensions of the instrument. Participants indicated the degree to which they would get what they wanted from each of the 84 occupation titles listed on the instrument using a 9-point scale ranging from 1 (*not very much*) to 9 (*very much*). The authors hypothesized "outcome expectations would account for additional unique variance in occupational considerations" (240). Through regression analysis, this research indicated outcomes expectations predicted occupational interests ($F = 20.45$, $p < .05$). Although the sample was limited, this study attempted to further the empirical understanding of the construct of outcomes expectations to better assess the role this measure plays in an individual's occupational choice.

Based on these previously conducted studies, outcomes expectations offers potential in gaining insight into an individual's interest in entrepreneurship and how one develops knowledge, skills and abilities to be better prepared to pursue a career in an area of entrepreneurship. This research will build upon these prior studies and will further measure the impact of this construct and advance the psychometric analysis of the construct. As described in detail in the methods section, the instrument used in the present research expands upon items and scales used to measure outcomes expectations within the context of entrepreneurship development.

Goal directed activity. The third core construct of SCCT has been identified as goal directed activity. According to Elliot, Sheldon, and Church (1997), this idea is defined as "consciously articulated, personally relevant objectives" that provide a sense of purpose and direction to one's behavior (915). Bandura (1977), Deci and Ryan (1987), Eccles and Wigfield (2002), and Schunk (1991) have examined individual goal

directed activity as an element of psychological theories aimed at understanding human motivation and development.

Using elements of goal theory and social cognitive theory to investigate nascent entrepreneurial start-up outcomes, Hechavaria et al. (2012) looked to develop a predictive model for the likelihood of creation of a new firm among nascent entrepreneurs based upon one's goal orientation. Data for this study came from the Panel Study of Entrepreneurial Dynamics I, a longitudinal study of over 31,000 individuals. A sample of 830 nascent entrepreneurs was identified in this data set for this longitudinal study. Participants in this study were sent the Study of Entrepreneurial Dynamics survey annually for three years. Results suggest formalized goal setting through tools such as a business plan lead to greater probability of continuing a start-up venture over abandoning the new business. The impact goal setting and action upon set goals on entrepreneurial ventures is evidenced through this study. While this work focused on emerging entrepreneurs, further research examination of the impact education has on entrepreneurship development along goal directed activities will provide additional insight into the importance entrepreneurs place upon the use of goals. The present research looks to expand upon existing research in this area through a set of survey questions designed to measure one's goal orientation.

A study by Culbertson et al; (2011) looked to assess the influence of goal orientation and self-efficacy in predicting entrepreneurial and managerial development. In this study, data were collected from 158 college students using VandeWalle's (1997) Goal Orientation Inventory. VandeWalle reported alpha reliabilities for three subscales on the Goal Orientation Inventory: Learning Goal Orientation ($\alpha = .88$), Performance-

Prove Goal Orientation (α = .84), and Performance Avoid Goal Orientation (α = .83). Similar reliability values have been reported in further research efforts (VandeWalle et al., 1999). Results of Culbertson's study indicated learning goal orientation and performance-prove goal orientation predicted entrepreneurial aspirations when coupled with high self-efficacy. These findings suggest providing opportunities for increased self-efficacy and goal directed orientations affect entrepreneurial development.

Morris (2013) conducted a qualitative study to identify entrepreneurship competencies by soliciting feedback and eventually gaining consensus from multiple subject matter experts. This process yielded 13 entrepreneurial competencies, including goal directed activity. From this list, the author developed a set of measures to assess development along each of the competencies. After conducting a pilot study with the self-developed instrument, the author reported a reliability of .73 for the goal directed items. These results were consistent with the original work of Duckworth and Quinn (2009), who reported a Cronbach's alpha of .70, as well as Hmieleski and Corbett (2006), who reported reliability of .73 for goal directed action in entrepreneurship development.

Action is the basis for the definitions of the terms *entrepreneur* and *entrepreneurship* as operationalized for this research and supports the researcher's interest in further exploration into the relationship between entrepreneurship education and entrepreneurship development. The existing literature begins to explore this relationship but additional inquiry is necessary as the field of entrepreneurship education is relatively young and is rapidly growing. As political and business leaders continue to seek increased entrepreneurial activity, a greater understanding of ways in which

education can influence entrepreneurship development will assist in the assessment of existing programs while influencing the creation of new programs.

Education interventions. Despite the existence of educational programs at numerous colleges and universities, questions of increasing entrepreneurship through education remain unanswered. Various models focused on entrepreneurship development exist within the post-secondary educational context. This section provides an overview of educational experiences directed toward encouraging individuals to pursue entrepreneurship.

History. Early post-secondary entrepreneurship education programs began to be offered in the United States in the 1970s with expanded and steady growth during the 1980s and a rapid rise throughout the 1990s and 2000s. According to Kuratko (2005), over 1,600 colleges and universities offer entrepreneurship related courses in the United States. Supporting this growth in programs is the Association to Advance Collegiate Schools of Business (AACSB), which has helped ensure that in the United States nearly all nationally-ranked schools now teach entrepreneurship (Katz, 2003). Many policymakers and educators assume there is a link between the provision of entrepreneurship education and future economic growth (Kuratko, 2005), yet a small amount of empirical evidence can be found in the literature to support this claim. However, De Faoite et al. (2003) found an increasing demand for entrepreneurship education within post-secondary education as a means of fostering economic growth. In examining the state of entrepreneurship education, the Kauffman Foundation (2008) held "entrepreneurship should be both a legitimate subject in American undergraduate education and a pervasive approach to learning and the management of universities" (4).

The report continues with four reasons entrepreneurship belongs in post-secondary education:

> First, entrepreneurship is critical to understanding and succeeding in the contemporary global economy. Second, entrepreneurship is already an expanding area of American college learning. Third, entrepreneurship is becoming a basic part of what universities themselves do. Fourth, entrepreneurship meets many of the goals of a quality American undergraduate education. (6)

From the historical perspective of entrepreneurship education programs, specific interventions and experiences will be described upon which the present research seeks to investigate the impact of entrepreneurship education has on entrepreneurship development.

Educational frameworks. Establishing the approaches post-secondary education has taken to advancing entrepreneurship development through planned interventions is vital to the present research. In furthering the study of development along the construct of entrepreneurship, the present research recognizes the variety of educational experiences one may have that leads to increased entrepreneurship development.

In a review of the field, Plaschka and Welsch (1990) identified that current entrepreneurship educational programs can be classified according to the following dimensions: (i) courses offered (single to multiple), (ii) level of integration (low to high), (iii) business life-cycle stage (inception, survival, growth, expansion, maturity), and number of disciplines involved. Kukertz (2013) identified two main goals of current entrepreneurship education: increasing the level of entrepreneurial competence and generating a positive attitude towards entrepreneurial behavior with two conflicting

trends, one focused on a narrowing focus on business education and a second practice of broadening of programs to reach beyond traditional disciplines associated with entrepreneurship such as business based curricula. These varied approaches demonstrate opportunities for institutions to offer entrepreneurship education programs across academic disciplines that can impact student development in a variety of fields.

A number of claims have been made in the literature outlining the design of entrepreneurship education programs. Table 4 provides a summary of these proposed frameworks upon which educational interventions should be based.

Table 4

Summary of Entrepreneurship Education Frameworks

Author/Date	Summary
Gartner (1985)	No one approach can be applied to entrepreneurship education as individuals who pursue entrepreneurship are not restricted to specific academic disciplines or paths of study.
Hynes (1996)	Entrepreneurs need a broader perspective than typical traditional business education.
Gorman et al. (1997); Edelman et al. (2008)	Use of more applied teaching methods the greater the probability of success of educational programs.
Solomon et al. (2002)	Essential elements of an ideal entrepreneurship curriculum: negotiations, leadership, creative thinking, innovation, career options, entrepreneurial personality, sources of venture capital, risk taking and tolerance for ambiguity, and needs and constraints of an entrepreneurial venture over its life-cycle.
Lans et al. 2008	Students of entrepreneurship need to build suitable competencies in broad entrepreneurial knowledge, skills and abilities rather than learning about specific tools and instruments.

Recently, entrepreneurship education programs have expanded beyond traditional business focused curricula to include science, engineering, and arts based courses. In other words, entrepreneurship is not limited to business majors. Building upon the work of Gibb (1996), Revell et al. (2009) identified the need for students with entrepreneurial skills in the workforce and called for higher education to expand efforts to meet

economic needs. In addition to efforts within the academy, policymakers sought a response from the post-secondary education community for greater numbers of entrepreneurs in the workforce. It has been found that college graduates in general need to be equipped with a broader range of skills in an economic environment where entrepreneurial ventures are considered the keys to innovation and growth (Minniti et al., 2006).

Curricular and co-curricular activities. In their examination of existing entrepreneurship programs, the Kauffman Foundation (2008) found the following:

> Education in entrepreneurship must be about the entrepreneur, the practitioner…must give students the practical, how-to technical skills to create, manage, assess, and sustain new enterprises…students need to learn to devise a product, create a business plan, find new resources, build a company, market their innovation. (8)

In recommending avenues for entrepreneurship education, the Kauffman Foundation study suggests entrepreneurship is a natural fit in general education as it draws connections between various academic disciplines and should be offered as a major or concentration in order to build upon established bodies of research and practice and opportunities for co-curricular programs must also be available given the applied nature of the subject. The findings and recommendations of the Kauffman Foundation illustrate models for entrepreneurship education, which can be applied within the unique mission of an institution.

Beyond studies designed to measure individual development across constructs such as entrepreneurial intention; orientation; and risk taking, researchers have examined

the impact of general educational experiences outside of specific entrepreneurship courses. Despite the research indicating that education and prior entrepreneurial experiences may influence individual attitudes towards starting their own business, the impact of entrepreneurship education, as distinct from general education, on intentions towards entrepreneurship has remained largely unexplored (Donckels, 1991; Krueger and Brazeal, 1994). The existing literature indicates even the effect of general education on entrepreneurial performance is positive (van der Sluis et al., 2006) and that entrepreneurial training is effective in persons who are starting their own business (Dickson et al, 2008; Karlan and Valdivia, 2006).

While post-secondary education has been looked at to increase its role in facilitating economic development, the early literature primarily focused on spin-off companies created by faculty and staff associated with a university. Expanding upon the investigation of entrepreneurial activities of faculty and staff, Asteboro et al. (2012) looked at start-up businesses created by recent graduates to assess the impact of entrepreneurship education and to investigate best practices for university based economic development. From this research, the authors found the following:

> The number of start-ups created by recently graduated students with an undergraduate degree in science or engineering is at least an order of magnitude larger than the spin-offs created by their faculty, that a recent graduate is twice as likely as her Professor to start a business within three years of graduation, and that the graduates' spin-offs are not of low quality. (675)

These findings indicate entrepreneurship education positively impacts economic development as it relates to the creation of start-up businesses by recent graduates.

Sanchez (2013) examined the effects of an entrepreneurship program using a rigorous and strong quasi-experimental control-group design in seeking to provide evidence of the effects of an entrepreneurship education program on entrepreneurial competencies and intention. Using a sample of students participating in an entrepreneurship education program in Spain, the author found post-test scores for the constructs studied (self-efficacy, proactiveness, risk taking, and intention of self-employment) are significantly higher when compared to the pre-test. This result illustrates student development along these constructs following an educational intervention. Findings from this study provide further evidence of the impact of entrepreneurship education and offer the opportunity for future research to continue to investigate educational development along these and other constructs.

Assessment practices. Entrepreneurship education programs vary across academic disciplines; therefore, standardized assessment of learning outcomes presents a challenge in exploring student development as a result of educational interventions. However, arguments for increased assessment efforts have been made (Gibb, 2002; Pittaway, 2009) to better demonstrate the impact education has on one's entrepreneurship ability. With the rise of new programs, assessment has been identified as a major gap in evaluating the effectiveness of entrepreneurship education (Dickson et al, 2008; Garavan and O'Cinneide, 1994; and Gorman et al., 1997).

Doval-Couetil (2013) conducted an analysis of assessment and measurement efforts within the field of entrepreneurship education and found that "relatively few academic papers have addressed the assessment of entrepreneurship education programs in a holistic manner" (397). Continuing, Doval-Couetil finds assessment difficult due to

a lack of commonly-held developmental constructs in the area of entrepreneurship education and, "to be complex, given a lack of consensus on learning outcomes, few examples of validated instruments or assessment protocols being used widely across programs, and difficulties associated with standardizing assessment given the heterogeneity of programs and students involved" (405). Additionally, Doval-Couetil suggests that unique characteristics differentiate entrepreneurship education from other academic disciplines making assessment particularly difficult:

> It is a young discipline with a body of knowledge that is ill-defined; its heterogeneity limits standardization across students, faculty, and institutions; it emphasizes practice and has significant involvement by nonacademic practitioners in teaching and administration; and it is assumed that venture creation and economic development should be educational outcomes.

In a study examining assessment practices of 117 courses taught in the United States and the United Kingdom, Pittaway and Edwards (2010) found assessment efforts in the area of entrepreneurship education remained focused on knowledge gained over experiential growth. This offers an opportunity for expanded research into ways in which students apply their educational experiences following participation in a course along with developing a clearer definition of entrepreneurship.

The entrepreneurial outcomes framework developed for the National Council for Graduate Entrepreneurship (NCGE) is currently one of the best available means to make distinctions between expected learning outcomes in entrepreneurship. This framework identifies eight categories of entrepreneurial learning outcomes which can be associated with particular types of entrepreneurship education. Applying the NCGE framework can

assist instructors in assessing student learning and potentially improve the understanding of how students build the knowledge, skills and abilities associated with successful entrepreneurship.

With increased calls for entrepreneurs in the workforce and the identified lack of assessment and measurement of existing educational programs, the field is in need of an enhanced definition of developmental constructs and improved metrics to evaluate the overall impact of entrepreneurship education.

Gender. Gender is a variable of interest in the present research as it relates to educational interventions and one's entrepreneurship development. A review of the existing literature indicates differences in the rate of entrepreneurship between men and women, with women generally displaying less entrepreneurial activity than men. This body of prior research includes studies investigating personality variables including areas such as entrepreneurial career intentions (Zhao et al, 2005), entrepreneurial cognition and opportunity recognition (Ardichvili et al., 2003), entrepreneurial role motivation (Miner, 1993), and the sustainability of new ventures (Ciavarella et al., 2004).

In exploring the difference in motivation and performance of female entrepreneurs, Klapper and Parker (2010) concluded that external factors including business environment, access to finance, and work-family conflicts only partially explain the gender gap in entrepreneurship. Zhao and Seibert (2006) and Zhao et al. (2010) focused on investigating the relationship between personality characteristics and entrepreneurship and confirmed a significant correlation between personality characteristics and entrepreneurial behavior.

Sowmya et al. (2010) investigated the attitudes of first year business students at a university in the United Arab Emirates towards new venture creation, and to derive recommendations on how to better promote and improve entrepreneurship education as part of a business curriculum. A sample of 110 female business students in their first year responded to the same questionnaire. Results from this study indicate positive effects of entrepreneurship education on female students as entrepreneurial intentions increased after participation in a course and self-efficacy towards starting a new venture was greater. This research indicates a positive change in intentions and self-efficacy but the sample of only having female student participants limits the generalizability of these results and does not permit comparison of the rate of change between male and female students following an educational intervention.

