

**A SYSTEMATIC ANALYSIS OF ENTREPRENEURIAL
LEARNING: PRACTICE AND EFFECTS**

A SYSTEMATIC ANALYSIS OF ENTREPRENEURIAL
LEARNING: PRACTICE AND EFFECTS

BY
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To my beloved parents

Abstract

This thesis aims to develop a deeper understanding of entrepreneurship education as a type of entrepreneurship support. We study the overall entrepreneurship support systems, the pedagogical models developed for students with different level of entrepreneurship experience, and the long-term influences of entrepreneurship education on students.

Entrepreneurship education and training has become very popular in universities, colleges, and business development centers world-wide, and has been of great interest in academia also. However, the entrepreneurship teaching is usually not informed by solid theories, and students' different learning needs are not taken into consideration. In addition, the long-term influences of entrepreneurship education on students are unclear.

This thesis consists of four manuscripts, each of which is a co-authored paper that presents an individual study.

Study 1 is a comprehensive literature review of 122 journal articles that disentangles multiple conceptualizations used to research entrepreneurship support and examines the effectiveness of each source and type of support. We present the theories we discovered and explore how three prevailing management theories could motivate theoretical refinements in the field. We also identify areas for future research and offer guidance on how to improve the relevance of entrepreneurship support studies.

Study 2 develops a set of conceptual models anchored in learning theory regarding how entrepreneurship should be taught to students. These conceptual models are built on the techniques of entrepreneurship pedagogy such as experiential learning. They are developed for three groups of students: students without any entrepreneurship experience,

students with previous entrepreneurship experience, and students who are currently running their start-ups. A set of potential variables that could be used for course evaluation purposes is also included. Choosing a model pertinent to students' attributes, lecturers could design entrepreneurship courses suitable for the students. This study also provides novel insights into the design of entrepreneurship programs.

Study 3 is an approximately four-year quantitative longitudinal study examining the stability of students' attitudes, perceived behavior control, subjective norms, and intention to entrepreneurship over time, and the role of entrepreneurship education in this process. Findings have implications for interpreting extant entrepreneurial literature, and policy and practice related to nascent entrepreneurship development and support. The results support our argument that the theoretical and practical value of entrepreneurship literature should hinge on the temporal stability of the attitudinal and intentional constructs used. This view is distinct from existing literature.

Study 4 is a qualitative study exploring what are the important knowledge/skills students learned from the entrepreneurship courses they took on average five years previously, which pedagogical approach seems most effective, whether the courses are useful for entrepreneurs and company employees. The results show that the experiential learning approach is the most effective pedagogical approach, and entrepreneurship education can be useful for entrepreneurs and certain types of company employees.

Preface

This thesis consists of four independent manuscripts. Since they are all co-authored papers, the contribution of the thesis author, Zhaocheng Zeng, is outlined as follows.

The first paper “Entrepreneurship support: Making sense of decades of practice and research” in Chapter 2 was written by Dr. Tiago Ratinho, Dr. Alejandro Amezcua, Dr. Benson Honig, and Zhaocheng Zeng. It was submitted to *Entrepreneurship Theory and Practice*, and is currently under review. It is a literature review paper. The research idea of it was originated by the first three authors, while the research design was discussed and developed by the four. Zhaocheng Zeng reviewed 122 papers in total, analyzed, and coded all of them. The draft was written by Ratinho and Amezcua, and was revised by the four authors together.

The second paper “How should entrepreneurship be taught to students with diverse experience? A set of conceptual models of entrepreneurship education” in Chapter 3 was written by Zhaocheng Zeng and Dr. Benson Honig. Zeng is the first author. This conceptual paper was published in the annual book series *Advances in Entrepreneurship, Firm Emergence, and Growth*. Zeng came up with the ideas of proposing different teaching models for students with different level of entrepreneurship experience. The development of the three conceptual pedagogical models, the literature review, and the discussions of the model evaluation were done by Zeng. The draft of the paper was written by Zeng and revised by Honig.

The third paper “The temporal consistency of entrepreneurship attitudes and intentions: do early stage entrepreneurship courses matter?” in Chapter 4 was written by Zhaocheng Zeng, Dr. Benson Honig, Dr. Bruce Martin, and Dr. Jeffrey McNally. Zeng is

the first author of this paper, which is a quantitative longitudinal study. Zeng did the literature review, developed hypotheses, conducted the data analysis, presented and discussed the results. This study includes three waves of data collection. The first two waves were collected by Honig, Martin, and McNally, while the third was collected by Zeng. This manuscript was drafted by Zeng and then revised by the three co-authors.

The fourth paper “A qualitative exploration of outcomes of entrepreneurship education” in Chapter 5 was written by Zhaocheng Zeng and Dr. Benson Honig. Zeng is the first author. This paper is a qualitative study. Zeng developed the research idea, did the literature review, collected and analyzed the data, and presented and discussed the results. This manuscript was drafted by Zeng and revised by Honig.

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meticulous way of doing things propels me to develop research that is solid, concise, and understandable to others.

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Chapter 1 Introduction

My research interest in entrepreneurship dates to my undergraduate years, when I was enrolled in the Software Engineering program at Sun Yat-sen University, China. The courses I had taken were all technical and were barely related to entrepreneurship—in fact, students in my program were not granted sufficient opportunities to take courses in the School of Business. Despite lacking a business education, some of my classmates and professors were nevertheless interested in creating new businesses in technology, software, and the Internet. One friend of mine had set up a website and uploaded small computer games she created. She once told me with excitement that she found it rewarding to create her own business and make money out of it. However, after a few years, I observed that most of these people gave up their efforts in entrepreneurship, and I kept hearing similar complaints such as “I don’t know what I should do” or “I feel lost because I can’t make a profit”. Most of their business ideas appeared to me innovative, creative, and useful, but regrettably failed to develop into sustainable and viable businesses. These unsuccessful stories and the lessons learned sparked my curiosity about entrepreneurship, especially entrepreneurial learning. I wanted to know whether there is a way to help these potential entrepreneurs acquire the right set of skills, techniques, and psychological and mental strengths to create a business. After I obtained my Bachelor degree in Software Engineering, I joined the Master program of Engineering Entrepreneurship and Innovation at McMaster University. During the program, I learned how to evaluate technology startup ideas, how to promote new products into new markets, how to manage intellectual property (such as a patent) and so on. In this process,

my interest in entrepreneurship and entrepreneurial learning kept growing, and finally brought me to the PhD program.

During my PhD, I was exposed to different types of entrepreneurship research. I gradually realized that entrepreneurship can be significant and useful for people. Entrepreneurship contributes to economic development (Kuratko, 2005; Shane & Venkataraman, 2000). New ventures can create wealth, innovation, jobs, and the conditions for a prosperous society. I am always impressed by entrepreneurs, who build their startups from scratch, overcome a lot of uncertainties and difficulties, satisfy unmet needs of people, and fight for the survival of their businesses. The learning of entrepreneurship and entrepreneurs is vital, because without this learning, where and how efforts should be invested in supporting entrepreneurs are unclear.

The aim of this thesis is to develop a deeper understanding of entrepreneurship education as a type of entrepreneurship support. The aim has been distilled into four main research questions as follows.

Research question 1: What are the sources, types, and effectiveness of support for entrepreneurs?

Research question 2: How entrepreneurship education should be taught to students with different levels of startup experience?

