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An entrepreneurial mindset: Not just for entrepreneurs

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An Entrepreneurial Mindset: Not Just For Entrepreneurs

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DEDICATION

I dedicate my dissertation work to my loving family. To my devoted husband, Garrett King, who always provided praise and encouragement during this journey. To my father and mother, Robert and Kathleen Miller, whose love and support was much appreciated. To my wonderful sisters, Corri Loan and Rebecca Slye, whose genuine care was unsurpassed. To my father in-law and mother in-law, Charles and Sherry King, who continually inspired me to succeed. And, most importantly to my daughters, Kenley King and Charley King, may they grow to become magnificent women, inheriting their mother's desire to live a meaningful and inspiring life.

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Abstract

An entrepreneurial mindset is beneficial for all individuals regardless of their career aspirations. College students, in particular, can benefit from the development of an entrepreneurial mindset as they will be inclined to desire to achieve more and continually strive for personal growth. Entrepreneurial development within college students can be realized through experiential learning aimed to cultivate entrepreneurial capabilities such as critical, creative, and innovative thought. These capabilities, coupled with a passion for personal achievement through life-long learning, an entrepreneurial mindset can be developed. This study first proposed an abbreviated measure of College Student Entrepreneurial Development (CSED) by revising an existing instrument, and then used the measure to assess growth in students' entrepreneurial development from participating in an experiential learning course intervention. Results indicated that the newly reduced measure of CSED did reliably fit a two-factor model of entrepreneurial development, containing the two subscales of self-efficacy and outcome expectations. Students receiving the curricular intervention were shown to have post-test CSED scores statistically higher than those who did not receive the intervention. Implications for offering a general education course for all students that incorporates entrepreneurial thinking are discussed. Considerations for university leadership, including both administrators and faculty, for implementing a course encouraging an entrepreneurial mindset are also presented.

Chapter 1

Introduction

Entrepreneurial thinking can be viewed as the development of an entrepreneurial mindset and can be assessed by how mature an individual is on various personality and skill-based dimensions. Entrepreneurial thinking is broader than entrepreneurship, or the desire to start a business, as it encompasses the way one thinks about their abilities and life goals. Skills such as such as creativity, vision, valuing ideas, and recognizing opportunities are at the root of entrepreneurial thinking (e.g. Higdon, 2005; Kauffman Foundation, 2008; World Economic Forum, 2016). These abilities combined with other transferrable higher education outcomes are vital competencies for life long achievement despite one's career choice. The skills associated with achieving an entrepreneurial mindset are essential for individual success in the 21st century global environment (Bacigalupo et al., 2016).

Despite employers' and the general public's demand for college graduates who are proficient in these skills, many employer surveys find that graduates still lack higher order skills such as entrepreneurial and critical thinking abilities. According to the National Association of Colleges and Employers 2019 Job Outlook Survey, problem solving and critical thinking, both strongly related to entrepreneurial thinking, are the top competencies needed for career readiness (National Association of Colleges and Employers, 2019). These skills are rated as essential for career success and most desired by employers, however employers rated recent graduates as only 'somewhat proficient' in demonstrating these skills (National Association of Colleges and Employers, 2019). Furthermore, the Society for Human Resource Management (2019) found that over half

of employers noted job applicants lacked soft skills such as problem solving, innovation, and the ability to deal with complexity and uncertainty.

When it comes to career success, Udemy, an online learning platform used by over 4,000 companies, has stated that fostering creativity and having a growth mindset, two components of entrepreneurial thinking, are the most important soft skills for employee success today (Liu, J., 2019). Being able to develop new ideas and apply solutions in a meaningful way are abilities that employers are continually looking for in new hires. Despite technological advancements, human soft skills such as these are essential for both individual and company success. Additionally, having a growth mindset involves the desire to continuously learn and the willingness to adapt to change; wanting to be innovative and constantly improve upon existing ideas of processes. A graduate with an entrepreneurial mindset would embody these concepts and flourish with respect to human abilities that technology can't replace.

Defining Entrepreneurial Thinking

The word entrepreneur is commonly associated with an individual who takes risks in hopes of making a profit, but entrepreneurial thinking is the mindset behind the action and is the focus of this study. It is important to disentangle what it means to think entrepreneurially. One comparison describes entrepreneurial thinking from a narrow versus wide perspective. The narrow viewpoint is that being entrepreneurial involves a business focus, which may include new start-up development or venture creation and growth, i.e. being an entrepreneur (Lackeus, 2015). In contrast, the wide viewpoint describes being entrepreneurial from a personal development perspective and includes such concepts as being creative, self-reliant, and action oriented i.e. having an

entrepreneurial mindset about life (Lackeus, 2015). This study will use the wide perspective of being entrepreneurial and focus on the benefits of an entrepreneurial mindset for all students and not just those wanting start their own business.

Entrepreneurial thinking is the mental process of demonstrating confidence, curiosity, self-reliance, and resiliency. Thus, thinking entrepreneurially is synonymous with having an entrepreneurial mindset and the two terms will be used interchangeably throughout the study. This mindset involves the development of competencies relative to both the cognitive nature (mental skills) and the non-cognitive nature (personal attitudes). Mental skills achieved through the development of an entrepreneurial mindset include opportunity recognition, interpersonal communication, active learning, and strategic goal setting (Fisher, Graham, & Compeau, 2008; Krueger, 2005; & Lackeus, 2015). Growth along the personal attitude dimension includes increased passion and self-efficacy and a deep-rooted sense of identity, where an individual strives for personal achievement and believes they will succeed (Fisher et al., 2008; Lackeus, 2015). Additional non-cognitive attitudes resulting from obtaining an entrepreneurial mindset include a tolerance for ambiguity, proactiveness, innovativeness and perseverance, which are all skills necessary for an individual to succeed in society regardless of their career path (Krueger, 2005; Lackeus, 2015; & Sanchez, 2011).

Definitions of entrepreneurial thinking in the literature today are varied and include both the narrow and wide perspective. Descriptions using a narrow perspective include terms such as innovative capabilities, value creation, and capitalizing on opportunities (Joensuu et al., 2013; Lackeus, 2015; Solesvik, 2013). While these are important skills of an entrepreneur, a wide-angle approach will be used to describe the

concept in this study. Common terms to describe someone who is entrepreneurial from this broad viewpoint include: creative, self-motivated, flexible, assertive, and growth-oriented (Fairbrothers & Winter, 2011; Hnatek, M., 2015). Nadelson and colleagues (2018) expanded upon being creative and motivated to describe entrepreneurial thinkers as individuals who think beyond the status quo, rely on curiosity, and are able to monitor their abilities and progress towards goals. In a related description, entrepreneurial thinkers can be said to use 'effectual reasoning', meaning they understand their strengths and abilities when choosing to pursue goals, as opposed to 'casual reasoning' where one would set a goal then figure out how to achieve it (Sarasvathy, 2001; Sobel & Kirkham, 2006). For the purpose of this study an entrepreneurial mindset, or entrepreneurial thinking, will be defined as understanding one's strengths and abilities to be curious, creative, adaptable, and eager to take a novel approach.

Distinguishing Entrepreneurial Thinking from Critical Thinking

An often discussed skill within the workforce and higher education alike is the skill of critical thinking. While this ability is extremely valuable to employers it is important to note that a critical thinker isn't necessarily an entrepreneurial thinker. Critical thinking involves questioning an issue, assessing information, and being open minded (Paul & Elder, 2006). These concepts have been taught at institutions of higher education for decades in classes such as philosophy, communications, and business, encouraging students to continually analyze and evaluate information. The outcomes of being a good critical thinker are deemed by employers as crucial, thus many universities embed these skills into their general education curriculum or freshman level seminars.

Courses devoted to teaching critical thinking have learning outcomes such as: explain an issue or problem, evaluate claims for credibility and relevance, demonstrate fair-mindedness, consider other perspectives, and draw logical conclusions (e.g. Florida State University, n.d. & James Madison University, n.d.). Additionally, critical thinking is self-directed and self-corrective thinking that requires effective communication (Paul & Elder, 2006). While higher education has echoed the importance of thinking critically about the *internal* aspects of an issue and the ability to understand in depth problems, what appears to be lacking from our teachings is an *external* focus on finding creative solutions that may not be readily apparent, which is a key component of entrepreneurial thinking.

Being able to analyze an issue, interpret information, and question evidence is important, but these critical thinking skills relate more to problem solving than problem finding. Recognizing that a problem or issue exists that requires a novel solution is a key aspect missing from the skillset of critical thinking. Also, while critical thinking often includes the abilities to draw connections, synthesize data, and make inferences, oftentimes the information being examined isn't apparently given. An entrepreneurial thinker would be curious to find questionable information and eager to spot unanticipated problems.

According to the nonprofit organization 3 Day Startup, which focuses on soft skills and entrepreneurial education, entrepreneurial thinking differs from critical thinking in that, "Entrepreneurial thinking recognizes that solutions to problems aren't always found by picking apart or analyzing ideas. Solutions lie in the investigation of the external world. By its nature, entrepreneurial thinking is outward facing, not inward

facing." (3 Day Startup, 2017). Thus, having an entrepreneurial mindset can be described as being open and curious as to what else is out there, not merely analyzing the current issue. To spot a solution or opportunity that doesn't exist yet is at the heart of entrepreneurial thinking. In order to help all students cultivate these skills, university programs and courses need to include these larger, forward thinking concepts in their learning outcomes to help students think more entrepreneurially.

For example in a business class, students would not be asked to think critically and spot the downfall of an already bankrupt organization, but to think entrepreneurially and determine potential threats for an extremely successful company. By thinking externally and about issues or problems that do not exist yet would strengthen the student's entrepreneurial thinking abilities; being curious about what could occur and thinking in an outward and forward looking direction.

Higher Education and Entrepreneurial Thinking

As entrepreneurial thinking capabilities are essential for personal and professional success, it can be argued that higher education is the perfect time and place to teach these fundamental skills (Kauffman Foundation, 2008). Higher education aims to create enlightened and productive graduates who will contribute to the community, be engaged with ideas, and be innovative in their thought processes. Having an entrepreneurial mindset applies to all areas of life, allowing one to cultivate personal development, contribute to society, and be a valued job candidate (Bacigalupo et al, 2016). As entrepreneurial thinking is a skill needed for career success, colleges and universities need to do more to cultivate these skills in their graduates.

While many institutes of higher education do offer courses in entrepreneur*ship*, with course titles such as Business Fundamental for Entrepreneurs, Social Innovation and Entrepreneurship, and Entrepreneurship and Small Business Management, teaching entrepreneurial *thinking* is often untouched. Yes, courses devoted to the basics of start-ups and innovation are important and growing in popularity at many universities across the county, but they fail to reach the majority of college students and are often restricted to certain majors. Furthermore, these courses often teach idea generation, funding, and business growth strategy, or broad business concepts such as forms of ownership, management, and operations, *not* thought processes. And again, while these business courses and concepts are essential for entrepreneurs, they fail to capture the attention of a nursing or communications major, for example, who need entrepreneurial thinking skills just as much as entrepreneurs do. It is not merely business majors or engineers that require an entrepreneurial mindset, but students across all disciplines should have access to courses that help them develop this skillset

Given the rapid technological advancements taking place today, college graduates often find themselves unsure of their place in the workforce. Technologies such as automation and artificial intelligence are creating the need for employees to learn new technical skills and function differently in their job. Higher order skills such as active learning, reasoning, and problem solving, are demanded by employers, as employees must be able to quickly understand and adapt to new these new technologies (Organisation for Economic Co-operation and Development, 2018). College students must develop broad based competencies and higher order thinking skills that will allow for personal achievement no matter what the job market may bring. According to the

World Economic Forum (2016), 65% of youth in primary schools will end up in jobs that are yet to exist. This fact places even more emphasis on the need for the development of a broad-based entrepreneurial mindset, which allows one to display the personality and mental capabilities for success in any career field.

In an article published by The Association of American Colleges & Universities, it is stated that the characteristics of entrepreneurial mindset go hand in hand with the goals of a liberal or general education (Higdon, 2005). The article suggests that the goal of a liberal education is to provide students with the tools needed to succeed in society, such as higher order thinking skills, opportunity recognition, plan execution, and the ability to deal with uncertainty (Higdon, 2005).

Employers are also publicizing the need for employees with entrepreneurial thinking abilities. They do not want an entrepreneurs per say, but individuals with skills like creativity, critical thinking, and complex problem solving abilities (World Economic Forum, 2016). In the interview process employers are more concerned about candidates having practical skills such as reasoning, negotiation, and judgment than merely the hard skills to perform job duties (Bessen, 2014). It is presumed that one third of all jobs today demand employees to have complex problem solving skills; additionally, the need for skills such as persuasion, creativity, active listening, and critical thinking will also rise (World Economic Forum, 2016).

Study Purpose, Rationale, and Research Questions

Higher Education has been responding to the need for well-rounded graduates by incorporating entrepreneurial topics into the curriculum. Entrepreneurship topics are being taught in classes such as business, management, and engineering. Many

universities are also adding entrepreneurship minors, concentrations, and centers devoted to the development of young entrepreneurs. However, these types of offerings are focused on building students' capabilities with regards to becoming an entrepreneur and not necessarily developing their entrepreneurial thinking skills.

The issue that remains is how and where to teach 'entrepreneurial thinking' within higher education. Entrepreneurial thinking isn't just for business and engineering majors but should be incorporated broadly within higher education and offered to all students. Thus, the ideal place to introduce concepts related to entrepreneurial thinking is in the general education/liberal arts curriculum. Collegiate organizations such as The Association of American Colleges & Universities (2008) as well as professional groups such as the Kaufman Foundation (2013) have all echoed the call to include a course devoted to developing an entrepreneurial mindset within the general education curriculum.

> We can start by recognizing the tremendous benefits to be gained from the infusion of entrepreneurial thinking across all academic disciplines of a liberal education. As educators of the next generation of leaders, we can't have graduates bound by traditional thinking. We must also have individuals who develop a creative approach to problem solving, the ability to see opportunities where others don't, and who focus, above all, on making a difference. (Higdon, 2005).

Courses open to the entire student population would grant all undergraduate students the ability to glean the necessary skills to develop an entrepreneurial mentality for personal growth and success, not only academically, in life as well (Lackeus, 2015). Thus all students are positioned to benefit from developing cognitive skills necessary to

overcome obstacles and think opportunistically about their future. As opportunity recognition can relate to not only career but lifestyle choices, and the characteristics of resilience and a tolerance for ambiguity can help with everyday coping skills as well as major life decisions (Higdon, 2005).

With the goal of developing an entrepreneurial mindset in all students, the related personality and skillset must be properly assessed with an appropriate instrument. Measuring entrepreneurial development could be done in a variety of ways, however for the purpose of this study entrepreneurial development will assess the growth of entrepreneurial thinking abilities, specifically in undergraduate students. While several measures exist for evaluating entrepreneurial intent, entrepreneurial self-efficacy, and innovation, these measures address entrepreneur*ship* constructs, are meant for the broad population, and do not specifically relate to the capabilities or skills of undergraduate students.

One measure that has been used to assess development of entrepreneurial abilities in undergraduates is the JMU Entrepreneurship Development Questionnaire (EDQ), created by Newbold and Erwin (2014). The EDQ assesses how a college student develops entrepreneurially using 93 items along four subscales; self-efficacy, intent, outcome expectations, and goal directed activity. Each of the subscales is based on an existing measure as such: Entrepreneurial Intent based on Thompson (2009), Entrepreneurship Self-Efficacy based on McGee and colleagues (2009), Entrepreneurship Outcome Expectations based on Farmer & Kung-McIntyre (2011), and Goal Directed Activity based on Krueger (2000). The aggregated EDQ is one of many measures used to assess student entrepreneurial development, other notable measures include Linan and Chen's

Entrepreneurial Intention measure (2009) and the Intentions to Innovate measure (Mayhew et al., 2012).

The EDQ is a compilation of existing measures with additional items added by the researchers, and meant to assess development along both entrepreneurial thinking and entrepreneurial intentions in both college students and existing entrepreneurs. However, for the purpose of this study, entrepreneurial *intentions* (i.e. entrepreneurship) is not of interest and only college student entrepreneurial thinking will be assessed. To help clarify the construct of college student entrepreneurial thinking, an item analysis will be conducted on the EDQ to determine the usefulness and validity of each of the items. Existing items will potentially be removed or revised to better assess entrepreneurial thinking development in students. The newly created measure will be administered in general education courses to assess curricular approaches to teaching entrepreneurial thinking.

The abbreviated EDQ will measure how mature a student is in their development of an entrepreneurial mindset. Using a pre- post-test design, students in a general education critical thinking business course will be administered the abbreviated EDQ to assess their growth in entrepreneurial thinking abilities. The particular course is one of several offered to fulfill the general education critical thinking requirement and is open to students of any major. Students are allowed to choose from a variety of courses and are not encouraged towards nor restricted from any course based on major. The critical thinking business course introduces students to business topics such as management, marketing, entrepreneurship, ethics, social responsibility and finance. Thus entrepreneurship is a part of the course content, however the topic of entrepreneurship

within a business textbook is straight forward and typically focuses simply on start-ups, idea generation, and funding.

Given that entrepreneurial thinking is much broader than the typical textbook presentation, does a critical thinking course that merely introduces entrepreneurship allow students the opportunity to develop a true expansive entrepreneurial mindset? If not, would a curricular intervention utilizing targeted entrepreneurial thinking activities and experiential learning increase student development of this mindset?

The goal of this study is to clarify the measurement of entrepreneurial thinking in undergraduate students and address if a theoretically developed general education course, that includes active experiential learning, leads to an increased level of entrepreneurial thinking in students. A curricular intervention will take place to assess the outcomes of targeted entrepreneurial thinking curriculum on college students enrolled in a general education business course. The intervention will be structured such that four sections of the same course will receive the intervention and four sections of the course will not.

Research Question 1: Is the newly created abbreviated Entrepreneurship Development Questionnaire (EDQ) a valid and parsimonious measure of entrepreneurial thinking in undergraduate students?

To address the first research question, scores from the EDQ will initially be examined using pilot data gathered in the fall of 2017 from a sample of undergraduate students. The psychometric properties of scores from this two scale version will be assessed and a confirmatory factor analysis will be conducted to assess convergent and discriminate validity. The items will be analyzed as to their contribution to the respective subscale by assessing reliability and factor loadings. If fit indices indicate poor fit, the

correlation residuals will be examined to determine the areas of misfit. The results of the statistical analysis, in conjunction with a subject matter expert review and an evaluation of face validity, will yield new abbreviated subscales. The abbreviated two scale College Student Entrepreneurial Development questionnaire will then be assessed through confirmatory factor analysis using the pretest data collected in 2020.

Research Question 2: What is the influence of a theoretically derived general education course utilizing experiential learning on first year student development of entrepreneurial thinking?

To address the second research question, first year students of a variety of majors enrolled in a general education business course will serve as participants. The study sample will consist of two groups; an intervention group of four course sections and a control group of four course sections. The intervention group will receive additional targeted curricular interventions related to entrepreneurial thinking whereas the control group will not receive such interventions. Pre- post test scores on the abbreviated EDQ will be assessed using hierarchical regression analysis to determine if the group receiving the curricular intervention had higher gains in developing an entrepreneurial mindset than the control group. Control variables will consist of demographic variables such as gender, ethnicity, and year in school. Other independent variables will include number of business courses taken, number of entrepreneurially related courses, parental exposure to entrepreneurial experiences, and other passive and active entrepreneurial involvement.

Chapter Summary

Developing an entrepreneurial mindset involves thinking entrepreneurially, not the desire to be an actual entrepreneur. College students must develop the skills and

abilities to be creative problem finders and be able to develop innovative solutions no matter what career path they choose. Entrepreneurial thinking should be incorporated within a general education context in higher education as it is a necessary mindset for students of any major. Chapter 2 will provide a detailed literature review, including the history of entrepreneurial education, the call for entrepreneurial education within general education, the existing measures related entrepreneurial thinking, and a rationale for a targeted curricular entrepreneurial intervention based on Kolb's Theory of Experiential Learning. Also, considerations for leadership within higher education will be discussed as a change in general education curriculum will mandate approval from university leaders. Chapter 3 will then further explain the research methods, expected participants, and proposed statistical analysis.

Chapter 2

This chapter will first provide a literature review of topics prominent in entrepreneurial thinking research beginning with a chronological review of the teaching of entrepreneurship and entrepreneurial learning. Various types of entrepreneurial education will be discussed followed by a call for the implementation of entrepreneurial thinking within general education. Existing measures of entrepreneurial thinking and the development of an entrepreneurial mindset will be discussed as to their applicability, or lack thereof, to college students. A guiding theoretical framework will also be introduced to justify the need for experiential learning processes to increase college student cognitive development of an entrepreneurial mindset. Finally, implications for university leadership regarding a curricular change process will be discussed.

Literature Review

Entrepreneurial thinking skills and abilities can be taught; one can develop an entrepreneurial spirit (Kuratko, 2003). As entrepreneurial thinking can be developed in students, leaders and educators are interested in how to provide opportunities for individuals to learn these important abilities. Higher education provides an ideal setting in which students can begin to hone their entrepreneurial thinking skill set (Katz, 2003; Krabel, 2018; Matlay, 2008; Selznick & Mayhew, 2018; Solomon et al., 2002).

Entrepreneurial thinkers are individuals who seek to continually evolve and learn new skills that will help them succeed, and this development is essential given today's rapidly changing and ever diverse society (Cope & Watts, 2000; Kempster, 2006; Swiercz & Lydon, 2002; Young & Sexton, 2003). An entrepreneurial mindset is needed for innovation and creativity, and to keep up with business and external demands.