Alumni. The role graduates of an institution play in entrepreneurial activities have gained increased attention in university-specific surveys of alumni as colleges and universities seek to better assess program outcomes and alumni behavior. Charney and Libecap (2000) found entrepreneurship graduates were three times more likely to start their own businesses, three times more likely to be self-employed, have higher annual incomes, possess 62 percent more assets, and are more satisfied with their jobs. The results of this research will be further explored through Study Three of this project to investigate whether a relationship exists between entrepreneurship graduates and alumni giving.

Surveys conducted by individual institutions to investigate the rate at which alumni pursue entrepreneurial ventures following graduation have found that university alumni are actively engaged in entrepreneurship as indicated by the large number of new

firms created by graduates. From institution-specific surveys, the percentage of university alumni which start businesses are reported to be approximately 24 percent from MIT (Hsu et al., 2007), Stanford's business school (Lazear, 2005), and Tsinghua University in China (Eesley et al., 2009); between 12 and 36 percent from an engineering program at Halmstad University in Sweden (Eriksson, 1996); and 42 percent from Chalmers University's entrepreneurship school in Sweden (Lindholm-Dahlstrand and Berggren, 2010). Additionally, approximately five percent of alumni from Harvard Business School indicate they start businesses within one year of graduation (Lerner and Malmendier, 2011). While the number of businesses created by alumni varies across these institutions, the results indicate further research is needed into the activities alumni pursue post-graduation. The relationship between alumni with an entrepreneurship education experience and the donations to institutions of higher education will be explored in the present study.

Research Designs

As entrepreneurship education programs vary from institution to institution and assessment efforts have taken different forms, attempts have been made to review the literature from a macro perspective to discover where further research is needed and how the field can be improved through additional studies. From these reviews of entrepreneurship education, the relationship between entrepreneurship education and entrepreneurial intentions and the creation of new ventures was found to be "under-researched" (Goduscheit, 2011; Pittaway and Cope, 2007) and lacking in high-quality quantitative studies (Johansen and Schanke, 2011). These meta-analyses reflect the need

for continued investigation using robust statistical methods to provide more in-depth understanding of the impact educational programs have on entrepreneurship.

Impact of entrepreneurship education. As the number of entrepreneurship education programs has increased, studies have been conducted to investigate the impact these educational interventions have on individuals. Given that the number of entrepreneurship education programs has expanded in recent years, the existing research about the effects of entrepreneurship education is still in its early phases (Gorman et al., 1997). Reviewing the literature shows research that simply describes entrepreneurship courses (Vesper and Gartner, 1997), discusses the content of good entrepreneurship education (Fiet, 2001) or evaluates the economic impact of courses by comparing takers and non-takers (Chrisman, 1997). These areas are expanding and integral to understanding long-term impacts of educational experiences but additional research is necessary. Some researchers have proposed a positive link between entrepreneurship education and entrepreneurial attitudes, intention or action, but the evidence is still not strong due to factors such as limited development of the construct, emerging educational programs (Gibb-Dyer, 1994; Robinson et al., 1991; Krueger and Brazeal, 1994). Some empirical studies do confirm that there is a positive impact of post-secondary entrepreneurship education courses or programs on perceived attractiveness and perceived feasibility of new venture initiation (Tkachev and Kolvereid, 1999; Fayolle et al., 2006). The present study will address identified gaps in the literature by further quantitative investigation of entrepreneurship development and associated constructs discussed earlier.

Studies of the impacts of entrepreneurship education (Dainow, 1986; Gorman et al., 1997) and of particular entrepreneurship programs (McMullan et al., 2002) have followed various research methodologies and provide evidence to support that specific programs contribute to entrepreneurship development. While these studies help to show education makes an impact, methodological limitations exist. Previous studies rarely involve control groups, (Block and Stumpf, 1992), basic controls such as pre- and post-testing are not employed and many studies survey participants with an existing predisposition towards entrepreneurship, biasing the results in favor of educational interventions (Gorman et al., 1997). While early studies in the area of educational impact followed simple statistical methods and research designs, additional work has been conducted to incorporate more complex methodologies.

Table 5

Summary of Impacts of Entrepreneurship Education

Author/Date	Design	Summary
Charney and Libecap (2000)	Treatment Group vs. Control Group	Alumni of the specific program studied here were found more likely to start-up new ventures or become self-employed, but graduates who are more successful, even if they decide on a more traditional career path, compared to their non-entrepreneurial counterparts.
Dutta, et al. (2010)	Treatment Group vs. Control Group	"Breadth or diversity of educational experiences positively influences future wealth creation, in terms of both the entrepreneur's personal income as well as personal net worth" (174).
Peterman and Kennedy (2003)	Pre-test/Post-test	Participants with low pre-test scores toward entrepreneurial propensities experienced a stronger positive treatment effect than participants with strong pre-test entrepreneurial intentions.
Oosterbeek et al. (2010)	Pre-test/Post-test	Effect on students' self-assessed entrepreneurial skills is insignificant after participating in the course.
von Graevenitz, Harhoff and Weber (2010)	Pre-test/Post-test	Intentions to start a business declined slightly although the course had a significant positive effect on students' self-assessed entrepreneurial skills.

Rideout and Gray (2013) conducted a meta-analysis of empirical studies focused on the effects of post-secondary entrepreneurship education programs. In this work, the authors found the existing body of literature did not contain examples of "strong quasi-experimental designs (pre-test-post-test matched control design) that would begin to address concerns about internal validity" (346). Based on this assessment, the authors recommend expanded studies using stronger research designs in both quasi-experimental and experimental designs with the goal of new studies including variables such as self-efficacy, values, attitudes, and social networks. The meta-analysis also highlighted the need for the development of "better more psychometrically sound measures" (348). The

findings of the Oosterbeek and von Graevenitz studies provide a basis for the research presented in this paper, which investigates entrepreneurship development along the constructs of SCCT described earlier to build upon existing instruments to further the psychometric properties of assessing development in entrepreneurship education. The present research incorporates a pre-test-post-test design to gain deeper statistical understanding of the relationship between entrepreneurship education and entrepreneurship development.

Entrepreneurship education program. The present research follows the framework established by the Entrepreneur Education Program developed in 2009 by Winkel and Vanevenhoven to gather longitudinal, data-driven insights into the impact of entrepreneurship education on (1) the motivational processes underlying students' road to entrepreneurship, and (2) the process of identity transformation from student to entrepreneur. Currently over 18,000 student responses representing 400 universities in 70 countries have been received (Vanevenhoven, 2013). Grounded in Social Cognitive Career Theory, the Entrepreneurship Education Project provided a framework upon which the research presented here was modeled. Additionally, this research utilized elements of an instrument created by the researchers associated with the Entrepreneurship Education Project. The work of Winkel and Vanevenhoven begins to answer key questions in measuring the impact of entrepreneurship education in a quantitative fashion through a longitudinal approach.

Present research. Building upon the existing literature, the present research offers further exploration into the examination of individual development along the constructs of Social Cognitive Career Theory in the area of entrepreneurship. Following

the belief that entrepreneurship skills can be taught, this research contributes to the body of knowledge by expanding psychometric measurement of the constructs through a modified survey instrument and investigating entrepreneurship educational impacts during and after one's participation in an educational intervention. Table 6 briefly outlines the three studies used in this research with a more detail explanation following in the methods section.

Table 6

Present Research Studies

Study	Sample	Intervention
One	Current Undergraduate Students	Course Co-curricular Activity
Two	Existing Entrepreneur	Formal Educational Experience
Three	Alumni	Academic Major

The literature demonstrates entrepreneurship education as an emerging field of academic study upon which students develop knowledge, skills and abilities to succeed in a chosen career. As the area of entrepreneurship education continues to expand and change, future investigation such as the present study into entrepreneurship development is necessary to advance the understanding of the overall impact of educational experiences and the motivation students have to pursue entrepreneurship. This additional research will be enhanced by robust statistical methodologies that test the previously identified constructs of entrepreneurship development to build reliable metrics upon which quantifiable results can be generated to demonstrate entrepreneurship can be developed through education.

Methodology

Participants

This research investigates the role education plays on the construct of entrepreneurship development. A series of three studies were conducted to gather data for this research. Participants were selected based either on their participation in specific courses, on identified entrepreneurial experience, or regarding alumni affiliation. Participation in each study was voluntary. During the 2013 Fall Semester, surveys were distributed to participants electronically via web-based software. The Institutional Review Board of James Madison University approved procedures for this research.

Study one – entrepreneurial course. The first study involved current undergraduate student participants from a mid-sized state supported institution in the mid-Atlantic region. Study One was conducted to determine if change along dimensions of entrepreneurship development occurs as the result of participating in an undergraduate entrepreneurship course or participation in a student organization focused on entrepreneurship. The dimensions of entrepreneurship development for this study include Entrepreneurship Self-Efficacy, Entrepreneurial Intent, Entrepreneurship Outcome Expectations, and Entrepreneurship Goal-directed Activity as defined in the literature and based upon Social Cognitive Career Theory. Students in either of two upper level management elective courses, called Venture Creation or Entrepreneurship, comprising the treatment group along with a control group of students majoring in management but not enrolled in either of the two entrepreneurship courses. Additionally, members of a student organization, the Society of Entrepreneurs, participated in the survey as part of the intervention group. The survey was distributed to 66 students in the

treatment group and 34 in the control group totaling 101 students in Study One. Participants received the survey at the beginning and end of the semester.

Study two – existing entrepreneurs. A second study involving a group of identified established entrepreneurs was conducted to investigate the role curricular experiences and co-curricular involvement had upon participation in creating a start-up business. Data were collected through a survey distributed to a national sample of 440 entrepreneurs. The sample of entrepreneurs identified to serve as participants in this study was based upon one or more of the following:

- a regional small business development center's client list,
- individuals recognized as leading entrepreneurs by a state-wide economic development organization,
- participants in regional start-up programs, and
- the professional network of the researcher.

In addition to the existing entrepreneurs participating in this study, a group of professionals in non-entrepreneurial careers served a comparison group.

Study three – entrepreneurship coursework alumni. The third study sought to gain understanding of the impact that education has on entrepreneurship development on a group of graduates. Two groups of alumni were surveyed in this study with participants in the intervention group having majored in Management and a control group of Integrated Science and Technology and Computer Science majors. The alumni from the Management program completed a course exposing them to entrepreneurship during their undergraduate experience. Those in the group of non-Management majors did not take this course. Gender differences were also explored in this study to investigate if

differences existed between males and females in the study. Alumni participants in this study graduated between the years of 2005-2012 from a mid-sized state supported institution in the mid-Atlantic region. This study focused on comparing differences between the participant groups in the areas of Entrepreneurial Self-Efficacy, Curricular Involvement and Business Start Up. In addition to examining the construct of entrepreneurship development, results from this study were analyzed to investigate the relationship between those who participated in an entrepreneurship education experience and financial donation to the university to provide a greater understanding of alumni engagement. The survey was distributed to 1,172 participants in the Management alumni group and 490 in the non-Management group.

Instruments

A survey developed by Winkel and Vanevenhoven (2010) was modified to create a survey instrument used in the three studies comprising this project. Grounded in Social Cognitive Career Theory (SCCT), Winkel and Vanevenhoven created the Entrepreneurship Education Project Survey based upon instruments designed by McGee et al. (2009), Thompson (2009), Krueger (2000), Farmer and Kung-McIntyre (2011), and Carr and Sequeira (2007). Permission to use and modify the Entrepreneurship Education Project Survey was obtained by the researcher from the authors. The Entrepreneurship Education Project Survey was designed from over 18,000 student response data, spanning over 70 countries and 400 universities (Entrepreneurship Education Project, 2013). The authors of the Entrepreneurship Education Project Survey used exploratory factor analysis to test the validity of the measures of this instrument. According to the authors (2010),

> The pattern correlation matrix revealed numerous coefficients of 0.40 and above. As a further examination, we conducted the Kaiser–Meyer–Olkin (KMO) test, which determines if there are enough items to predict each factor. The KMO value for each of the measures in the EFA was greater than the recommended value of 0.60. (321)

Based upon these findings, the instrument satisfactorily measures the constructs of interest. The present research will test the reliability and validity of a modified instrument to further investigate the measurement of the constructs used in this research.

As identified in the literature review, the body of existing research would benefit from studies examining impacts of education on entrepreneurship development. Such data would be useful to educators by providing information upon which to enhance academic programs, for policy makers to better analyze the impact educational interventions might possibly have on an individual's entrepreneurship development, and for future students to understand how education relates to careers in entrepreneurship. Data gathered through existing entrepreneurs and alumni will be helpful in examining the impact entrepreneurship education has on economic development through the number of new ventures and jobs created. Data collected through the present research will be added to the Entrepreneurship Education Project dataset as a means of contributing to future instrument design efforts.

The investigator modified the previous work of Winkel and Vanevenhoven (2010) to design the instrument used in the present research, JMU Entrepreneurship Development Questionnaire, to measure the subscales of Entrepreneurship Self-Efficacy, Entrepreneurial Intention, Entrepreneurship Outcome Expectations, and Goal Directed

Activity. A description of each of these subscales follows in this section. Foundational questions designed to measure these constructs were asked of all participants across the three studies conducted as part of the present research. Based upon needs identified through a review of the literature, the investigator added items to provide greater depth to the understanding of the subscales. In designing these new items, the investigator held conversations with individuals engaged in entrepreneurship education to address areas upon which additional information may provide new insights into the understanding of entrepreneurship development.

New items were added to gain understanding into contributions the subscales have on entrepreneurship development as previously used measurement tools contained limited items upon which to analyze results. Likert scales were modified to clarify responses by reducing seven-point Likert scales to four-point and to remove neutral responses. Items and scales used on the JMU Entrepreneurship Development Questionnaire can be found in the appendices that follow. Additionally, open-ended responses were added to gather data that could not easily be obtained through Likert based responses. Open-ended items were of interest to the investigator in Study Two and Study Three to provide depth into the areas such as *roles in entrepreneurship*, *location of start-up* and *an individual's work situation when creating a venture* that could not easily be measured using Likert scale items. A complete list of the open-ended items used in Study Two can be found in Appendix E and in Appendix F for Study Three. A detailed description including reliability for each construct and measurement used for each subscale follows.

Entrepreneurship self-efficacy sub-scale. The Entrepreneurship Education Project Survey by Winkel and Vanevenhoven (2010) used a 25-item scale developed by McGee et al. (2009) to measure the construct of Entrepreneurial Self-Efficacy. On this scale, respondents were asked to self-evaluate on a 100 point basis where "0 indicates absolutely no confidence in one's ability, 50 indicates moderate certainty one can successfully complete the activity, and 100 indicates one is complete confidence in one's ability." McGee (2009) reported a Cronbach's alpha of internal consistency to be .80 for the dimension of entrepreneurial self-efficacy. In the present research, the researcher used 26-items to measure entrepreneurial self-efficacy across three responses of *no confidence*, *moderately confident* and *completely confident*. A three-point Likert scale was chosen over the previously used 100-point basis to reduce self-rater error. A measurement scale of 100 points is too broad and does not allow for easily interpretable analysis, as participants may not respond consistently over such a broad range of possible responses. Also, respondents are more familiar and comfortable with Likert rating scales. Participants were asked to rate their confidence using these three choices on items such as, "Come up with a new idea for a product or service on your own," "Design a product or service that will satisfy customer needs and wants" and "Create an action plan to launch my idea and make it succeed." The entire scale used to measure Entrepreneurship Self-Efficacy can be found in Appendix A.