Research question 3: How people's attitudes and intentions to pursue entrepreneurship change over time, and what is the role of entrepreneurship education in this process?

Research question 4: What do people learn from entrepreneurship education and training, and what is the most effective pedagogical approach in the learning process?

1.1 Entrepreneurship support

This section provides a brief introduction of entrepreneurship support.

It has been a widely accepted view that entrepreneurship generates positive external values that lead to economic and employment growth, wealth creation, technological diffusion, and regional development (Audretsch, Keilbach, & Lehmann, 2006).

Entrepreneurship is an important driver of economic prosperity. Prior studies have used a variety of measures to investigate the impact of entrepreneurship in the economy such as job creation (Davidsson, 2004; Van Praag & Versloot, 2007), wealth creation (Guzman & Stern, 2015), innovation (Acs & Audretsch, 1988), facilitation of technology transfer (Markman, Phan, Balkin, & Gianiodis, 2005; Wright, Birley, & Mosey, 2004), or knowledge spillovers (Audretsch & Keilbach, 2007).

The importance of entrepreneurship to society is highly recognized by a rapid emergence of endowed chairs, specialized courses, and publications in recognized academic journals (Katz, 2003; Sorenson & Stuart, 2008; Stewart & Cotton, 2013). Resource investments highlight that entrepreneurship support is becoming a more important phenomenon as public, private, and non-governmental institutions develop a whole industry for services that target and support entrepreneurs at all stages of development. For instance, governments allocate funds to promote and enhance entrepreneurial activities (Gilbert, Audretsch, & McDougall, 2004). One outcome of the many supportive investments in research and direct services is the creation of an entire industry in the form of business incubators, science parks, and small business development centers (Adkins, 2002; Knopp, 2012). Entrepreneurship support refers to “the act of providing an entrepreneur with access to a valued resource” (Hanlon &

Saunders, 2007, p. 620). The two most important dimensions of entrepreneurship support are the *sources of support* and *types of support* (Hanlon & Saunders, 2007). The former refers to people or organizations that provide resources, while the latter refers to classes in a categorization of such resources. The orientation toward “get all the help possible” networks represents a prevailing prescription that increases access to valuable resources and suggests increasing numbers of possible combinations of multiple sources and types of support (Hanlon & Saunders, 2007).

Despite a considerable body of investments, a substantial variety of entrepreneurship support models, and a growing history of experimentation, the influence of entrepreneurship support mechanisms on entrepreneurial practice is still unclear (Ireland & Webb, 2007; Zahra & Wright, 2011). The understanding of sources and types of support in practice and their effectiveness also remain largely unknown.

An all-around understanding of entrepreneurship support is useful to both scholars and practitioners across disciplines, such as public policy and economic development (Acs & Audretsch, 1990; Birch, 1987), and strategic management (Holburn & Zelner, 2010; Lazzarini, 2015; Nelson, 1995). It can provide insight into how these support mechanisms, such as changes in public policy, interact with the environment and shape the growth trajectories of firms (Marquis & Huang, 2009).

1.2 Entrepreneurship education and training

This section provides a brief introduction of entrepreneurship education and training.

Entrepreneurship has been viewed as one of the most potent economic forces for our society in the past twenty years (Kuratko, 2005). Its contribution to the economy lies in

two aspects. First, the number of new jobs created by new ventures is continuously growing. New firms enable millions of people to enter the labor market and pursue economic success. Second, new ventures bring innovation into the market, which can change the market structure and existing technologies. Reynolds, Hay, and Camp (1999) show that nearly 70% of all new inventions are created by entrepreneurial firms. The promotion of entrepreneurship has been shown closely connected to the economic performance (Minniti & Bygrave, 2004). In this context, there is an increasing number of people, especially young people, interested in starting their own businesses (Tulgan, 1999).

The ever-growing number of entrepreneurs and would-be-entrepreneurs has led to increasing attention to the field of entrepreneurship education. The recent growth in courses, programs, workshops offered by private or public educational institutions have coalesced around the aim of teaching entrepreneurship knowledge and skills (Katz, 2003).

The inherent assumption behind the growing popularity of entrepreneurship education is that entrepreneurship can be taught. Drucker (1985) views entrepreneurship as a discipline that can be learned, rather than be determined by magic or by genetic endowments. It is worthwhile to note that there is some argument claiming that entrepreneurship cannot be taught (Solomon, 2007), because some critical skills such as responsibility and patience, judgement, handling people cannot be taught directly and need to be learned in the real-world practice (Henry, Hill, & Leitch, 2005; Timmons & Stevenson, 1984). Despite this opinion, most of the empirical studies' results are consistent with Drucker's view and indicate that entrepreneurship can be taught to most

students (Gorman, Hanlon, & King, 1997). For example, Timmons and Stevenson (1984) show that analytical thinking, entrepreneurial accounting, entrepreneurial finance, marketing, information systems management are among those aspects of entrepreneurship that can be taught. It is believed that entrepreneurship education should and can play a crucial role in helping people pursue startup activities. Although what should be taught in entrepreneurship education is not crystal clear, there are certain major themes illustrating entrepreneurs and startup activities that are usually included in entrepreneurship education (Kuratko, 2005). Some examples of these themes include venture financing, entrepreneurial strategies, the entrepreneurial spirit, and types of entrepreneurs and methods to achieve success (Kuratko, 2005).

There are three types of entrepreneurship education: formal, non-formal, and informal (Colardyn & Bjornavold, 2004; Eshach, 2007). Formal entrepreneurship education is usually offered by institutions, such as colleges, universities, and high schools. It has embraced entrepreneurship by providing courses, degrees, and programs worldwide as part of their academic credentialing. Non-formal entrepreneurship education, while it may occur in a classroom and encompasses institutional learning, is usually not accredited, nor part of a recognized degree or diploma. Finally, informal entrepreneurship education usually refers to experiential learning, whereby individuals learn by actively engaging in startup activities (Kolb & Kolb, 2005). It is how individuals develop their entrepreneurship skills outside of the classroom (Honig, 2004).

The impact of entrepreneurship education is usually evaluated by measuring four types of variables: (1) students' attitudes and intentions to start a business (Souitaris, Zerbinati, & Al-Laham, 2007); (2) human capital outcomes such as entrepreneurship-

related knowledge and skills (Martin, McNally, & Kay, 2013); (3) startup activities (Kolvereid & Moen, 1997); and (4) entrepreneurial self-efficacy and intentions (Wilson, Kickul, & Marlino, 2007). Although there is an extensive body of research on the impact of entrepreneurship education, these studies rarely examine the long-term influence of entrepreneurship education on students. That is, whether entrepreneurship education has lasting effects remains unknown.

1.3 Summary of the four studies

This section summarizes the four independent studies included in this thesis.

Study 1: Entrepreneurship Support: Making Sense of Decades of Practice and Research

This study seeks to answer the first research question: What are the sources, types, and effectiveness of support for entrepreneurs?

Entrepreneurship support is defined as provision of valuable resources to entrepreneurs by individuals or organizations, which purposively carry structured activities to facilitate the imminent establishment of a new independent firm, increase survival chances, or promote long-term performance. Some examples of entrepreneurship support could be entrepreneurship education (e.g., entrepreneurship courses, entrepreneurship training) and entrepreneurship policies (e.g., technology entrepreneurship policy which encourages the formation and growth of new technology-based firms). Learning what to support, how to support, and what is the effect of the support contributes to the understanding of entrepreneurship. Without this learning,

policy makers cannot implement effective policies that encourage entrepreneurial activities, and educational institutions cannot set up effective programs.