Similarly, an entrepreneurial thinker is one who takes risk, seeks opportunities, recognizes innovate solutions, and takes action to create value (Isenberg, 2013; Mars & Rios-Aguilar, 2010; Thorton, 1999).

These entrepreneurial thinking skills are needed by college graduates in order to succeed in the workforce of today's ever changing business and social environment (Association of American Colleges & Universities, 2008; Kaufman Foundation, 2013). Colleges and universities have been responding to this need and entrepreneurship education has grown over the decades, however these courses have been geared towards business and engineering students and not available to all majors (e.g. Katz, 2003; Sirelkhatim & Gangi, 2015). The expansion of entrepreneurship education to include an entrepreneurial mindset and the logical placement of such a mindset course in a general education curriculum will be discussed in the following literature review.

Chronological Review of Entrepreneurship Education

During the 1980's entrepreneurship education gained momentum and the number of courses and related programs increased throughout the U.S. and the U.K. (Sirelkhatim & Gangi, 2015). Educational initiatives were focused on teaching entrepreneurship concepts and business plan competitions emerged. The expansion of undergraduate courses multiplied over the decades with only 127 schools reporting undergraduate entrepreneurship courses in 1979, 590 schools with courses in 1986, and then 1,060 schools with courses in 1991 (Solomon et al, 1994).

The growth in postsecondary entrepreneurship classes can be alluded to popularity of Peter Drucker's seminal book *Innovation and Entrepreneurship* published in 1985. His work validated the need and purpose for entrepreneurship instruction,

particularly within higher education business schools (Katz, 2003). Entrepreneurship programs were recommended to include multiple courses that range from structured lectures and case discussions to unstructured venture evaluations and feasibility plans (Ronstadt, 1987). During the 1980s entrepreneurship became thought of as a career process where entrepreneurs must first take the time to think critically and build experience in the field (Ronstadt, 1987).

The view of entrepreneurship education remained focused on business plans, business management, and venture creation throughout the 1990s. Classes revolving around small business development and managing a start-up were the norm at many universities, with over 1,400 schools having such courses (Solomon et al., 1994). Research regarding entrepreneurship also increased during this time period as *Advances in Entrepreneurship* began publication in 1993 and the *Journal of Small Business Management* in 1995. However, both research and education tended to define being entrepreneurial as purely creating an innovative organization that creates value (Gartner, 1990).

The turn of the century brought about a wider viewpoint on entrepreneurial instruction. No longer was entrepreneurial education simply teaching "about" or "for" entrepreneurship, where students gain an understanding the fundamentals of actual entrepreneur*ship*, but the viewpoint of expanded to include teaching "through" entrepreneurial concepts (Lackeus, 2015). The concept of teaching through entrepreneurship utilizes experimental learning processes where students of any major can connect entrepreneurial characteristics to their core discipline (Kuratko, 2005). During the early 2000s, entrepreneurial education shifted from simply teaching skills

related to developing a mindset for success in business to developing a mindset for success in life; thus the broader concept of entrepreneurial thinking as defined in this study became more mainstream. Scholarship on the topic began to use the term 'entrepreneurial thinking' to refer to a mindset or viewpoint that individuals can obtain and not necessarily a way to become an entrepreneur (e.g. Nadelson et al., 2018: Patel & Mehta, 2017).

Expanding Entrepreneurial Education beyond Entrepreneurship

Entrepreneurial education can take on a variety of meanings within postsecondary institutions; the two most common approaches are entrepreneurship education and entrepreneurial thought education. The latter, and focus of this study, is geared towards the development of thinking skills to help develop an entrepreneurial mindset that an individual can apply to their everyday life (Nadelson et al., 2018). This spectrum of thought is taught in courses that focus on developing the attitude or mentality similar to that of an entrepreneur, including concepts such as visionary thinking, curiosity, and a motivation to seek novel approaches. Entrepreneurial thinking education not only focuses on value creation and capitalizing on opportunities, but on how to first assess one's own strengths and abilities in order to create an opportunity that they can then capitalize on (Patel & Mehta, 2017). Thus, building a personal mindset that includes self-regulation, resilience, and willingness to collaborate is key to entrepreneurial education.

Education related to entrepreneurial thinking often involves programs of substantial length in time and include learning activities, continual interaction, and feedback (Heuer & Kolvereid, 2014, Solesvik, 2013). Semester-long courses that allow

for students to develop an entrepreneurial mindset are typically structured around experiential learning activities that increase cognitive development of the construct (Strimel et al., 2019). Examples of such learning activities include giving assignments with no single correct answer, assigning long-term projects, asking students to connect unrelated ideas, and utilizing projects that require information beyond what is given (Nadelson et al., 2018).

Teaching students to cognitively develop an entrepreneurial mindset through experiential learning is much different than teaching traditional entrepreneurship. Traditional entrepreneurship education often includes teaching the fundamentals of being an entrepreneur or engaging in a start-up opportunity. Entrepreneurship education may take on concepts such innovation and new product development, paths to becoming an entrepreneur, funding and financial management, and even marketing and distribution (Katz & Green, 2018). These business topics are essential to students wanting to pursue their own opportunity and create personal wealth, but not necessarily applicable to students across all majors. An entrepreneurial mindset, however, is relevant to all students as this mindset creates the desire to pursue opportunities to create value for others, e.g. employers, community, family, and not simply wealth for themselves.

When assessing traditional, narrowly focused entrepreneurship education, research has often focused on the effects of an entrepreneurship program on students' aspiration to be an entrepreneur, as reviewed by Bae and colleagues (2014). Learning outcomes related to being an actual entrepreneur, such as entrepreneurial intent after taking an entrepreneurship course are often studied (e.g. Antal et al., 2014; Marzocchi et al., 2019). Specifically, classes such as venture creation, business planning, and

introduction to entrepreneurship have been integrated into business and engineering schools and many studies have confirmed that entrepreneurship courses do increase entrepreneurial intentions and motivation (e.g. Barba-Sanchez & Atienza-Sahuquillo, 2018; Elmuti et al., 2012). These studies, using the narrow definition of entrepreneurial, were measuring how likely an individual is to want to start up their own business or how confident ones feels in their ability to run their own business after learning about entrepreneurial topics. Thus, entrepreneurship education has previously only had learning outcomes related to being an actual entrepreneur. However, these outcomes are vastly different than the emphasis on this study, which is on the broad outcome of developing a student's entrepreneurial thinking abilities and their desire become the best version of themselves and make a difference for others.

Entrepreneurial Thinking within the General Education Curriculum

Entrepreneurial thinking can and should apply to all postsecondary students; perhaps the logical extension of these efforts would be to include entrepreneurial thinking in the general education curriculum. To include the development of an entrepreneurial mindset in general education would only strengthen student outcomes as it would provide all graduates the ability to recognize and act on new opportunities throughout life. Nearly all higher education institutions have some set of required general education classes. Whether the courses are all required or students can choose from a subset of classes, the courses are predominantly open to all majors and are taken by all students. The purpose of a general education course is to provide students with a broad base of knowledge and skills necessary to succeed in whatever career path they choose. Students are to acquire capabilities that transcend their major courses such as competence in

quantitative and qualitative skills, and awareness regarding global and ethical issues. Entrepreneurial thinking is well suited for inclusion in general education as the personal skills and mental abilities acquired transcend the specifics of major classes, and help students create connections among all their college courses.

General education is often meant to help students mature in their thought processes by understanding a broader context, spotting interconnected issues, building critical thinking skills, and developing creative abilities. The World Economic Forum states that 21st Century job candidates must have curiosity, initiative, persistence, adaptability, leadership, and social awareness (Soffel, 2016). All students can acquire these skills to succeed in their respective career field through a general education course aimed at building their entrepreneurial mindset. The goal of such a course is not for students to start a business, but to allow them to be creative and innovative, and to learn how to apply these skills to their personal and professional lives (Wasley, 2008). The call for more highly skilled workers has been resonated for decades by the Kauffman Foundation, in that entrepreneurial skills such as creativity, self-direction, initiative, and collaboration must be taught in higher education (2007). These 21st Century skills tie directly to entrepreneurial thinking competencies, for example: creative thinking relates to entrepreneurial opportunity seeking, self-direction relates to entrepreneurial internal motivation, and initiative being relates to an entrepreneurial outcome orientation (Boyles, 2012).

Both the cognitive and non-cognitive competencies developed through gaining an entrepreneurial mindset will help students succeed not only in their academics but in life as well (Lackeus, 2015; McEwen & McEwen, 2010). The Association of American

Colleges & Universities agrees that the positive outcomes of having an entrepreneurial mindset can be well situated in a general education curriculum (Higdon, 2005). The outcomes of general education such as opportunity recognition and a tolerance for ambiguity also relate directly to having an entrepreneurial mindset (Higdon, 2005). For example, opportunity recognition can be broader than simply spotting an unmet need in the marketplace or capitalizing on a new technological advancement, the skill can also apply to life and society. Recognizing an opportunity could also relate to the opportunity for personal growth, applying for a new position, or creating a more efficient way to perform job duties.

A general education curriculum that stresses the importance of entrepreneurial thinking creates students that excitedly challenge traditional approaches who can build connections among thoughts or ideas when others cannot. A course in entrepreneurial thinking would not merely be an introduction to the topic, but allow for students to question assumptions and to integrate ideas across disciplines (D'Intino et al., 2010; McEwen & McEwen, 2010). Entrepreneurial thinking also supports effective communication skills, an already established outcome of most general education programs, as students are able to understand the importance of working together and learning from others while also being able to clearly articulate and defend their own ideas. Courses can be most beneficial when they include students with a variety of interests and perspectives, from a variety of majors (D'Intino et al., 2010).

Entrepreneurial thinking involves determining how to make yourself useful to others, in your current employment situation or in your community (Entrepreneurial Learning Initiative, n.d.). Obtaining skills to generate ideas that add value for others isn't

bound by college major or academic interest. One doesn't need to start a business to have the belief that they can solve the complex social, environmental, or economic challenges of today's world (Hollins University, 2020). A general education course in entrepreneurial thinking will cultivate individuals who are curious about the world, revolutionaries of change, influencers of the future (Hines, 2005). The goal of an entrepreneurial mindset is to equip all college graduates with the attitude that they can utilize their skills to make a positive difference.

Targeted Interventions in College

Many scholars agree that an entrepreneurial mindset can be taught and numerous studies have sought to identify best practices in curricular programming (e.g. Bosman & Fernhabler, 2018; Lindberg et al., 2017; Selznick & Mayhew, 2018). Within the higher education arena, engineering and business students are commonly studied as to their entrepreneurial mindset and their intention towards actual entrepreneurship. While intentions to engage in a start-up opportunity is not the focus of this study, similar programmatic activities could be used to enhance student thinking and the development of their entrepreneurial mentality.

Best practices in entrepreneurship education also apply to developing entrepreneurial thinking abilities. Course components such as developing students' ability to recognize opportunities, collaborate efficiently in teams, effectivity communicate ideas, and reflect on their work have been shown to significantly increase entrepreneurial learning and inspiration, but not intent (Nabi et al., 2018). These types of course activities and assignments can lead to higher levels of inspiration and passion which create a personal drive for success no matter the student's career choice. It is interesting

to note that entrepreneurial intent may not increase for students as they may feel that they are not well suited to start their own business, but they still have the passion and motivation to achieve more out of life. (Nabi et al., 2018).

Programmatic efforts to encourage learning through creativity, informality, and curiosity have been implemented in entrepreneurship courses to not only increase new venture creation abilities but also graduate employability (Gilbert, 2012). By immersing students in real world problems, and not just the creation of business plans, students can develop skills such as self-efficacy, tolerance for ambiguity, determination, and leadership. It was found that an innovation program situated around real world interactions can develop undergraduates' creative abilities, curiosity, productive self-reflection tendencies, articulation of thought, and teamwork interactions (Gilbert, 2012).

Within entrepreneurship courses, developing an entrepreneurial mindset is often included as a learning outcome, but in this realm mindset normally refers to the mental abilities that distinguish entrepreneurs from non-entrepreneurs (Lindberg et al., 2017). However, pedagogical influences to develop this particular viewpoint can have a broader effect on the development of student entrepreneurial thinking abilities. For example, using experiential learning processes to force students to process new information given certain contextual factors can increase abstract reasoning, a skill needed by all entrepreneurial thinkers and not just entrepreneurs. Using the experiential learning cycle (Kolb, 1984) to model a pedagogical intervention it was found that opportunity identification capability increased due to idea-enhancing exercises and entrepreneurial creativity increased due to self-reflection exercises for students in an entrepreneurship course (Lindberg et al., 2017).

A research stream related to entrepreneurial tendencies examines students' innovation capabilities, or their individual attributes towards generating an executing new and useful ideas (Mayhew et al., 2018). Many of the constructs of innovation capacity mirror those of an entrepreneurial mindset such as intrinsic motivation, proactivity, persuasive communication, creative cognition and risk tolerance. Utilizing a semester long curriculum to develop student creative cognition, problem solving, collaboration, and leadership abilities, it was found that using active learning strategies did enhance student innovation capacities (Mayhew et al., 2018). Furthermore, the same study found that innovation capacities also increased in a generic course that included a one day interactive lecture on innovation that encouraged student feedback and reflection (Mayhew et al., 2018). Thus, pedagogical approaches that include active learning, challenging activities, and group projects can increase a student's innovative and entrepreneurial mindset. Additionally, self-reflection is paramount as students develop this mindset; they must have the opportunity to think and evaluate the benefits and consequences of their beliefs or actions.

Existing Measures of Entrepreneurial Mindset

To assess the various pedagogical approaches aimed to increase the development of student entrepreneurial thinking an applicable measure must exist. The instrument must evaluate a student's mindset of having an entrepreneurial outlook on life and not their motivation to be an entrepreneur. Many measures related to entrepreneurial capabilities exist in the literature, but most have been used to assess to entrepreneur*ship* tendencies such as the Entrepreneurial Mindset Profile (Davis et al., 2016). The dimensions of the Entrepreneurial Mindset Profile (EMP) include both traits, such as

nonconformity, risk acceptance, and need to achieve, and skills such as idea generation, execution, and persistence. These components could be interpreted as measuring a mindset, however the introductory questions on the assessment address personal abilities with regards to new business ventures and the instrument itself is quite lengthy at 72 items. Studies using the EMP typically assess nascent entrepreneurs, existing entrepreneurs, and managers to determine who would be successful in a start-up venture (Davis et al., 2016 & James et al., 2017). The EMP has been used in a university setting, but to predict student performance on business simulations, discerning which students are most likely to make the best entrepreneurial decisions with regards to running their own business (Downing, 2018). Thus the word 'mindset' in the measure doesn't relate to the broad definition of assessing an entrepreneurial mindset, or outlook on life, used in this study.

Several other measures exist that assess entrepreneurship tendencies, and extensive research focuses on the impact of higher education on a student's desire to engage in new venture creation (e.g. Henry et al., 2005; Kuratko, 2005, McGee et al., 2009). Existing measures are varied and address many different conceptions of entrepreneurial abilities; common instruments include those related to entrepreneurial intent and entrepreneurial self-efficacy, which both assess entrepreneur*ship* constructs (Wilson et al., 2007 & Zhao et al., 2005). Entrepreneurial intent measures direct plans to try and start up a business or intention to work hard to launch a new business (Thompson, 2009; Chen et al., 1998; Linan & Chen, 2008). Thompson's (2009) "Individual Entrepreneurial Intent Scale" is widely used in the literature to measure direct intention of becoming an entrepreneur, not the development of a mindset.

Entrepreneurial self-efficacy is another construct often studied and measures one's belief in their ability to be a successful entrepreneur (Chen et al., 1998; McGee et al., 2009). While entrepreneurial self-efficacy is directly related to entrepreneurship, a case could be made that general self-efficacy could be related to the development of an entrepreneurial mindset, as it can more broadly be viewed as the belief that one can accomplish a general task, or persistence to complete a task (Bandura, 1997). Belief in one's ability is often referred to as confidence, and has been found to be a function of personality (e.g. Newman et al., 2019). However, this study aims to assess a mental thought process regarding an outlook on life, and not the confidence or willingness to start a business. As entrepreneurial thinking capabilities can be taught, this ability is not wholly based on personality type (Kuratko, 2003).

As opposed to merely assessing a single entrepreneurial tendency, such as self-efficacy or intent, there has been an effort to measure the more expansive construct of entrepreneurial development. The Entrepreneurial Development Questionnaire (EDQ) was developed to assess entrepreneurial capabilities from a variety of perspectives (Newbold & Erwin, 2014). While the EDQ includes four subscales of entrepreneurial intent, self-efficacy, outcome expectations, and goal directed activity, this measure also examines entrepreneurship per say, rather than a mindset For example, many questions directly relate to start up intentions, business ownership abilities, and immediate actions to become an entrepreneur (Newbold & Erwin, 2014). This measure does attempt to address entrepreneurial development from a wider angle, however many questions solely relate to aspiring or existing entrepreneurs not college students who are developing their

entrepreneurial thinking mentality. Additionally the EDQ is extremely lengthy at 92 items, and many items across the subscales appear redundant in nature.

For this study, the EDQ as created by Newbold and Erwin (2014) will be the base instrument used to create a more appropriate and simplified measure of the development of an entrepreneurial mindset in college students. This study seeks to contribute to the literature on entrepreneurial mindset and entrepreneurial education by identifying what programmatic curricular interventions are more likely to encourage entrepreneurial thinking. The revised, abbreviated version of the EDQ will allow for a more parsimonious evaluation of a student's development of an entrepreneurial mindset

Summary of Literature

This review of entrepreneurial education and its expansion beyond simply entrepreneurship topics provides a background for the emergence of teaching an entrepreneurial mindset within higher education. As discussed, this mindset, or thought process, is applicable to all students, not just those in business school with the desire to start their own company. Undergraduate students can benefit from a course focusing on developing an entrepreneurial mindset that will lead them to engage in a life of personal growth and success by obtaining skills such as curiosity, self-motivation, and tenacity. In order to justify the student benefit gained from such a course, an appropriate measure must be used that addresses a mindset, not entrepreneurship action.

Theoretical Framework

Teaching someone to develop a mindset and how to think differently about life is not a linear one way process. It would be ineffective for a student to passively listen or read about developing an entrepreneurial mentality; they must actively engage in the

process of learning, practice the skills, and reflect on their capabilities. A course with an outcome of gaining an entrepreneurial mindset cannot assess students on simply memorization or recall on multiple choice exams. Students must be able to demonstrate the mindset and skills, which can effectively be achieved through active experimental learning activities.

Kolb's Theory of Experiential Learning

Learning is not a linear process but a cycle through which knowledge is created; it is a holistic progression of adaptation to the world (Kolb & Kolb, 2005; Kolb & Kolb, 2014). Experiential Learning Theory (ELT) dictates that learning is an ongoing cycle of grasping concrete experiences upon which the learner observes and reflects, then forms an abstract conceptualization or hypothesis which is actively experimented on and tested (Kolb, 1984). The experience plays a vital role in the learning process as it provides the opportunity for individuals to explore their strengths and manage their emotions while transforming the experience into knowledge (Kolb, 1984).

The ELT four mode cycle begins with encountering a new concrete experience or engaging in a new version of an existing experience (Kolb, 1984). The individual then participates in reflective observation of the experience, noting anything of importance or any inconsistencies with what they previously understood to be true. After this reflection, abstract conceptualization occurs where learning from the experience takes place and new ideas or concepts are formed. The fourth mode is active experimentation where the learner plans out and applies their new ideas to the world around them (Kolb, 1984).

This experiential learning process has been widely used for decades in literature regarding business management and postsecondary education in general as reported in

previous meta-analytical and conceptual research on the topic (Hickcox, 1991; Iliff, 1994, Selznick, 2019*).* Student centered, hands-on learning is at the root of ELT where the student directly experiences the content instead of merely reading or hearing about it. The use of student centered approaches such as case studies, simulations, role plays, and games is paramount, but the learner must not only have a concrete experience and think about and analyze an issue, but also obverse and reflect on the experience and then actively experiment upon their thoughts (Kolb & Kolb, 2014).

Within the entrepreneurial education literature, ELT is often used as a basis to establish best practices in pedagogical approaches (e.g. Higgins et al., 2019; McCord et al., 2018; Parris & McInnis-Bowers, 2017). Both entrepreneurship and entrepreneurial thinking require active participation in the learning process and relating concepts to the student's real world environment (Higgins et al., 2019). When faced with a real, complex problem, students must engage in entrepreneurial thinking to overcome the stressful nature of the issue, contextualize the problem, and evoke meaningful change (Higgins et al., 2019). As such, the four cyclical modes of experiential learning can and should be used to engage in entrepreneurial thinking and critical problem solving. Course related exercises to encourage such action based entrepreneurial thought processes are not limited to in-class experiences and could include community based activities, service learning assignments, study abroad, and internships (Higgins et al., 2019).

Acquiring and making use of knowledge is a process, as is entrepreneurial thinking and action. Students must be dynamically involved in the learning process and not passive listeners. ELT allows students to actively take in a new experience, reflect, conceptualize, and then take action (Parris & McInnis-Bowers, 2017). In developing an

entrepreneurial ‘business not as usual’ course curriculum, these design principles can be used to challenge students’ assumptions and to stimulate creative solution seeking (Parris & McInnis-Bowers, 2017). Whether an entrepreneurial course is based on creating a new business or creating a new way of thinking, students should be constantly challenged to embrace novel concepts and ideas. ELT can be used to create activities and assignments that encourage students to immerse themselves in the experience, question the status quo, and explore pros and cons of their choices to make a positive difference (Parris & McInnis-Bowers, 2017).