Entrepreneurial intent sub-scale. In selecting the Entrepreneurship Development Survey for adoption in the present research, the investigator modified the 10-item entrepreneurial intention scale designed by Thompson (2009) that was included in the omnibus Entrepreneurship Education Project Survey. Reliability using Cronbach's

alpha for the items developed by Thompson (2009) was found to be .89. The items previously used were measured on a seven-point Likert scale ranging from *very untrue* to *very true*. Building upon these items, the researcher added eight items to further explore one's development along the construct of entrepreneurial intention following an educational intervention. The scale used in the Entrepreneurship Education Project Survey contained only six items upon which to analyze entrepreneurial intent. The investigator sought to add items to gather more depth along this construct specifically related to potential educational impacts on entrepreneurship intention. Additionally, previously used items used declarative phrases such as *never* that could influence a participant's response.

The JMU Entrepreneurship Development Questionnaire asked participants to indicate a response to items including, "Search for business start-up opportunities," "Spend time learning about starting a new venture," and "Research best practices in starting a new venture." This construct was measured on a four-point Likert scale of *very untrue*, *untrue*, *true* and *very true* in order to explore how they engage in various activities or have certain plans related to entrepreneurial intention. Appendix B provides a full description of the items used to measure the construct of entrepreneurial intention.

Entrepreneurship outcome expectations sub-scale. A third subscale of entrepreneurship development, Entrepreneurship Outcome Expectations, was measured in this research also using items based on a scale inspired by Krueger (2000). Krueger cited a Cronbach's alpha of .80 for these items. As the previous instrument contained only six items for this measure, the researcher added items to gather further strength in the measurement of this construct. Additionally, the survey used in this research

expanded to 29 items modified from a seven to four point Likert scale to clarify responses for participants and to remove neutral responses. The investigator sought to add items to gather more depth along this construct in expanding upon previously investigated expected financial outcomes to include creativity, collaboration and response to opportunities. The present survey asked participants to rate their intention on items such as "Generate Personal Wealth," "Be Self Employed," and "Create Multiple Ventures" on a four point Likert Scale of *not at all*, *very little*, *a good deal* and *very much*, on the extent to which they expected to achieve the following outcomes by starting their own venture. Items used to measure entrepreneurial outcomes expectations can be found in Appendix C.

Goal directed activity sub-scale. Farmer and Kung-McIntyre (2011) measured the construct of Goal Directed Activity using six-items on a five-point Likert scale with a Cronbach's alpha of .95. To further the measurement of this construct, the researcher added 20 items measured along a four-point Likert scale of *strongly disagree*, *disagree*, *agree* and *strongly agree*. The four-point Likert scale removed an option for a neutral response. The investigator added items to gather more depth along this construct specifically related to entrepreneurial goals focused on new venture creation. A complete list of the items used to measure goal directed activity can be found in Appendix D. Participants were asked to indicate agreement to statements such as, "I often think about becoming an entrepreneur," "I (alone or with others) have defined products or services for the business," and "I regularly think about becoming an entrepreneur." Limited use of goal directed activity as a construct was found in the existing literature as described above. Through a review of the literature, the researcher identified an opportunity for the

present research to provide a contribution to the existing body of knowledge by expanding the psychometric study of the construct of goal directed activity.

Demographics. Additional demographic questions were included on the JMU Entrepreneurship Development Questionnaire. Information related to an individual's family background was obtained through items previously used by Carr and Sequeira (2007).

As new items were added to the JMU Entrepreneurship Development Questionnaire and scales were refined, this research sought to further the psychometric properties of past instruments. The investigator's research will examine further the reliability and validity of the measurement of the constructs described above. A description of how each survey was used in the three studies along with hypothesis and related variables is provided below.

Procedure

Study one – entrepreneurial course. A pre-test-post-test design was used to examine the impact of a course on entrepreneurship development during one academic semester. The pre-test was distributed during the first week of classes during the Fall 2013 Semester and a post-test was administered during the last week of the fall term. Gender information was also requested to further explore differences along the construct of entrepreneurship development between male and female students.

Using the JMU Entrepreneurship Development Questionnaire, Study One seeks to investigate the following hypotheses:

***Hypothesis one*:** After participating in an entrepreneurial education course over one academic semester, an individual will have improved Entrepreneurship Self-Efficacy,

Entrepreneurial Intent, Entrepreneurship Outcome Expectations and Entrepreneurship Goal-Directed Activity.

- Dependent Variables: Entrepreneurship Self-Efficacy, Entrepreneurial Intent, Entrepreneurship Outcome Expectations, Goal-Directed Activity
- Independent Variables: participation in the class (yes/no), change over time

***Hypothesis two*:** Students participating in an extra-curricular activity will show greater increases over one academic semester in Entrepreneurship Self-Efficacy, Entrepreneurial Intent, Entrepreneurship Outcome Expectations, and Entrepreneurship Goal-Directed activity than students not engaged in an extra-curricular activity.

- Dependent Variables: Entrepreneurship Self-Efficacy, Entrepreneurial Intent, Entrepreneurship Outcome Expectations, Goal Directed Activity
- Independent Variables: participation in an extra-curricular activity (yes/no), change over time

***Hypothesis three*:** Female students will demonstrate greater average scores for Entrepreneurship Self-Efficacy, Entrepreneurial Intent, Entrepreneurship Outcome Expectations and Entrepreneurship Goal Directed Activity after participation in an entrepreneurship course.

- Dependent Variables: Entrepreneurship Self-Efficacy, Entrepreneurial Intent, Entrepreneurship Outcome Expectations, Goal Directed Activity
- Independent Variables: participation in the class (yes/no), change over time, gender (male, female)

Study two – existing entrepreneurs. The JMU Entrepreneurship Development Questionnaire was distributed (n = 450) in September 2013 to existing entrepreneurs. This second study investigated educational impacts on the entrepreneurship development of current entrepreneurs in measuring Entrepreneurship Self-Efficacy, Entrepreneurial Intent, Entrepreneurial Outcome Expectations and Goal Directed Activity.

The following proposed hypotheses are tested in Study Two:

***Hypothesis four*:** Established entrepreneurs will demonstrate greater scores for Entrepreneurship Self-Efficacy, Entrepreneurial Intent, Entrepreneurship Outcome Expectations and Goal Directed Activity.

- Dependent Variables: Entrepreneurship Self-Efficacy, Entrepreneurial Intent, Entrepreneurship Outcome Expectations, Goal Directed Activity
- Independent Variables: group (entrepreneur/non-entrepreneur), gender (yes/no)

***Hypothesis five*:** Existing entrepreneurs that participated in a formal educational experience will differ from non-entrepreneurs along the subscales of Entrepreneurship Self-Efficacy, Entrepreneurial Intent, Entrepreneurship Outcome Expectations and Goal Directed Activity by gender than non-entrepreneur.

- Dependent Variables: Entrepreneurial Self-efficacy, Entrepreneurial Intent, Entrepreneurship Outcome Expectations, and Goal-Directed Activity
- Independent Variables: group (entrepreneur/non-entrepreneur), participation in a formal educational experience (yes/no), gender (male/female)

***Hypothesis six*:** Entrepreneurs with an entrepreneurship education experience will create a greater number of new businesses.

- Dependent Variables: Entrepreneurship Self-Efficacy, Entrepreneurial Intent, Entrepreneurship Outcome Expectations, and Goal-Directed Activity
- Independent Variables: participation in a formal educational experience (yes/no), business start-up (yes/no)

Study three – entrepreneurship coursework alumni. Alumni of an undergraduate business program were surveyed in October 2013. This third study focused on alumni of the Management program from 2005-2012 and used the JMU Entrepreneurship Development Questionnaire to measure Entrepreneurship Self-Efficacy, Entrepreneurial Intent, Entrepreneurship Outcome Expectations, and Entrepreneurship Goal Directed Activity. Respondents were asked to answer unique questions related to alumni participation in university activities, philanthropic interests, and experiences outside a formal curricular or co-curricular program such as interactions with faculty that contributed to an individual's choice to become an entrepreneur. Questions added to the JMU Entrepreneurship Development Questionnaire specific to alumni can be found in Appendix F. This information will be used to provide depth to the understanding of the impact of entrepreneurship education on entrepreneurship development and be useful to fundraisers in seeking further engagement with graduates who are identified as entrepreneurs. Additionally, results from this study can be useful to policy makers in providing insight into the role entrepreneurship education plays on the creation of new ventures and jobs. Study Three expands upon the existing literature described earlier to

further investigate gender differences between alumni who participated an entrepreneurship education experience and the levels to which wealth generated by entrepreneurs is donated to the university.

In researching the impact entrepreneurship education has on the entrepreneurship development of alumni, the following hypotheses are explored:

***Hypothesis seven*:** Alumni with a degree in Management will demonstrate greater average scores on Entrepreneurial Self-Efficacy, Entrepreneurial Intent, Entrepreneurship Outcome Expectations, and Entrepreneurship Goal-Directed Activity than the group on non-Management alumni and will differ by gender.

- Dependent Variables: Entrepreneurship Self-Efficacy, Entrepreneurial Intent, Entrepreneurship Outcome Expectations, Goal-Directed Activity
- Independent Variables: group (Management/non-Management), gender (male/female)

***Hypothesis eight*:** Management alumni will donate at a higher rate than non-Management alumni to the university.

- Dependent Variables: Entrepreneurship Self-Efficacy, Entrepreneurial Intent, Entrepreneurship Outcome Expectations, Goal-Directed Activity
- Independent Variables: group (Management/non-Management), donation to institution of higher education (yes/no)

Anticipated Statistical Methods

A repeated measures multivariate analysis of variance (MANOVA) was used to test Hypotheses 1-7 and a Chi-Square test was used for Hypothesis 8. Analysis will be

conducted to first consider interactions among the independent variables in testing each hypothesis. Main effects of the independent variables will then be examined.

Summary

Through the results of these three separate but related studies, the present research will further investigate the application of Social Cognitive Career Theory in the area of entrepreneurship development by exploring the impact of entrepreneurship educational experiences at various points in an individual's career. Scores on the sub-scales of Entrepreneurship Self-Efficacy, Entrepreneurial Intent, Entrepreneurship Outcome Expectations, and Goal Directed Activity were analyzed across these studies. Through this research, the investigator seeks a greater understanding of how a post-secondary entrepreneurship educational intervention influences one's entrepreneurship development.

Results

The researcher administered the JMU Entrepreneurship Development Questionnaire to 520 individuals over three separate studies as a means of investigating the impact of post-secondary education on entrepreneurial development. A summary of participants can be found in Table 7.

Table 7

Summary of Research Participants by Study

	Entrepreneurs			Comparison			
Study	Male	Female	N	Male	Female	n	Total N
One	29	17	46	14	5	19	65
Two	120	34	154	74	32	106	260
Three	127	68	125	49	21	70	195

The focus of the present research was twofold: to modify measurement scales for the construct of entrepreneurship development and to conduct analysis of data gathered through three studies to investigate if educational experiences impacted how an individual developed as an entrepreneur. In the introduction chapter, Table 1 provides a summary of the major research questions pursued in this research. This section begins with reliability and validity results for the new items added to the survey instrument followed by the findings of the testing of the hypotheses set forth by the researcher. Reported results of the statistical analyses are organized by the three studies comprising this research. The discussion section, which follows, offers interpretation of these results.

Measurement Properties of Revised Entrepreneurial Development Questionnaire

The researcher focused on the subscales of Entrepreneurial Intent, Entrepreneurship Self-Efficacy, Entrepreneurship Outcome Expectations, and Goal Directed Activity as the JMU Entrepreneurship Development Questionnaire was

administered and, in an attempt to improve measurement scales for the construct of entrepreneurship development, added new items for use in collecting data for the present research. The foundation of the JMU Entrepreneurship Development Questionnaire was based on a survey previously developed by Winkel and Vanevenhoven (2010) in collecting data for the Entrepreneurship Education Project. A more detailed explanation of this project is provided in the literature review section. Winkel and Vanevenhoven created the Entrepreneurship Education Project Survey based upon instruments designed by McGee et al. (2009), Thompson (2009), Krueger (2000), Farmer and Kung-McIntyre (2011), and Carr and Sequeira (2007). The researcher added items to the four subscales of Entrepreneurial Intent, Entrepreneurship Self-Efficacy, Entrepreneurship Outcome Expectations, and Goal Directed Activity to gain further understanding into the impact on the construct of entrepreneurship development. Scales were also refined to gather more directed responses to the items along these subscales. A full listing of the new and existing items on each subscale of the JMU Entrepreneurship Development Questionnaire and the refined scales can be found in Appendices A through F.

The initial step in the present research was to investigate selected measurement properties of the subscales to enhance analysis of data gathered through the administration of the JMU Entrepreneurship Development Questionnaire. Reliability and validity evidence of the subscales of Entrepreneurial Intent, Entrepreneurship Self-Efficacy, Entrepreneurship Outcome Expectations, and Goal Directed Activity were described as part of the current research. The Entrepreneurial Intent subscale was reduced from a seven-point to a four-point Likert scale to remove neutral responses and to provide a more realistic number of response options; the Entrepreneurship Self-

Efficacy subscale was reduced from a one hundred-point scale to a three-point Likert scale to gather more interpretable results; the Entrepreneurship Outcome Expectations subscale was refined from a seven-point to a four-point Likert scale; and the Goal Directed Activity subscale was reduced from a five-point Likert scale to a four-point Likert scale.

The JMU Entrepreneurship Development Questionnaire was administered to collect data for the present research with 520 participants responding across three studies. Cronbach's alpha was calculated for the four subscales of the instrument: Entrepreneurial Intent with 18 items ($\alpha = .93$), Entrepreneurship Self-Efficacy with 26 items ($\alpha = .93$), Entrepreneurship Outcome Expectations with 29 items ($\alpha = .93$), and Goal Directed Activity with 20 items ($\alpha = .95$). The inclusion of these new items improved the reliability of the prior Winkel instrument, and these results are described below.

To investigate the contribution of the items, the researcher calculated reliability coefficients of internal consistency through SPSS in each of the three separate studies comprising this research. The reliability coefficients of internal consistency calculated in this research illustrate an improvement in reliability from the previously developed scales as presented in Table 8. The original Entrepreneurial Intent subscale developed by Thompson (2009) consisted of 6 items ($\alpha = .89$), the Entrepreneurship Self-Efficacy subscale constructed by McGee (2009) consisted of 25 items ($\alpha = .80$), the Entrepreneurship Outcome Expectations subscale created by Krueger (2000) consisted of 7 items ($\alpha = .80$), and the Goal Directed Activity subscale of Farmer and Kung-McIntyre (2011) consisted of 6 items ($\alpha = .95$).

Item-total correlations were calculated for each new item on the JMU Entrepreneurship Development Questionnaire. Full results of the item-total correlations can be found in Appendix G. The researcher analyzed the new items and, as all items were correlated above .20, no items were removed from the instrument. An inter-item correlation matrix for each of the four subscales measured on the JMU Entrepreneurship Development Question is presented in Appendix H.