In this study, we employed a systematic literature review method proposed by Short (2009) and used by many other scholars such as Klotz, Hmieleski, Bradley, and Busenitz (2014), Shepherd, Williams, and Patzelt (2015), and Ucbasaran, Shepherd, Lockett, and Lyon (2013) to create our sample and conduct our analysis. We used keyword searches and collected journal articles related to entrepreneurship support from general management journals, entrepreneurship journals, and management of technology scholarly journals. During the screening process, 122 articles were identified as relevant to our study and were included in our sample. We mainly tried to understand the sources, types, and effectiveness of support provided for entrepreneurs, and the theoretical base of these literature. Our findings show that government and support programs (e.g., small business development center) are the major sources of entrepreneurship support, and that business training and learning is the most important type of support. Regarding the theoretical base of the literature, we find that very few studies use theories to guide their research, and what is worse, there is no entrepreneurship support theory found.

This study has significant contributions to the literature. First, the work highlights research areas where management scholars could generate theories that seek to elaborate the sources, activities and effects of entrepreneurship support. Second, the findings will improve the learning, understanding, management, and promotion of entrepreneurship support in our society.

Study 2: How should entrepreneurship be taught to students with diverse experience?

A set of conceptual models of entrepreneurship education

This study seeks to answer the second research question: How entrepreneurship education should be taught to students with different levels of startup experience?

In this study, we discussed how people learn entrepreneurship, and how should entrepreneurship be taught to students with different levels of entrepreneurship experience. We developed a set of conceptual models, which are anchored in learning theory, and are built on the techniques of entrepreneurship pedagogy such as experiential education. These models were developed for three groups of students: students without any entrepreneurship experience, students with previous entrepreneurship experience, and students who are currently running their start-ups. The first model, which is developed for students without previous entrepreneurship experience, includes four components: understanding toward entrepreneurship, entrepreneurship knowledge/skills, entrepreneurship simulation, and entrepreneurship participation. For the first group of students, the first step is to familiarize them with the role of an entrepreneur. It is also important to provide an opportunity for them to build their teamwork skills and practice their proper function in an environment that provides for social experiences (e.g., a simulation game). Some introduction to “what is an entrepreneur” are vital for this group. The second model, which is developed for students with previous entrepreneurship experience, includes three components: entrepreneurial reflection, supplementary knowledge/skill learning, and entrepreneurial projects. For this group of students, facilitating them to conduct reflective activities on previous events is the first and major responsibility of lecturers. The third model, which is developed for students currently

running their own startups, includes three components: problem-based learning, supplementary knowledge/skill learning, and experience sharing. This model is a dynamic circle model which enables students to bring their real-time problems to class, share experience, and receive firsthand feedback and comments. In all three models, students are required to take classes in relevant topics of entrepreneurship knowledge, which enables students to further develop their human capital in this field.

This study has two important contributions to the literature. First, we contribute to the advancement of fundamental theory and teaching practice in entrepreneurship education. Second, we challenge the traditional teaching practice that uses a one-size-fits-all approach to teach students entrepreneurship. Instead of treating all students as one homogeneous group, we consider their different needs based on their entrepreneurship experience, and propose three different pedagogical models regarding how entrepreneurship education should be taught to different groups of students.

Study 3: The temporal consistency of entrepreneurship attitudes and intentions: do early stage entrepreneurship courses matter?

This study seeks to answer the third research question: How people's attitudes and intentions to pursue entrepreneurship change over time, and what is the role of entrepreneurship education in this process? It examines the stability of entrepreneurship learning outcomes. This is an approximately four-year longitudinal study with three waves of data collection. Based on the theory of planned behavior (Fishbein & Ajzen, 1977), we tried to understand whether and how students' attitudes, subjective norms, perceived behavioral control (PBC), and intention to entrepreneurship change over time,

and the role of entrepreneurship education in this process. We adopted a longitudinal control-group design. The longitudinal data were collected from 108 students. The first wave of data was collected before students started their entrepreneurship course. The second and the third wave of data were collected right after and three years after course completion. This time span allows us to examine students' attitudes and intentions in different time points, and to detect the changes in this process.

Our findings show that students' attitudes, subjective norms, PBC, and intention to entrepreneurship were relatively stable before and right after they finished the entrepreneurship course, however, three years after they completed their course, their subjective norm, PBC, and intention to entrepreneurship had a significant drop. This result suggests that entrepreneurship education may have a very limited influence in further increasing students' attitudes and intention to pursue entrepreneurship, and moreover, it may not be able to sustain students' original level of attitudes and intention. Our finding also reveals a concern for self-selection bias in entrepreneurship education research. We found that students who took entrepreneurship courses had a higher attitudes and intention to pursue entrepreneurship compared to their counterparts who didn't take entrepreneurship courses.

As far as we know, this is the first study which longitudinally examines the stability of students' attitudes and intention to entrepreneurship with time, and the effect of entrepreneurship courses in this process. Overall our study makes two main contributions to the entrepreneurship and wider management literature. Our first and most valuable contribution is the learning we provide on the stability of attitudes and intentions over time (i.e., approximately four years). There is scant research in the entrepreneurship

field to-date as well as in the broader motivational literature. The theoretical and practical value of this learning is considerable. Our examination of expectancy-value theory (Fishbein & Ajzen, 1977) and mere exposure theory (Zajonc, 1968) through a novel test of entrepreneurship education impact contributes to understanding the boundaries and parameters of these two established theories in the entrepreneurship domain. We also help to identify parameters for generalizing theories that employ attitudinal and intentional constructs to motivation, such as the theory of planned behavior (Ajzen, 1985) and the theory of reasoned action (Fishbein & Ajzen, 1977). The learning from the study indicates that time is an important parameter, potentially limiting the efficacy of interventions designed to motivate certain behaviors, such as entrepreneurial activity.

Study 4: A qualitative exploration of outcomes of entrepreneurship education

This study seeks to answer the fourth research question: What do people learn from entrepreneurship education and training, and what is the most effective pedagogical approach in the learning process? It examines the learning effects of entrepreneurship education. We sought to understand what are the important knowledge/skills students learned from the entrepreneurship courses they took, which pedagogical approach seems most effective, whether the courses are useful for their startups if they are creating or running their own businesses, and whether it is professionally useful for their company work if they are currently company employed. We adopted a qualitative approach and conducted interviews with 30 participants who took entrepreneurship courses on average 5 years previously. The time gap allows us to detect the long-term influence of entrepreneurship education on students.