Utilizing ELT, a variety of course assignments can be created that guide students through the four modes of the learning cycle. In particular, effective group projects combine ELT with other specific design elements, such as the ‘5 S Assignment’ framework as initially developed by Michaelsen and colleagues (2004). Within the 5 S framework, groups are asked to work with a problem that is Significant and relevant thus entering the concrete experience mode of ELT. All student groups are working on the Same problem, encouraging both individual and group reflection of the issue. The group must then engage in abstract conceptualization to hypothesize and make a Specific choice. Finally, the groups Simultaneously report their decision thus actively experimenting with what would, in fact, be the best course of action given other groups’ decisions. The final ‘S’ represents the requirement of a Salient or meaningful decision on behalf of the group creating another concrete experience, thus fully engaging the students in the experiential learning cycle. Within the entrepreneurial education realm, this framework has been used to create effective group assignments involving a new product choice for a particular company and business simulations requiring managerial decisions

(McCord et al., 2018). Additionally, individual assignments such as role playing a business, marketing, or managerial decision can effectively utilize ELT and the '5 S Assignment' design (McCord et al., 2018)

The fundamental principles of ELT will be utilized in the curricular intervention. Exercises such as decision caselets (short case studies) and company opportunity studies encourage the development of an entrepreneurial mindset in students. These types of curricular interventions allow students to progress through the four modes of the experiential learning cycle. For example, a caselet would expose students to a new concrete experience as they will be confronted with a novel situation or problem. They would then reflect on notable observations, relating the experience to what they already "know" and assume to be true given past experiences. Contemplating the dilemma presented in the caselet, students would form new ideas through active conceptualization, i.e. the potential ways in which they could act or respond to the dilemma. By developing a thought-out response, based on the reflection of their concrete experience, active learning would occur. Students would then engage in active experimentation and present their response, or course of action, for the given situation. Exercises like case studies and role play scenarios that have real world connections for students allow them to be active participants in the experiential learning process.

Considerations for Institutional Leadership and Leadership Development

In order for a course that teaches an entrepreneurial mindset to come to fruition, university leaders must not only realize the value of the course for students, but also take action to implement such a course. University faculty and administrators must advocate for programmatic change that places an entrepreneurial thinking course within the

general education curriculum. By allowing students to engage in experiential and entrepreneurial learning, they can build real life connections that resonate far more than a mere lecture based class would. A promising outlook exists as students receiving such entrepreneurial content will graduate being curious, creative, and proactive, making them more marketable job candidates (Krabel, 2018).

Traditionally, entrepreneurial education has been housed in business schools, focusing on teaching business and engineering students the fundamentals of entrepreneurship. However, developing an entrepreneurial mindset is beneficial for all students regardless of their major or career interests (Bacigalupo et al., 2016). Being entrepreneurial doesn't simply relate to starting up a new business, i.e. entrepreneurship, but can also refer to a mindset while working within a business, i.e. intrapreneurship. Any employee, in any industry, can exhibit entrepreneurial thought within their organization and be an entrepreneurial leader (Renko, 2015). By engaging in intrapreneurship, employees who are self-motivated, come up with novel ideas, and take initiative are vital their employer; they may also be better equipped to operate as entrepreneurial leaders in their workplaces and communities.

Thus, such an entrepreneurial course shouldn't be isolated in a business school offered only to business students, but should be placed in the general education curriculum of the university and available to all students (Kuratko, 2005). The introduction of an inclusive entrepreneurial course may not be accepted or appreciated by all in an institutional setting as certain programs or departments may feel ownership over courses related to entrepreneurial education. Thus, curricular changes will need to take

place for entrepreneurial mindset curriculum to be taught through a general education course.

In implementing a higher education change effort, university leaders or provosts cannot simply dictate new curricular policies or announce a new approach for entrepreneurial education. University leaders must foster an environment for change and evoke a shift in perspective. Drawing from Kotter's rationale on the transformational change process, there are several key factors that must be incorporated to realize a successful change initiative (1995). Creating a clear vision is of upmost importance; academic leaders must clearly communicate the need for change to generate a motivational rationale for those throughout the campus community. Communication must be simple, concrete, repetitive, and credible in order for the message to be compelling and resonate with individuals across campus (Heath & Heath, 2007). Departments and faculty across campus must recognize the positive student outcomes that would occur from offering an entrepreneurial thinking course to all students.

Leadership Theories

As there are many leaders within a college or university setting (e.g. administration, provosts, deans, department heads, center directors) a shared leadership approach should be used to implement this change. Shared leadership allows individual faculty or other personnel to lead a programmatic effort without being in a traditional leadership role (Pearce & Sims, 2001). Interested faculty can engage in the process of creating such a course and influence a provost or administrator that it should be implemented, shared leadership is interactive and involves encouraging others to achieve a goal (Pearce & Conger, 2003). Utilizing shared leadership would allow all internal

stakeholders the ability to collaborate and promote a general education entrepreneurial thinking course.

A key factor to realizing successful change includes forming a powerful coalition and empowering others to act on the newly created inspiring vision (Kotter, 1995). This can be accomplished through a shared leadership approach which involves the interaction of individuals and groups working towards a common objective; leadership emerges from within the organization with no appointed hierarchical leader (Pearce et al., 2018). Including those with relevant expertise in the curricular change process will allow for the integration of multiple perspectives and a more promising outcome.

Utilizing shared leadership, a university can conjure individuals on campus with a vested interest in transitioning entrepreneurial education into the general education curriculum. However, the proper structures and processes must be in place, such as support, autotomy, accountability, and interdependence, in order for shared leadership to be effective (Kezar & Holcombe, 2017). Thus, there needs to be a culture for change and support from within, with an atmosphere that encourages novel approaches and revolutionary programs. In addition, university leaders are needed who are able to realize a change needs to occur and also willing to take the risk implement the new course curriculum.

Entrepreneurial leaders are those who are willing to take the necessary risk, seeking out new opportunities and also encouraging others within their organization to do the same (Renko, 2015). As they promote opportunity recognition and continual improvement, entrepreneurial leaders are needed within a university to inspire a curricular change. Having a leader who not only encourages others to think creatively,

but who also realizes and capitalizes on opportunities, is essential to implementing a new and innovative course into the curriculum.

Empowering university members to act on the new curricular vision also involves the leader managing the university environment and perception of the change (Heifetz & Linsky, 2002). Hence an entrepreneurial culture must exist, the philosophy of the university must be one that is open to new opportunities. It is essential that the university has an inclination to encourage change from within and inspire faculty to be innovative. This culture can breed entrepreneurial leaders who promote opportunity recognition and implementation (Renko, 2017).

Entrepreneurial leaders within the university influence others to think about the future and what could be, and to perceive a novel approach regarding education. By being an *entrepreneurial accelerator*, the leader is motivating faculty to challenge norms and act innovatively (Renko, 2017). Entrepreneurial accelerators will publicize the importance of developing an entrepreneurial mindset through inspiring communication, thus, influencing others to pursue this new educational effort as well.

Just as important as being as ringleader for change, is being a change enactor. An *entrepreneurial doer* is one that will take action to secure the new opportunity (Renko, 2017). After recognizing the importance of instilling an entrepreneurial mindset in students, an entrepreneurial doer will ensure the class is placed into the curriculum. Having the ability to secure resources and garner administrator support is essential to seeing an entrepreneurial class come to existence.

By engaging in entrepreneurial leadership, devoted university members will realize a change is needed, conjure support from across campus, and take action to

implement the change (Renko, 2017). To introduce an entrepreneurial mindset course into the general education curriculum, university administration must take an entrepreneurial and shared leadership approach, empowering university members to think differently, creating a new understanding for entrepreneurial education at their institution (Eckel & Kezar, 2011).

Chapter Summary

This chapter provided a literature review to justify the concept of developing an entrepreneurial mindset for college students within a general education curriculum. The progression of entrepreneurial education was discussed, how it has moved beyond educating future entrepreneurs to educating all students on the development of a life-long mindset for personal growth and success. The measurement of entrepreneurial mindset was also examined as to the inapplicability of existing measures to general college students, and the need for the revision of the EDQ to fit this need. A theoretical framework using ELT was provided to justify the targeted curricular intervention to be used to assess the development of an entrepreneurial mindset within first year college students. Finally, the implications for university leaders was outlined, calling for a shared entrepreneurial leadership approach for implementing programmatic change to position an entrepreneurial mindset course within the general education curriculum.

Chapter 3

Research Methodology

The purpose of this study was to evaluate the influence of a targeted curricular intervention on student development of entrepreneurial thinking. Utilizing experiential learning activities related to entrepreneurial thinking, first year students were assessed as to their development of an entrepreneurial mindset. To measure entrepreneurial thinking, the EDQ was analyzed to determine which items are appropriate to assess this construct in undergraduate students. A more parsimonious and relevant measure, the abbreviated College Student Entrepreneurial Development questionnaire was then be utilized in this study.

Research Questions

RQ 1: Is the abbreviated College Student Entrepreneurial Development questionnaire a valid and parsimonious measure of entrepreneurial thinking in undergraduate students?

RQ 2: What is the influence of a theoretically derived general education course utilizing experiential learning on first year student development of entrepreneurial thinking?

Participants and Study Context

Study participants included first-year, full time students enrolled in a large 4-year public institution located in the southeastern United States. The study sample consisted of two groups; an intervention group and a control group based on course enrollment in specific sections of general education critical thinking business course open to all majors. The intervention group received additional targeted curricular interventions related to

entrepreneurial thinking whereas the control group did not receive such interventions. Curricular instruction and exercises for the intervention group included experiential and intentional hands-on, action-based activities that encouraged the development of an entrepreneurial mindset (Appendix I).

Kolb's Experiential Learning Theory outlines the process that students should go through in order to effectively develop new skills; having an experience, reflecting on that experience, concluding from the experience, then trying out a new plan based on what's been learned (Kolb, 1984). This cycle of experiential learning allows students to more fully develop entrepreneurial thinking skills as they are actively putting their skills into practice and learning how to further succeed based on the outcome of their initial experience. Examples of such learning activities included case studies with open ended solutions, group assignments to determine faults associated with a new idea, and individual projects for students to relate entrepreneurial actions to their own abilities.

The course utilized for the basis of this study was a critical thinking business class, geared towards first year freshman students, and is a part of the General Education curriculum. The business course is one of several critical thinking courses offered and students self-select which critical thinking class they wish to enroll in. All critical thinking courses have the same stated objectives, e.g., evaluate claims in terms of credibility and reliability, demonstrate the ability to analyze and generate claims or positions, and evaluate conclusions, assumptions, and supporting evidence. The business course in which participants of this study were enrolled focused on introduction to business topics including management, marketing, ethics, entrepreneurship, finance, and accounting, in order to meet the critical thinking objectives.

The intervention group consisted of four sections of the general education critical thinking business course taught by a single professor with enrollment of 40 students per section and the control group consisted of four sections of the same course taught by a different single professor with similar enrollments. The pre- and post-test surveys were offered to all 160 students in the control group and all 160 students in the intervention groups, resulting in 320 potential participants. Responses were gathered from 215 student participants reflecting a 67% response rate. Listwise deletion was utilized to eliminate cases that contained missing data; only cases with fully completed pre- and post-test surveys were retained, thus the final sample size was reduced to 198 student participants. The intervention group consisted of 145 participants with 97% being first year students. The control group consisted of 53 participants with 96% being first year students. Within the entire sample, there were only five students who identified as being of sophomore status and only one of junior status, based on credit hours completed.

Within the intervention group, 59 students (41%) claimed to be a business major, other notable majors included nursing at eleven students and health sciences at nine students. Interestingly, twenty-eight students (17%) responded undeclared/other. For the control group, 36% of participants declared business as their major (n=19), other notable majors for this group included health sciences at five students and undeclared/other at twenty students. The various business majors represented included marketing, management, economics, finance, and computer information systems.

As this course is a general education course to satisfy the critical thinking requirement, students did self-select to take this business course rather than another critical thinking class. However, during course selection, the course objectives and class

descriptions were identical for all sessions of this particular business class. For both the intervention and the control group, the class was offered in an online format with virtual class sessions. The course content and textbook used were nearing identical, with the only difference between the groups being the instructor. Albeit, first year students have limited knowledge of professors when they are enrolling in classes, thus course selection based on instructor is unlikely.

Data Collection and Measure

Student participants were asked to complete both the pre- and post-test survey online for minimal extra credit points. Extra credit did not exceed one half of a percentage point as related to their final grade. Students were given a one-week timeframe to compete each survey, and did so on their own time, out of class. The pre-test took place at the start of the semester, in the beginning of September with the post-test conducted in the middle of November which allowed for 10 weeks of curricular intervention. In both cases, reminders of this opportunity were provided during virtual class and through online announcements. Additionally, for the control group, emails were sent to those who had completed the pre-test, encouraging them to complete the post-test as well. After matching pre- and post-test responses, participant data not containing both the pre- and post-test and those with missing data were removed resulting in a sample size of 145 participants in the intervention group and 53 participants in the control group for a total sample of 198 student participants.

The initial survey instrument was the Entrepreneurship Development Questionnaire (Newbold & Erwin, 2014). In its original form, the Entrepreneurship Development Questionnaire (EDQ) is a 93-item measure with four subscales:

Entrepreneurial Intent, Entrepreneurial Self-Efficacy, Entrepreneurial Outcome Expectations and Entrepreneurial Goal Directed Activity. The EDQ was developed by the researchers through a compilation of existing measures and additional new items. When reviewing Cronbach's Alpha for each subscale, it was found that the EDQ subscales were shown to have improved reliability over the previous individual measures (See Table 1).

With respect to individual items on the EDQ, the researchers did assess item-total correlations for the new items added and all correlations were appropriately above .20 (Newbold & Erwin, 2014). Inter-item correlations were also assessed for each subscale and all items were deemed to be appropriately, but not excessively, correlated (Newbold & Erwin, 2014). However, a confirmatory factor analysis was not conducted by the researchers on scores from the instrument to verify the four distinct subscales.

Table 1

Summary of Reliability Coefficients for Prior Instruments and the EDQ

Subscale	Cronbach's Alpha Prior Instrument	EDQ
Self-Efficacy (McGee, 2009)	.80	.93
Entrepreneurial Intent (Thompson, 2009)	.89	.93
Goal Directed Activity (Farmer & Kung-McIntyre, 2011)	.95	.95
Outcome Expectations (Krueger, 2000)	.80	.93

The subscale of entrepreneurial self-efficacy is specifically defined as how strongly a person believes he or she possess the appropriate capabilities needed to perform entrepreneurially related tasks successfully (Chen et al., 1998). Self-efficacy, confidence, and belief in oneself is highly related to having an entrepreneurial mindset

A second subscale, entrepreneurial intent, refers to having the ambition and desire to engage in entrepreneurially related activities (Collins, Hannon, & Smith, 2004). Intent has been studied with respect to college students and researchers have found that entrepreneurial education does increase entrepreneurial intentions and actions (Hmieleski & Carbett, 2006; Galloway & Brown, 2002; Wilson et al., 2007). However, of the four EDQ subscales, entrepreneurial intent is the most related to the concept of entrepreneur*ship*, which is not the construct of interest in this study.

The subscale of goal directed activity relates to one having deliberately planned objectives that are personal in nature to provide direction and purpose in life (Elliot, Sheldon, & Church, 1997). Thus, one who sets specific inspiring goals will be motivated to engage in activities to achieve their goals, therefore receiving personal fulfillment. A study regarding goal orientation revealed that individuals who want to learn new skills and prove their abilities by setting and achieving personal goals are more likely to have entrepreneurial tendencies (Culbertson et al., 2011).

Entrepreneurial outcome expectations is the final scale on the EDQ and refers to the expected results of intentional entrepreneurial activities in which an individual engages in (Newbold & Erwin, 2014). The concept of entrepreneurial expectations includes taking deliberate actions to achieve a desired outcome such as increase creativity, collaboration with others, success, and personal growth (Newbold & Erwin, 2014).

While the original EDQ contains four subscales with 93 items, only a subset of items that are relevant to college students were used to assess students' entrepreneurial mindset in this study. The subscales were first assessed as to their construct validity;

subscales containing significant items related to start-ups, obtaining funding, or new business creation were eliminated as those subscales assessed entrepreneur*ship* tendencies. Thus, the subscales of Entrepreneurial Intent and Goal Directed Activity were not included in the measure for this study. When conducting the analysis, only the subscales of Self-Efficacy and Outcome Expectations were utilized wherein participants rated their responses on a five-point scale (1= strongly disagree; 5= strongly agree). In addition to the two scale EDQ, participants also responded to demographic and entrepreneurial experience questions.

To address the first research question, determining if the developed abbreviated College Student Entrepreneurial Development questionnaire is a valid and parsimonious measure of entrepreneurial thinking in undergraduate students, the two scale EDQ was further examined using pilot data gathered in the fall of 2017. The psychometric properties of this two scale version were assessed using existing 2017 data drawn from a sample of undergraduate college students. A confirmatory factor analysis was conducted to assess convergent and discriminate validity. Each subscale was examined separately to determine if the corresponding items fit a one-factor model. The items were analyzed as to their contribution to the respective subscale by assessing the subscale reliability coefficients and factor loadings. The fit indices for both subscales indicated poor fit thus the correlation residuals were examined to determine areas of misfit.

Abbreviated subscales were then proposed based on the results of the statistical analysis combined with subject matter expert review and evaluation face validity using keyword elimination (Appendix A). The abbreviated two scale College Student Entrepreneurial Development (CSED) questionnaire, as shown in Appendix B, was

assessed through confirmatory factor analysis using the pretest data collected in 2020. The CSED questionnaire did appropriately fit a two factor model and was shown to be a reliable measure, thus it was used in a pre- post- test design to answer the second research question regarding the impact of targeted experiential learning activities on student development of entrepreneurial thinking.

Variables

In addressing research question two, the post-test score from the developed CSED questionnaire served as the dependent variable in this study. The independent variables will consist of the course taken by the student participants (1= curricular intervention, 0= control) and the pre-test score on the CSED measure which allowed for the assessment of student gains in entrepreneurial mindset abilities.

Other independent variables serving as control variables involved the degree of student entrepreneurial exposure and experience. The number of entrepreneurial related classes taken (0= no classes to 3= three or more classes) and whether or not the student had taken any college business classes (0= no business classes and 1= one or more business classes) served as education variables.

Passive entrepreneurial exposure was assessed through participation in groups or clubs (0= no participation to 3= participation in three or more groups), attending workshops or seminars (0= have not attended to 3= attended three or more events). Parental experience with entrepreneurial actions, thus participant exposure to entrepreneurial individuals also served as a variable of interest (0= no parental entrepreneurial involvement, 1= some involvement, 2= great involvement). Direct involvement in entrepreneurial actions was also measured with respect to active

entrepreneurial participation in startup pitches or incubators (0= no participation to 3= participation in three or more events) and personal engagement in venture creation (0= have not engaged in venture creation, 1= have engaged).

Finally, demographic control variables were also assessed including gender (0= male, 1= female), year in school, and race having response choices: white/Caucasian, black/African American, Latino/Hispanic, Asian, and other. The data was screened for normalcy and skew and kurtosis values were examined. It was found that the variable year in school was highly skewed as 97% of participants were first year students. As the course utilized for this study is geared towards freshman, this finding was not atypical. The variable year in school was removed and not included in further analysis as skew and kurtosis values were far outside normal range. Additionally, the variable race was highly skewed with white/Caucasian at 167 responses, with the next largest identification being Asian with only 14 responses. In an effort to maintain a functioning variable, race was dummy coded to reflect a white, non-white response (0= non-white, 1= white). Table 2 provides the summary statistics for all retained independent variables by course taken with Table 3 displaying the summary frequencies by course taken.

Table 2

Summary Statistics for Demographic and Entrepreneurial Experience Variables

Course Taken	Gender	Race	Business Courses	Entrep Related Course	Particip Entrep Groups	Passive Entrep Seminar	Parental Entrep Exp	Active Start up Pitch	Personal Venture Creation
Control									
Mean	0.74	0.77	0.36	0.91	0.53	0.85	1.77	0.58	0.21
SD	0.445	0.423	0.484	0.986	0.846	1.133	0.847	0.969	0.409
N	53	53	53	53	53	53	53	53	53
Range	1	1	1	3	3	3	2	3	1
Intervention									
Mean	0.48	0.87	0.41	1.07	0.51	0.57	1.64	0.33	0.11
SD	0.501	0.339	0.493	1.005	0.783	0.903	0.788	0.746	0.314
N	145	145	145	145	145	145	145	145	145
Range	1	1	1	3	3	3	2	3	1
Total									
Mean	0.55	0.84	0.39	1.03	0.52	0.65	1.68	0.40	0.14
SD	0.499	0.364	0.490	1.000	0.798	0.975	0.804	0.817	0.344
N	198	198	198	198	198	198	198	198	198
Range	1	1	1	3	3	3	2	3	1

N=198

Table 3.