Table 8

Summary of Reliability Coefficients of Internal Consistency for Prior Instruments and the JMU Entrepreneurship Development Questionnaire

Subscale	Prior Instrument	JMU Entrepreneurship Development Questionnaire (N = 520)
Entrepreneurial Intent	.89 (Thompson, 2009)	.93
Entrepreneurship Self-Efficacy	.80 (McGee, 2009)	.93
Entrepreneurship Outcome Expectations	.80 (Krueger, 2000)	.93
Goal Directed Activity	.95 (Farmer and Kung-McIntyre, 2011)	.95

Study one – entrepreneurial course. The researcher collected data using this JMU Entrepreneurship Development Questionnaire to investigate the impact that participation in an undergraduate course has on students at two points in time: at the beginning and end of one academic semester. Subscores were calculated for the pre-test and post-test along the measures of Entrepreneurial Intent, Entrepreneurship Self-Efficacy, Entrepreneurship Outcome Expectation and Goal Directed Activity. These subscores were then used to test each hypothesis. A score for each subscale was computed by calculating the sum of each participant's responses by the respective items

on the four measures: the 18-item Entrepreneurial Intent measure, the 26-item Entrepreneurship Self-Efficacy measure, the 29-item Entrepreneurship Outcome Expectation measure, and the 20-item Goal Directed Activity measure.

Three students dropped the course between administrations of the survey, so the total responses (N = 69) to the pre-test were reduced by three with the deletion of these cases. One case was deleted as an outlier (N = 65). Of these 65 responses, 43 males and 22 females participated in this study. Additionally, 46 participants were enrolled in a course (treatment group) with 19 not enrolled in the course (control group). Descriptive statistics for the independent variables by each dependent variable used in this study can be found in Tables 9-12.

Table 9

Means and Standard Deviations of Pre-test and Post-test Scores on the Subscale of Entrepreneurial Intent

Entrepreneurial Intent (N = 65)	Pre-test		Post-test	
	Treatment (n = 46)	Control (n = 19)	Treatment (n = 46)	Control (n = 19)
	M (SD)	M (SD)	M (SD)	M (SD)
Male (n = 29)	48.48 (11.83)	46.35 (8.41)	52.93 (12.78)	40.21 (8.17)
Female (n = 17)	45.64 (10.13)	39.60 (6.18)	51.18 (11.67)	37.80 (9.28)

Table 10

Means and Standard Deviations of Pre-test and Post-test Scores on the Subscales of Entrepreneurship Self-Efficacy

Entrepreneurship Self-Efficacy (N = 65)	Pre-test		Post-test	
	Treatment (n = 46)	Control (n = 19)	Treatment (n = 46)	Control (n = 19)
	M (SD)	M (SD)	M (SD)	M (SD)
Male (n = 29)	63.10 (10.67)	61.42 (10.85)	68.34 (9.60)	58.21 (8.65)
Female (n = 17)	57.88 (10.97)	56.80 (7.62)	69.11 (10.40)	55.40 (9.34)

Table 11

Means and Standard Deviations of Pre-test and Post-test Scores on the Subscales of Entrepreneurship Outcome Expectations

Entrepreneurship Outcome Expectations (N = 65)	Pre-test		Post-test	
	Treatment (n = 46)	Control (n = 19)	Treatment (n = 46)	Control (n = 19)
	M (SD)	M (SD)	M (SD)	M (SD)
Male (n = 29)	85.72 (20.22)	86.85 (10.13)	92.41 (16.25)	79.57 (12.05)
Female (n = 17)	81.05 (14.92)	82.20 (6.37)	87.35 (11.34)	76.60 (24.86)

Table 12

Means and Standard Deviations of Pre-test and Post-test Scores on the Subscale of Goal Directed Activity

Goal Directed Activity (N = 65)	Pre-test		Post-test	
	Treatment (n = 46)	Control (n = 19)	Treatment (n = 46)	Control (n = 19)
	M (SD)	M (SD)	M (SD)	M (SD)
Male (n = 7)	56.58 (13.95)	54.00 (13.94)	60.27 (13.95)	51.21 (14.54)
Female (n = 16)	53.47 (11.17)	46.00 (10.97)	61.41 (8.95)	45.20 (11.56)

A within-subjects multivariate analysis of variance (MANOVA) was used to analyze data collected in Study One. To test the three hypotheses set forth in the methodology section for Study One, scores from the pre and post-test (N = 65) administrations of the JMU Entrepreneurship Development Questionnaire were used to explore differences between participants in the treatment group (n = 46) and in the control group (n = 19) over time. The four dependent variables examined in this study were Entrepreneurial Intent, Entrepreneurship Self-Efficacy, Entrepreneurship Outcome Expectations, and Goal Directed Activity. Independent variables in this study were: time (pre-test and post-test), group (treatment and control), and gender (male and female).

There were no univariate or multivariate within-cell outliers at $p < .001$. The assumption of homogeneity was met with Box's M = 97.17, $p > .05$ which was interpreted as non-significant. Mauchly's Test of Sphericity was statistically significant, χ^2 (27) = .05, $p < .001$, indicating the assumption of sphericity had been violated. To address this violation, Greenhouse-Gasser correction was used, $\varepsilon = .49$. Table 13 shows moderate statistically significant Pearson's correlations were calculated to demonstrate that multicollinearity was not an issue in the data, and the assumption of equal variance

was met through a non-statistically significant Levene's test for each of the dependent variables: Entrepreneurial Intent ($F = .79$, $p > .05$), Entrepreneurship Self-Efficacy ($F = .28$, $p > .05$), Entrepreneurship Outcome Expectations ($F = 2.34$, $p > .05$), and Goal Directed Activity ($F = 1.37$, $p > .05$).

Table 13

Pearson's Correlations for Measures of Entrepreneurial Intent (EI), Entrepreneurship Self-Efficacy (ESE), Entrepreneurship Outcome Expectations (EOE) and Goal Directed Activity (GDA)

	EI	ESE	EOE	GDA	Group	Gender
EI	-					
ESE	.67*	-				
EOE	.64*	.43*	-			
GDA	.72*	.63*	.61*	-		
Group	.31*	.34**	.27**	.20	-	
Gender	.08	.20	.03	.12	.10	-

*$p < .01$ **$p < .05$

Table 14 provides a summary of the MANOVA with follow-up ANOVA results for statistically significant main effects.

Table 14

Multivariate Analysis of Variance of Group, Gender and Time on the Measures of Entrepreneurial Intent, Entrepreneurship Self-Efficacy, Entrepreneurship Outcome Expectations and Goal Directed Activity with Analysis of Variance Follow-up

	Df	SSQ	MS	*F*	η^2	*p*
Time	3	73335.41	10476.48	87.26	.58	.001*
Time*Group	3	2440.38	705.67	2.90	.04	.02***
Entrepreneurial Intent	1	1141.91	1141.91	6.05	.09	.01**
Entrepreneurship Self-Efficacy	1	1672.31	1672.31	10.38	.15	.01**
Entrepreneurship Outcome Expectations	1	2059.00	2059.00	4.18	.06	.04***
Goal Directed Activity	1	704.47	704.47	2.41	.03	.12
Time*Gender	3	196.65	56.86	.23	.01	.89
Time*Group*Gender	3	195.89	56.64	.23	.01	.89

*$p < .001$, ** $p < .01$, ***$p < .05$

In the first hypothesis, the researcher tested to see if participation in an entrepreneurial education course over one academic semester would positively impact individuals in the course with greater scores on the subscales of Entrepreneurial Intent, Entrepreneurship Self-Efficacy, Entrepreneurship Outcome Expectations, and Goal-Directed Activity than those in the control group.

Testing this hypothesis using the Greenhouse-Gasser correction as the MANOVA statistic, $F(3) = 2.90$, $p < .05$, $\eta^2 = .04$, a statistically significant interaction was found for time and group indicating participation in a class impacted an individual's score over the course of an educational experience. In follow- up ANOVAs for the interaction of group membership by time, statistically significant effects were found for three of the DVs: Entrepreneurial Intent $F(1, 61) = 6.05$, $p < .01$, $\eta^2 = .09$, Entrepreneurship Self-Efficacy $F(1, 61) = 10.38$, $p < .01$, $\eta^2 = .15$, and Entrepreneurship Outcome Expectations $F(1, 61) = 4.18$, $p < .05$, $\eta^2 = .06$. A statistically significant main effect was found using Greenhouse-Gasser correction as the MANOVA statistic, $F(3) = 87.26$, $p < .001$, $\eta^2 = .58$, for time indicating a difference between scores on the pretest and posttest. The results reflected a modest impact of time on the combined DVs, partial $\eta^2 = .58$. The results of the within-subjects MANOVA supported the researcher's hypothesis that those who participated in the course scored higher on the four areas measured after this entrepreneurship education experience.

In the second hypothesis, the researcher was interested in exploring to see if students who participated in an extracurricular experience scored higher on the subscales of Entrepreneurial Intent, Entrepreneurship Self-Efficacy, Entrepreneurship Outcome Expectations, and Goal Directed Activity after participating in the extracurricular

activity. As no members of the control group in this sample participated in the extracurricular experience, this hypothesis could not be tested using this dataset.

In the third hypothesis, the researcher tested to see if female students demonstrated greater scores on the post-test than the pre-test for Entrepreneurship Self-Efficacy, Entrepreneurial Intent, Entrepreneurship Outcome Expectations, and Goal Directed Activity after participation in an entrepreneurship course. No statistically significant difference was found between male and female students in the treatment and control groups over time on the four subscales measured in this study using the Greenhouse-Gasser correction as the MANOVA statistic, $F(3) = .23$, $p > .05$, $\eta^2 = .01$. No follow-up was necessary for the main effects of gender as it was found to be non-significant.

Study two - existing entrepreneurs. Data gathered through the administration of the JMU Entrepreneurship Development Questionnaire to 154 existing entrepreneurs and 106 non-entrepreneurs was used to test three hypotheses in Study Two (N = 260). Using a between-subjects multivariate analysis of variance, the researcher explored if differences between existing entrepreneurs and non-entrepreneurs existed along the subscales of Entrepreneurial Intent, Entrepreneurship Self-Efficacy, and Entrepreneurship Outcome Expectations. These measures served as the dependent variables in this study with the following independent variables: group (entrepreneur and non-entrepreneur), and gender (male and female).

There were no univariate or multivariate within-cell outliers at $p < .001$. The assumption of homogeneity was met with Box's M = 105.40, $p > .05$ which was interpreted as non-significant. Table 15 shows moderate statistically significant

Pearson's correlations were calculated to demonstrate that multicollinearity was not an issue in the data, and the assumption of equal variance was met through a non-statistically significant Levene's test for each of the dependent variables, Entrepreneurial Intent ($F = 3.10$, $p > .05$), Entrepreneurship Self-Efficacy ($F = 1.59$, $p > .05$), and Entrepreneurship Outcome Expectations ($F = 1.99$, $p > .05$).

Table 15

Pearson's Correlations for Measures of Entrepreneurial Intent, Entrepreneurship Self-Efficacy and Entrepreneurship Outcome Expectations

	EI	ESE	EOE	Group	Gender	Business Start	Formal Education
EI	-						
ESE	.57*	-					
EOE	.51	.44	-				
Group	.44*	.58	.17*	-			
Gender	.09	.08	.16	.07	-		
Business Start	.45	.36	.13*	.76*	.16	-	
Formal Education	.27	.27	.12**	.44*	.10	.33	-

*$p < .01$ **$p < .05$

Means and standard deviations are reported for combined independent variables by each dependent variable in Table 16 (Entrepreneurial Intent), Table 17 (Entrepreneurship Self-Efficacy), and Table 18 (Entrepreneurship Outcome Expectation). No responses were reported for the control group on the variables of business start and formal entrepreneurship education experience as members of the control group contained individuals from non-business professions.

Table 16

Means and Standard Deviations for Group by Gender for Entrepreneurial Intent

Entrepreneurial Intent (N = 260)	Existing Entrepreneurs (n = 154)	Non-Entrepreneurs (n = 106)
	M (SD)	M (SD)
Male (n = 194)	45.19 (6.67)	37.66 (10.16)
Female (n = 66)	44.08 (8.82)	33.03 (10.45)

Table 17

Means and Standard Deviations for Group by Gender for Entrepreneurship Self-Efficacy

Entrepreneurship Self-Efficacy (N = 260)	Existing Entrepreneurs (n = 154)	Non-Entrepreneurs (n = 106)
	M (SD)	M (SD)
Male (n = 194)	70.09 (7.29)	58.72 (9.29)
Female (n = 66)	70.58 (9.42)	56.53 (9.21)

Table 18

Means and Standard Deviations for Group by Gender for Entrepreneurship Outcome Expectations

Entrepreneurship Outcome Expectations (N = 260)	Existing Entrepreneurs (n = 154)	Non-Entrepreneurs (n = 106)
	M (SD)	M (SD)
Male (n = 194)	84.67 (13.29)	80.29 (15.77)
Female (n = 66)	77.91 (11.54)	72.90 (15.87)

A summary of MANOVA results along with follow-up ANOVA results for statistically significant effects can be found in Table 19. These results are explored further for hypotheses four and five as follows.

Table 19

Multivariate Analysis of Variance of Group and Gender on the Measures of Entrepreneurial Intent, Entrepreneurship Self-Efficacy and Entrepreneurship Outcome Expectations with Analysis of Variance Follow-up

Scale	N = 260	*df*	SSQ	MS	*F*	η^2	*p*
Group		3,248			45.60	.35	.001*
Entrepreneurial Intent		1	4186.92	4186.92	57.02	.18	.001*
Entrepreneurship Self-Efficacy		1	7830.96	7830.96	110.15	.30	.001*
Entrepreneurship Outcome Expectations		1	1067.09	1067.09	5.31	.02	.02
Gender		3,254			4.62	.04	.05***
Entrepreneurial Intent		1	398.53	398.53	5.42	.02	.02
Entrepreneurship Self-Efficacy		1	35.10	35.10	.49	.01	.48
Entrepreneurship Outcome Expectations		1	2428.15	2428.15	12.09	.04	.001*
Group*Gender		3,254			.99	.01	.39

*$p < .001$, ** $p < .01$, ***$p < .05$

In the fourth hypothesis, the researcher hypothesized that established entrepreneurs would demonstrate greater scores for Entrepreneurial Intent, Entrepreneurship Self-Efficacy, and Entrepreneurship Outcome Expectations than the control group. With the use of Roy's Largest Root, a statistically significant main effect was found for group membership, F (3, 248) = 45.60, $p < .001$, $\eta^2 = .35$. In a follow-up ANOVA, statistically-significant effects for the group membership (existing entrepreneur or non-entrepreneur) variable were found for two of the DVs: Entrepreneurial Intent, F (1) = 57.02, $p < .001$, and Entrepreneurship Self-Efficacy F (1) = 110.15, $p < .001$. These results confirm the researcher's hypothesis of a difference between the groups participating in this study.

In the fifth hypothesis, the researcher tested if established entrepreneurs who participated in an entrepreneurship education experience would demonstrate greater average scores for Entrepreneurial Intent, Entrepreneurial Self-Efficacy, and Entrepreneurship Outcome Expectations than non-entrepreneurs and if scores would differ by gender. A non-statistically significant interaction effect was found for gender by group, F (3, 248) = .99, $p > .05$, $\eta^2 = .01$. No additional follow-up was necessary. This hypothesis was not supported as differences were not found along the subscales measured in this study. Following claims in the literature (Zhao, et al 2005), males scored higher than females on the three dependent variables.