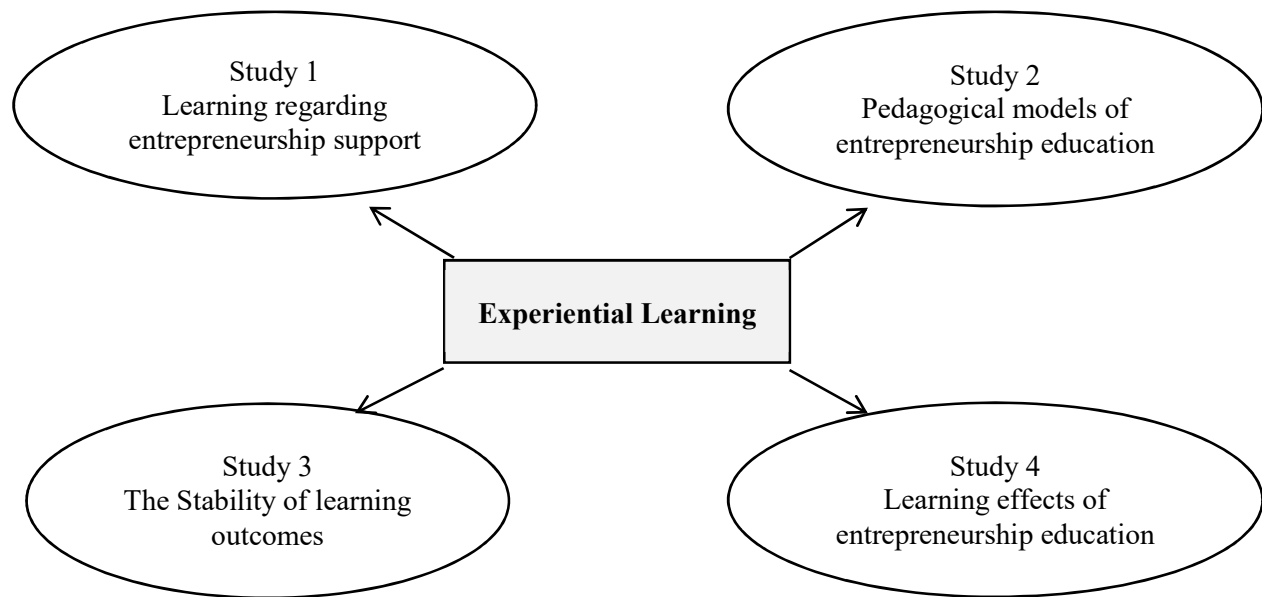
Our findings show that qualities of entrepreneurs (e.g., courage, risk-taking), research skill, planning skill, and communication skill are the most important things people learned from their courses. The most effective pedagogical approach is the experiential learning approach, as a large majority of participants claimed that they learned those important knowledge/skills through experiential learning. The results also show that entrepreneurship courses can be useful for entrepreneurs as well as company employees. However, the organization size and the types of jobs may affect people's perceived usefulness of entrepreneurship education in their company work.

This study has important contributions. First, we contribute to the understanding of the long-term effect of entrepreneurship education on students. The interviews were conducted, on average, 5 years after they completed entrepreneurship courses. This research design allows us to explore the important knowledge and skills that stays with the students. Second, we add to the understanding of how entrepreneurship education can be useful for people who are entrepreneurs and who are company employees. Third, we contribute to the understanding of experiential learning theory by showing that experiential learning can be helpful for students' long-term knowledge/skill retention.

1.4 Experiential learning connects the four independent studies

All four studies share the same theme: Experiential Learning (EL). We use Figure 1.1 to illustrate their relationships: each oval in a corner represents an independent study, and the block in the center represents the overarching EL theory that connects all these studies.

Figure 1.1 The relationship among four independent studies



Kolb (1984) defined experiential learning as a process through which knowledge is created through the transformation of experience. This theory was developed based on the work done by several famous scholars, such as Dewey (2007), Piaget (1976), and Lewin (1951), who recognized the important role of experience in human learning process. Kolb (1984) developed the experiential learning model in which learning is a cycle involving four modes including concrete experience, reflective observation, abstract conceptualization, and active experimentation. Kolb (1984) pointed out that people can acquire information through two ways: direct experience and recreation of experience. Concrete experience is created when people engage in direct apprehension of immediate experience, while abstract conceptualization is characterized by people's comprehension of conceptual interpretation and symbolic representation (Corbett, 2005). Kolb (1984) also showed that people can transform experience into learning through two ways: transformation via intention and transformation via extension. People who

transform via extension usually engage in active experimentation by testing their experiences and ideas in the real world, while people who transform via intention usually engage in reflective observation by observing and reflecting on their acquired experiences and ideas. Experiential learning theory is widely used to address learning and educational issues in many fields including management, education, entrepreneurship, psychology, medicine and nursing, and information science (Kayes, 2002; Kolb, Boyatzis, & Mainemelis, 2001; Looi et al., 2010; Maudsley & Strivens, 2000).

Next, we discuss how experiential learning theory connects the four independent studies included in this thesis.

In Study 1, we conducted a systematic literature review to examine the sources, types, and effectiveness of entrepreneurship support, and the theoretical base of these literature. Experiential learning theory suggests that reflection on previous experiences is important in human learning and development (Holman, Pavlica, & Thorpe, 1997; Kolb, 1984). It contributes to the deep learning process and serves as a base for knowledge synthesis (Neck, Greene, & Brush, 2014). In this study, we collected scholarly journal articles related to entrepreneurship support, and observed the relevant research experience in this field. We reflected on the accumulated knowledge in entrepreneurship support, and revealed the sources, types, and effectiveness of the support as well as the lack of theories in the literature. Dewey (1938) suggested that during the reflection process, people distinguish among good and bad experiences. With the reflection of the research findings, we can offer guidance on how to improve the qualities of entrepreneurship support studies, and to develop better entrepreneurship support programs. The approach we used in this review study reflects the spirit of experiential learning.

In Studies 2, 3, and 4, we focused on researching entrepreneurship education and training, which is the most popular and important types of supports for entrepreneurs in our society.

Study 2 answered the call of Hargreaves (1996) and Atkinson (2000) that teaching should be informed by research evidence, which in turn should be generated through the guidance of solid theories. We developed a set of conceptual models anchored in learning theory, providing suggestions on how entrepreneurship education should be taught to different types of students: students without previous entrepreneurship experience, students with entrepreneurship experience, and students who are currently running their own startups. Instead of being driven by personal preference, conventional wisdom, or political ideology, we used research evidence to support our proposed models. Our models are mainly built on experiential learning theory (Dewey, 1938; Kolb, 1984), together with other theories including human capital theory (Becker, 2009; Coff, 2002; Davidsson & Honig, 2003), role theory (Biddle, 1986; Sarbin & Allen, 1954; Thomas & Biddle, 1966), and social capital theory (Davidsson & Honig, 2003).

In Study 3, we conducted a four-year longitudinal study to look for the evidence that can support the effectiveness of entrepreneurship education on students. We aimed to find whether there is a long-term persistent effect, by investigating the stability of students' attitudes and intentions over time and the role of entrepreneurship education in this process. One of the major characteristics of experiential learning is active experimentation, which means actively testing the acquired experiences and ideas in the real world. Through the literature review, we already know that entrepreneurship education may have a short-term influence on students (Bae, Qian, Miao, & Fiet, 2014).

However, whether it has a long-term effect remains unknown. This required us to test whether the influence of entrepreneurship education on students is persistent and sustainable. This type of longitudinal study is important, because without testing the long-term effect of entrepreneurship education, we are unable to know whether the claimed positive outcomes of entrepreneurship courses can be sustained over time. If these outcomes do not persist with time, it means that the positive change asserted by entrepreneurship education may only be an illusion. Addressing this gap is one of the contributions of this paper. The evidence generated from this study advances our understanding of time effect in students' learning process, and has important implication on the improvements of entrepreneurship education programs.