Summary Frequencies for Demographic, Entrepreneurial Experience Variables

Grouping Variable	Control (%)	Intervention (%)	Total (%)
Gender			
Male	26.4%	51.7%	44.9%
Female	73.6%	48.3%	55.1%
Race			
White	22.6%	13.1%	15.7%
Non-White	77.4%	86.9%	84.3%
College Business Courses Taken			
No business courses	64.2%	59.3%	60.6%
Yes, at least one course	35.8%	40.7%	39.4%
Entrepreneurially Related Courses Taken			
No courses	43.4%	36.6%	38.4%
1 course	32.1%	30.3%	30.8%
2 courses	15.1%	22.8%	20.7%
3 or more courses	9.4%	10.3%	10.1%
Participation in Entrepreneurial Groups			
No groups	64.2%	63.4%	63.6%
1 group	24.5%	25.5%	25.3%
2 groups	5.7%	7.6%	7.1%
3 or more groups	5.7%	3.4%	4.0%
Passive Entrepreneurial Seminars			
No experiences	54.7%	64.8%	62.1%
1 experience	22.6%	19.3%	20.2%
2 experiences	5.7%	9.7%	8.6%
3 or more experiences	17.0%	6.2%	9.1%
Parental Entrepreneurial Exposure			
No parental exposure	49.1%	55.2%	53.5%
Some exposure	24.5%	25.5%	25.3%
Yes definite exposure	26.4%	19.3%	21.2%
Active Start up Pitch or Incubator			
No experiences	67.9%	79.3%	76.3%
1 experience	13.2%	12.4%	12.6%
2 experiences	11.3%	4.1%	6.1%
3 experiences	7.5%	4.1%	5.1%
Personal New Venture Creation			
No experience	79.2%	89.0%	86.4%
Yes, personal experience	20.8%	11.0%	13.6%

N=198

Analysis

In testing Research Question 1, the EDQ was assessed using pilot data collected in the fall of 2017. Item analysis was conducted for each subscale to assess the contribution of each item to the respective scale. This consisted of examining the correlation among the items of each subscale to assure moderate to high correlation. To examine the fit of each subscale a CFA was performed and fit indices including the chi-square value and root mean square error of approximation (RMSEA) were assessed. As the fit indices revealed misfit, the correlation residuals were examined for each subscale to discern which item relationships were not well represented by the model. These particular items were noted for potential removal as they may relate to the underlying construct.

To further assess the items and to determine which should be removed to create a more parsimonious measure, a subject matter expert review and keyword face validity review were conducted. Subject matter experts reviewed the items to their usefulness in measuring entrepreneurial development with respect to critical thinking and obtaining a personal growth mindset It was specifically mentioned that the measure was to assess entrepreneurial development not entrepreneurship tendencies. The items were also examined by the researcher as to their face validity in assessing the construct of interest. Items mentioning entrepreneurship, startups, or venture creation were noted as potentially non-useful items. The EDQ was then reduced based on a complication of the statistically analysis and reviews. Items that were deemed as not relevant based on two or more of the aforementioned assessments were removed from the measure (Appendix A).

After the subscale reductions based on item fit and face validity, the resulting scales were analyzed through a confirmatory factor analysis (CFA) to determine if the new abbreviated two-factor model of College Student Entrepreneurial Development (CSED) does fit the data. The items did fit a two-factor model, and a chi square difference test was conducted to confirm that the longer version did fit significantly worse that the newly developed shorter version. To further validate these findings, a CFA was conducted on the College Student Entrepreneurial Development (CSED) questionnaire data collected in the fall 2020. Fit indices, reliability, and variance extracted were all examined and signify that the newly developed, more parsimonious measure of CSED was supported by the fit of a two-factor model to the data. Factor loadings and variance explained were also assessed to determine to most influential items in each subscale factor.

In testing Research Question 2, a mixed Analysis of Variance (ANOVA) was performed to evaluate the mean differences between the intervention and control groups in their pre- and post-test CSED scores. As there was a significant difference between the groups in post-test scores, a hierarchical regression analysis was performed to determine if course taken (i.e. intervention or control) explained variance in post-test scores over and above all other independent variables.

The hierarchical regression analysis was conducted by entering the variables in nested models to estimate the effects of the control and independent variables on the post-test CSED scores in a sequential method. In Model 1, the demographic variables of gender and race where entered. Model 2 included educational components such as entrepreneurially related courses and college business courses taken. Model 3 included

the passive entrepreneurial exposure variables of participation in groups, attending seminars, and parental entrepreneurial exposure. Model 4 further expanded to include the active entrepreneurial participation variables of start-up pitch experience and venture creation. Model 5 added the pre-test CSED scores and finally Model 6 added course taken, intervention or control.

Limitations

The conducted research had several limitations. Notably, a convenience sample of undergraduate students was used with students self-selecting into the course section of their choice. While the course description was the same for both the intervention and control group, the professor for each group was different. However, incoming freshman registered for classes from their home prior to arriving on campus thus many students would know little regarding differences in various instructors.

The course intervention was restricted to online student activities and assignments due to the virtual nature of the course. The COVID-19 pandemic prohibited in-person learning activities from being conducted. True experiential learning activities should utilize hands-on, in person exercises with instructor feedback to realize their full potential.

Another limitation is that the results of this study are not generalizable to other college student populations that are more ethnically or socially diverse. The sample was predominantly white, with non-white race choices having to be condensed into one variable. This study could not determine if race had any impact on post test scores, thus future studies could continue to explore potential findings with a more diverse sample.

Finally, the sample was overwhelmingly first year students and the results again may not be generalizable to second year students, upperclassman, or transfer students. This study was unable to capture differences with respect to year in school or participant age. The CSED measure is attended for all college aged students, thus additional studies should determine if the measure is valid for other students at different points in their educational career.

Chapter Summary

In conclusion, the current study is meant to improve the measurement of college student entrepreneurial development by refining an existing instrument and then conducting a curricular intervention to test the reliability and validity of the new instrument. The pre-, post-test data collection design allows the impact of the curricular intervention on college student entrepreneurial development to be assessed.

Chapter 4

Results

Research Question 1: Measure development using pilot data

In testing Research Question 1, the existing EDQ containing four subscales was broadly reviewed for applicability to the development of a college student's entrepreneurial mindset. When reviewing the subscales for content validity it was found that the Entrepreneurial Intent scale and the Entrepreneurial Goal Directed Activity scale did not align with the definition of college student entrepreneurial development. These two subscales were not related to the concept of a mindset but instead related to the actual process of entrepreneurship. While the Entrepreneurial Intent scale does include several college-age specific questions, the entire scale is related to entrepreneurship and creating a new venture. The Entrepreneurial Goal Directed Activity scale solely contained questions specifically regarding being a traditional business owning entrepreneur. Thus, it was concluded that these subscales would be removed as their content did not relate to developing a broader mindset towards achievement in life, but instead towards specially owning a business. The remaining two subscales, Entrepreneurial Self-Efficacy and Entrepreneurial Outcome Expectations were further analyzed for population-relevant content validity using a combination of statistical analysis, subject matter expert review, and keyword context review (Appendix A).

The Abbreviated EDQ containing the two subscales of Self-Efficacy and Outcome Expectations was analyzed through Confirmatory Factor Analysis and Item Analysis. Data previously collected in 2017 by the researcher was used for the initial examinations. This 2017 pilot data contained EDQ responses from student participants

who were enrolled in various Introduction to Business courses at a large public university. Listwise deletion was used to remove subjects with missing data resulting in a sample size of 351 undergraduate students. Descriptive statistics are shown in Table 4 and reveal that multivariate multicollinearity does not appear to be an issue as tolerance levels are all above .10.

Table 4.

Self-Efficacy and Outcome Expectations Item-Level Descriptive Statistics

Item	Mean	Std. Dev	Tolerance	Skew	Kurtosis
Entrepreneurial Self-Efficacy					
Q1	3.17	1.15	0.311	-0.367	-0.820
Q2	3.46	1.18	0.230	-0.639	-0.534
Q3	3.50	1.087	0.334	-0.714	-0.191
Q4	3.10	1.172	0.250	-0.221	-0.898
Q5	3.06	1.196	0.235	-0.222	-0.953
Q6	2.97	1.177	0.219	-0.182	-0.950
Q7	2.70	1.171	0.293	0.159	-0.932
Q8	3.07	1.244	0.272	-0.198	-1.071
Q9	3.18	1.280	0.225	-0.331	-0.988
Q10	3.54	1.264	0.400	-0.599	-0.660
Q11	3.09	1.225	0.250	-0.230	-0.994
Q12	3.47	1.183	0.278	-0.628	-0.456
Q13	3.6	1.155	0.293	-0.80	-0.103
Q14	3.74	1.168	0.198	-0.912	0.046
Q15	3.6	1.149	0.230	-0.789	-0.100
Q16	3.22	1.296	0.237	-0.351	-1.029
Q17	3.09	1.289	0.204	-0.211	-1.102
Q18	3.1	1.203	0.446	-0.197	-0.946
Q19	3.38	1.21	0.208	-0.591	-0.631
Q20	3.37	1.173	0.191	-0.550	-0.602
Q21	3.42	1.218	0.233	-0.622	-0.582
Q22	3.5	1.178	0.205	-0.726	-0.293
Q23	3.4	1.166	0.311	-0.558	-0.563
Q24	3.34	1.176	0.184	-0.529	-0.557
Q25	3.32	1.17	0.246	-0.407	-0.661
Q26	3.43	1.171	0.207	-0.592	-0.454

Table 4 cont.

Self-Efficacy and Outcome Expectations Item-Level Descriptive Statistics

Item	Mean	Std. Dev	Tolerance	Skew	Kurtosis
Entrepreneurial Outcome Expectations					
Q1	4.30	0.835	0.239	-1.445	2.508
Q2	4.38	0.786	0.244	-1.589	3.452
Q3	2.82	1.283	0.260	0.051	-1.152
Q4	3.06	1.318	0.289	-0.186	-1.191
Q5	2.39	1.209	0.365	0.437	-0.878
Q6	2.63	1.230	0.329	0.146	-1.101
Q7	2.92	1.245	0.291	-0.120	-1.105
Q8	3.25	1.314	0.316	-0.410	-1.010
Q9	2.46	1.213	0.297	0.363	-0.912
Q10	3.72	1.185	0.421	-0.894	-0.001
Q11	3.06	1.261	0.341	-0.196	-0.967
Q12	2.51	1.219	0.201	0.231	-1.073
Q13	3.07	1.238	0.299	-0.305	-0.969
Q14	3.70	1.214	0.396	-0.934	-0.031
Q15	2.88	1.294	0.240	-0.060	-1.130
Q16	2.50	1.271	0.263	0.318	-1.030
Q17	2.84	1.372	0.166	0.083	-1.273
Q18	2.93	1.373	0.267	-0.068	-1.274
Q19	4.13	0.961	0.425	-1.367	1.955
Q20	4.17	1.009	0.325	-1.512	2.205
Q21	3.88	1.152	0.309	-1.057	0.425
Q22	3.87	1.093	0.347	-1.042	0.639
Q23	3.87	1.102	0.390	-1.057	0.598
Q24	3.66	1.114	0.444	-0.903	0.278
Q25	3.29	1.232	0.264	-0.364	-0.804
Q26	4.35	0.970	0.598	-1.819	3.136
Q27	3.07	1.322	0.332	-0.129	-1.095
Q28	3.70	1.271	0.447	-0.774	-0.457
Q29	3.37	1.329	0.256	-0.483	-0.908

N=351, Five point Likert Scale, 1–extremely unlikely to 5–extremely likely.

After reviewing the histograms for each item it appears that the data is fairly normal, and also linearly related. Univariate normality was also assessed by examining skew and kurtosis values, comparing to cut-offs of |3| and |10| respectively (Kline, 2011).

As shown in Table 4, the data is normally distributed as skew and kurtosis values were are well below the cut-off values.

Bivariate multicollinearity also doesn't appear problematic when reviewing the correlation matrix, as shown in Appendix C. In both subscales, most variables are mostly low to moderately correlated with each other. A review of the Entrepreneurial Self-Efficacy (SE) subscale reveals a cluster of strong Pearson's correlations (.69-.81) among items that deal with designing a product, estimating the demand, and determining the price. Another cluster of strongly correlated items appears among those items all dealing with managing employees (.78-.81). The single highest inter-item correlation, at .85, was among the items "anticipate problems my idea may face" and "research relevant facts related to my idea". All other variables were considered moderately correlated with the lowest correlation of .49 between the items "design an effective marketing campaign" and "deal effectively with day-to-day problems".

When reviewing the correlation matrix for the Entrepreneurial Outcome Expectations (OE) Subscale it appears it demonstrates lower inter item correlations. Approximately half of the correlations were weak at below .5, with the first two items, both assessing monetary expectations, having extremely weak correlations with all other items. These first two items assessing the desire for wealth and income had the highest inner item correlation at .85. There is one small cluster of higher correlations (.67-.80) among items assessing the desire to create multiple lasting ventures. The majority of the other correlations in this subscale were weak, at .5 or below, with the weakest correlation, at .3, between the items "generate personal wealth" and "engage in a creative process". When assessing the correlation matrix as a whole, taking into account cross subscale

correlations, it appears that the item “generate personal wealth” is the least correlated, all below .49, with all other items regardless of subscale.

Univariate outliers were not of issue in this analysis as the scale for all items contained only five points, and after reviewing the frequency distributions, it was confirmed that all data fell within the range 1-5. Multivariate outliers were also screened by examining the Mahalanobis distance. It was determined that values above 180 may be considered a multivariate outlier and 3 cases were identified. However, these cases were not deleted given a relatively low sample size and narrow range of possible item scores; all 351 subjects remained in the analysis.

A confirmatory factor analysis (CFA) was first conducted on each subscale using the previously collected 2017 EDQ data. The two subscales, Entrepreneurial Self-Efficacy (SE) containing 26 items and Outcome Expectations (OE) contain 29 items, both employing a five-point Likert Scale from 1-Strongly Disagree to 5-Strongly Agree. To assess the fit of each subscale, a CFA was performed utilizing Maximum Likelihood estimation in LISREL 10.3. As the purpose of the CFA was to engage in item analysis for new scale development, each existing EDQ subscale was examined separately using a one-factor model to determine overall fit and to identify potential areas of misfit among the items.

To assess the fit of the two EDQ subscales, several fit indices were examined as shown in Table 5. While the chi-square values for both subscales are statistically significant ($p<.001$) possibly indicating a lack of fit, the chi-square index only assesses exact fit and is influenced by sample size, thus additional fit indices were examined to assess approximate fit. The root mean square error of approximation (RMSEA), was

assessed to examine the approximate absolute fit of the model. The RMSEA was chosen over other indices as sample size is above the recommended 250 (Hu & Bentler, 1998). When comparing the RMSEA values to the proposed approximate cut off of less than .06 (Hu & Bentler, 1999), both subscale models have values much greater than .06 indicating poor fit; thus there is a lack of fit of the one-factor model the population data for both individual subscales.

An incremental index was also examined to assess the fit of each one-factor model compared to the fit of the independence model, i.e., a model where all covariances are zero. The Comparative Fit Index (CFI) was chosen and has a proposed cut-off of greater than .95 (Hu & Bentler, 1999). It is found that both EDQ subscales have CFI values much less than .95 as shown in Table 5, indicating that each one-factor model does not fit better than the baseline independence model.

Table 5.

Fit Indices for Each One-Factor Subscale Model

Subscale	χ^2	df	p-value	RMSEA	CFI
Self-Efficacy	2433.374	299	<.001	0.143	0.775
Outcome Expectations	3141.840	377	<.001	0.145	0.673

N=351

Note. Root square mean error of approximation (RMSEA), Comparative fit index (CFI)

As the fit indices reveal model misfit, residuals were also examined to assess the potential areas of concern. The standardized covariance residuals indicate how far off the model was at reproducing the covariance matrix, these standardized values can be compared to a z-score metric with residuals greater than one standard deviation from the mean (>|1.96|) would indicate misfit. On the SE subscale model, there was a cluster of moderate standardized covariance residuals among Q1 through Q4. These first four items

all refer identifying/satisfying a “need” by coming up with a “new idea”, thus these items specially deal with the idea generation process as opposed to the other items on the measure. The second OE subscale contained several very large standardized covariance residuals greater than 10.0 when fitted to a one factor model. These large residuals appear among Q23 “Focus on results” with both Q20 “Achieve individual success” and also with Q21 “Capitalize on opportunities”. The items all refer to personal success through deliberate results driven action, thus it is understood that all items would be related beyond the factor. Additional large residuals within the OE subscale appear among Q19 “Be part of a team” with both Q20 “Achieve individual success “and Q24 “Manage the work of others”. The relationship among these items may be due to the fact that being part of a team involves both group and personal success.

While each EDQ subscale contained large standardized covariance residuals, these residuals are often difficult to interpret and do not provide definite meaning. Thus, the correlations residuals were also reviewed (Appendix C) and compared to a recommended approximate cutoff approximately of less than .15 (Kline, 2011). An examination of the SE subscale correlation residuals revealed potential misfit among a group of large residuals greater than .15 among Q1 through Q4; this is consistent with the large standardized covariance residuals explained above. The relationship among these four items relating to a new idea/need is not represented by the one-factor SE model; these items may be a separate construct relating to self-efficacy in idea generation as opposed to overall self-efficacy in entrepreneurial success. Additionally, there is a second area of large residuals indicating potential misfit among Q12-Q15 with all questions

relating to dealing with employees and problems, thus these items may be measuring a different aspect of entrepreneurial self-efficacy such as managerial self-efficacy.

The second subscale, OE, had a cluster of large correlation residuals greater than 0.2 among Q19-Q24. As foreshadowed by the covariance residuals, these six items, which refer to teams, working with others, and success may not be part of a one-factor model of entrepreneurial outcome expectations. These items may instead be tapping into the construct of teamwork and successfully working with others, as opposed to general entrepreneurial start-up activities. Additionally, items Q1 and Q2 refer to income and wealth and produce large correlation residuals with several other items indicating that these relationships were not reproduced well by the one-factor model and these two items referring to money may be a separate construct.

As the correlation residuals indicate possible areas of misfit related to each subscale one-factor model, the items were further examined as to their usefulness to the subscale. Within each subscale all item parameter estimates and variances explained were assessed. Items having low unstandardized parameter estimates, contributing least to each subscale factor, and/or having a low amount of variance explained, less than 50%, by the factor are presented in Table 6.

The SE subscale had three items with parameter estimates less than 0.78 and variance explained of less than 46% thus these items were deemed questionable as to their usefulness. The second subscale, OE, further revealed that Q1 and Q2, dealing with monetary income, had the lowest parameter estimates of .25 and .22 with variance explained of less than 10%. Another item of concern would be Q26, expressing the desire

to enjoy one's job, with a parameter estimate of .26 and variance explained of again less than 10%.

Table 6.

Items with Low Parameter Estimates

Item	Unstnd. Parameter Estimates	Standard Error	R^2
SE Subscale			
Q1	0.776	0.055	0.455
Q3	0.729	0.052	0.450
Q18	0.757	0.016	0.396
OE Subscale			
Q1	0.257	0.044	0.095
Q2	0.222	0.042	0.080
Q10	0.729	0.058	0.379
Q14	0.687	0.060	0.320
Q19	0.342	0.050	0.126
Q22	0.584	0.055	0.286
Q23	0.579	0.055	0.275
Q24	0.626	0.055	0.316
Q26	0.262	0.052	0.073
Q28	0.694	0.064	0.298

N=351, all parameter estimates significant at $p<.05$

Following the statistical item analysis, subject matter experts, SMEs, were consulted to rate how useful each item was as an indication of the development of a college student's entrepreneurial mindset. SMEs, including existing entrepreneurs and management professors, were sent a survey asking them to rate the usefulness of each item. The following definitions were given to represent each subscale: Entrepreneurship Self-Efficacy (SE): how strongly a person believes he or she possess the appropriate capabilities or mindset needed to perform entrepreneurially focused tasks successfully (Chen et al., 1998), and Entrepreneurial Outcome Expectations (OE): the expected results of deliberate and mindful entrepreneurially focused activities (Newbold & Erwin, 2014).

Additionally, traditional entrepreneurship, start-ups and new ventures, and managing a business were specifically mentioned as not being indicators of the broader entrepreneurial mindset The SMEs rated each item on a scale of one to five, with higher values indicate a useful item, and the item scores where then averaged. Items having an overall score of less than 3.3 were identified as potential items not representative of the subscale construct (Groves et al., 2009). The results of the SME review can be found in Appendix A

The EDQ was also examined using keyword elimination to remove items that violate content validity. The measure of College Student Entrepreneurial Development aims to determine how developed a student is in expanding their mindset, abilities and potential in life. Thus, items must relate to personal abilities that can be developed and assessed during a single semester. When evaluating the success of a curriculum designed to enhance these abilities and develop entrepreneurial leaders, it is essential that the items assess actual outcomes that can be measured. To assess content validity, items were examined for keywords (e.g., new venture, start-up, investment, management, and accounting) that would potentially be misaligned with underlying construct of a college student's entrepreneurial development. Other related topics involving current actions that undergraduate students may find difficult to pursue while in college such as, currently starting a business, seeking funding, or conducting new business research were also flagged for potential removal.

The combined results, as seen in Appendix A, reveals that items were reviewed for the following three concerns: statistical analysis (low factor loadings and /or high correlation residuals), SME review (items scoring < 3.5, thus not pertaining to the

construct), and keyword concern (e.g. entrepreneur*ship*, new ventures, accounting, management). Items having two or more concerns were removed were chosen to be removed. The results of these combined analyses, as seen in Appendix A, reduced the Self-Efficacy subscale of the EDQ measure from 26 to 8 items, including Q1, Q3 and Q18 as identified in the parameter estimates (Appendix B). Other items removed pertained to supervising and training employees, accounting and financial abilities, and generating ideas to launch a business. These abilities relate more so to specific functional areas within business such as human resources or accounting as opposed more broad-based abilities needed to exhibit entrepreneurial self-efficacy to realize a mindset for personal success.

The second subscale Outcome Expectations, was reduced by the greatest amount from 29 to 6 items. From analyzing the parameter estimate in conjunction with the SME review it was decided that Q1 would be retained and only Q2 would be removed. The two items are highly correlated and "personal wealth" was deemed a more entrepreneurial concept than "personal income". Other items were also retained despite low parameter estimates, such as item Q10 relating to personal freedom and Q14 regarding personal growth and development as these items are indications of an entrepreneurial growth mindset Additional items were removed as they related to entrepreneur*ship* and management topics such as: working with others (Q19 and Q24), investing, selling, and initiating an IPO (Q6, Q8, Q9, Q12, Q16), and global working relationships (Q27, Q28, Q29).