The researcher conducted a separate MANOVA to test if existing entrepreneurs would create a greater number of new businesses following an educational experience in the sixth hypothesis in the present research. The dependent variables used in the MANOVA were Entrepreneurial Intent, Entrepreneurship Self-Efficacy, and Entrepreneurship Outcome Expectations. The independent variables used were business start-up (yes and no) and participation in a formal educational experience (yes and no).

Descriptive statistics for this MANOVA can be found in Table 20 (Entrepreneurial Intent), Table 21 (Entrepreneurship Self-Efficacy), and Table 22 (Entrepreneurship Outcome Expectations). The group of non-entrepreneurs was not used in testing this hypothesis as non-entrepreneurs had not participated in an entrepreneurship educational experience. Table 23 provides a summary of MANOVA results used in testing this hypothesis.

Table 20

Means and Standard Deviations for Business Start by Formal Education for Entrepreneurial Intent

Entrepreneurial Intent (N = 260)	Business Start (n=119)	No Business Start (n=35)
	M (SD)	M (SD)
Formal Education (n = 58)	46.44 (6.46)	45.76 (7.46)
No Formal Education (n = 96)	43.47 (7.99)	46.36 (4.41)

Table 21

Means and Standard Deviations for Business Start by Formal Education for Entrepreneurship Self-Efficacy

Entrepreneurship Self-Efficacy (N = 260)	Business Start (n=119)	No Business Start (n=35)
	M (SD)	M (SD)
Formal Education (n = 58)	70.62 (7.69)	70.07 (7.81)
No Formal Education (n = 96)	68.48 (4.58)	75.18 (5.91)

Table 22

Means and Standard Deviations for Business Start by Formal Education for Entrepreneurship Outcome Expectations

Entrepreneurship Outcome Expectations (N = 260)	Business Start (n=119)	No Business Start (n=35)
	M (SD)	M (SD)
Formal Education (n = 58)	84.66 (13.15)	84.38 (8.64)
No Formal Education (n = 96)	82.35 (14.98)	82.22 (8.61)

Table 23

Multivariate Analysis of Variance of Business Start-up and Formal Education for Existing Entrepreneurs on the Measures of Entrepreneurial Intent, Entrepreneurship Self-Efficacy and Entrepreneurship Outcome Expectations with Analysis of Variance Follow-up

Scale N = 260	*df*	SSQ	MS	*F*	η^2	*p*
Business Start	3,148			1.63	.03	.18
Formal Education	3,148			1.05	.02	.37
Business Start*Formal Education	3,148			2.35	.04	.07

*$p < .001$, ** $p < .01$, ***$p < .05$

As the interaction between business start-up and formal education did not produce a statistically significant result, F (3, 148) = 2.35, $p > .05$. Main effects for business start-up, F (3, 148) = 1.63, $p > .05$ and formal education, F (3, 148) = 1.05, $p > .05$ were also found to be non-statistically significant. No additional follow-up was necessary.

Study three - entrepreneurship coursework alumni. In Study Three, the researcher received responses to the JMU Entrepreneurship Development Questionnaire from 125 alumni of an undergraduate business program containing entrepreneurship courses who had received a degree in Management and from 70 who were non-Management majors. Participants with a degree in Management served as one group in this study along with a second group consisting of non-Management majors from an applied science and a computer science program.

There were no univariate or multivariate within-cell outliers at $p < .001$. The assumption of homogeneity was met with Box's M = 24.77, p > .05 which was interpreted as non-significant. Table 24 shows moderate statistically-significant Pearson's correlations were calculated to demonstrate that multicollinearity was not an issue in the data, and the assumption of equal variance was met through a non-statistically significant Levene's test for each of the dependent variables: Entrepreneurial

Intent ($F = .60$, $p > .05$), Entrepreneurship Self-Efficacy ($F = 1.74$, $p > .05$), and Entrepreneurship Outcome Expectations ($F = 2.12$, $p > .05$).

Table 24

Pearson's Correlations for Measures of Entrepreneurial Intent (EI), Entrepreneurship Self-Efficacy (ESE), Entrepreneurship Outcome Expectations (EOE) and Goal Directed Activity (GDA)

	EI	ESE	EOE	Gender	Group
EI	-				
ESE	.45*	-			
EOE	.54*	.52*	-		
Gender	.19*	.18**	.27*	-	
Group	.01	.01	.027	.07	-

*$p < .01$ **$p < .05$

Descriptive statistics including means and standard deviations are reported for the independent variables by each dependent variable in Table 25 (Entrepreneurial Intent), Table 26 (Entrepreneurship Self-Efficacy), and Table 27 (Entrepreneurship Outcome Expectation) for the scores for Study Three.

Table 25

Means and Standard Deviations for Group, Gender and Extracurricular Activity for Entrepreneurial Intent

Entrepreneurial Intent (N=195)	Management Alumni (n = 125)	Non-Management Alumni (n = 70)
	M (SD)	M (SD)
Male (n = 127)	36.33 (9.94)	36.55 (10.53)
Female (n = 68)	32.19 (10.52)	31.61 (12.16)

Table 26

Means and Standard Deviations for Group, Gender and Extracurricular Activity for Entrepreneurship Self-Efficacy

Entrepreneurship Self-Efficacy (N=195)	Management Alumni (n = 125)	Non-Management Alumni (n = 70)
	M (SD)	M (SD)
Male (n = 127)	58.75 (10.05)	57.83 (9.19)
Female (n = 68)	54.31 (12.60)	54.47 (9.60)

Table 27

Means and Standard Deviations for Group, Gender and Extracurricular Activity for Entrepreneurship Outcome Expectations

Entrepreneurship Outcome Expectations (N=195)	Management Alumni (n = 125)	Non-Management Alumni (n = 70)
	M (SD)	M (SD)
Male (n = 127)	76.65 (15.58)	77.65 (16.45)
Female (n = 68)	68.36 (12.52)	66.85 (15.88)

In the seventh hypothesis, the researcher hypothesized that alumni with a degree in Management would demonstrate higher scores by gender on Entrepreneurial Intent, Entrepreneurial Self-Efficacy, and Entrepreneurship Outcome Expectations. A between-subjects multivariate analysis of variance was performed on three dependent variables: Entrepreneurial Intent, Entrepreneurship Self Efficacy, and Entrepreneurship Outcome Expectations. The independent variables were group membership (management and non-management) and gender (male and female). A total of 195 responses to the survey were

received for Study Three. In testing this hypothesis, 125 participants were Management majors with 70 non-Management majors serving as the control group.

No statistically-significant interaction effect was found for differences between the treatment and control groups by gender, as Roy's Largest Root was F (3, 189) = .24, $p > .05$, so no follow-up was needed. A statistically significant main effect was found for gender as Roy's Largest Root was F (3,189) = 5.33, $p < .001$. In a follow-up ANOVA for gender, statistically significant effects were found for the three DVs: Entrepreneurial Intent F (1) = 7.33, $p < .001$, Entrepreneurship Self-Efficacy F (1) = 5.41, $p < .01$, and Entrepreneurship Outcome Expectations F (1) = 15.50, $p < .001$. A summary of MANOVA results can be found in Table 28. Males in this sample scored higher along the subscales than females.

Table 28

Multivariate Analysis of Variance of Group and Gender on the Measures of Entrepreneurial Intent, Entrepreneurship Self-Efficacy and Entrepreneurship Outcome Expectations with Analysis of Variance Follow-up

	df	SSQ	MS	*F*	η^2	*p*
Group	3,189			.01	0	.99
Gender	3,189			5.33	.07	.001*
Entrepreneurial Intent	1	806.21	806.21	7.33	.03	.01**
Entrepreneurship Self-Efficacy	1	595.40	595.40	5.41	.02	.02***
Entrepreneurship Outcome Expectations	1	3567.75	3567.75	15.50	.07	.001*
Group*Gender	3,189			.24	.01	.86

*$p < .001$, **$p < .01$, ***$p < .05$

In the eighth hypothesis, the researcher tested to see if management alumni donated to the university at a higher level than non-management alumni. A Pearson Chi-Square test was conducted. In this sample, 125 participants were management majors

with 70 non-management majors serving as the comparison group. Of these respondents, 30 Management alumni donated, compared to 27 non-management alumni. Table 29 presents frequency data for participants in this study. The results of the Pearson Chi-Square test indicate a statistically-significant relationship between donor activity and group membership (χ^2 (7) = 15.08, $p < .05$). Results from the Chi-Square test do not support the researcher's hypothesis that management majors disproportionately donate to the university at a higher level as non-Management alumni donated at the highest frequency in this study.

Table 29

Frequencies of Major by Donor

	Management Alumni	Non-Management Alumni
Donor	30 (15)	95 (48.7)
Non-Donor	27 (13.8)	43 (22.1)

The results generated through these three studies offer insight into the impact of entrepreneurship education along the subscales measured. A more detailed interpretation of these results is provided in the Discussion section of this paper.

Discussion

The main research questions for this study were addressed through the analysis of data collected through the JMU Entrepreneurship Development Questionnaire in an attempt to investigate the impact educational experiences have on entrepreneurship development. A unique dataset has been developed through the present research as a diverse set of participants engaged in the survey representing unique viewpoints into entrepreneurship development at various stages of the education process and the careers of entrepreneurs. Results generated through this research contribute to the existing body of knowledge and will be discussed by the three studies of the present research. Limitations and opportunities for future research are also presented in this section. A summary of findings by study is presented in Table 30 following the outline of research questions presented in the Introduction.

Table 30

Summary of Research Questions and Associated Results

Study	Participants	Research Questions	Results
One	Students	Did the modified items and scales used to measure entrepreneurship development improve the reliability of the instrument?	Yes. Internal consistency reliability improved. Scales refined to capture more direct responses from participants. Item-total correlations are reported in Appendix G-J.
		What is the impact of a semester long entrepreneurship education course on the constructs of Entrepreneurial Intent, Entrepreneurship Self- Efficacy, Entrepreneurship Outcome Expectations and Goal Directed Activity?	Repeated measures MANOVA results indicate participation in the course had a positive impact on entrepreneurship development.

Two	Existing Entrepreneurs	Do existing entrepreneurs report higher average scores in Entrepreneurial Intent, Entrepreneurship Self- Efficacy and Entrepreneurship Outcome Expectations than current non-entrepreneurs?	Yes. The existing entrepreneurs in this study demonstrated higher average scores than the control group.
		Do those individuals with entrepreneurship education experiences have higher average levels of Entrepreneurial Intent, Entrepreneurship Self-Efficacy, and Entrepreneurship Outcome Expectations than those who have not taken entrepreneurship coursework?	No. MANOVA results indicate existing entrepreneurs with formal education experience scored higher on Entrepreneurial Intent, Entrepreneurship Self-Efficacy and Entrepreneurship Outcome Expectations than existing entrepreneurs without educational experiences.
		What impact did an entrepreneurship education intervention have on later entrepreneurial behavior?	The results of this study do not indicate an impact of education or creation of a business on entrepreneurship development.
Three	Alumni	Do male and female alumni differ in entrepreneurial development by those who participated in an entrepreneurship education experience scores on Entrepreneurial Intent, Entrepreneurship Self-Efficacy and Entrepreneurship Outcome Expectations versus alumni who did not participate in an educational intervention?	No. MANOVA results indicate no statistically significant difference on scores between the groups on Entrepreneurial Intent, Entrepreneurship Self-Efficacy and Entrepreneurial Outcomes Expectations.
		How do alumni identified as entrepreneurs engage in the advancement of their alma mater?	Chi-Square results indicate Management alumni did not give financially at a higher level than non-Management alumni.

Measurement

A main focus of the current research was refining and enhancing a survey instrument to measure entrepreneurship development along the subscales of

Entrepreneurial Intent, Entrepreneurship Self-Efficacy, Entrepreneurship Outcome Expectations, and Goal Directed Activity. Building upon instruments developed previously by others and summarized in Table 8, the researcher refined measurement scales and offered new items to gather data from students, entrepreneurs and alumni of entrepreneurship education programs. Results from this analysis indicate the addition of these items and the refinement of the measurement scales improved the instrument used in the present research. As presented in Table 8, reliability improved across the subscales in each study and individual item correlations were high to moderate on the subscales. Full results of item total correlations for the items added in the present research are offered in Appendix G and inter-item correlations can be found in Appendix H.

Based upon the results generated in the current research, the JMU Entrepreneurship Development Questionnaire offers an improvement over previously used instruments along the subscales measured as demonstrated through higher Cronbach's alpha measure of reliability. Claims in the existing literature (Autio, et al., 1997; Geldhoff, et al., 2013) held constructs measuring Entrepreneurship Development lacked psychometrically-validated measurement scales. Findings from the use of the JMU Entrepreneurship Development Questionnaire in the present research offer an improvement upon previously used instruments and addresses identified gaps in current practice. Continued and expanded use of the JMU Entrepreneurship Development Questionnaire is needed to further analyze the reliability and validity of the instrument, but the results of the present research are promising in further measurement of the subscales used. The enhancements made to the measurement instrument in this research

demonstrate a contribution to the field of measuring an individual's entrepreneurship development along the subscales of interest.

Study one - entrepreneurial course. Data were gathered from a treatment group of current students enrolled in an entrepreneurship course and a control group consisting of students not in an entrepreneurship course with scores on the subscales at two points in time (pre-test and post-test) to test three hypotheses. The first hypothesis examined the question of whether entrepreneurship development changed over time for those who completed or did not complete an entrepreneur course. In testing whether participation in a course positively impacted an individual's scores on the measures of Entrepreneurial Intent, Entrepreneurship Self-Efficacy, Entrepreneurship Outcome Expectations, and Goal Directed Activity, a within-subjects repeated measures MANOVA generated a statistically significant interaction effect for time and group, $F(3) = 2.90$, $p < .01$, $\eta^2 = .04$, indicating participation in a class impacted an individual's score over the course of an educational experience. Statistically-significant univariate follow-up results for the subscales of Entrepreneurial Intent, Entrepreneurship Self-Efficacy, and Entrepreneurship Outcome Expectations were found indicating three of the four subscales were positively impacted by participation in the course, but not goal directed activity. Although this interaction effect indicates a small effect ($\eta^2 = .05$) of an entrepreneurship course over one academic semester, it does illustrate those completing an entrepreneurial-related course scored higher on the average than those who did not take the course on three subscales after taking a class. These results represent a preliminary finding of the positive impact of an educational experience on entrepreneurship development.

The researcher was interested in testing previous claims in the literature (Kauffman Foundation, 2008) that participation in an extracurricular activity such as a business plan competition would advance entrepreneurship development along the subscales of interest in this study. Only a small number of participants (n = 13) in this study were part of a student entrepreneurship group, with no members of the group of students not enrolled in the course engaged in the extracurricular activity. This sample did not provide a group upon which to test the second hypothesis investigating the impact of an extracurricular activity on entrepreneurship development. Extra-curricular opportunities are an important element in the educational experience and should be investigated further to explore the impact on an individual's entrepreneurship development.