In Study 4, we conducted a qualitative study to investigate (a) what students have learned from their entrepreneurship courses, or did not learn but would like to have learned, (b) what seems to be the most effective pedagogical approach in their learning, and (c) what they find useful for their careers. One major characteristic of experiential learning is learning by doing (Cope & Watts, 2000). We found that most of the people learned important entrepreneurship knowledge and skills through engagement in actual activities such as actual startup projects, simulation, and collaboration with entrepreneurs. The result shows that experiential learning is the most effective pedagogical approach in teaching entrepreneurship, and it contributes to the long-term knowledge retention.

1.5 Overall research contribution

The contribution of this thesis to the literature is three-fold. First, we advance the understanding of the long-term influence of entrepreneurship education on students. Existing research has extensively examined the short-term influence of entrepreneurship

education, and proposed many positive outcomes achieved right after students finished their entrepreneurship courses. Some examples of these outcomes include enhanced attitudes and intention to entrepreneurship (Bae et al., 2014), and increased human capital in entrepreneurship (Martin et al., 2013). However, because most of these studies have a very short time frame (e.g., four months), whether these positive outcomes are sustained over time remains unknown. That is, whether entrepreneurship education can have a long-term influence on students, particularly after having completed their education and training, remains unclear. Why do we need to consider the long-term effect of entrepreneurship education and why is it important? We know that people are unlikely to start their businesses at the same time or conduct the start-up activities at the same pace (Lichtenstein, Carter, Dooley, & Gartner, 2007). Some start their businesses earlier while the others may start later, well after completing their formal education. There is no guarantee that all people will engage in new venture creation right after they finish their entrepreneurship education and training. If those proposed positive outcomes cannot be sustained until such time that people start to act, it means that the positive effects reported by research may only be an illusion. Our third and fourth studies add to the understanding of the long-term effects of entrepreneurship education.

Second, we call on the need of incorporating theories into entrepreneurship teaching. We found that theories are seldom used to guide the examination of entrepreneurship support. Entrepreneurship education and training, as one of the most important and popular types of entrepreneurship support, has a similar problem. The lack of solid theories in entrepreneurship education research and the disconnect between teaching and research communities hinders the accumulation and utilization of good evidence to

inform effective teaching decisions (Hargreaves, 1996; Kuratko, 2005; Sorenson & Stuart, 2008). We argue that the improvement of the learning, understanding, and promotion of entrepreneurship education and training cannot be achieved without solid theories.

Third, we call on the attention to students' different needs in entrepreneurship education and training. Entrepreneurship education often treats students as a homogeneous group, and overlooks the diverse experience and diverse demands of different students (Collins, Hannon, & Smith, 2004). Using a one-size-fits-all approach, schools are rarely capable of meeting the real needs of students. We argue that to improve the quality of entrepreneurship education, we must get to know the characteristics of our students. Based on their different characteristics, different pedagogical models may need to be developed to serve their learning needs.

1.6 The structure and information of the thesis

This section provides a brief introduction of the structure and information of the thesis. Table 1.1 shows the structure of the thesis. Table 1.2 shows the authors' information, the role of Zhaocheng Zeng, and the publishing status of the four independent studies included in this thesis.

Table 1.1 Organization of this thesis

Chapter number	Contents
Chapter 1	Introduction
Chapter 2	Study 1: Entrepreneurship Support: Making Sense of Decades of Practice and Research
Chapter 3	Study 2: How should entrepreneurship be taught to students with diverse experience? A set of conceptual models of entrepreneurship education
Chapter 4	Study 3: The temporal consistency of entrepreneurship attitudes and intentions: do early stage entrepreneurship courses matter?
Chapter 5	Study 4: A qualitative exploration of outcomes of entrepreneurship education
Chapter 6	Conclusion

Table 1.2 Authors' information, role of Zhaocheng Zeng, and publishing status of the four independent studies in this thesis

Study	Study Title	Authors	Role of Zeng	Publishing status
1	Entrepreneurship Support: Making Sense of Decades of Practice and Research	T. Ratinho A. Amezcua B. Honig Z. Zeng	Co-author; developing research design; reviewing and coding 122 articles; conducting data analysis; revising manuscript	Submitted to Entrepreneurship Theory and Practice; under review
2	How should entrepreneurship be taught to students with diverse experience? A set of conceptual models of entrepreneurship education	Z. Zeng B. Honig	First author; conducting literature review, developing pedagogical models; proposing variables for model evaluation; writing the manuscript	Published in Models of Start-up Thinking and Action: Theoretical, Empirical and Pedagogical Approaches. Advances in Entrepreneurship, Firm Emergence and Growth, Volume 18, pp. 237–282
3	The temporal consistency of entrepreneurship attitudes and intentions: do early stage entrepreneurship courses matter?	Z. Zeng B. Honig B. Martin J. McNally	First author; conducting literature review; developing hypotheses; collecting the last wave of data; conducting data analysis; writing the manuscript	Ready to submit
4	A qualitative exploration of outcomes of entrepreneurship education	Z. Zeng B. Honig	First author; conducting literature review; collecting all data; conducting data analysis; writing the manuscript	Ready to submit

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Chapter 2 Where the rubber meets the road: does entrepreneurial support make a difference?

Citation: Tiago Ratinho, Alejandro Amezcua, Benson Honig, Zhaocheng Zeng, “Where the rubber meets the road: does entrepreneurial support make a difference?”

Abstract

Entrepreneurs receive support globally because of their asserted economic importance. Governments enable policies to create environments conducive to the emergence of new ventures while the private sector finances promising new ventures. Yet, after decades of investments in initiatives to support entrepreneurs, we know little about its efficacy in increasing startup rates, extending survival of new firms, or accelerating new firm growth. This review disentangles the multiple conceptualizations used to research entrepreneurship support and examines the effectiveness of each source and type of support. We begin by systematically analyzing extant literature on the subject, discussing each source and type of support, and the empirical support for its effectiveness. We then discuss the theorizations found and explore how three prevalent management theories could motivate theoretical refinements in the field. In identifying areas for future research, we suggest that entrepreneurship support encompasses many levels of analysis. Finally, we offer guidance on how to improve the relevance of entrepreneurship support studies.

“Entrepreneurship is neither a science nor an art. It is a practice.”

Peter Drucker (1985)

2.1 Introduction

Worldwide policy makers, business leaders, and scholars view entrepreneurship as a panacea. It is widely seen as generating positive externalities that lead to economic and employment growth, wealth creation, technological diffusion, and regional development (Audretsch, Keilbach, & Lehmann, 2006). As a field of research, the increasing numbers of endowed chairs, specialized courses, and publications in recognized academic journals reveal entrepreneurship's importance to society (Katz, 2003; Sorenson & Stuart, 2008; Stewart & Cotton, 2013). Having realized this, public, private, and non-governmental institutions have developed a whole industry for services that target and support entrepreneurs at all stages of development.