After removing items to create a more parsimonious one-factor measure for each subscale, fit indices were reviewed to determine if each newly shortened subscale

measure fit better than the longer measure (Table 7). While both shortened subscales still revealed a high Root Mean Square Error of Approximation (RMSEA), indicating the models are still relatively worse than a perfect model, the RMSEA is very sensitive at small sample sizes (Hu & Benter, 1998). As the shortened and long versions of the scale were non-nested models, the Akaike's Information Function (AIC) was reviewed to compare the shorter versus longer measure and the Standardized Root Mean Square Residual (SRMR) was also analyzed to assess absolute fit. The AIC values decreased drastically and the SRMR dropped to below 0.05 for both shorter measures indicating the more parsimonious measures were both better fitting models. An incremental assessment of fit, the Comparative Fit Index (CFI) also revealed that the shorter measures fit better than the longer when compared to a baseline model. While the CFI values were not above the suggested 0.95, they did increase and were close with both above 0.91 (Hu & Bentler, 1998).

Table 7.

Fit Indices of the Reduced and Full Subscale Measures using 2017 Pilot Data

Measure	χ^2	df	*p*-value	RMSEA	AIC	SRMR	CFI
SE Subscale							
8-item measure	199.27	20	<.001	0.160	231.27	0.048	0.916
26-item measure	2433.37	299	<.001	0.143	2537.37	0.073	0.775
OE Subscale							
6-item measure	87.923	9	<.001	0.158	111.92	0.047	0.937
29-item measure	3141.84	377	<.001	0.145	3257.84	0.127	0.673

N=351

As the new, more parsimonious measures fit the data much better than the longer measures, internal consistency reliability and variance accounted for by each one-factor scale model was reviewed, as shown in Table 8. Internal consistency reliability was assessed by examining the omega (ω) coefficient yielding high values of .90 and .93;

both scale measures were very reliable as the coefficient is well above 0.7 (DeShon, 1998). The variance accounted for by each scale was also analyzed and, as all values are greater than 50%, there is a moderate amount of variance extracted. Both had large amounts of variance extracted at 60% and 63%.

Table 8.

Reliability and Variance Extracted for Each Scale using 2017 Pilot Data

	ω	Variance extracted
Self-Efficacy (8 items)	.903	.606
Outcome Expectations (6 items)	.932	.633

N=351

Ultimately, given that each of the newly reduced measures did have appropriate fit statistics, i.e. lower AIC, SRMR below .05, and CFI above 0.91, and high reliability values above .90, it can be concluded that in this case, the models fit the data from the shorter measures better as compared to the longer measures for both Entrepreneurial Self-Efficacy and Entrepreneurial Outcome Expectations.

Research Question 1: Measure analysis using newly collected data

To further validate these findings, a confirmatory factor analysis (CFA) was conducted on the newly created College Student Entrepreneurial Development (CSED) questionnaire, containing the two subscales of self-efficacy and outcomes expectations, using data collected in the fall of 2020. This data was collected from undergraduate student participants enrolled in critical thinking business courses, resulting in a sample size of 198. The CSED questionnaire contained the subscales: Entrepreneurial Self-Efficacy (SE) containing eight items and Outcome Expectations (OE) containing six items, each employing a five-point Likert Scale from 1-Strongly Disagree to 5-Strongly

Agree. To assess the fit of the two-factor model, a CFA was performed utilizing Maximum Likelihood estimation in LISREL 10.3.

When reviewing the two-factor model using the data collected in the fall of 2020, several fit indices were examined as shown in Table 9. While the chi-square value was statistically significant ($p<.001$) possibly indicating a lack of fit, the chi-square index only assesses exact fit and is influenced by sample size (Hu & Bentler, 1999). Hence, a nested one factor model was compared to the two factor model of CSED and fit indices were examined. The chi-square difference tests revealed that the change was significant indicating the two-factor model did fit better than the one-factor model. The SRMR was chosen as an approximation of absolute fit over the RMSEA given a sample size of less than 250 (Hu & Bentler, 1998). The SRMR of the two-factor model is less than .05 indicating good fit.

Table 9.

Fit Indices for the College Student Entrepreneurial Development Measure

Model	χ^2	df	*p*-value	$\Delta\chi^2$	Δdf	*p*-value	SRMR	CFI
One-Factor	480.905	77	<.001				0.114	0.753
Two-Factor	176.412	76	<.001	304.49	1	<.001	0.048	0.939

N=198

An incremental index, the CFI, was also examined to assess the fit of the two-factor model compared to the fit of the independence model, i.e. a model where all covariances are zero. It was found that the model has a CFI just shy of .94, as shown in Table 9, indicating a close fit and potentially better than the baseline independence model. It can be assumed that the model does fit the data as there is no clear rule that can be used for all models under all conditions (Marsh, Hau, & Wen, 2004).

As the fit indices revealed a well-fitting two-factor model, covariance residuals were examined to confirm that there were no potential areas of concern. The standardized covariance residuals (Appendix F) indicate how far off the model was at reproducing the covariance matrix, these standardized values can be compared to a z-score metric with residuals greater than one standard deviation from the mean (>|1.96|) would indicate misfit. For the both the SE and OE subscales of the model, all standardized covariance residuals were within range to indicate good fit.

Internal reliability, using the data collected in the fall of 2020, was assessed by examining the omega (ω) coefficient (Table 10) and all factors appear reliable with ω coefficients well above 0.7. The variance accounted for by each construct was also analyzed, and both constructs both had over 50% variance extracted. The two factors were correlated at 0.60 indicating a relationship among the factors yet not overly related, thus self-efficacy and outcome expectations can be seen as two distinct constructs.

Table 10.

Reliability and Variance Extracted for the New Two-Factor Model of CSED

	ω	Variance extracted
Self-Efficacy (8 items)	.920	.590
Outcome Expectations (6 items)	.882	.545

N=198

The unstandardized coefficients, presented in Table 11, were all statistically significant ($p<.05$) indicating that while items 4 and 9 had lower variances explained by the associated factor, the items still explained a significant amount of variance in the factor, holding the other items constant. Standardized path coefficients and variance explained were analyzed for each item (Table 8). Within the self-efficacy factor, item 3 has the highest amount of variance explained by the factor (R^2=70%) whereas it 4 has

lowest (R^2=47%). However these still represent substantial amounts of variance explained, and in addition, item 4 contributes to the factor as for every one standard deviation increase in item 4, the factor increases .683 standard deviation units. Within the OE factor, item 9 has the least amount of variance explained of any of the items, with only 26% of its variance explained by the factor. The standardized factor loading reveals that for every one standard deviation increase in item 9 the factor only increases about a half of a standard deviation. The most influential item to the factor was question 13 as a standard deviation increase in the item increase the factor by .8 standard deviations (R^2=64%).

Table 11.

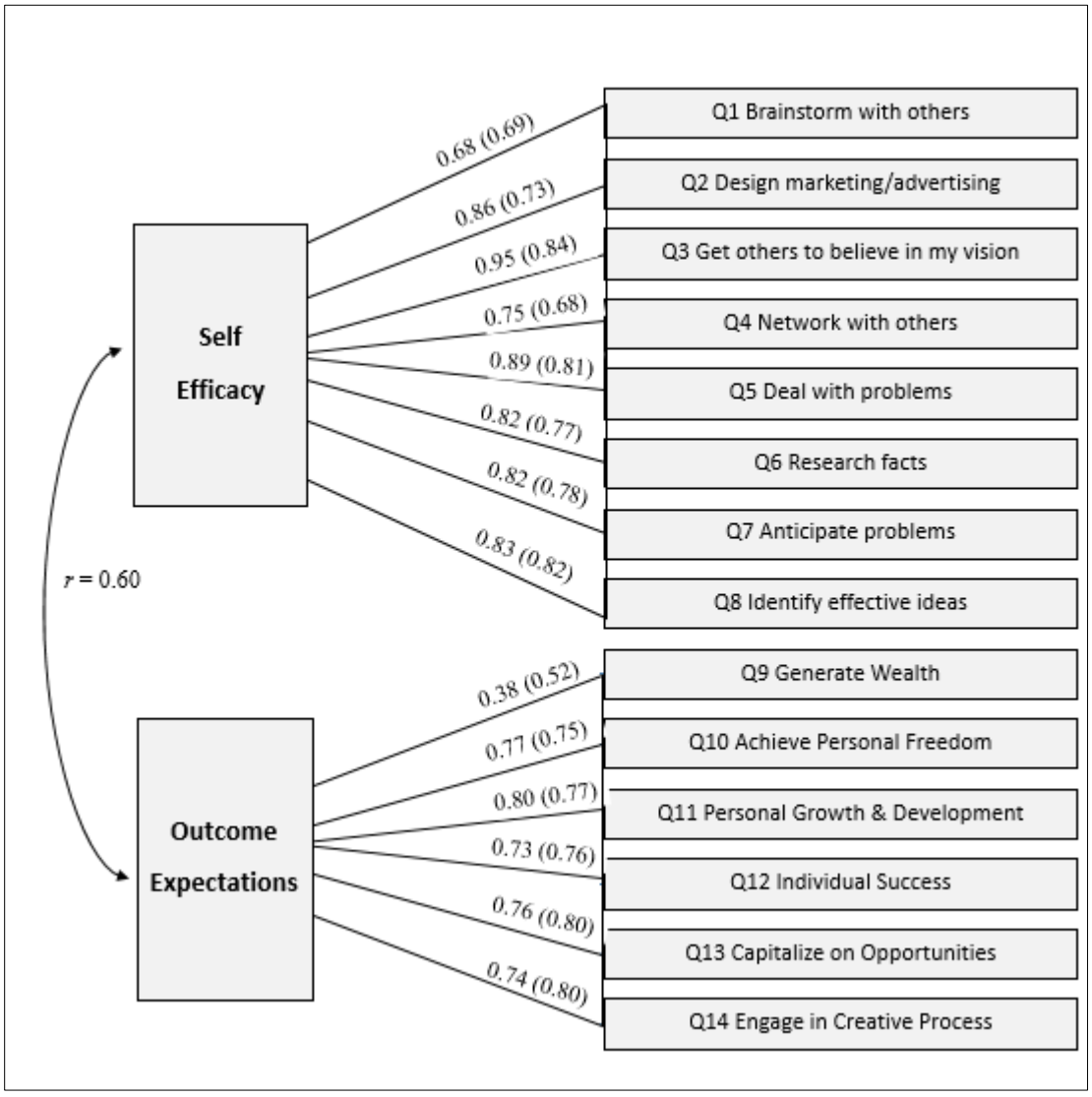
Factor Loadings, Significance, Effect Size for the Two-Factor Model of CSED

	Standardized Factor Loading	R^2	Unstandardized Factor Loading	Standard Error	Error Variance
Self-Efficacy					
Q1	0.688	0.474	0.676	0.063	0.507
Q2	0.730	0.533	0.856	0.073	0.641
Q3	0.842	0.709	0.955	0.066	0.375
Q4	0.683	0.467	0.745	0.070	0.635
Q5	0.811	0.657	0.890	0.066	0.413
Q6	0.770	0.593	0.815	0.065	0.456
Q7	0.783	0.613	0.823	0.064	0.427
Q8	0.821	0.673	0.830	0.060	0.334
Outcome Expectations					
Q9	0.515	0.265	0.379	0.051	0.399
Q10	0.745	0.555	0.773	0.033	0.479
Q11	0.774	0.599	0.799	0.064	0.427
Q12	0.757	0.573	0.727	0.060	0.395
Q13	0.802	0.642	0.757	0.058	0.319
Q14	0.795	0.632	0.736	0.057	0.316

Note: *N*=198 all unstandardized factor loadings were significant at p<.05

Thus it can be concluded that this two factor model of CSED does fit the data and that subscale scores are reliable with most items explaining a large amount of variance in the factor. Figure 1 displays the unstandardized and standardized factor loadings in parentheses for two factor model of College Student Entrepreneurial Development. The two subscales are correlated at 0.60 indicating that they are related and do, together, reflect the overall construct of an entrepreneurial mindset

Figure 1. College Student Entrepreneurial Development Model with Factor Loadings



Note. The model included random error variance associated with each item, but not pictured here.

Research Question 2: Curricular intervention

To test Research Question 2, a 2x2 mixed ANOVA was performed prior to a hierarchical regression analysis to evaluate mean differences on the pre-and post-test scores by course taken (intervention or control). Mean subscale scores were created using a weighted sum method where the factor loading was multiplied by the score for each item. This allowed for items with higher loadings on the factor to have greater effects on the subscale score (DiStefano et al., 2009). As the CSED model revealed the subscales were sufficiently correlated, (r=.60) scores from the two subscales were aggregated for use in the regression. The goal of the regression analysis was to provide initial insight into the relationship between the curricular intervention, which was explicitly designed to promote entrepreneurial self-efficacy and outcome expectations, and post-test entrepreneurial development scores. While each subscale could be considered separately, provided the measurement results, the purpose of this research was to determine the effect of a curricular intervention on the overall construct of entrepreneurial development.

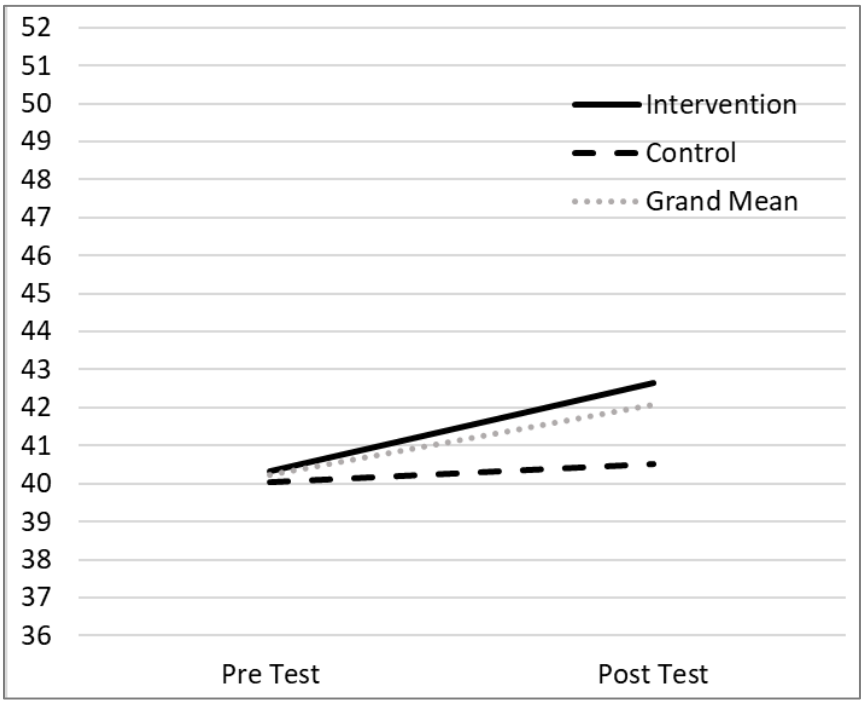
An entrepreneurial mindset has been shown to be a multideminsional construct including the aspects of both self-efficacy and perceived outcomes regarding entrepreneurial behaviors. For example, Davis and colleagues found that the entrepreneurial mindset of existing entrepreneurs could be measured by assessing both personality traits and actual skills (2016). However, much of the existing literature examines the effects of such a mindset on actual entrepreneurship intentions (e.g. McGee et al., 2009; Wilson et al., 2007; Zhao et al., 2005). Conversely, the goal of the present

research was to assess the effectiveness of curricular intervention on the growth of a student's entrepreneurial thinking development.

Considering the CSED score in the aggregate provides a robust mechanism for comprehensive evaluation of the curriculum, which the regression was designed to test, and its association with these two theoretically-derived and strongly correlated scales. Given the measurement analysis did yield a two-factor model, post-hoc analyses evaluated the growth along each dimension to reinforce the relationship among the subscales (Appendix J). However, in this stage of initial measurement application and regression analysis, the construct of entrepreneurial development will be assessed using an overall CSED score in which the two weighted sum subscale scores were combined.

At the onset, the intervention group mean overall CSED score (M=40.31) did not substantially differ from the mean score of the control group (M=40.03). This was to be expected as participants in both the intervention and control groups were enrolled in a critical thinking business course. The critical thinking business courses both displayed the same objectives and class overview at initial enrollment; from the student's perspective there was no inherent difference in the courses. Thus there is no empirical evidence to support the belief that students in a particular group would have significantly higher initial levels of entrepreneurial development, nor would they have self-selected into a particular course due to their abilities or interest as the courses were seemingly identical.

Figure 2. Mean Differences in CSED by Course Taken



When reviewing the mixed ANOVA, the interaction of overall Entrepreneurial Development Scores by Course Taken was not statistically significant between groups at an alpha of .05, $F(1,196) = 3.026$, $p=.824$. However, the main effect of group differences was found to be significant, $F(1,196) = 6.814$, $p=.010$. When consulting the t-test results for pre-, post-test comparisons between the groups, the Levene's Test was not significant so equal variances were assumed. While group differences did not exist for pre-test scores, post-test scores were significantly higher for the intervention (M=42.65, SD=6.48) than the control group, (M=40.51, SD=7.25), $t(196)= -1.991$, $p =.048$. The score increase from Pre-Test to Post-Test of the intervention group was substantially larger (M= 40.31 to M=42.65), than the increase for the control group (M=40.04 to

M=40.51), see Figure 2 above. Thus, initial evidence indicates that the curricular intervention did yield a difference in entrepreneurial development between the groups.

To examine these group differences in a controlled analysis, and to account for how much variance in the dependent variable, CSED Post-Test Score, could be explained by the Course Taken, a hierarchical regression was performed. As previously mentioned, the overall CSED Post-Test score was calculated using a weighted sum score approach. This allowed the two-factor structure to still be influential as items with greater contributions to each sub-scale had a larger effect on the overall score. The regression analysis was conducted controlling for the influence of demographic variables (Gender and Race), course experiences (Entrepreneurially Related Courses and College Business Courses), passive entrepreneurial experiences (Seminars, Clubs, and Parental Exposure), and active entrepreneurship experiences (Start-Up Pitch and Venture Creation).

Specifically, Model 1 contained the demographic variables only and Model 2 further included collegiate course experiences. Model 3 added the passive entrepreneurial experiences with the active entrepreneurship experiences included in Model 4. Models 5 and 6 each added one additional variable, with Pre Test College Student Entrepreneurial Development scores added in Model 5 and Course Taken in Model 6. Modeling was conducted in this way to estimate the effects of each block of variables on CSED post test scores over and above the previously entered variables. After the demographic variables, course experience was entered followed by passive experiences which only require the participant to be a bystander in the experience and not necessarily take action. Active experiences were then entered to discern if deliberate and personal entrepreneurial actions effected post test scores. Ultimately, of interest, was

whether the course taken had an effect on post test scores beyond the effect of pre-test scores.

Prior to conducting the hierarchical regression, the independent variables were examined for normality and one variable, Year in School, was removed from the analysis as its skew (6.61) and kurtosis value (47.93) were well beyond the acceptable range. No other issues were noted relative to either the variable distributions. Multicollinearity was also reviewed and found within acceptable ranges. Individual variable Tolerance values ranged from .51 to .99, and VIF values ranged from 1.01 to 1.96. Appendix G displays the correlations between the model variables.

In testing the assumption of homogeneity of regression slopes, the interaction of all continuous variables and the categorical grouping variable were estimated and were all found to be not statistically significant at $p>.05$. Thus, there was no evidence of violation of homogeneity of regression slopes. The hierarchical regression analysis was conducted and results are shown in Table 12, outlining the model summary R^2, R^2 change, adjusted R^2, and F-test significance for each subsequent block of variables added.

It was found that R was significantly different from zero ($p<.05$) in the model progressions 2 through 6, with the final model reflecting $R^2 = .408$, $F(13, 184) = 11.646$, $p<.001$. Model 5 added College Student Entrepreneurial Development Pre-Test scores, resulting in a substantial increase in the amount of variance explained, at almost 25%, in Post Test scores. The final model, Model 6, indicates that Course Taken (intervention or control) explains an additional three percent of the variance in Post Test CSED scores above and beyond all other independent variables.

Table 12.

Hierarchical Regression Model Summary for Predicting CSED Post-Test Scores

Model	*R*	R^2	Adjusted R^2	R^2 Change	F	*p*-value
1	.103	0.011	0.000	-	1.039	.356
2	.247	0.061	0.042	0.050	3.141	.016*
3	.353	0.125	0.092	0.064	3.860	.001**
4	.361	0.130	0.089	0.005	3.133	.002**
5	.615	0.378	0.345	0.248	11.360	<.001***
6	.639	0.408	0.373	0.030	11.646	<.001***

N=198, *p<.05; **p<.01; ***$p\leq$.001.

Table 13 highlights the standardized regression coefficients (β), and the standard error per variable for each subsequent model tested. Additional regression results that include the intercept and unstandardized regression coefficients (b), the 95% confidence interval for β, and the calculated semi-partial correlations (sr^2) for significant variables for each model are located in Appendix H.

When reviewing the parameter estimates, Model 1 containing only demographic variables, contained no significant predictors. Model 2 added collegiate courses and whether or not the student had taken business courses was statistically significant and continued so through Model 4. But when CSED Pre-Test Scores was added as a control, business courses ceased to be a significant variable from that point forward in the prediction of CSED Post-Test scores. A notable predictor is the amount of parental exposure to entrepreneurial experiences, which remained a significant contributor in the final model once it was added in Model 3.

Table 13.