No difference was found in the third hypothesis between males and females by group over time along the subscales of Entrepreneurial Intent, Entrepreneurship Self-Efficacy, Entrepreneurship Outcome Expectations, and Goal Directed Activity. Based on the work of Klapper and Parker (2010) and Zhao (2010), the researcher wanted to further investigate the role of entrepreneurship education on an individual based on gender. The existing research indicated that males tended to score higher on the subscales measured on the JMU Entrepreneurship Development Questionnaire. However, limited pre-test/post-test data was available in these previous studies (which focused on personality characteristics), whereas the researcher investigated to find gender differences on the subscales. The present research did not produce a statistically-significant interaction between time, group and gender, $F(3) = .23$, $p > .05$, indicating scores on the subscales after participating in the educational intervention differed between male and female

students participating in this study. Males scored higher on average on the pre and post-tests, indicating male students gained more along the subscales as a result of participating in the course.

The current research supports claims in the literature of male students scoring higher than female students, but results of the MANOVA conducted by the researcher do not support the hypothesis that female students would demonstrate greater scores on the subscales after an educational intervention. The third hypothesis tested differences in gender through a quasi-experimental treatment-control group designed to further investigate the role entrepreneurship education has on female students. While this result was found to be non-statistically significant, the opportunity exists for additional research to further explore other subscales and potentially long-term impacts of entrepreneurship education on male and female students.

As described in the results section, this study illustrates that students enrolled in the entrepreneurship course reported greater development along the subscales of the JMU Entrepreneurship Development Questionnaire than students not participating in the entrepreneurship education course over one academic semester. This analysis supports the researcher's first hypothesis of improved progress in these areas as the result of a formal educational experience. The positive impact of a curricular experience on entrepreneurship development along the subscales exhibited through Study One of the present research supports the claims in the literature (Dickson et al, 2006) that entrepreneurship can be developed through education. Although the researcher's other two hypotheses were not supported by the data, the testing and measurement of these constructs offers additional research into other factors that may impact development.

As various policy and business leaders have called for increasing the number of entrepreneurs in the workforce, the finding in the present research offers evidence that post-secondary education can positively impact an individual's entrepreneurship development and potentially foster an individual's interest in engaging in entrepreneurship following a formal educational intervention focused on entrepreneurship. The researcher has opened a dialogue with the founders of the Entrepreneurship Education Project and will share results of this research as a means of contributing to a longitudinal data set exploring the impacts of entrepreneurship education. The results generated through Study One of the present research offers potential valuable data to the Entrepreneurship Education Project as it includes both treatment and control groups collected through a refined survey instrument. Continued research into successful models of entrepreneurship education is needed, but preliminary evidence suggests that development can occur as a result of formal educational experiences.

Study two - existing entrepreneurs. The researcher proposed three hypotheses in Study Two as a means of exploring the construct of entrepreneurship development from the perspective of existing entrepreneurs. One of the main research questions posed in the present research addressed differences on the measures of the JMU Entrepreneurship Development Questionnaire between the existing entrepreneurs surveyed and a group of non-entrepreneurs. Statistically-significant results were found to answer this research question exploring whether differences exist between these two groups.

Results from the MANOVA conducted to test the researcher's hypothesis that existing entrepreneurs would report higher scores, F (3, 248) = 45.60, $p < .001$, along the subscales of Entrepreneurial Intent, Entrepreneurship Self-Efficacy, and Entrepreneurship Outcome Expectations than those in the control group. A modest effect ($\eta^2 = .26$) on the DVs by the group variable indicates a difference between the existing entrepreneurs and non-entrepreneurs in this study. With a follow-up ANOVA, statistically significant effects were found for Entrepreneurial Intent, F (1) = 28.97, $p <.001$ and Entrepreneurship Self-Efficacy, F (1) = 122.8, $p < .001$ indicating existing entrepreneurs scored higher on these two subscales. These findings support the researcher's expectation that existing entrepreneurs would have greater intention to engage in entrepreneurial activities and higher self-efficacy than non-entrepreneurs. Participants in this study represent a broad cross-section of economic sectors and entrepreneurs from companies of various sizes, allowing for a generalizable result given the heterogeneous nature of the sample. Drawing a conclusion from these results, one can claim that existing entrepreneurs have identified strengths along Entrepreneurial Intent and Entrepreneurship Self-Efficacy as reflected by the differing average scores between entrepreneurs and non-entrepreneurs. One potential action from this finding would be to expand educational programs to focus on these areas as a means of developing future entrepreneurs.

In the fifth hypothesis, the researcher tested whether group and gender differences existed on scores on the measures of the JMU Entrepreneurship Development Questionnaire. A non-statistically significant interaction was found for group by gender in this study. With this finding, further research is needed into entrepreneurship

educational experiences that can be shaped to prepare females to pursue entrepreneurship. As entrepreneurship is commonly held as a male-dominated field, the results from this study do not differ from current economic conditions but suggest the subscales of Entrepreneurial Intent, Entrepreneurship Self-Efficacy, and Entrepreneurship Outcome Expectations are areas upon which to focus educational programs as statistically-significant differences were not found by gender in this sample. Additional investigation of these differences on other subscales would benefit the body of knowledge and potentially influence entrepreneurship education programs by expanding curriculum to increase female achievement across these subscales as a means of encouraging greater engagement in entrepreneurial activities by females.

The researcher's sixth hypothesis was not supported by the results of this study, indicating that the existing entrepreneurs with formal entrepreneurship educational experience and created start-up businesses did not differ from the non-entrepreneur group along the measures of entrepreneurship development. While this finding does not offer support for the hypothesis of differences between entrepreneurs and non-entrepreneurs based upon a formal educational experience, $F\,(3, 148) = 2.35$, $p > .05$, a total of 58 of the 154 entrepreneurs surveyed had participated in an educational program. It is difficult to generalize this result to a broader population, given the small number of individuals participating in an educational intervention. Additional research is needed to explore this relationship further, perhaps with a set of participants that includes a larger number of entrepreneurs with educational experiences.

As the existing entrepreneurs did not participate in a common educational experience, the impact of education on business creation could not be generalized from

this sample. Further research utilizing a sample of entrepreneurs with a common educational experience may produce different results related to the creation of new businesses. The data gathered through the survey of the existing entrepreneurs in this study offers a rich source to further explore educational impacts at various points in an individual's entrepreneurial pursuits. The researcher worked with the leadership of a local small business development center in surveying existing entrepreneurs and will be sharing the results of this research with those involved in developing educational programs offered through the small business development center as a means of creating educational experiences that would benefit entrepreneurs currently in the workforce. Additional data can be collected from entrepreneurs participating in these future educational programs and be further analyzed to continue studying impacts of education on an individual's entrepreneurship development.

Study three - entrepreneurship coursework alumni. Two hypotheses were posed by the researcher in this study to investigate the construct of Entrepreneurship Development following an educational experience by group membership and gender along the measures of Entrepreneurial Intent, Entrepreneurship Self-Efficacy, and Entrepreneurship Outcome Expectations. Participants in this study were assigned to one of two groups: a group of alumni of an undergraduate Management program and a second group consisting of graduates from an applied science and a computer science program.

The seventh hypothesis posed in this research explored whether average differences exist between the Management alumni and the non-Management alumni and males and females on the scores along Entrepreneurial Intent, Entrepreneurship Self-Efficacy, and Entrepreneurship Outcome Expectations. Results from this study did not

produce a statistically significant interaction effect for group by gender, F (3, 189) = .24, $p > .05$. A statistically significant main effect was found for gender, F (3, 189) = 5.33, $p < .001$, $\eta^2 = 07$, with males scoring higher. This result does not indicate a large difference between groups as only 7% of the difference in entrepreneurial development can be explained by gender, it does offer an opportunity to further investigating the relationship between gender and scores on the measures of the JMU Entrepreneurship Development Questionnaire.

The alumni participants in the treatment group were all exposed to entrepreneurship material as part of a course but all had not participated in a designated entrepreneurship course. Although members of the group of non-entrepreneurs were not enrolled in the same course as the treatment group, the nature of careers pursued by alumni of the applied science and computer science programs may lead to pursuit of entrepreneurial endeavors. The differences in course content and career paths of participants in the sample make it difficult to generalize the results of this study, as more in-depth research is needed with a sample consisting of graduates of a focused entrepreneurship education program. However, findings from this study do hold that gender differences exist in this sample, indicating an opportunity to offer educational experiences focused on females designed to increase their development along the measures of the JMU Entrepreneurship Development Questionnaire.

In the final hypothesis tested by the researcher, a Chi Square test was conducted to explore if Management alumni made financial contributions at a disproportionate rate than non-Management alumni. A statistically-significant result was produced, indicating a difference between graduates of the Management program and non-Management

alumni. Results indicated non-Management alumni donated at a higher rate than the Management alumni participating in this study. The results of this study do not support the researcher's hypothesis, as those with exposure to an entrepreneurship educational experience were more likely to have contributed financially to the university. The existing literature (Charney and Libecap, 2000) found alumni of entrepreneurship programs were more likely to start their own business, have higher annual incomes and possess more assets but did not directly address alumni giving levels. Results from this finding present a preliminary finding that alumni with an entrepreneurship educational experience do not donate at a greater rate than non-Management alumni, but, given the limited sample size, additional research is needed to generalize this finding to a broader population. Despite claims in the literature that entrepreneurs generate greater wealth, donations to the university they graduated from did not occur at a higher rate. Investigation into the reasons that alumni with an entrepreneurship educational experience did not give philanthropically to their alma mater is necessary to better understand if entrepreneurs value giving to higher education or if the wealth generated is used for other activities such as donations to other charitable causes, investing in other entrepreneurial ventures or starting a new business.

Results from Study Three will be shared with leaders in the development and alumni offices of the institution from which alumni participants were drawn. The institution is currently planning a comprehensive fundraising campaign and the results from this study may offer information of interest to those engaging with potential donors. The researcher will provide a summary of results and insight gained from the participants in this study with the leaders of appropriate university offices as a means of facilitating

connections with alumni entrepreneurs and potentially offering further insights into the interests of alumni as it relates to entrepreneurship education.

Limitations

The present research had several limitations. Although statistically-significant findings were produced on some of the researcher's hypotheses and offered responses to general research questions posed, future work is needed to further the exploration into the construct of entrepreneurship development. The researcher recognizes the limitations that are present and the need to continue investigating factors impacting one's development along the measures of Entrepreneurial Intent, Entrepreneurship Self-Efficacy, Entrepreneurship Outcome Expectations, and Goal Directed Activity.

Elements of this research included the addition of items and the refinement of measurement scales on a survey instrument. This research represented the initial administration of the JMU Entrepreneurship Development Questionnaire. Additional usage of the instrument is needed to further assess the psychometric properties of the refinements made to the items and measurement scales. Through expanded administration of the instrument, future studies will benefit from greater insight into the reliability and validity of this measurement tool.

Data were collected in Study One from students from a single university with a small number of participants in an entrepreneurship education experience. This sample produced useful results for this study, but additional participants from other universities would allow for greater generalization to a broader population. As only a small number of participants engaged in an extra-curricular activity with only members of the group enrolled in the course pursuing the extra-curricular activity, results could not be produced

to test this hypothesis. A measure of a greater number of students pursuing extra-curricular opportunities is necessary in order to investigate this hypothesis and generate findings. Future research would benefit from a survey of students from multiple institutions, which would allow for comparison across universities and a larger sample upon which to draw students with entrepreneurship education experiences including extra-curricular activities.

Study Two utilized a sample drawn from a pool of existing entrepreneurs available to the researcher through professional contacts. This sample of convenience can be expanded to include a larger number of existing entrepreneurs along with a more random sample of individuals in the group of non-entrepreneurs. This study would generate a more diverse sample upon which conclusions could be drawn and comparisons made. Geographic diversity of the sample could also be improved, as a majority of the participants were drawn from one region of the country. The inclusion of additional geographic locations would enhance the perspectives and experiences in the study.

Finally, Study Three sampled alumni from a single institution. An expanded sample from multiple universities would enhance future research by enlarging the pool of participants and affording the opportunity to compare results between programs. Participants from a program with a specific focus on entrepreneurship education would offer a more direct perspective on educational impacts on entrepreneurship development. Additionally, alumni from other academic majors could serve as a control group, which may offer other analysis from contrasts between groups.

In addition to limitations in the samples used across the three studies comprising the present research, the instrument used was modified based upon prior research and

required reliability and validity analysis. This research sought to further develop the survey instrument and measurement scales through the use of this survey. Future application of this instrument is needed to further assess its use in measuring entrepreneurship development. In additional use with larger samples, the instrument can continue to be refined to best gather data from students, entrepreneurs and alumni.

Conclusion

Entrepreneurship has been a focal point as an element of the nation's economy in the popular as well as academic press. The attention given to entrepreneurship across a variety of media outlets has produced numerous definitions of the term and strategies to increase the number of entrepreneurs. The present research offers a definition of entrepreneurship as an "action based process of creating a venture, which provides market value" upon which to investigate educational interventions designed to further an individual's Entrepreneurship Development. It was the intent of the researcher to clarify an operational definition upon which the impact of educational experiences could be measured. This definition served as the basis upon which refinement of a psychometric measurement instrument and quantitative analysis was conducted in the present research. This study offers evidence that entrepreneurship development can be reliably measured.

Through the enhancement of the survey instrument and quantitative data collected in the three studies, the current research contributes to the existing body of knowledge in meaningful and practical ways. Calls for greater numbers of entrepreneurs have been made by policy leaders, many of which look to post-secondary education as a means of producing the necessary workforce. Previous research examined the role that the field of higher education can take in addressing these calls, and the present research suggests that

higher education can make an impact by offering educational opportunities for students in the area of entrepreneurship. Results from Study One include the support of the first hypothesis, indicating that participation in an entrepreneurship course positively impacts an individual's development along the constructs measured by the instrument when compared to a control group not enrolled in a course.

The second study illustrated that existing entrepreneurs scored higher on average on the measures of Entrepreneurial Intent, Entrepreneurship Self-Efficacy, and Entrepreneurship Outcome Expectations, indicating current entrepreneurs possess strengths in these areas. However, a relationship between educational experience and new venture creation was not discovered in this study. Additional work is needed to investigate how entrepreneurs with educational experiences are translating these strengths into practice.

Study Three did not produce statistically-significant results by group upon which to generalize differences between the alumni participants but did find a small difference between males and females. These findings offer opportunities for further exploration into impacts of entrepreneurship education beyond graduation. Alumni participants in Study Three did not donate financial resources to the university at a higher level than those who did not participate in the entrepreneurship educational intervention.

Gender served as an independent variable across all three studies in this research and produced consistent results of the differences between males and females on participant scores along the subscales measured. In all three studies, males reported higher on average scores than females. These findings can be explored further to investigate if the specific educational experience could impact the differences in scores or

what other factors contribute to the difference between males and females. From these results, the possibility of expanding educational programs focusing on the entrepreneurship development of females as a means of increasing the number of female entrepreneurs exists. Similar efforts have been made in fields such as science, engineering and mathematics to address gender differences in the professions. Further research into educational impacts on female students in the area of entrepreneurship is needed to refine curricular approaches in addressing gender differences. As the dataset used in this research includes a diverse set of participants at various points in their careers along a common set of measures, future research can build upon the study of gender differences to investigate other educational interventions and measures of entrepreneurship development.

Results from the present research signify unique contributions to the body of knowledge through refinement and expansion of a survey instrument along with quantitative analysis of results from the three studies conducted in this research. The methodological approach and research design offers data from a new combination of perspectives from entrepreneurs at different positions in their respective careers. By drawing upon responses from those who participated in a variety of educational experiences at differing points in their entrepreneurship development, this research adds to the literature in exploring entrepreneurship educational impacts across a diverse set of participants. The variability in participants found in this dataset provides a unique vantage point in the investigation of entrepreneurship education in both the evaluation of the survey instrument and in testing the hypotheses set forth by the researcher.