Governments increasingly value entrepreneurship by allocating funds to promote and enhance entrepreneurial activity (Gilbert, Audretsch, & McDougall, 2004). One result of the many investments in research and direct services to support entrepreneurship is the creation of an entire industry in the form of business incubators, science parks, and small business development centers (Adkins, 2002; Knopp, 2012). A major motivation of governmental support for entrepreneurship lies in the market failures that impede its stronger emergence in the economy (Flynn, 1993). Additionally, developed economies worry about their ability to provide long-term employment (Acs, Desai, & Hessels, 2008; Fairlie, 2013), particularly in view of growing world trade and free trade agreements, thus motivating national support activities directed toward nascent entrepreneurs. Despite these considerable investments, a substantial variety of entrepreneurship support models, and a growing history of experimentation, entrepreneurship

scholars have failed to study how entrepreneurship support mechanisms might influence entrepreneurial practice (Ireland & Webb, 2007; Zahra & Wright, 2011). Further, we know little about sources and types of support in practice and, more importantly, have limited research and a lack of consensus regarding the effectiveness of these efforts.

Understanding entrepreneurship support is useful to scholars across disciplines. For instance, public policy and economic development researchers view small firms as building blocks of vibrant and wealth-creating economies (Acs & Audretsch, 1990; Birch, 1987). Further, in the field of strategy, support can lead to firm-level competitive advantages (Lazzarini, 2015), influence foreign direct investments (Holburn & Zelner, 2010), and affect policies that enable firms to innovate and exploit intellectual property (Nelson, 1995). A solid grasp of the mechanisms of entrepreneurial support can help management scholars to extend theories so that the interdependence between private and public interests are fully recognized (Mahoney, McGahan, & Pitelis, 2009). Additionally, this review provides insight regarding how support mechanisms, such as changes in public policy, interact with the environment and shape the growth trajectories of firms (Marquis & Huang, 2009). By providing a stronger understanding of the origins of new firms that accounts for the outcomes of institutional intervention, we argue that scholarship focused on incumbent and larger firms will have better information regarding how to extend theories and design compelling research.

To start, we build on prior entrepreneurship literature to define entrepreneurship support, differentiate between sources and types of support, and discuss the most common intended outcomes of supporting entrepreneurs. Although types of support can co-exist in one source of support, this conceptualization will assist us in disentangling who is providing what to entrepreneurs, and to what end.

2.1.1 What is entrepreneurship support?

Just as social support improves human health and reduces morbidity (House, Umberson, & Landis, 1988), entrepreneurship support seeks to infuse new and young firms with sustaining elements that increase survival¹ and development. The delivery of support can be tangible such as granting financial resources to a new firm, or supplementary, such as providing professional advice from accountants, investors, and lawyers. Building on the definition by Hanlon and Saunders (2007), we define entrepreneurship support as

“(the) Provision of valuable resources to entrepreneurs by individuals or organizations, which carry structured activities to facilitate the imminent establishment of a new independent firm, increase survival chances, or promote long-term growth.”

This definition allows us to consider both tangible and intangible resources (Hanlon & Saunders, 2007). Historically, entrepreneurship support has been associated with financial aid granted by governmental initiatives like the Small Business Innovation Research (SBIR) program. Established in the 1980s, the program provides funding for innovation research to small firms as a tool to increase American firms’ competitiveness (Lerner, 1999, 2000). However, today’s communities host a portfolio of activities to infuse new firms with intangible resources such as knowledge, legitimacy, and reputation (Brush, Greene, & Hart, 2001). Efforts to infuse intangible resources to new firms often facilitate the emergence of networks to grow localized knowledge capital, which in turn will assist startups in accessing knowledge. Regions

¹ We recognize that survival is a double-edged sword—persistence in the face of a non-working business model may demonstrate stubbornness and a refusal to acknowledge a market that does not reward a specific idea. In such cases, termination may be a better option. Thus, while some degree of survival is obviously necessary to achieve success, by itself, it may be a weak or ambiguous indicator of eventual success.

also increasingly support the establishment of knowledge-based urban development schemes in order to facilitate regional economic prosperity (Benneworth & Ratinho, 2014).

This definition also allows us to study for-profit and not-for profit forms of support (Hanlon & Saunders, 2007). While venture capitalists professionalize the firms they invest in seeking to maximize future returns (Hellmann & Puri, 2002), informal networks are a particular form of social capital that assist the entrepreneur during the initial stages of establishing a new firm (Birley, 1985). Thus, we examine individuals and institutions that provide resources to entrepreneurs for the imminent establishment of an independent new venture. This means that we exclude the following two entities.

- (i) Corporate entrepreneurship. This is because it refers to a process of strategic renewal within existing organizations, the creation of new business units, and redefinitions of products and existing markets (Sharma & Chrisman, 2007; Zahra & Wright, 2011).
- (ii) Entrepreneurship education programs. This is because they train individuals by developing entrepreneurial skills that can be applied in multiple contexts extending beyond the scope of the immediate creation of new firms (Kuratko, 2005; Zahra, Newey, & Shaver, 2011)

Another important distinction we introduce in our delineation of entrepreneurship support is the inclusion of only structured activities. We therefore exclude incidental support such as that given by family members (Powell & Eddleston, 2013), as they would be very difficult to monitor and are not typically a target for entrepreneurial support programs.

Finally, we expand prior conceptualizations of entrepreneurship support to include guided preparation (Chrisman, McMullan, & Hall, 2005) which considers exclusively support at the research and planning stages that occur *before* the establishment of a new venture. We see

entrepreneurship support taking place *before* and *after* the establishment of a new venture. This includes support in growth and expansion efforts such as that of business acceleration, an increasingly popular form of assistance consisting of intensive training and mentoring to cohorts of firm for a limited period (Cohen & Hochberg, 2014; Isabelle, 2013; Miller & Bound, 2011).

2.1.2 Sources and types of support

The two most important dimensions of entrepreneurship support are the *sources of support* and *types of support* (Hanlon & Saunders, 2007). Sources of support refer to individuals or organizations who provide the resource. Types of support refer to the resources provided to the entrepreneur. Each source of support can provide multiple types of support. Similarly, one specific type of support can be provided by many sources (Hanlon & Saunders, 2007). Further, due to the mentality of “get all the help possible,” networks represent a prevailing prescription in entrepreneurship support that increases access to valuable resources and suggests a larger number of possible combinations of multiple sources and types of support (Hanlon & Saunders, 2007).

2.1.3 Outcomes of support

Entrepreneurship is an important driver of economic prosperity. Prior studies have used a variety of measures to investigate the impact of entrepreneurship in the economy such as job creation (Davidsson, 2004; Van Praag & Versloot, 2007) or wealth creation (Guzman & Stern, 2015). More complex constructs such as innovation (Acs & Audretsch, 1988), facilitation of technology transfer (Markman, Phan, Balkin, & Gianiodis, 2005; Wright, Birley, & Mosey, 2004), or knowledge spillovers (Audretsch & Keilbach, 2007) have also caught the attention of researchers.

We conceptualize three direct outcomes for entrepreneurship support. The creation of *new ventures* represents the traditional dependent variable in this field (Gartner, 1985; Gartner & Shane, 1995; Low & MacMillan, 1988). Therefore, entrepreneurship support seeks to guide entrepreneurs in a variety of gestation activities such as idea development, resource mobilization, competing for financing, and business planning (Carter, Gartner, & Reynolds, 1996; Chrisman et al., 2005; Newbert, 2005).

Entrepreneurship support can also extend a firm's long-term *survival*. Conceived as an exit rate or mortality, survival often measures a firm's long term viability in organizational ecology (Freeman, Carroll, & Hannan, 1983; Geroski, 1995), strategy (Pe'er, Vertinsky, & Keil, 2014) and entrepreneurship research (Gartner & Shane, 1995; Shane, 2008).