Parameter Estimates for CSED Post Test Score Prediction Hierarchical Models

Construct	Variable	1 Beta *(SE)*	2 Beta *(SE)*	3 Beta *(SE)*	4 Beta *(SE)*	5 Beta *(SE)*	6 Beta *(SE)*
Demographic	Gender	0.07 (0.96)	0.14 (0.99)	0.14* (0.96)	0.14 (0.96)	0.09 (0.82)	0.13* (0.83)
	Ethnicity	-0.07 (1.32)	-0.07 (1.29)	-0.05 (1.27)	-0.05 (1.27)	-0.07 (1.08)	-0.09 (1.07)
Collegiate Courses Taken	Business Classes		0.21** (1.02)	0.18* (1.00)	0.18* (1.00)	0.05 (0.88)	0.05 (0.86)
	Entrepr Classes		0.07 (0.48)	0.02 (0.51)	0.03 (0.51)	-0.04 (0.44)	-0.06 (0.43)
Passive Entrepreneurial Experience	Clubs or Groups			0.15 (0.71)	0.15 (0.73)	0.15* (0.62)	0.14 (0.61)
	Seminars			-0.03 (0.55)	-0.04 (0.6)	-0.08 (0.51)	-0.06 (0.5)
	Parental Exposure			0.22*** (0.58)	0.21** (0.59)	0.17** (0.5)	0.18** (0.49)
Active Entrepreneurial Experience	Start Up Pitch				0.09 (1.58)	0.01 (1.35)	0.02 (1.32)
	Venture Creation				-0.03 (0.78)	-0.03 (0.66)	-0.01 (0.65)
Initial Entrepr. Development	Pre-Test Entrepr. Devel. Score					0.54*** (0.06)	0.53*** (0.05)
Curricular Intervention	Course Taken						0.18** (0.91)

N=198, *p<.05; **p<.01; ***$p\leq$.001.

The addition of active entrepreneurship experiences (giving a start-up pitch or personally being involved in venture creation) as predictors in Model 4 explained only a minimal additional variance in Post Test scores and neither variable was significant in its contribution. These entrepreneurship variables remained insignificant in Models 5 through 6. Interestingly, in the final model, gender resurfaced as a significant predictor. As a variable coded males=0 and females=1 this would indicate that there is a positive relationship between Females and CSED Post Test score. Parental exposure remained

significant in the final model, thus a parental introduction to entrepreneurial activities significantly impacted CSED Post-Test Scores. The inclusion of CSED Pre-Test Scores as a control variable produced the most sizeable change in R^2 at almost 25%. However, the addition of Course Taken still increased the explained variance in Post-Test Scores by approximately 3% over and above the prior model, and the change was statistically significant. Hence, course taken did positively enhance CSED Post Test scores.

Post-Hoc Analysis

Given a two-factor model of CSED was found to exist, post-hoc regression analyses were conducted individually on the two subscales to determine the effect of the curricular intervention on self-efficacy and outcome expectations separately (Appendix J). As with the hierarchical regression results predicting overall CSED scores, Course Taken did prove to be a significant predictor in both subscale models. When Course Taken, intervention or control, was added in Model 6, an additional significant amount variance was explained, at an additional 2% for Self-Efficacy and 3% for Outcome Expectations (Appendix J). For each subscale, the final Model 6 revealed significant predictors of parental exposure, pre-test score, and course taken. This finding mimics the overall CSED regression results. However, a notable difference between the subscale regression results was that gender and participation in clubs were both significant predictors regarding self-efficacy scores but not outcome expectation scores.

As gender proved to be significant in the final regression Model 6 predicting overall CSED post-test scores as well, this finding was further examined to determine if there were significant differences in growth between males and females in the intervention group. Females in the intervention group began with slightly lower CSED

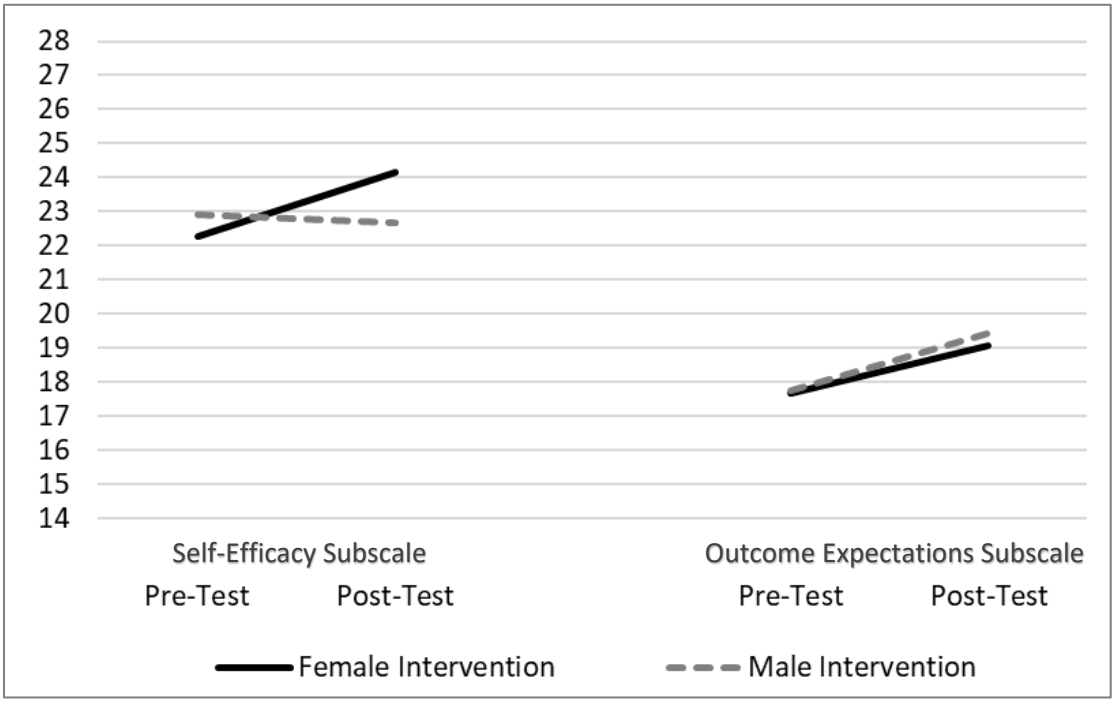
scores (M=39.9, SD=7.35) compared to their male counterparts (M=40.68, SD=7.98). While just below males at the onset, females experienced tremendous growth and ultimately had higher post-test CSED scores (M=43.22, SD=5.82) than males (M=42.11, SD=7.05). Females in the intervention group had higher growth in CSED at 3.3 points than males, who only realized a 1.4 point increase, however, this difference in growth was not significant at an alpha of .05, $t(143)= -1.646$, $p=.102$.

Considering the subscales of Self-Efficacy and Outcome Expectations, two separate ANOVAs were conducted to determine if, within the intervention group, there were differences in subscale scores by gender. When examining the ANOVA results for the Self-Efficacy subscale, the interaction of Self-Efficacy scores by gender was significant $F(1,143) = 6.070$, $p=.015$. Males actually experienced a negligible decline (Pre M= 22.93, Post M= 22.67) while females, on average, yielded an increase in Self-Efficacy (Pre M= 22.27, Post M= 24.14). Follow-up t-tests revealed a significant difference in gender with respect to only Post-Test Self-Efficacy scores, $t(143)= -1.987$, $p=.049$, as females in the intervention group had significantly higher post test scores than males. Additionally, a t-test comparing growth, or change in scores within the intervention group, revealed that females experienced significantly higher growth in Entrepreneurial Self-Efficacy (M= 1.87) than males (M= -.026), $t(143)= -2.464$, $p=.015$.

When examining the ANOVA results for the Outcome Expectations subscale, the interaction of Outcome Expectations scores by gender was not significant $F(1,143) = .245$, $p=.622$, yet the main effect of scores was $F(1,143) = 31.839$, $p<.001$. Thus, regardless of gender, significant differences were realized within the intervention group between Pre and Post-Test score on the Outcome Expectations subscale of

Entrepreneurial Development. Males experienced a 1.70 point increase (Pre M= 17.74, Post M= 19.44) while females experience a similar 1.42 point increase (Pre M= 17.65, Post M= 19.44). Thus, while both genders experienced gains on the Outcome Expectations subscale, females experienced greater advances on the Self-Efficacy subscale allowing them to achieve higher overall growth in CSED than males.

Figure 3. Intervention Group Pre- and Post-Test CSED Subscale Means by Gender



Chapter 5

Discussion and Implications

Discussion

The purpose of this study was two-fold; first, to further refine a measure of entrepreneurial development in undergraduate students and then secondly, to determine if a curricular intervention could increase growth in entrepreneurial development. When modifying the existing measure of entrepreneurial development, items were analyzed and several ultimately eliminated to create a new instrument to assess this development in college undergraduates. The new measure of College Student Entrepreneurial Development contains 14 items with two underlying subscales of Self-Efficacy and Outcome Expectations.

When reducing the entrepreneurial self-efficacy subscale based on pilot data, a confirmatory factor analysis revealed three items that created concern based on the unstandardized parameter estimates. These items included Q1-the ability to come up with a new idea on one's own, Q3-the ability to identify the need for a new product and Q18-the ability to interpret financial statements. Additionally, the standardized correlation residuals revealed that the relationships among items Q1-Q7 and Q12-Q15 were not reproduced well. When reviewing these items, it was found that the questions of concern related to efficacy with respect to a new product launch and efficacy with respect to management and accounting functions. Other items of concern noted by subject matter experts included items Q21-Q25 which related to launching and managing a new business. Ultimately 20 items of concern were eliminated resulting in a shortened eight item measure.

The retained eight items were deemed relevant to self-efficacy with respect to a college student's entrepreneurial development. A follow up confirmatory factor analysis on newly collected data provided support for this set of items as a subscale as the model appropriately fit the data. The scores were shown to be reliable in assessing college students' self-efficacy in their entrepreneurial development. For example, students who were further developed expressed confidence in their ability to brainstorm ideas with others, which is more closely related to a college student's abilities than, for example, coming up with an idea on one's own.

Also, more developed students responded that they could effectively advertise a new product, meaning they were self-assured in their knowledge and ability to market a product, which is a different skill set than designing and estimating cost and price of a new product. As such, items addressing skills more in-line with new product development were not retained. With respect to self-efficacy in dealing with others, student respondents who scored high on entrepreneurial development were confident in their ability to network and get others to believe in their vision, which is a different ability than hiring, training, and supervising employees. The latter relates to management functions and not to entrepreneurial inspiration and vision, which supports the removal of these management items. Additionally, other business skills like accounting and finance are taught throughout college and beyond, so as these concepts are not fully understood by individuals at the beginning of their collegiate experience, and these items were removed.

When reducing the second subscale of entrepreneurial development, outcome expectations, the pilot data was once again used to assess fit through a confirmatory

factor analysis. The statistical results revealed many items of concern with respect to factor loadings, correlation residuals, or both. The lack of fit may partially be due to the fact that this subscale was the last on a 93 item measure. Thus, the pilot data respondents may have experienced fatigue towards the end of the survey. Due to the numerous items of statistical concern, focus was directed to keyword face validity and subject matter expert review. The items of the outcome expectations subscale were assessed to how well they measured a college student's desire to achieve the given entrepreneurial outcome, with the outcome being centered on personal growth or development, not business ownership.

Thus, 23 items were deemed irrelevant based on this distinction. For example, items that referred to establishing, investing in, or creating a business were removed. Items that related to business expansion, such as increasing revenue, increasing market share, or creating a partnership were also eliminated. These items pertain to business growth, not personal growth. Also, items that referred to profiting from a business, such as selling a company or increasing income were removed. However, Q1-Generate personal wealth was retained as generating *wealth* is viewed more broadly as a life goal rather than specifically increasing *income* from an investment, which is a business goal.

The six retained items were further assessed through a confirmatory factor analysis using the newly collected data. The model did fit the data which supports the use of the set of items as a subscale. The scores were shown to assess a college students entrepreneurial outcome expectations with reliability. Students having greater outcome expectations scored higher on their inclination to obtain personal growth, achieve success, and have greater personal freedom. These items appropriately assess an

undergraduate's entrepreneurial aspirations to generate personal worth, not business income. Another retained item was the desire to capitalize on life opportunities, not specifically market opportunities for new ventures or products. Lastly, the item assessing the inclination to engage in creative processes was kept as it relates broadly to critical and entrepreneurial thinking and is directly applicable to undergraduate student abilities.

Assessing a student's entrepreneurial mindset is vastly different than assessing that of a working professional. Students do not have the prior knowledge base and experience upon which to draw on that older individuals do when making decisions or thinking about their future. Assessing an established individual's entrepreneurial development may be more skill based, such as having the ability to independently accomplish certain business tasks and be able to manage personal or business finances successfully. However, a college student may not have the efficacy to complete these tasks own their own, but could still be entrepreneurial and work collaboratively to achieve goals and feel competent to gather information to make informed decisions.

Measuring entrepreneurial development in undergraduate students is not effective if items fail to assess the current capabilities of those enrolled at a university. While in college, students can think entrepreneurially about creatively capitalizing on opportunities but they may not be at a point in their life where they want to engage in business growth initiatives or product creation. Just as it is important to differentiate entrepreneurial development from entrepreneurship, it is imperative to ensure the measurement is assessing undergraduate capabilities and does not assume the individual is further into their career. Often college students are still maturing and finding their path

in life, thus this refined instrument broadly measures an entrepreneurial mindset, taking into account the thought processes of a younger college student population.

The newly generated 14-item measure of College Student Entrepreneurial Development was then used to assess growth in undergraduate students' entrepreneurial thinking abilities using a pre-, post-test design. Mean scores were created using a weighted sum method for each of the subscales, self-efficacy and outcome expectations. As the two subscales were shown to be related, an overall CSED score was calculated by summing the two subscale scores. Entrepreneurial development is a multidimensional construct and includes both the belief in one's abilities and the desire to achieve personal outcomes. For the purpose of this study, in the initial refinement and use of a new measure, entrepreneurial development was assessed using an overall CSED score.

Student participants were enrolled in a course deemed either the intervention or control, and an analysis of variance test confirmed that students in the intervention class had higher gains in entrepreneurial development than students in the control class. Thus the curricular intervention did yield additional entrepreneurial growth for students in the intervention group as compared to students in the control group.

The curricular intervention included open ended critical thinking reflections, decision caselets (abbreviated case studies), and opportunity studies (Appendix I). These exercises were designed to encourage experiential learning where students have the ability to demonstrate their personal strengths and transform an experience into knowledge. The critical thinking reflections allowed students to explore their personal and future capabilities with respect to critical and entrepreneurial thinking. For example, students reflected on what it means to be a creative, critical, and entrepreneurial thinker,

the concept of responding versus reacting to situations, and the ability to transform obstacles into opportunities.

While the decision caselets and opportunity studies revolved around business scenarios and existing product offerings, students explored these assignments in an engaging and experiential manner. They made decisions on how a business should evolve or how a company should transform, and then analyzed their decisions based on classmates' responses. In certain situations they were given internal company and/or external environmental factors and had to create a meaningful resolution to a given obstacle-opportunity. Students also examined seemingly profitable and successful companies to identify weaknesses to overcome and new innovations for the company to implement. This allowed students to overcome their prior definition of success to explore the various ways in which a company could revolutionize their existing product offerings or business practices. Hence, students were able to reflect using current knowledge to contemplate a dilemma, construct new ideas through active conceptualization, present an innovative resolution, reflect upon their choices, ultimately resulting in active learning.

As the students in the intervention course, receiving the experiential learning entrepreneurial curriculum, had higher gains in entrepreneurial development than students in the control group, a hierarchical regression analysis was performed. The results demonstrated that the course taken did account for a statistically significant amount of variance in post-test entrepreneurial development scores, above and beyond all other independent variables, including pre-test score. The curricular intervention did advance students' entrepreneurial mindset along both subscales as students realized higher gains in both self-efficacy and outcome expectations with respect to their personal

entrepreneurial development. While pre-test scores did account for 25% of the variance in post-test scores, the course taken accounted for a significant, additional 3% of variance in post-test scores, beyond that of all other variables.

Another notable independent variable was parental exposure to entrepreneurial experiences, i.e. whether or not the student's parents engaged in entrepreneurial actions. Once added to the model, parental exposure remained a significant predictor. It appears adolescents are highly susceptible to parental influences, even if they are indirect influences. Teenagers may view their parents' actions and internalize those capabilities and goals as their own. Growing up with adults who strive for personal fulfillment, creative inquiry, and lifelong learning, adolescents may subconsciously also take on those characteristics. It could also be that parents who exhibit entrepreneurial tendencies also directly encourage their children to have the same attitudes and outlook on life. By verbally motivating their children to strive for more and never settle, or encourage them to think about problems and solutions in new and novel ways, parents can inspire entrepreneurial thinking.

Interestingly, in addition to parental exposure, in the final model gender reemerged as an influential variable, signifying positive relationship with females and post-test entrepreneurial development scores. While mean scores of participants in the intervention group showed more growth than participants in the control group, females in the intervention group experienced the most growth of all. Thus, the curricular intervention had more of an effect on females than males. Males in the intervention group had growth of almost one and a half points when comparing mean scores (Pre=40.68, Post=42.11) while females experienced far more growth at over three points

(Pre=39.92, Post=43.22). Females started below their male counterparts in pre-test mean score and proceeded to exceed them in post-test mean score.

As females are a traditionally underrepresented group with respect to leadership roles and self-promotion, it is an important finding that a curricular program involving experiential learning can help cultivate women's entrepreneurial thought processes and in particular their self-efficacy. Women can be encouraged to develop the abilities to have a growth mindset and entrepreneurial outlook on life. As found in a study by Wilson and colleagues (2007), females enrolled in an MBA program, pursuing a high level career, still experienced lower entrepreneurial self-efficacy than their male peers. Yet, they also found entrepreneurial education did inspire females and thus increased their self-efficacy over time (Wilson et al., 2007).

As a goal of this study was to create a new measure that discerned an entrepreneurial mindset from entrepreneur*ship*, two entrepreneurship experience variables were included to determine their impact on the broader construct of entrepreneurial development. Active entrepreneurship experience was assessed through the variables, participating in a start-up pitch or incubator and then participating in an actual venture creation. These entrepreneurship variables were entered in Model 4, and were deemed insignificant contributors in the current and all subsequent models. By including these active experience variables in the model, variance explained only increased by one half of one percent. Hence, entrepreneur*ship* experience did *not* influence entrepreneurial development beyond other contributing variables.

Implications for Practice

As the curricular intervention utilized in this study was successful in increasing the growth of college students' entrepreneurial development, there is evidence to support the inclusion of entrepreneurial curriculum on a broader scale. Having an entrepreneurial mindset towards life can help students assess their own abilities in order to create growth opportunities that they can capitalize on (Patel & Mehta, 2017). In an entrepreneurial thinking course, students will be able to develop skills such as visionary thinking, self-confidence, perseverance and curiosity. In addition to these soft skills, being able to unearth new and vital information to discover a solution to a problem is also an ability to be gained. Thinking about novel approaches and anticipating obstacles are important entrepreneurial skills to be developed.

This research has shown that offering a collegiate course incorporating entrepreneurial thinking can be valuable to any student, not just those majoring in business. All students can personally benefit from having an entrepreneurial outlook, increasing their self-efficacy and outcome expectations, therefore seeking to capitalize on opportunities and achieve success. By being motivated to continually grow and develop, undergraduates will not only succeed in college but in future careers and throughout life (Lackeus, 2015; McEwen & McEwen, 2010). This is the ultimate goal of a general education program, to teach skills and abilities that help students thrive no matter their vocation. Thus, entrepreneurial thinking is essential to include in a general education course, as the personal skills developed are beneficial to all (Nadelson et al., 2018).

National organizations such as the Association of American Colleges & Universities, the World Economic Forum, and the Kauffman Foundation all concur that

having an entrepreneurial mindset, e.g. curiosity, initiative, adaptability, collaboration and leadership, is essential for those entering the workforce (Higdon, 2005; Kauffman Foundation, 2007; Soffel, 2016). Students do not have to aspire to be entrepreneurs, but can instead demonstrate intrapreneurship when benefitting from having an entrepreneurial outlook**.** By expressing innovativeness and creativity while working for someone else, intrapreneurs are typically more productive and engaged, thus deemed vital by their employers (Sabin, 2020).

Younger employees and those just graduating college desire engagement and meaning in their work, therefore they continually seek opportunities for growth and personal achievement (Adkins, 2016). Having an entrepreneurial company culture allows for entrepreneurial leaders to emerge from within. By empowering employees to be creative and innovative the organization is able to exploit opportunities they were previously unaware of (Renko, 2017). Entrepreneurial employee-leaders strive for achievement, are tenacious, and proactive; they exhibit an entrepreneurial mindset and encourage others to do the same (Renko et al., 2015). This mindset and leadership ability can be developed and involves learning to think and act entrepreneurially by cultivating creative skills, personal knowledge, and cognitive abilities (Leitch et al., 2013).

As an entrepreneurial mindset can be cultivated, a course teaching these skills should be offered at the general education level (Leitch et al., 2013; Higdon, 2005). Having an entrepreneurial mindset involves determining how to utilize your strengths to better a situation, either personally or professionally (Entrepreneurial Learning Initiative, n.d.). Since the goal of this mindset is to make a positive difference, the ability to develop entrepreneurial self-efficacy and outcome expectations should be available to all

college students. A course within general education that develops students' abilities to have an entrepreneurial outlook and create favorable change would only be beneficial.