From this dataset, the present research provides conclusions drawn from quantitative analysis that suggest entrepreneurship can be developed through exposure to educational experiences. Statistically-significant results have been derived but opportunities for continued investigation remain, given the limitations present in the current research.

Along with the knowledge gained through these results and the opportunity to apply findings from this research to advance entrepreneurship educational experiences offered to a variety of participants, the reliability and validity of the instrument were improved through these three studies. From the validity evidence gathered through this research, the JMU Entrepreneurship Development Questionnaire offers promise to future investigation into the measures of the instrument with the possibility of evaluating other entrepreneurship courses and extra-curricular activities. The existing literature called for more reliable survey instruments to measure the impact of entrepreneurship education and the JMU Entrepreneurship Development Questionnaire can serve as a tool for future researchers to use to explore how individuals develop as the result of an educational experience. With a rise in the number of entrepreneurship education programs, this instrument can be applied in a variety of settings to gather data for longitudinal studies and be further validated through additional use.

Scholars and practitioners have debated if entrepreneurship could be defined and developed. The research began with this question and offered a refined definition in an attempt to clarify a collection of complex definitions present in the literature. From this definition, the researcher refined a measurement instrument and analyzed data to investigate characteristics of entrepreneurship development. Based upon the findings of

this research, entrepreneurship development can be advanced and post-secondary education can offer experiences to build talent in this area in an attempt to help address national workforce needs.

Appendix A

Entrepreneurship Self-Efficacy

Reference: Existing items from McGee (2009)

Three-point Likert scale: *No Confidence*, *Moderately Confident*, *Completely Confident*

Rate how confident you are in your ability to accomplish it at the present time.

Existing Items	New Items
Come up with a new idea for a product or service on your own.	Delegate tasks and responsibilities to employees in my venture.
Brainstorm with others to come up with a new idea for a product or service.	
Identify the need for a new product or service.	
Design a product or service that will satisfy customer needs and wants.	
Estimate customer demand for a new product or service.	
Determine a competitive price for a new product or service.	
Estimate the amount of start-up funds and working capital necessary to start a new venture.	
Design an effective marketing/advertising campaign for a new product or service.	
Get others to identify with and believe in my vision and plans for a new venture.	
Network (i.e., make contact with and exchange information with others).	
Clearly and concisely explain verbally/in writing my new venture ideas in everyday terms.	
Supervise employees.	
Deal effectively with day-to-day problems and crises.	
Inspire, encourage, and motivate my employees.	
Train employees.	
Organize and maintain the financial records of my venture.	
Manage the financial assets of my venture.	
Read and interpret financial statements.	
Research relevant facts related to my idea.	
Anticipate potential problems that my idea may face.	

Persuade others to work with me and/or support my idea.	
Generate as many ideas as possible.	
Create an action plan to launch my idea and make it succeed.	
Recruit and hire employees.	
Identify which ideas are the most effective to pursue.	

Appendix B

Entrepreneurial Intent

Reference: Existing items from Thompson (2009)

Four-point Likert scale: *Very Untrue*, *Untrue*, *True*, *Very True*

Thinking of yourself, how true is it that you:

Existing Items	New Items
Are saving money to start a new venture.	Search for business start-up opportunities.
Spend time learning about starting a new venture.	Read books on how to set up a venture.
Intend to set up a new venture in the future.	Have plans to launch your own venture.
	Take courses focused on entrepreneurship.
	Seek internships with new ventures.
	Participate in extracurricular (clubs, etc.) in the area of entrepreneurship.
	Discuss ideas for new ventures with friends or relatives.
	Intend to patent or trademark an idea.
	Pursue funding for an idea or new venture.
	Seek mentors from established entrepreneurs.
	Attend conferences or lectures in the area of entrepreneurship.
	Plan to invest in a new venture in the future.
	Develop technological solutions to current problems.
	Build teams to solve problems.
	Research best practices in starting a new venture.

Appendix C

Entrepreneurship Outcome Expectations

Reference: Existing items from Krueger (2000)

Four-point Likert scale: *Not at All*, *Very Little*, *A Good Deal*, *Very Much*

Please rate to what extent you intend to:

Existing Items	New Items
Generate Personal Wealth.	Increase Personal Income.
Be Self-Employed.	Establish Own Business.
Achieve Greater Personal Freedom.	Bring Ideas to Market.
Obtain Personal Growth and Development.	Patent a Technology.
Gain Individual Public Recognition.	Invest in a Start-Up Company.
Build a Lasting Business.	Create New Jobs.
	Increase Company Revenue.
	Sell a Company.
	Launch an Initial Public Offering.
	Increase Market Share Create Multiple Ventures.
	Create Value for Established Business.
	Be Part of a Team.
	Achieve Individual Success.
	Capitalize on Opportunities.
	Engage in a Creative Process.
	Focus on Results.
	Manage the Work of Others.
	Meet Market Needs.
	Do the Kind of Job You Enjoy.
	Compete in World Markets.
	Making and Utilize Professional Relationships and Contacts.
	Reach Partnerships With Other Companies.

Appendix D

Goal Directed Activity

Reference: Existing items from Farmer and Kung-McIntyre (2011)

Four-point Likert scale: Strongly Disagree, Disagree, Agree, Strongly Agree

Please indicate your agreement with each of the following statements:

Existing Item	New Item
I often think about becoming an entrepreneur.	I regularly think about becoming an entrepreneur.
I would like to see myself as an entrepreneur.	It is important for me to express my entrepreneurial aspirations.
Becoming an entrepreneur would be an important part of who I am.	I think I have enough skills and abilities to start a business.
When I think about it, the term "entrepreneur" would fit me pretty well.	I believe that starting a business is a good career option.
I am interested in starting a company, non-profit or NGO.	Fear of failure would prevent me from starting a business.
I am not a "traditional" entrepreneur but I take time to solve problems or take advantage of opportunities to make changes in my environment.	In the next 6 months will be good opportunities to start businesses in the area where I live.
	In my area people think that entrepreneurship is a desirable career choice.
	I have engaged in a deliberate, systematic search for an idea for a new business.
	I have been thinking about a business idea or a number of business ideas that can potentially grow into a real business.
	I (alone or with others) have defined products or services for the business.
	I (alone or with others) have tried to define the market opportunity for the business.
	I have devoted significant time to this business idea.
	I have discussed ideas for a new business with my friends and family.
	I have talked about a new business with people that I have a business or working relationship with.

Appendix E

Open-Ended Items – Existing Entrepreneurs

What is your role in entrepreneurship? (open-ended response)

Have you started a business that is currently operating?

Yes
No
If Yes, How Many? (open-ended response)

Did you start this new venture?

In Your Hometown
In Your College or University Town
Elsewhere (open-ended response)

What year did you start the venture? (open-ended response)

What is your role in the new venture?

Inventor/Owner of Intellectual Property
Investor
Manager
Other (specify)

What is the ownership structure (please check/fill in that which best describes the venture?

Independently started, wholly owned
Independently started, % equity position
Joint venture with your employer, % equity position
Joint venture with an existing company, % equity position
Other (open-ended response)

What is the status of the venture?

Are you still involved with this business venture/start-up?
If No, the year you left/sold/closed the venture/business (open-ended response)

Which of the following best describes your working situation when you started your new venture:

Self-employed/own business
Self-employed/consultant
Family business
Employed in private firm (>500 employees)

Employed in private firm (25-500 employees)
Employed in private firm (<25 employees)
Employed in government (including educational institution)
Employed in non-profit organization
Other (specify)

Which of the following best describes your work position when you started your new venture:

Managerial Tech/analytical
Marketing
Buy/sell/trade
Entrepreneurial
Instruct/training
Other (specify)

As of the last day of the previous month, how many of each of the following types of employees (including yourself) work for your venture?

Full Time Employees
Part Time Employees
Interns (unpaid employees)

If you are considering starting the venture with partners, would these partners be:

Family members
Friends from home
Friends from school
Other (specify)

How many ventures have you created?

Have you participated in formal educational or training programs related to entrepreneurship or business start-up?

Yes
No
If Yes, please describe (open-ended response)

Appendix F

Open-Ended Items – Alumni Survey

Is there anything (class, extracurricular activity, professor, etc.) that you feel contributed to becoming an entrepreneur?

Are you interested in opportunities to engage with entrepreneurship programs JMU?

How would you like to work with entrepreneurship programs?

Student Mentorship
Volunteer Board Service
Class Presentation/Guest Lecture
Internship Provider
Other (open-ended response)

Appendix G

Item Total Correlation – JMU Entrepreneurship Questionnaire

Table G1

Item Total Correlation for New Items on the JMU Entrepreneurship Development Questionnaire for the Entrepreneurship Intent Subscale

New Items	JMU Entrepreneurship Development Questionnaire
Search for business start-up opportunities.	.63
Read books on how to set up a venture.	.65
Have plans to launch your own venture.	.68
Take courses focused on entrepreneurship.	.51
Seek internships with new ventures.	.42
Participate in extracurricular (clubs, etc.) in the area of entrepreneurship.	.62
Discuss ideas for new ventures with friends or relatives.	.62
Intend to patent or trademark an idea.	.59
Pursue funding for an idea or new venture.	.72
Seek mentors from established entrepreneurs.	.74
Attend conferences or lectures in the area of entrepreneurship.	.68
Plan to invest in a new venture in the future.	.73
Develop technological solutions to current problems.	.47
Build teams to solve problems.	.43
Research best practices in starting a new venture.	.78

Table G2

Item Total Correlation for New Items on the JMU Entrepreneurship Development Questionnaire for the Entrepreneurship Self-Efficacy Subscale

New Item	JMU Entrepreneurship Development Questionnaire
Delegate tasks and responsibilities to employees in my venture.	.55

Table G3

Item Total Correlation for New Items on the JMU Entrepreneurship Development Questionnaire for the Entrepreneurial Outcome Expectations Subscale

New Items	JMU Entrepreneurship Development Questionnaire
Increase Personal Income.	.46
Establish Own Business.	.58
Bring Ideas to Market.	.68
Patent a Technology.	.40
Invest in a Start-Up Company.	.51
Create New Jobs.	.55
Increase Company Revenue.	.65
Sell a Company.	.47
Launch an Initial Public Offering.	.45
Increase Market Share.	.63
Create Multiple Ventures.	.58
Create Value for Established Business.	.64
Be Part of a Team.	.45
Achieve Individual Success.	.53
Capitalize on Opportunities.	.58
Engage in a Creative Process.	.59
Focus on Results.	.57
Manage the Work of Others.	.49
Meet Market Needs.	.63
Do the Kind of Job You Enjoy.	.40
Compete in World Markets.	.54
Making and Utilize Professional Relationships and Contacts.	.60
Reach Partnerships With Other Companies.	.62

Table G4

Item Total Correlation for New Items on the JMU Entrepreneurship Development Questionnaire for the Goal Directed Activity Subscale

New Item	JMU Entrepreneurship Development Questionnaire
I regularly think about becoming an entrepreneur.	.80
It is important for me to express my entrepreneurial aspirations.	.70
I think I have enough skills and abilities to start a business.	.62
I believe that starting a business is a good career option.	.65
Fear of failure would prevent me from starting a business.	.11
In the next 6 months will be good opportunities to start businesses in the area where I live.	.56
In my area people think that entrepreneurship is a desirable career choice.	.61
I have engaged in a deliberate, systematic search for an idea for a new business.	.68
I have been thinking about a business idea or a number of business ideas that can potentially grow into a real business.	.80
I (alone or with others) have defined products or services for the business.	.74
I (alone or with others) have tried to define the market opportunity for the business.	.75
I have devoted significant time to this business idea.	.70
I have discussed ideas for a new business with my friends and family.	.76
I have talked about a new business with people that I have a business or working relationship with.	.82

Appendix H

Inter-Item Correlation Matrix

Table H1

Inter-Item Correlations for the Entrepreneurial Intent Subscale

	Item Number								
Item	1	2	3	4	5	6	7	8	9
Search for business start-up opportunities	-								
Are saving money to start a new venture	.47	-							
Read books on how to set up a venture	.46	.52	-						
Have plans to launch your own venture	.62	.55	.56	-					
Spend time learning about starting a new venture	.53	.55	.65	.68	-				
Intend to set up a new venture in the future	.63	.49	.54	.73	.64	-			
Take courses focused on entrepreneurship	.30	.38	.45	.38	.30	.36	-		
Seek internships with new ventures	.24	.37	.36	.30	.36	.28	.51	-	
Participate in extracurricular (clubs, etc.) in the area of entrepreneurship	.39	.41	.48	.46	.45	.42	.37	.42	-
Discuss ideas for new ventures with friends or relatives	.54	.39	.40	.54	.47	.60	.28	.13	.33
Intend to patent or trademark an idea	.40	.41	.39	.52	.41	.43	.28	.26	.36
Pursue funding for an idea or new venture	.48	.52	.51	.58	.51	.55	.33	.31	.47
Seek mentors from established entrepreneurs	.50	.45	.54	.57	.59	.58	.38	.27	.52
Attend conferences or lectures in the area of entrepreneurship	.37	.40	.59	.45	.53	.48	.45	.39	.60
Plan to invest in a new venture in the future	.58	.48	.46	.59	.55	.66	.37	.30	.43
Develop technological solutions to current problems	.31	.27	.26	.31	.27	.34	.11	.10	.29
Build teams to solve problems	.26	.19	.21	.28	.30	.31	.20	.09	.28

(continued)

	Item Number								
Item	10	11	12	13	14	15	16	17	18
Research best practices in starting a new venture									
Search for business start-up opportunities									
Are saving money to start a new venture									
Read books on how to set up a venture									
Have plans to launch your own venture									
Spend time learning about starting a new venture									
Intend to set up a new venture in the future									
Take courses focused on entrepreneurship									
Seek internships with new ventures									.
Participate in extracurricular (clubs, etc.) in the area of entrepreneurship									
Discuss ideas for new ventures with friends or relatives	-								
Intend to patent or trademark an idea	.39	-							
Pursue funding for an idea or new venture	.46	.62	-						
Seek mentors from established entrepreneurs	.50	.45	.61	-					
Attend conferences or lectures in the area of entrepreneurship	.37	.40	.52	.64	-				
Plan to invest in a new venture in the future	.57	.50	.57	.54	.46	-			
Develop technological solutions to current problems	.43	.37	.38	.42	.34	.41	-		
Build teams to solve problems	.36	.25	.34	.40	.33	.38	.52	-	
Research best practices in starting a new venture	.52	.49	.61	.66	.62	.61	.43	.45	-