Finally, firm performance leads to increased economic prosperity and wealth creation. We define performance as any indication of a firm's financial health such as sales and employment growth, profitability, or other development measures such as completion of an initial public offering (Guzman & Stern, 2015; Shane, 2003). The desire to create jobs, particularly at the regional level, motivates the establishment of support measures to assist companies to create and maintain employment levels. The net effect is dependent on short, medium and long-term measures (Huggins & Williams, 2011).

Figure 2.1 Entrepreneurial support conceptual framework

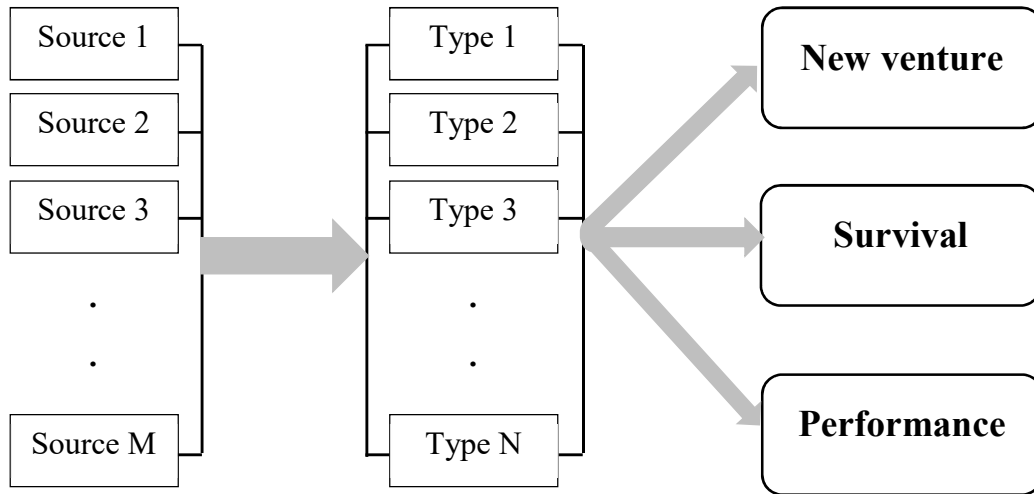


Figure 2.1 represents our conceptual framework. Note that we conceptualize multiple combinations of sources, types of support, and performance outcomes. This means that a source of support can assist entrepreneurs with multiple types of support; thus, yielding several possible outcomes.

2.2 Method

To understand entrepreneurship support research, we reviewed a pool of 122 articles published in high-quality scholarly journals until the end of 2015. Given the amount of articles covering different aspects of entrepreneurship support, we used the best practices of systematic literature reviews put forth by Short (2009) and more recently used by others (Klotz, Hmieleski, Bradley, & Busenitz, 2014; Shepherd, Williams, & Patzelt, 2015; Ucbasaran, Shepherd, Lockett, & Lyon, 2013) to create our sample and conduct our analysis. This includes selecting publications that cover multiple management, entrepreneurship, and specialty topics such as

management of technology, innovation management, or technology transfer. We based our analysis on our conceptualization of entrepreneurship support (Figure 2.1), which captures variables common to all sources and types of support.

2.2.1 Sampling and screening procedure

We used criterion sampling to identify our article base by following the guidelines of Patton (2014) and implemented by Grégoire, Corbett, and McMullen (2011) (Table 2.1). Keywords used yield articles whose authors purposefully represented their study as entrepreneurship support².

We selected full articles published in three sets of journals: first, following previous reviews, we initially began looking exclusively at General Management and Entrepreneurship journals. The low number of articles obtained (see Table 2.2) led to a broader search that included technology and innovation management journals (known for publishing research in entrepreneurship support mechanisms such as business incubators or science parks) and other renowned entrepreneurship journals (Linton & Thongpapanl, 2004; Stewart & Cotton, 2013).

² We understand that this procedure is not without limitations. However, we wish to focus our discussion on scholarly research intended to make contributions to entrepreneurship support body of knowledge. The discussion section of this article reviews other literature that the authors consider valuable to the understanding of this phenomenon.

Table 2.1 Sampling criteria

Criteria	Rationale
a) General Top Management journals	Following Short (2009), we looked at Academy of Management Journal, Academy of Management Review, Strategic Management Journal, Journal of Management, Organization Science, Management Science, Administrative Science Quarterly and Journal of Management Studies as general management outlets.
b) Entrepreneurship journals	Given the specificity of the topic, we also included in our search entrepreneurship journals: Journal of Business Venturing, Entrepreneurship Theory and Practice, Journal of Small Business Management and Strategic Entrepreneurship Journal (Klotz et al., 2014; Shepherd et al., 2015).
c) Specialty Technology and Innovation Management and other Entrepreneurship journals	Popular entrepreneurship support mechanisms such as business incubation have found their home in other specialized journals such as Technovation, Journal of Technology Transfer and Research Policy. Further, we have included Entrepreneurship and Regional Development and Small Business Economics to capture other important perspectives in the topic.
d) Full length journal articles or research notes	We narrowed down our search by excluding book review, editorials, or dialogue pieces.
e) Presence of the following combinations of keywords in title, abstract, or keywords: EITHER (entrepr*, new venture*, small business*, new	In line with criterion sampling, we used combinations of words specific to entrepreneurship support. This criterion guarantees that articles are selected based on how the authors chose to represent and publish their research.

Criteria	Rationale
firm*, nascent firm*, young firm*, start(-)up) AND (support, infrastructure, training, policy, development, ecosystem)	
f) Specific searches	We searched for “Organizational sponsorship”, “Entrepreneurship public policy” and others to ensure that no major contributions would be overlooked.

Given the nominal attention given to entrepreneurship support in the field of entrepreneurship, we chose to use a wider set of keywords to capture the maximum number of articles on the topic. For instance, while not everyone equates small business* or young firm* with entrepreneurship (see Shane and Venkataraman (2000)), some entrepreneurship support mechanisms cater to both types of firms.

There are three methodological advantages in our procedure. First, we chose articles published in recognized high-impact academic journals. This increased the relevance of our pool of articles and the contributions we analyzed. Second, it allowed us to scan automatically hundreds, if not thousands of articles, reducing the error associated with manually navigating multiple volumes of the selected journals. Third, a keyword search yielded a sample based on each authors’ language as an alternative to other third party indexing. This means that our sample includes studies whose authors purposefully represented as entrepreneurship support studies. Taken together, our sampling criteria ensured the validity of our sample. Using these criteria, we counted 407 articles.

After sampling automatically, we manually verified the relevance of each article abstract. We excluded articles that belong to any of the following categories.

- a) Articles use the search keywords but their framework, research questions, or analysis do not relate to our review topic.
- b) Articles fall outside the scope of entrepreneurship support as conceptualized above. That is, we excluded articles on corporate entrepreneurship, entrepreneurship educational programs, franchising, and internationalization of multi-national companies.
- c) Articles have no insight into the mechanisms of entrepreneurship support.

After this step, our sample contained 122 articles (see Table 2.2) published between 1985 and 2015.

2.2.2 Coding scheme

We used content analysis techniques for our review given that the data in our pool of articles is codified in text, tables, and figures. Variables were designed to help us understand the background, structure, and findings of each article (Table 2.3) as well the range of activities that represent entrepreneurship support.