Research has shown that in order to cultivate and develop sophisticated thought, a program must be of substantial length (Heuer & Kolvereid, 2014; Solesvik, 2013). Neither a single workshop nor a week-long seminar would be sufficient in allowing students the time to mature their entrepreneurial thought processes. A semester long course that incorporates experiential learning activities, such as critical reflections, decision cases, and opportunity studies, best increases the development of an entrepreneurial mindset (Strimel et al., 2019).

Implications for Leadership

As a traditional course in entrepreneurship is typically offered as a business course, incorporating entrepreneurial content into a general education course may prove challenging. It is essential that university leaders recognize the value of this content and the need to provide entrepreneurial thinking experiences to all students. This would best be accomplished by integrating experiential learning and entrepreneurially focused curriculum within a general education course. As leaders are layered throughout higher education in various capacities, a shared leadership approach should be utilized to implement this new curricular integration.

Department heads, deans, and higher administration must unite and collaborate, working toward the common goal of offering entrepreneurial content to all students. Utilizing a shared leadership perspective, change-makers can arise from within the university to spearhead these efforts (Pearce et al., 2018). It would be impulsive to assume that a business school or management department would be the only area(s)

within the university that would take part in offering entrepreneurial content. Any department on campus having a general education course geared towards critical thinking, problem solving, analyzing information, or investigating issues would be well positioned to incorporate entrepreneurial thought. Thus shared leadership would allow all departments, professors, or administrators the ability to take part in this curricular endeavor, as passionate leaders would organically emerge.

Within higher education, implementing curricular change can be a daunting task if the culture of the university is not receptive. Thus, it will require entrepreneurial leaders who have created an entrepreneurial culture for change. Specifically, entrepreneurial doers have the ability to, not only, recognize an opportunity but also take action to exploit it (Renko et al., 2015). Within a university setting, these leaders can foresee a promising educational scenario and will have the determination to implement change to realize positive student outcomes. Hence, it is entrepreneurial leaders who understand the benefit of offering an entrepreneurially focused course at the general education level, and it is these leaders who will enact change to implement such a course.

However, there will ultimately be those who revoke an effort to incorporate entrepreneurial content in a general education class, potentially stating entrepreneurship is not for everyone. So having entrepreneurial accelerators voice their support for incorporating entrepreneurial content in general education classes is essential in realizing a successful integration. Certain individuals may oppose a change in course content or course offering, and some departments may want to retain control of entrepreneurial teaching. These detractors will need to be swayed and convinced that an entrepreneurial mindset is beneficial to all students. Entrepreneurial accelerators can use the CSED

measure to make evident the positive growth that occurs in all students from an entrepreneurially focused course. By assessing CSED within experimental phase general education courses, the results will help convince skeptics that an entrepreneurial mindset can be developed and can be advantageous to any student with any major (e.g. Wasley, 2008; Soffel, 2016). By entrusting shared leadership in conjunction with entrepreneurial leadership, passionate individuals can emerge and advocate for such a course at all levels of the university.

In order to realize a curricular change effort, leaders are needed who have vision and who are willing to take risks. Entrepreneurial leaders have mental insight, can foresee positive outcomes, and are therefore motivated with a strong desire to create and instill change (Thornberry, 2006). By influencing and encouraging higher administration, entrepreneurial accelerators are key to executing a university wide course that allows students to engage in entrepreneurial thought processes. A key to maintaining such a course is to legitimize its usefulness, demonstrating to administration that the course is beneficial to students. The developed CSED measure can be utilized in a pre-post design to assess students' growth in entrepreneurial development. Assessment results can then be used to actively inform and involve university personnel in curricular decision making (Suskie, 2018). By showing positive student growth and positive student course experiences, administration and other reluctant faculty will be made aware of the success of an entrepreneurially focused course. Additionally, assessing the effectiveness of the curricular intervention, beyond student course grades, will provide supplementary evidence for program or performance reviews (Suskie, 2018).

Entrepreneurial leadership allows followers, i.e. faculty implementers, the ability to perceive their educational role as meaningful and valuable to general education and to the university as a whole. By creating a course that helps students develop the self-efficacy and outcome expectations for continued growth and personal development, faculty can feel confident in the significance of their teaching. Utilizing the CSED measure, professors can assess their students' growth in entrepreneurial development further corroborating their teaching success. They will be assured they are not only helping students learn course material, but providing students the opportunity to continually develop skills and abilities to make a difference in their work and in their lives. By having entrepreneurial leaders endorse entrepreneurial content within general education courses, faculty will also realize the leaders' passion and take on this goal as their own. Faculty will be inspired to teach and enthusiastic to be able to develop students' entrepreneurial mindset

Future Research

This study first altered an existing measure of entrepreneurial development to be more parsimonious and applicable to a younger population. Hence, further testing is needed to ensure the instrument is a valid measure of college student entrepreneurial development. This measure should be used in additional studies within higher education to gather support for the two-factor structure and that entrepreneurial development includes both self-efficacy and outcome expectations.

The new, reduced CSED questionnaire is meant for all students across campus, thus future studies could examine the differences in entrepreneurial self-efficacy and outcome expectations between students of various majors. For example, are engineering

students more developed in their entrepreneurial thought than management students, given that engineering courses may be more innovative and experiential? Or, do incoming first year students have higher entrepreneurial development if they have had leadership experience while in high school? Additional studies such as these are needed in a variety of educational contexts to validate this developed CSED measure.

The present research also examined the effectiveness of an experimental learning curricular intervention on college students' self-efficacy and outcome expectations for entrepreneurial thought, however the intervention was unexpectedly restricted to online assignments and activities only. As the course was forced to be administered in a virtual format, additional research could examine the effectiveness of in-person activities such as role plays, group assignments, or even community based projects. Experiential learning activities are traditionally conducted in a face-to-face environment thus future studies could examine the effectiveness of such, or compare students enrolled in face-to-face and virtual courses with respect to their entrepreneurial development.

The student participants of the present research were of freshman status and enrolled in a semester long business course that was part of the critical thinking domain of general education. Future research could explore the effectiveness of such a curricular intervention in other general education courses, beyond the critical thinking area. For example, entrepreneurial thinking could be incorporated within a course revolving around human culture that encourages reflection, imagination, and creativity. Utilizing a similar experiential learning approach, entrepreneurial content could be seamlessly integrated as it directly relates to reflection and creativity. Entrepreneurial development could also be evaluated within a course regarding psychological or personal wellness as students could

experience an intervention that would be focused on examining personal responsibilities towards themselves and others, which involves growth and exploration.

Other studies could explore gender differences in entrepreneurial development, particularly the subscale of self-efficacy. As this study found that an intervention involving experiential learning was especially beneficial for females other research could further examine this finding. For example, a longitudinal study involving a curricular intervention with nursing students may yield insight on the success of various types of experiential learning programs within a highly female population.

Another topic of study could include entrepreneurial development and leadership tendencies. Do students who choose to take leadership courses or have prior leadership experience have a more developed entrepreneurial mindset about life? Or could a curricular intervention increase entrepreneurial self-efficacy and thus increase leadership self-efficacy? Entrepreneurial leadership research could utilize the CSED measure to help assess if entrepreneurial growth and leadership abilities are related in a college student population. Would students identify more with entrepreneurial leadership after engaging in experiential learning activities aimed to increase their entrepreneurial self-efficacy and anticipated outcomes regarding life?

Or from a different entrepreneurial leadership perspective, do entrepreneurial leader-educators have more of an impact on students' growth on the CSED measure than non-leader educators? Does a professor who maintains an entrepreneurial outlook, leading and inspiring students to do the same, yield additional growth in entrepreneurial development of their students than a professor without these characteristics?

Entrepreneurial leadership is well suited to be studied under a variety of contexts within higher education using the developed CSED instrument.

As only first year students were assessed in the present study, more extensive longitudinal research could examine the impact of experiential entrepreneurial learning on the entrepreneurial development of upper-level students. By incorporating entrepreneurial self-efficacy and outcome expectations into an upper-level elective or honors course, more mature students could be assessed as to their receptiveness to an intervention and growth on this domain. As upper level students have had more opportunities to engage in extracurricular activities such as academic clubs, athletics, community service, and Greek organizations, does involvement or leadership experience in a collegiate group increase entrepreneurial development. Or does prior course experience, i.e. chosen major, play more of a role in development than extracurricular participation? It would be interesting to examine these research questions longitudinally within upperclassman to determine if collegiate experiences have an effect on the development of an entrepreneurial mindset as opposed to merely examining the effects of personal characteristics or high school experience.

Additionally, at the onset this study was limited in the ethnic diversity of the student population. Given the low number of non-white participants, only white, non-white, claims could be deduced. No claims could be made about specific ethnicities and the effect of a curricular intervention on a particular group. Future studies could assess a curricular intervention to develop entrepreneurial thinking among a more disparate student population. For example, research could assess entrepreneurial development at a more heterogeneous university or among majors that have a diverse representation of

ethnicities. Being able to draw inferences about the success of experiential learning programs with respect to different racial or underrepresented groups would be beneficial to student entrepreneurial development research.

Conclusion

By developing an entrepreneurial mindset, students can become citizens that make a positive change. A positive change in their personal life, in their community, or in their career. Individuals who think entrepreneurially will make a difference and grow to achieve more out of life. It is essential that all college students are exposed to entrepreneurial thought processes to develop these skills and abilities. Universities must realize that companies aspire to attain employees who are innovative and think differently, so they must teach these skills just as they teach typical job skills. It is just as important for a graduate to have the entrepreneurial desire to achieve more in life and to engage in personal growth as it is for them to land a well-paying job. Having an entrepreneurial mindset will last long after that first job, and will holistically increase personal worth, which many may say is far greater that personal wealth.

Appendix A

Entrepreneurial Development Questionnaire[a] (EDQ) Review for Applicability Subscale of Self-Efficacy

Entrepreneurial Self-Efficacy: Rate how confident you are in your ability to:

Item	Full item text	Statistical concern	SME concern	Keyword concern
Q1	~~Come up with a new idea for a product or service on your own.~~	yes	1.3	
Q2	Brainstorm with others to come up with an idea for a product/service.			
Q3	~~Identify the need for a new product or service.~~	yes	2.7	Product launch
Q4	~~Design a product or service that will satisfy customer wants/needs~~	yes	2	Product launch
Q5	~~Estimate customer demand for a new product or service.~~		1	Product launch
Q6	~~Determine a competitive price for a new product or service.~~		1	Product launch
Q7	~~Estimate start up funds, working capital necessary to start a venture.~~		2	Product launch
Q8	Design effective marketing & advertising for a product/service.			
Q9	Get others to identify with and believe in my vision and plans			
Q10	Network (make contact and exchange info with others).			
Q11	~~Clearly & concisely explain verbal & in writing my venture ideas~~		3.3	Business launch
Q12	~~Supervise employees.~~	yes	1	Manage-ment
Q13	Deal effectively with day-to-day problems and crises.			
Q14	~~Inspire, encourage, and motivate my employees.~~	yes	3.3	Manage-ment
Q15	~~Train employees.~~	yes	2	Manage-ment
Q16	~~Organize and maintain the financial records of my venture.~~		1	Accounting
Q17	~~Manage the financial assets of my venture.~~		1	Accounting
Q18	~~Read and interpret financial statements.~~	yes	1.3	Accounting
Q19	Research relevant facts related to my idea.			
Q20	Anticipate potential problems that my idea may face.			
Q21	~~Delegate tasks and responsibilities to employees in my venture.~~		2	Manage-ment
Q22	~~Persuade others to work with me and/or support my idea.~~		3.3	Business launch
Q23	~~Generate as many ideas as possible.~~		2.7	Business launch
Q24	~~Create an action plan to launch my idea and make it succeed.~~		2	Business launch
Q25	~~Recruit and hire employees.~~		1	Manage-ment
Q26	Identify which ideas are the most effective to pursue.			

--- indicates item to be removed based on statistical analysis (low factor loadings and/or high correlation residuals), SME review (scoring < 3.5), and keyword concern. Items having two or more concerns were removed.

[a]Newbold & Erwin, 2014

Appendix A continued

Entrepreneurial Development Questionnaire[a] (EDQ) Review for Applicability
Subscale of Outcome Expectations

Entrepreneurial Outcome Expectations: Rate to what extent you intend to:

Item	Full item text	Statistical concern	SME concern	Keyword concern
Q1	Generate Personal Wealth	yes		
Q2	Increase Personal Income	yes	3	
Q3	Establish Own Business		1	Business launch
Q4	Bring Ideas to Market		2	Business launch
Q5	Patent a Technology		1	Business launch
Q6	Invest in a Start Up Company		1	Business launch
Q7	Create New Jobs		1.3	Business growth
Q8	Increase Company Revenue		1	Business growth
Q9	Sell a Company		1	Business growth
Q10	Achieve Greater Personal Freedom	yes		
Q11	Be Self Employed		3	Management
Q12	Launch an Initial Public Offering		1	Business launch
Q13	Gain Individual Public Recognition		3	Management
Q14	Obtain Personal Growth & Development	yes		
Q15	Increase Market Share		2	Business growth
Q16	Create Multiple Ventures		1	Business launch
Q17	Build a Lasting Business		1	Business launch
Q18	Create Value for Established Business		1.3	Business growth
Q19	Be Part of a Team	yes	3	Management
Q20	Achieve Individual Success			
Q21	Capitalize on Opportunities			
Q22	Engage in a Creative Process	yes		
Q23	Focus on Results	yes	3	
Q24	Manage the Work of Others	yes	1.7	Management
Q25	Meet Market Needs		2.3	Product launch
Q26	Do the Kind of Job You Enjoy	yes	3.3	
Q27	Compete in World Markets		1	Business growth
Q28	Make Professional Relationships/Contacts	yes	3.3	Business growth
Q29	Reach Partnerships w/ Other Companies		1.3	Business growth

--- indicates item to be removed based on statistical analysis (low factor loadings and/or high correlation residuals), SME review (scoring < 3.5), and keyword concern. Items having two or more concerns were removed.

[a]Newbold & Erwin, 2014

Appendix B

Proposed Abbreviated College Student Entrepreneurial Development (CSED) Questionnaire

Entrepreneurial Self-Efficacy

Please rate how confident you are in your ability to:

Q1	Brainstorm with others to come up with a new idea for a product or service.
Q2	Design an effective marketing/advertising campaign for a new product or service.
Q3	Get others to identify with and believe in my vision and plans for a new venture.
Q4	Network (i.e., make contact with and exchange information with others).
Q5	Deal effectively with day-to-day problems and crises.
Q6	Research relevant facts related to my idea.
Q7	Anticipate potential problems that my idea may face.
Q8	Identify which ideas are the most effective to pursue.

Entrepreneurial Outcome Expectations

Please rate to what extent you intend to:

Q9	Generate Personal Wealth
Q10	Achieve Greater Personal Freedom
Q11	Obtain Personal Growth and Development
Q12	Achieve Individual Success
Q13	Capitalize on Opportunities
Q14	Engage in a Creative Process

Appendix C

Inter-Item Correlations for the 2017 EDQ Subscale: Self-Efficacy

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Q25
Q2	.768																								
Q3	.698	.774																							
Q4	.721	.726	.697																						
Q5	.624	.645	.607	.758																					
Q6	.572	.591	.521	.700	.811																				
Q7	.593	.541	.490	.650	.709	.783																			
Q8	.609	.647	.544	.691	.681	.677	.668																		
Q9	.598	.635	.545	.685	.683	.664	.642	.789																	
Q10	.441	.512	.478	.538	.554	.517	.507	.559	.637																
Q11	.598	.660	.562	.645	.675	.658	.643	.737	.795	.656															
Q12	.364	.481	.394	.396	.446	.469	.429	.474	.548	.563	.554														
Q13	.378	.503	.437	.428	.472	.455	.380	.488	.540	.614	.552	.699													
Q14	.411	.546	.469	.451	.505	.489	.434	.534	.610	.652	.597	.753	.786												
Q15	.353	.485	.413	.406	.444	.447	.370	.468	.517	.575	.530	.778	.729	.817											
Q16	.540	.565	.498	.563	.596	.621	.576	.643	.673	.550	.638	.616	.569	.626	.627										
Q17	.518	.541	.485	.567	.610	.661	.615	.647	.620	.549	.594	.583	.555	.561	.582	.830									
Q18	.418	.419	.391	.437	.486	.507	.495	.427	.478	.495	.440	.510	.538	.504	.491	.595	.695								
Q19	.549	.616	.552	.608	.629	.650	.577	.637	.653	.601	.716	.596	.640	.668	.576	.695	.672	.538							
Q20	.532	.614	.533	.610	.588	.646	.566	.622	.652	.638	.687	.613	.661	.687	.604	.666	.677	.553	.850						
Q21	.502	.583	.494	.562	.617	.625	.555	.665	.684	.568	.669	.627	.672	.710	.649	.681	.685	.543	.753	.786					
Q22	.572	.669	.592	.615	.608	.630	.569	.656	.707	.634	.714	.648	.618	.697	.627	.680	.659	.498	.761	.791	.796				
Q23	.559	.644	.552	.603	.594	.552	.575	.603	.602	.553	.636	.490	.513	.584	.526	.566	.546	.400	.641	.654	.619	.704			
Q24	.551	.597	.543	.666	.661	.664	.654	.691	.721	.597	.711	.549	.586	.604	.562	.652	.677	.510	.732	.729	.714	.754	.774		
Q25	.375	.460	.429	.506	.537	.555	.520	.546	.606	.571	.597	.729	.601	.689	.719	.626	.629	.509	.620	.649	.677	.707	.562	.720	
Q26	.490	.588	.544	.584	.570	.599	.535	.617	.654	.607	.683	.669	.631	.683	.652	.670	.646	.506	.753	.750	.742	.791	.687	.802	.777

Appendix C continued

Inter-Item Correlations for the 2017 EDQ Subscale: Outcome Expectations

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28
Q2	.858																											
Q3	.177	.162																										
Q4	.212	.202	.708																									
Q5	.131	.099	.626	.627																								
Q6	.167	.137	.671	.613	.710																							
Q7	.156	.146	.641	.656	.640	.680																						
Q8	.324	.296	.520	.614	.522	.589	.704																					
Q9	.143	.107	.682	.626	.668	.685	.674	.588																				
Q10	.440	.447	.415	.479	.326	.391	.478	.619	.366																			
Q11	.229	.244	.701	.560	.553	.567	.651	.536	.621	.469																		
Q12	.124	.099	.730	.654	.681	.662	.653	.561	.758	.431	.695																	
Q13	.296	.262	.559	.607	.513	.527	.568	.595	.550	.560	.623	.704																
Q14	.476	.433	.352	.419	.291	.343	.418	.526	.347	.608	.462	.360	.618															
Q15	.213	.181	.655	.721	.586	.621	.661	.634	.655	.502	.601	.715	.701	.483														
Q16	.135	.115	.711	.646	.660	.686	.674	.556	.711	.409	.647	.764	.621	.356	.718													
Q17	.154	.133	.793	.715	.634	.659	.705	.591	.712	.441	.696	.746	.629	.371	.742	.796												
Q18	.194	.171	.652	.666	.539	.583	.624	.589	.593	.449	.595	.676	.600	.405	.721	.674	.804											
Q19	.390	.371	.167	.238	.143	.197	.240	.289	.108	.373	.177	.152	.256	.413	.230	.125	.161	.284										
Q20	.361	.342	.175	.263	.112	.164	.271	.314	.118	.429	.229	.128	.296	.479	.250	.153	.198	.318	.702									
Q21	.381	.358	.363	.426	.263	.365	.372	.408	.311	.497	.383	.331	.461	.500	.455	.329	.364	.465	.569	.669								
Q22	.304	.281	.336	.473	.273	.340	.349	.332	.289	.449	.329	.339	.421	.422	.385	.318	.326	.429	.456	.569	.717							
Q23	.318	.310	.317	.407	.274	.344	.354	.401	.297	.431	.294	.272	.415	.494	.400	.286	.304	.402	.485	.560	.663	.686						
Q24	.331	.308	.347	.407	.323	.360	.427	.446	.319	.473	.347	.364	.414	.452	.440	.322	.355	.419	.523	.535	.524	.517	.570					
Q25	.290	.297	.550	.681	.513	.541	.576	.600	.532	.522	.470	.551	.562	.432	.709	.560	.598	.634	.409	.387	.553	.540	.547	.629				
Q26	.202	.206	.074	.200	.054	.129	.182	.227	.064	.310	.127	.087	.219	.363	.142	.088	.119	.229	.433	.533	.463	.450	.434	.381	.312			
Q27	.218	.202	.528	.623	.534	.498	.541	.566	.547	.391	.464	.595	.512	.386	.669	.577	.576	.646	.293	.276	.459	.431	.435	.483	.706	.216		
Q28	.287	.258	.322	.422	.294	.319	.371	.500	.303	.460	.315	.304	.374	.415	.446	.320	.378	.446	.441	.466	.472	.444	.468	.470	.546	.445	.525	
Q29	.293	.274	.527	.642	.484	.489	.613	.639	.551	.530	.532	.552	.569	.471	.642	.542	.598	.629	.408	.414	.570	.530	.548	.567	.729	.336	.722	.664