Table H2

Inter-Item Correlation Matrix for the Entrepreneurship-Self Efficacy Subscale

	Item Number								
Item	1	2	3	4	5	6	7	8	9
Come up with a new idea for a product or service on your own	-								
Brainstorm with others to come up with a new idea for a product or service	.54	-							
Identify the need for a new product or service	.59	.46	-						
Design a product or service that will satisfy customer needs and wants	.60	.52	.60	-					
Estimate customer demand for a new product or service	.48	.37	.46	.50	-				
Determine a competitive price for a new product or service	.36	.34	.36	.44	.56	-			
Estimate the amount of start-up funds and working capital necessary to start a new venture	.35	.28	.38	.44	.52	.66	-		
Design an effective marketing/advertising campaign for a new product or service	.29	.29	.30	.35	.41	.54	.53	-	
Get others to identify with and believe in my vision and plans for a new venture	.40	.32	.43	.43	.37	.47	.46	.50	-
Network (i.e., make contact with and exchange information with others)	.35	.34	.40	.36	.34	.37	.43	.42	.56
Clearly and concisely explain verbally/in writing my new venture ideas in everyday terms	.35	.45	.39	.38	.33	.39	.35	.33	.51
Supervise employees	.18	.17	.26	.23	.23	.27	.34	.28	.36
Recruit and hire employees	.22	.27	.26	.30	.27	.32	.33	.29	.38
Delegate tasks and responsibilities to employees in my venture	.16	.27	.22	.24	.18	.31	.38	.34	.35
Deal effectively with day-to-day problems and crises	.20	.26	.12	.21	.26	.25	.31	.25	.25
Inspire, encourage, and motivate my employees	.20	.19	.33	.21	.29	.29	.29	.23	.38
Train employees	.13	.20	.13	.15	.16	.26	.27	.29	.27
Organize and maintain the financial records of my venture	.22	.19	.23	.23	.29	.36	.42	.33	.24
Manage the financial assets of my venture	.29	.27	.31	.29	.37	.44	.47	.36	.31
Read and interpret financial statements	.25	.25	.31	.32	.37	.44	.53	.42	.36
Research relevant facts related to my idea	.24	.32	.28	.31	.22	.32	.29	.34	.37
Anticipate potential problems that my idea may face	.26	.25	.31	.32	.30	.42	.41	.34	.45
Generate as many ideas as possible	.44	.39	.43	.46	.40	.45	.40	.37	.56
Identify which ideas are the most effective to pursue	.40	.39	.48	.45	.47	.46	.45	.41	.50
Persuade others to work with me and/or support my idea	.42	.38	.38	.36	.39	.39	.38	.37	.56
Create an action plan to launch my idea and make it succeed	.41	.38	.41	.40	.43	.47	.50	.48	.52

(continued)

	Item Number								
Item	10	11	12	13	14	15	16	17	18
Come up with a new idea for a product or service on your own									
Brainstorm with others to come up with a new idea for a product or service									
Identify the need for a new product or service									
Design a product or service that will satisfy customer needs and wants									
Estimate customer demand for a new product or service									
Determine a competitive price for a new product or service									
Estimate the amount of start-up funds and working capital necessary to start a new venture									
Design an effective marketing/advertising campaign for a new product or service									
Get others to identify with and believe in my vision and plans for a new venture									
Network (i.e., make contact with and exchange information with others)	-								
Clearly and concisely explain verbally/in writing my new venture ideas in everyday terms	.54	-							
Supervise employees	.31	.37	-						
Recruit and hire employees	.36	.33	.59	-					
Delegate tasks and responsibilities to employees in my venture	.32	.34	.52	.56	-				
Deal effectively with day-to-day problems and crises	.24	.30	.36	.33	.48	-			
Inspire, encourage, and motivate my employees	.38	.33	.42	.44	.37	.38	-		
Train employees	.25	.27	.37	.42	.44	.35	.43	-	
Organize and maintain the financial records of my venture	.23	.20	.31	.33	.32	.34	.22	.35	-
Manage the financial assets of my venture	.29	.34	.26	.34	.32	.38	.28	.26	.68
Read and interpret financial statements	.35	.28	.34	.36	.33	.28	.29	.27	.61
Research relevant facts related to my idea	.31	.35	.24	.28	.33	.28	.24	.28	.29
Anticipate potential problems that my idea may face	.34	.33	.28	.27	.38	.32	.26	.29	.30
Generate as many ideas as possible	.40	.38	.30	.38	.32	.29	.35	.27	.30
Identify which ideas are the most effective to pursue	.37	.43	.40	.44	.36	.27	.33	.32	.32
Persuade others to work with me and/or support my idea	.45	.45	.30	.39	.35	.29	.34	.32	.26
Create an action plan to launch my idea and make it succeed	.41	.46	.36	.43	.38	.33	.37	.39	.28

(continued)

	Item Number							
Item	19	20	21	22	23	24	25	26
Come up with a new idea for a product or service on your own								
Brainstorm with others to come up with a new idea for a product or service								
Identify the need for a new product or service								
Design a product or service that will satisfy customer needs and wants								
Estimate customer demand for a new product or service								
Determine a competitive price for a new product or service								
Estimate the amount of start-up funds and working capital necessary to start a new venture								
Design an effective marketing/advertising campaign for a new product or service								
Get others to identify with and believe in my vision and plans for a new venture								
Network (i.e., make contact with and exchange information with others)								
Clearly and concisely explain verbally/in writing my new venture ideas in everyday terms								
Supervise employees								
Recruit and hire employees								
Delegate tasks and responsibilities to employees in my venture								
Deal effectively with day-to-day problems and crises								
Inspire, encourage, and motivate my employees								
Train employees								
Organize and maintain the financial records of my venture								
Manage the financial assets of my venture	-							
Read and interpret financial statements	.66	-						
Research relevant facts related to my idea	.33	.42	-					
Anticipate potential problems that my idea may face	.34	.35	.42	-				
Generate as many ideas as possible	.32	.32	.37	.46	-			
Identify which ideas are the most effective to pursue	.37	.38	.34	.50	.59	-		
Persuade others to work with me and/or support my idea	.31	.36	.40	.43	.44	.48	-	
Create an action plan to launch my idea and make it succeed	.32	.34	.36	.46	.51	.58	.58	-

Table H3

Inter-Item Correlation Matrix for the Entrepreneurship Outcome Expectations

	Item Number								
Item	1	2	3	4	5	6	7	8	9
Generate Personal Wealth	-								
Increase Personal Income	.63	-							
Establish Own Business	.27	.22	-						
Bring Ideas to Market	.30	.25	.61	-					
Patent a Technology	.22	.19	.23	.36	-				
Invest in a Start-Up Company	.27	.22	.39	.39	.42	-			
Create New Jobs	.22	.20	.40	.43	.44	.57	-		
Increase Company Revenue	.40	.42	.38	.46	.30	.36	.48	-	
Sell a Company	.17	.13	.32	.34	.44	.43	.35	.29	-
Achieve Greater Personal Freedom	.32	.36	.36	.42	.07	.18	.21	.34	.20
Be Self Employed	.24	.25	.62	.50	.19	.26	.32	.37	.27
Launch an Initial Public Offering	.10	.08	.26	.27	.44	.44	.44	.24	.47
Gain Individual Public Recognition	.12	.21	.25	.26	.27	.32	.36	.22	.34
Obtain Personal Growth and Development	.27	.28	.28	.38	.01	.16	.22	.35	.13
Increase Market Share	.24	.26	.34	.42	.31	.38	.44	.52	.44
Create Multiple Ventures	.21	.17	.49	.45	.39	.50	.44	.43	.56
Build a Lasting Business	.28	.26	.57	.58	.26	.36	.43	.51	.34
Create Value for Established Business	.32	.36	.30	.42	.29	.33	.36	.49	.06
Be Part of a Team	.31	.32	.11	.24	.10	.18	.20	.28	.05
Achieve Individual Success	.39	.44	.22	.29	.07	.17	.16	.35	.11
Capitalize on Opportunities	.32	.32	.35	.40	.04	.17	.22	.40	.15
Engage in a Creative Process	.30	.31	.35	.49	.16	.19	.20	.34	.19
Focus on Results	.29	.35	.33	.44	.07	.15	.19	.39	.22
Manage the Work of Others	.24	.28	.13	.26	.16	.27	.33	.35	.30
Meet Market Needs	.27	.27	.48	.57	.28	.26	.27	.42	.48
Do the Kind of Job You Enjoy	.23	.28	.22	.30	-.05	.03	.06	.26	-.02
Compete in World Markets	.21	.18	.24	.38	.41	.31	.40	.38	.39
Making and Utilize Professional Relationships and Contacts	.23	.26	.33	.40	.12	.22	.27	.46	.16
Reach Partnerships With Other Companies	.19	.15	.32	.39	.27	.36	.30	.40	.37

(continued)

	Item Number									
Item	10	11	12	13	14	15	16	17	18	19
Generate Personal Wealth										
Increase Personal Income										
Establish Own Business										
Bring Ideas to Market										
Patent a Technology										
Invest in a Start-Up Company										
Create New Jobs										
Increase Company Revenue										
Sell a Company										
Achieve Greater Personal Freedom	-									
Be Self Employed	.52	-								
Launch an Initial Public Offering	.04	.26	-							
Gain Individual Public Recognition	.26	.26	.46	-						
Obtain Personal Growth and Development	.41	.32	.06	.29	-					
Increase Market Share	.29	.35	.40	.37	.33	-				
Create Multiple Ventures	.24	.40	.47	.37	.19	.55	-			
Build a Lasting Business	.47	.57	.26	.29	.37	.50	.58	-		
Create Value for Established Business	.36	.37	.25	.30	.33	.40	.41	.57	-	
Be Part of a Team	.25	.20	.09	.17	.36	.23	.15	.22	.45	-
Achieve Individual Success	.47	.34	.01	.24	.40	.27	.13	.34	.38	.44
Capitalize on Opportunities	.41	.40	.04	.20	.47	.33	.23	.41	.38	.35
Engage in a Creative Process	.45	.42	.07	.20	.42	.30	.19	.46	.43	.35
Focus on Results	.40	.36	.02	.16	.35	.29	.18	.45	.42	.32
Manage the Work of Others	.28	.24	.13	.25	.28	.32	.23	.26	.34	.45
Meet Market Needs	.35	.48	.16	.21	.38	.40	.36	.52	.46	.30
Do the Kind of Job You Enjoy	.42	.34	-.08	.11	.40	.18	-.01	.24	.24	.33
Compete in World Markets	.21	.22	.38	.30	.22	.46	.39	.33	.37	.29
Making and Utilize Professional Relationships and Contacts	.37	.38	.10	.22	.42	.37	.22	.41	.41	.38
Reach Partnerships With Other Companies	.33	.37	.26	.27	.26	.42	.40	.41	.46	.34

(continued)

	Item Number									
Item	20	21	22	23	24	25	26	27	28	29
Generate Personal Wealth										
Increase Personal Income										
Establish Own Business										
Bring Ideas to Market										
Patent a Technology										
Invest in a Start-Up Company										
Create New Jobs										
Increase Company Revenue										
Sell a Company										
Achieve Greater Personal Freedom										
Be Self Employed										
Launch an Initial Public Offering										
Gain Individual Public Recognition										
Obtain Personal Growth and Development										
Increase Market Share										
Create Multiple Ventures										
Build a Lasting Business										
Create Value for Established Business										
Be Part of a Team										
Achieve Individual Success	-									
Capitalize on Opportunities	.58	-								
Engage in a Creative Process	.46	.52	-							
Focus on Results	.44	.54	.59	-						
Manage the Work of Others	.43	.31	.28	.38	-					
Meet Market Needs	.33	.47	.44	.46	.29	-				
Do the Kind of Job You Enjoy	.48	.45	.46	.46	.28	.33	-			
Compete in World Markets	.23	.32	.29	.31	.28	.33	.13	-		
Making and Utilize Professional Relationships and Contacts	.43	.51	.46	.48	.39	.44	.45	.38	-	
Reach Partnerships With Other Companies	.33	.42	.40	.41	.44	.44	.24	.44	.61	-

Table H4

Inter-Item Correlation Matrix for the Goal-Directed Activity Subscale

	Item Number								
Item	1	2	3	4	5	6	7	8	9
I often think about becoming an entrepreneur	-								
I would like to see myself as an entrepreneur	.83	-							
Becoming an entrepreneur would be an important part of who I am	.79	.85	-						
When I think about it, the term "entrepreneur" would fit me pretty well	.78	.82	.85	-					
I regularly think about becoming an entrepreneur	.83	.83	.81	.83	-				
It is important for me to express my entrepreneurial aspirations	.63	.68	.68	.71	.67	-			
I am not a "traditional" entrepreneur but I take time to solve problems or take advantage of opportunities to make changes in my environment	.38	.44	.47	.41	.35	.39	-		
I am interested in starting a company, non-profit or NGO	.40	.47	.45	.41	.48	.41	.23	-	
I think I have enough skills and abilities to start a business	.46	.52	.55	.59	.46	.38	.34	.51	-
I believe that starting a business is a good career option	.49	.61	.57	.63	.55	.49	.37	.43	.54
Fear of failure would prevent me from starting a business	-.09	-.03	.01	-.01	-.09	.09	.35	.19	.09
In the next 6 months will be good opportunities to start businesses in the area where I live	.43	.36	.38	.38	.37	.43	.26	.48	.37
In my area people think that entrepreneurship is a desirable career choice	.44	.44	.49	.53	.52	.42	.60	.24	.31
I have engaged in a deliberate, systematic search for an idea for a new business	.53	.59	.56	.58	.53	.44	.28	.43	.45
I have been thinking about a business idea or a number of business ideas that can potentially grow into a real business	.63	.67	.72	.77	.71	.53	.40	.41	.55
I (alone or with others) have defined products or services for the business	.44	.53	.48	.56	.54	.54	.37	.64	.50
I (alone or with others) have tried to define the market opportunity for the business	.59	.59	.66	.56	.63	.53	.40	.62	.53
I have devoted significant time to this business idea	.51	.58	.57	.55	.52	.39	.36	.54	.47
I have discussed ideas for a new business with my friends and family	.57	.59	.62	.60	.62	.53	.48	.55	.52
I have talked about a new business with people that I have a business or working relationship with	.70	.72	.68	.68	.72	.65	.42	.53	.47

(continued)

	Item Number										
Item	10	11	12	13	14	15	16	17	18	19	20
I often think about becoming an entrepreneur											
I would like to see myself as an entrepreneur											
Becoming an entrepreneur would be an important part of who I am											
When I think about it, the term "entrepreneur" would fit me pretty well											
I regularly think about becoming an entrepreneur											
It is important for me to express my entrepreneurial aspirations											
I am not a "traditional" entrepreneur but I take time to solve problems or take advantage of opportunities to make changes in my environment											
I am interested in starting a company, non-profit or NGO											
I think I have enough skills and abilities to start a business											
I believe that starting a business is a good career option	-										
Fear of failure would prevent me from starting a business	.15	-									
In the next 6 months will be good opportunities to start businesses in the area where I live	.39	.21	-								
In my area people think that entrepreneurship is a desirable career choice	.49	.18	.35	-							
I have engaged in a deliberate, systematic search for an idea for a new business	.41	.09	.60	.41	-						
I have been thinking about a business idea or a number of business ideas that can potentially grow into a real business	.59	-.04	.44	.56	.61	-					
I (alone or with others) have defined products or services for the business	.40	.16	.59	.40	.59	.62	-				
I (alone or with others) have tried to define the market opportunity for the business	.40	.14	.44	.40	.47	.60	.76	-			
I have devoted significant time to this business idea	.42	.18	.46	.44	.54	.64	.66	.67	-		
I have discussed ideas for a new business with my friends and family	.53	.07	.34	.69	.57	.74	.57	.60	.57	-	
I have talked about a new business with people that I have a business or working relationship with	.52	.01	.48	.57	.62	.75	.70	.64	.59	.70	-

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