Appendix D

Correlation Residuals for the 2017 EDQ Subscale: Self-Efficacy

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Q25
Q2	.261																								
Q3	.245	.270																							
Q4	.212	.159	.191																						
Q5	.105	.067	.091	.178																					
Q6	.050	.010	.003	.117	.216																				
Q7	.106	-.001	.007	.107	.155	.226																			
Q8	.075	.052	.013	.094	.072	.065	.098																		
Q9	.042	.015	-.007	.063	.049	.027	.048	.136																	
Q10	-.050	-.034	-.010	-.010	-.006	-.045	-.017	-.017	.038																
Q11	.040	.038	.007	.021	.038	.019	.047	.082	.113	.054															
Q12	-.120	-.059	-.087	-.146	-.106	-.086	-.088	-.094	-.044	.041	-.040														
Q13	-.109	-.040	-.047	-.117	-.084	-.104	-.140	-.084	-.055	.088	-.045	.181													
Q14	-.112	-.037	-.051	-.134	-.091	-.111	-.124	-.080	-.029	.088	-.044	.196	.226												
Q15	-.130	-.053	-.067	-.134	-.106	-.106	-.145	-.098	-.072	.054	-.062	.264	.213	.263											
Q16	-.001	-.038	-.040	-.042	-.021	.001	-.001	.008	.012	-.033	-.025	.040	-.010	.004	.054										
Q17	-.016	-.054	-.045	-.030	.001	.049	.045	.020	-.032	-.026	-.061	.015	-.016	-.052	.016	.195									
Q18	-.007	-.054	-.031	-.037	.002	.020	.042	-.071	-.041	.037	-.080	.058	.084	.017	.041	.090	.197								
Q19	-.027	-.025	-.020	-.036	-.027	-.010	-.038	-.038	-.050	-.019	.010	-.017	.024	.007	-.035	.011	-.003	.001							
Q20	-.047	-.030	-.042	-.037	-.071	-.017	-.051	-.057	-.054	.015	-.022	-.002	.042	.023	-.009	-.021	-.002	.014	.119						
Q21	-.070	-.054	-.074	-.077	-.035	-.030	-.056	-.006	-.015	-.048	-.032	.019	.060	.053	.043	.002	.014	.010	.030	.060					
Q22	-.018	.012	.006	-.044	-.064	-.046	-.060	-.036	-.014	-.001	-.009	.021	-.014	.020	.002	-.021	-.033	-.052	.016	.042	.056				
Q23	.042	.068	.038	.024	.004	-.041	.023	-.004	-.030	-.004	.001	-.061	-.041	-.010	-.022	-.049	-.061	-.082	-.013	-.003	-.031	.034			
Q24	-.028	-.048	-.032	.019	.001	.001	.036	.011	.014	-.027	.001	-.067	-.034	-.061	-.052	-.036	-.002	-.030	.000	-.006	-.013	.004	.116		
Q25	-.149	-.123	-.091	-.079	-.060	-.045	-.039	-.069	-.034	.007	-.045	.172	.041	.087	.164	.004	.015	.021	-.042	-.016	.020	.029	-.033	.055	
Q26	-.084	-.051	-.026	-.057	-.084	-.058	-.078	-.056	-.047	-.011	-.021	.058	.016	.024	.043	-.012	-.027	-.029	.028	.021	.022	.048	.035	.072	.117

Appendix D continued

Correlation Residuals for the 2017 EDQ Subscale: Outcome Expectations

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15	Q16	Q17	Q18	Q19	Q20	Q21	Q22	Q23	Q24	Q25	Q26	Q27	Q28
Q2	.771																											
Q3	-.068	-.062																										
Q4	-.040	-.029	.059																									
Q5	-.090	-.104	.056	.039																								
Q6	-.065	-.076	.074	-.003	.169																							
Q7	-.089	-.080	.008	.002	.066	.079																						
Q8	.092	.083	-.079	-.004	-.020	.020	.101																					
Q9	-.095	-.111	.069	-.006	.113	.103	.057	.005																				
Q10	.251	.273	-.073	-.025	-.117	-.073	-.013	.155	-.110																			
Q11	.000	.033	.110	-.050	.018	.006	.056	-.027	.045	.011																		
Q12	-.128	-.132	.082	-.015	.094	.046	.000	-.056	.126	-.072	.086																	
Q13	.061	.046	-.046	-.017	-.035	-.048	-.041	.019	-.039	.090	.055	.080																
Q14	.302	.273	-.097	-.044	-.116	-.083	-.034	.099	-.090	.260	.041	-.102	.186															
Q15	-.049	-.059	-.019	.025	-.024	-.019	-.018	-.008	-.002	-.021	-.033	.020	.052	.002														
Q16	-.114	-.113	.069	-.016	.079	.077	.028	-.055	.086	-.089	.044	.103	.004	-.102	.031													
Q17	-.108	-.107	.118	.019	.023	.019	.026	-.051	.055	-.082	.063	.051	-.020	-.111	.019	.108												
Q18	-.056	-.059	.005	-.001	-.046	-.031	-.027	-.026	-.037	-.053	-.012	.010	-.022	-.056	.029	.015	.111											
Q19	.280	.270	-.115	-.053	-.113	-.070	-.044	.021	-.166	.154	-.088	-.138	-.015	.212	-.072	-.162	-.141	-.006										
Q20	.243	.235	-.127	-.048	-.162	-.123	-.033	.027	-.176	.195	-.055	-.184	.005	.263	-.074	-.155	-.126	.008	.567									
Q21	.205	.197	-.090	-.041	-.147	-.065	-.084	-.023	-.131	.145	-.043	-.136	.025	.177	-.031	-.133	-.122	-.001	.366	.451								
Q22	.140	.130	-.088	.036	-.110	-.062	-.078	-.072	-.124	.120	-.069	-.098	.013	.120	-.069	-.114	-.128	-.007	.266	.365	.412							
Q23	.156	.162	-.099	-.023	-.103	-.051	-.065	.005	-.108	.108	-.097	-.157	.015	.197	-.046	-.139	-.142	-.026	.298	.360	.363	.406						
Q24	.158	.149	-.099	-.053	-.081	-.063	-.022	.022	-.115	.127	-.072	-.096	-.015	.134	-.038	-.133	-.123	-.039	.323	.321	.203	.217	.275					
Q25	.049	.077	-.070	.042	-.048	-.047	-.048	.010	-.072	.041	-.112	-.087	-.034	-.010	.045	-.072	-.066	-.003	.132	.090	.107	.122	.137	.190				
Q26	.119	.130	-.140	-.021	-.140	-.075	-.034	.023	-.145	.144	-.074	-.134	.013	.210	-.088	-.131	-.111	.009	.337	.430	.309	.306	.292	.229	.101			
Q27	-.011	-.008	-.062	.014	.000	-.062	-.053	.005	-.028	-.067	-.090	-.013	-.056	-.035	.036	-.025	-.057	.040	.029	-.007	.034	.033	.044	.065	.125	.015		
Q28	.119	.104	-.111	-.025	-.098	-.092	-.065	.088	-.119	.124	-.092	-.142	-.042	.106	-.018	-.122	-.086	.001	.247	.258	.160	.153	.182	.163	.119	.297	.119	
Q29	.053	.054	-.091	.004	-.076	-.098	-.009	.051	-.051	.050	-.048	-.085	-.025	.030	-.020	-.088	-.065	-.006	.131	.117	.125	.114	.139	.129	.120	.126	.142	.239

Appendix E

Inter-Item Correlations for All Variables in the
2017 Reduced Self-Efficacy and Outcome Expectations Subscales

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13
Q2	.564*												
Q3	.626*	.743*											
Q4	.414*	.529*	.604*										
Q5	.538*	.519*	.672*	.542*									
Q6	.510*	.465*	.601*	.513*	.649*								
Q7	.501*	.526*	.584*	.584*	.687*	.726*							
Q8	.557*	.614*	.688*	.516*	.668*	.637*	.630*						
Q9	.125	.176*	.270*	.243*	.342*	.245*	.265*	.318*					
Q10	.362*	.301*	.388*	.288*	.445*	.385*	.335*	.408*	.429*				
Q11	.386*	.253*	.386*	.290*	.426*	.386*	.379*	.476*	.397*	.620*			
Q12	.383*	.243*	.343*	.342*	.352*	.387*	.270*	.408*	.359*	.543*	.606*		
Q13	.267*	.218*	.326*	.355*	.376*	.345*	.302*	.453*	.402*	.565*	.597*	.625*	
Q14	.393*	.303*	.395*	.330*	.406*	.344*	.284*	.456*	.402*	.576*	.578*	.595*	.688*

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

Appendix F

Covariance Residuals for the 2020 CSED Two Factor Model

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13
Q2	.787												
Q3	.561	1.545											
Q4	-.712	.385	.538										
Q5	-.253	-.889	-.157	-.178									
Q6	-.878	-1.179	-.586	-.166	.319								
Q7	-.476	-.566	-.927	.960	.998	1.491							
Q8	-.102	.203	-.054	-.674	.034	.065	-.148						
Q9	-1.262	-1.085	.140	.570	1.253	.104	.491	1.024					
Q10	1.014	-.329	.243	-.279	1.352	.554	-.197	.642	.594				
Q11	.896	-1.135	-.059	-.358	.892	.001	.216	1.323	-.024	.535			
Q12	1.172	-1.169	-.501	1.468	-.229	.560	-1.612	.471	-.431	-.361	.255		
Q13	-.976	-1.766	-1.299	.365	-.176	-.366	-1.719	.773	-.139	-.413	-.354	.262	
Q14	.867	-.710	-.082	.072	.424	-.308	-1.183	.853	-.216	-.210	-.508	-.081	.610

Appendix G

Correlations of CSED Model Variables

	Post-Test Entrep Dev Score	Gender	Race	Business Courses	Entrep Related Courses	Entrep Groups	Entrep Seminar	Parental Entrep Exp	Start Up Pitch Exp	Venture Creation	Pre-Test Entrep Dev Score
Gender	.072										
Race	-.071	.030									
Business Courses	.184	-.290	-.022								
Entrep Related Courses	.103	-.089	-.059	.187							
Entrep Groups	.174	.-104	-.105	.192	.410						
Entrep Seminars	.099	-.047	-.028	.144	.280	.503					
Parental Entrep Exposure	.235	-.010	-.018	.067	.029	.039	.138				
Start Up Pitch Exp.	.104	-.043	.023	.163	.261	.462	.535	.058			
Venture Creation	.143	.034	-.031	.071	.005	.150	.250	.179	.492		
Pre-Test Entrep Dev Score	.568	.007	.021	.271	.197	.151	.190	.132	.187	.194	
Course Taken	.141	-.225	.116	.044	.073	-.010	-.126	-.073	-.138	-.125	.016

Appendix H

Regression Results for Models 1 through 3 Predicting CSED Post-Test Scores

Model	Variable	*b*	β	*p*-value	95% CI Lower	95% CI Upper	Semi-Partial (sr^2)
1	(Constant)	41.656			37.912	45.400	
	Gender	1.006	0.074	0.298	-0.895	2.907	
	Race	-1.353	-0.073	0.306	-3.956	1.249	
2	(Constant)	38.498			34.326	42.669	
	Gender	1.915	0.142	0.054	-0.031	3.860	
	Race	-1.225	-0.066	0.345	-3.777	1.328	
	Business Courses	2.898	0.210	0.005**	0.890	4.906	0.04
	Entrepreneurially Related Courses	0.487	0.072	0.312	-0.460	1.434	
3	(Constant)	35.098			30.625	39.572	
	Gender	1.954	0.144	0.043*	0.058	3.850	0.02
	Race	-0.949	-0.051	0.454	-3.445	1.546	
	Business Courses	2.515	0.183	0.013*	0.542	4.488	0.03
	Entrepreneurially Related Courses	0.138	0.020	0.787	-0.864	1.140	
	Entrepreneurial Groups	1.255	0.148	0.078	-0.144	2.655	
	Entrepreneurial Seminars	-0.230	-0.033	0.678	-1.318	0.859	
	Parental Entrepreneurial Exposure	1.858	0.221	0.001***	0.721	2.995	0.05

N=198, *p<.05; **p<.01; ***$p\leq$.001.

Appendix H continued

Regression Results for Models 4 and 5 Predicting CSED Post-Test Scores

Model	Variable	*b*	β	*p*-value	95% CI Lower	95% CI Upper	Semi-Partial (sr^2)
4	(Constant)	35.161			30.672	39.650	
	Gender	1.890	0.140	0.052	-0.013	3.793	
	Race	-0.879	-0.047	0.491	-3.392	1.635	
	Business Courses	2.476	0.180	0.015*	0.494	4.457	0.03
	Entrepreneurially Related Courses	0.203	0.030	0.693	-0.810	1.217	
	Entrepreneurial Groups	1.265	0.150	0.086	-0.180	2.710	
	Entrepreneurial Seminars	-0.283	-0.041	0.637	-1.464	0.898	
	Parental Entrepreneurial Exposure	1.747	0.208	0.003**	0.590	2.904	0.04
	Start Up Pitch Experience	1.754	0.089	0.269	-1.365	4.874	
	Venture Creation Experience	-0.245	-0.030	0.755	-1.788	1.299	

Model	Variable	*b*	β	*p*-value	95% CI Lower	95% CI Upper	Semi-Partial (sr^2)
5	(Constant)	19.511			14.285	24.736	
	Gender	1.240	0.092	0.133	-0.380	2.861	
	Race	-1.270	-0.069	0.242	-3.404	0.863	
	Business Courses	0.648	0.047	0.462	-1.084	2.379	
	Entrepreneurially Related Courses	-0.297	-0.044	0.501	-1.164	0.571	
	Entrepreneurial Groups	1.275	0.151	0.041*	0.050	2.501	0.01
	Entrepreneurial Seminars	-0.566	-0.082	0.267	-1.570	0.438	
	Parental Entrepreneurial Exposure	1.396	0.166	0.006**	0.412	2.381	0.03
	Start Up Pitch Experience	0.259	0.013	0.848	-2.409	2.926	
	Venture Creation Experience	-0.245	-0.030	0.713	-1.553	1.064	
	Pre-Test Entrep Develop Score	0.477	0.539	0.000***	0.368	0.586	0.25

N=198, *p<.05; **p<.01; ***$p\leq$.001.

Appendix H continued

Regression Results for Model 6 Predicting CSED Post-Test Scores

Model	Variable	*b*	β	*p*-value	95% CI Lower	95% CI Upper	Semi-Partial (sr^2)
6	(Constant)	17.110			11.769	22.450	
	Gender	1.815	0.134	0.029*	0.187	3.443	0.02
	Race	-1.719	-0.093	0.109	-3.826	0.388	
	Business Courses	0.698	0.051	0.417	-0.996	2.393	
	Entrepreneurially Related Courses	-0.416	-0.062	0.336	-1.268	0.436	
	Entrepreneurial Groups	1.181	0.140	0.054	-0.019	2.382	
	Entrepreneurial Seminars	-0.425	-0.061	0.396	-1.412	0.561	
	Parental Entrepreneurial Exposure	1.482	0.177	0.003**	0.517	2.447	0.03
	Start Up Pitch Experience	0.359	0.018	0.786	-2.251	2.970	
	Venture Creation Experience	-0.041	-0.005	0.950	-1.328	1.246	
	Pre-Test Entrep Develop Score	0.469	0.529	0.000***	0.362	0.575	0.24
	Course Taken	2.793	0.184	0.002**	0.996	4.590	0.03

N=198, *p<.05; **p<.01; ***$p\leq$.001.

Appendix I

Curricular Intervention for Entrepreneurial Thinking

Decision Caselets: Caselets allow students to apply new concepts to case scenarios. Caselets are short studies describing a business issue requiring students to determine the issue at hand and how to proceed. The use of caselets allows students to relate abstract concepts to concrete situations, building practical experience. Additionally, caselets contain only brief, relevant facts, forcing the student to defend their given position.

In an entrepreneurial thinking business course, students responded to caselets individually, then discussed either in a small group or discussion board context. Examples include:

- Demographic implications (e.g. gender, race) regarding business ownership
- The downside of social responsibility efforts
- Maintaining a solid corporate culture and the repercussions
- Reaching a target market without offending another population group

Business Opportunity Studies: Decision making studies often relate to what a company needs to do to become profitable, or how an organization needs to change to increase revenue, gain customers, etc. Opportunity studies, however, allow students to contemplate opportunities for seemingly successful organizations. With no apparent disadvantage or weakness, students must be creative and innovative in their ideas.

In an entrepreneurial thinking business course, students completed opportunity studies on successful companies. Examples include:

- For a successful company, determining a potential downside and how it could be proactively remedied.
- For a profitable business, determining a novel opportunity or innovative new product.
- For a company whose stock price is rising, determining which competitor is most likely to encroach on that success

Personal Growth Reflections: Reflections allow students the ability to examine their personal experiences and how they have shaped their thinking and acceptance of new ideas. Reflective writing helps students acknowledge how their assumptions have led to certain behaviors or actions. Engaging with one's thoughts and connecting to course concepts, students examine their current approach to life and future shift in perspective.

In an entrepreneurial thinking business course, students completed personal growth reflections. Examples include:

- Considering one's behavior when confronted with a situation and whether it is best to react or respond?
- When confronted with a new unexpected situation, is it considered to be an obstacle or an opportunity?

Appendix J

Regression Results for Subscale of CSED
Predicting Self-Efficacy

Hierarchical Regression Model Summary for Predicting Self-Efficacy Post-Test Scores

Model	*R*	R^2	Adjusted R^2	R^2 Change	F	*p*-value
1	0.142	0.020	0.010	-	2.009	0.137
2	0.305	0.068	0.049	0.048	3.545	0.008**
3	0.359	0.129	0.097	0.036	4.022	0.001*
4	0.370	0.137	0.096	0.008	3.323	0.001*
5	0.517	0.268	0.229	0.131	6.836	0.001*
6	0.539	0.291	0.249	0.023	6.934	0.001*

N=198, *p<.05; **p<.01; ***$p\leq$.001.

Parameter Estimates for Self-Efficacy Post Test Score Prediction Hierarchical Models

Construct	Variable	1 Beta *(SE)*	2 Beta *(SE)*	3 Beta *(SE)*	4 Beta *(SE)*	5 Beta *(SE)*	6 Beta *(SE)*
Demographic	Gender	0.128 (0.677)	0.190** (0.693)	0.194** (0.676)	0.188** (0.677)	0.158* (0.628)	0.196** (0.636)
	Ethnicity	-0.066 (0.926)	-0.058 (0.909)	-0.041 (0.890)	-0.036 (0.895)	-0.046 (0.827)	-0.067 (0.823)
Collegiate Courses Taken	Business Classes		0.183* (0.715)	0.153* (0.704)	0.149* (0.705)	0.066 (0.666)	0.071 (0.658)
	Entrepr Classes		0.107 (0.337)	0.040 (0.357)	0.051 (0.36)	-0.006 (0.336)	-0.021 (0.333)
Passive Entrepreneurial Experience	Clubs or Groups			0.180* (0.499)	0.181* (0.514)	0.184* (0.475)	0.174* (0.469)
	Seminars			-0.021 (0.388)	-0.031 (0.42)	-0.047 (0.388)	-0.029 (0.385)
	Parental Exposure			0.191** (0.406)	0.175* (0.412)	0.150* (0.381)	0.159* (0.377)
Active Entrepreneurial Experience	Start Up Pitch				-0.032 (0.549)	-0.039 (0.507)	-0.017 (0.503)
	Venture Creation				0.104 (1.111)	0.044 (1.036)	0.049 (1.023)
Initial Self-Efficacy	Pre-Test Self-Efficacy Score					0.387*** (0.06)	0.372*** (0.059)
Curricular Intervention	Course Taken						0.162* (0.705)

N=198, *p<.05; **p<.01; ***$p\leq$.001.

Appendix J continued

Regression Results for Subscale of CSED
Predicting Outcome Expectations

Hierarchical Regression Model Summary for Predicting Outcome Expectations Post-Test Scores

Model	*R*	R^2	Adjusted R^2	R^2 Change	F	*p*-value
1	0.074	0.005	-0.005	0.005	0.536	0.586
2	0.198	0.039	0.019	0.034	1.977	0.100
3	0.286	0.082	0.048	0.043	2.423	0.021*
4	0.288	0.083	0.039	0.001	1.889	0.056
5	0.527	0.278	0.239	0.195	7.189	0.001***
6	0.555	0.308	0.268	0.031	7.542	0.001***

N=198, *p<.05; **p<.01; ***$p\leq$.001.

Parameter Estimates for Outcome Expectations Post Test Score Prediction Hierarchical Models

Construct	Variable	1 Beta *(SE)*	2 Beta *(SE)*	3 Beta *(SE)*	4 Beta *(SE)*	5 Beta *(SE)*	6 Beta *(SE)*
Demographic	Gender	-0.037 (0.405)	0.018 (0.419)	0.018 (0.413)	0.016 (0.416)	-0.022 (0.371)	0.019 (0.373)
	Ethnicity	-0.063 (0.555)	-0.060 (0.549)	-0.054 (0.543)	-0.052 (0.549)	-0.075 (0.489)	-0.100 (0.485)
Collegiate Courses Taken	Business Classes		0.194** (0.432)	0.178* (0.429)	0.177* (0.433)	0.073 (0.394)	0.073 (0.387)
	Entrepr Classes		-0.007 (0.204)	-0.019 (0.218)	-0.015 (0.221)	-0.050 (0.197)	-0.070 (0.195)
Passive Entrepreneurial Experience	Clubs or Groups			0.051 (0.305)	0.053 (0.315)	0.049 (0.281)	0.037 (0.276)
	Seminars			-0.044 (0.237)	-0.046 (0.258)	-0.095 (0.23)	-0.076 (0.227)
	Parental Exposure			0.206** (0.248)	0.201** (0.253)	0.167** (0.225)	0.176** (0.221)
Active Entrepreneurial Experience	Start Up Pitch				-0.016 (0.337)	-0.002 (0.3)	0.023 (0.296)
	Venture Creation				0.037 (0.681)	0.002 (0.607)	0.006 (0.596)
Initial Outcome Expectations	Pre-Test Outcome Expectations Score					0.465*** (0.056)	0.471*** (0.055)
Curricular Intervention	Course Taken						0.186** (0.413)

N=198, *p<.05; **p<.01; ***$p\leq$.001.

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