Table 2.2 Sources of articles

Journal		Keyword sampling	Screening
General Management Journals	Academy of Management Journal	6	1
	Academy of Management Review	3	1
	Administrative Science Quarterly	3	0
	Journal of Management	4	0
	Journal of Management Studies	9	1
	Strategic Management Journal	16	0
	Organization Science	6	0
	Management Science	13	1
Entrepreneurship journals	Journal of Business Venturing	75	28
	Strategic Entrepreneurship Journal	1	1
	Journal of Small Business Management	18	7
	Entrepreneurship: Theory and Practice	24	3
Specialty TIM	Technovation	45	21
	Journal of Technology Transfer	25	13
	Entrepreneurship and Regional Development	80	17
	Small Business Economics	40	16
	Research Policy	39	12
Total		407	122

Table 2.3 Coding scheme

Variable	Operationalization
Literature base / theory	Theoretical foundations used in the article. In some cases, it might be a combination of theories, several bodies of literature, or an underlying rationale not explicitly mentioned.
Type of study	Generating: Articles that generate or significantly contribute to theory development
	Testing Articles that test existing theories
	Referring Article that identify literature base but do not further elaborate
	Phenomenological Articles that are based on phenomenon and give mostly descriptive results
Empirical vs. conceptual	Empirical articles are based on data while conceptual use only theoretical concepts.
Qualitative vs. quantitative	Qualitative articles use non-numerical data (for instance, case studies) while quantitative articles are based on numerical data and often make use of statistical analyses.
Source of support	Individual or organization providing support.
Type of support	How entrepreneurs are being supported
Sample	Sample on which the study is based, if empirical.
Dependent variable	Variables used as output.
Key findings	Main findings of the study possible coded at the level of interaction
Key theoretical implications	Main theoretical implications
Key practical implications	Main practical implications
Target level of recommendations	Practical implications can be found on several levels

2.3 Main findings

The overwhelming majority of articles we found are empirical (91.8%). In contrast, we found eight purely conceptual articles (6.6%). Only two were both conceptual and empirical (1.6%). We note that the conceptual studies do not cover all sources and types of entrepreneurship support, which compromises the generalizability of its tenets. A related descriptive statistic reveals that only 11 studies (9.0%) generate any theoretical insights. Most studies are testing existing theories (36.1%), merely referencing past studies (36.9%), or are purely phenomenological (16.4%). While these results may not be surprising in any field of research, they highlight the lack of attention dedicated to proposing a theoretical background to study entrepreneurship support.

2.3.1 Sources and types of support

We found a wide range of sources of support (Table 2.4) and for each we coded the primary and secondary types of support discussed (Table 2.5). In addition to widely known entrepreneurship support sources such as business incubators or venture capitalists, we found a significant share of articles investigating governmental support to startups (23.8%) as well as diverse entrepreneurship support programs (22.1%) (Table 2.4). We also found a surprising amount of studies investigating what is increasingly known as the entrepreneurial ecosystem (13.1%) – the interdependent relationships between multiple key actors that support entrepreneurship (Autio, Kenney, Mustar, Siegel, & Wright, 2014; Zahra, Wright, & Abdelgawad, 2014).

Table 2.4 Sources of support

Source	Count	%
Government	29	23.8
Support program	27	22.1
Ecosystem	16	13.1
Business incubators	12	9.8
Venture Capitalists	10	8.2
Business development center	9	7.4
Universities	9	7.4
Science Park	4	3.3
Mixed	4	3.3
Business angels	2	1.6
Total	122	100.0

In our sample, the most popular type of support was business training and learning (41.0%) (Table 2.5). Often delivered to teams of entrepreneurs, this type of support takes the form of mentoring, coaching, seminars, newsletters or other instruments designed to accelerate the entrepreneurs' learning curve (Bruneel, Ratinho, Clarysse, & Groen, 2012). Policy discourse represents 23% of the articles and consists mostly of policies enacted to shape regulatory and fiscal environments with a clear intent of creating conditions conducive to the creation, growth and long term viability of startups (Gilbert et al., 2004). Startup financing, often seen as the most important tool for supporting startups, represents 15.6% of the articles in our sample. Because important differences exist between private and public venture capital, loans, grant, and angel investments, we organize the literature accordingly in Table 2.5.

Table 2.5 Types of support

Type	Primary Activity	Secondary Activity
Business Training and Learning	50	5
Environmental Context	11	9
Financing	19	5
Angel Investors	2	1
Grants	4	0
Loans	3	0
Private Venture Capital	8	1
State Sponsored Venture Capital	2	3
Networking	4	9
Physical Infrastructure	2	9
Policy discourse	28	15
Technology transfer	8	2
Total	122	50

2.3.2 Outcomes of entrepreneurship support

A significant number of articles did not investigate the outcomes included in our conceptualization of entrepreneurship support (Figure 2.1). Many authors show a preference for historical analyses that explain the efficiency of sources or types of support, develop typologies of sources and types of support, or study underlying processes (e.g., innovation, technology transfer). While none of those studies informs us much about the efficacy of entrepreneurship support, we opted to keep them in our analysis as a complement to understand better this body of literature. Further, we see this as a major finding: that only about a third (34.5%) of the reviewed articles researched the outcomes of entrepreneurship support (Table 2.6). In other words, most scholarly research investigating sources and types of support does not attempt to establish any causal links between attributes of entrepreneurship support and its outcomes but rather focuses on internal mechanisms and generating typologies.

Table 2.6 Outcomes of entrepreneurship support investigated

Outcomes studied	Count	%
New venture	25	20.5
Survival	3	2.5
Performance	14	11.5
Efficiency of entrepreneurship support	40	32.8
Typology and industry analysis	22	18.0
Economic impact	4	3.3
Technology transfer	3	2.5
Innovation	5	4.1
History	4	3.3
Multiple	2	1.6
Total	122	100.0

Our article sample confirms our conceptualization of entrepreneurship support particularly the intuition that a given source of support can operate multiple types of support. In fact, we find that aside from the papers on business angels who only provide angel investment, all sources of support deploy more than one type of support (Table 2.7). Government represents the most comprehensive provider of support. In addition to policymaking, these articles highlighted governmental efforts to provide business learning programs, financing schemes, and physical infrastructure, among others. Given its complex nature, articles focused on entrepreneurial ecosystems as sources of support emphasized the types of support that can emerge because of interactions of all actors within the ecosystem including networking opportunities and contextual configurations. Next, we discuss in detail each source of support, the corresponding types of

support researched, and the outcomes found in each article. We organized the following section in descending order of frequency of articles found per source of support.

Table 2.8 summarizes the outcomes studied per sources of support. Taken together, studies researching the impact of entrepreneurship support in the creation, survival, or performance of new firms find some evidence of positive impact of each of the instruments analyzed. However, we find these results hard to generalize given the disparity found in dependent variables researched, the multitude of contexts in which studies were conducted, and the small sample size of many empirical settings.

Take the example of new venture creation, which scholars operationalize in divergent ways. While some authors measure the decision of individuals to start a business (Dubini, 1989; Shabbir & Di Gregorio, 1996), others track the emergence of industrial clusters as examples of regional entrepreneurial developments (Carayannis, Popescu, Sipp, & Stewart, 2006; Wonglimpiyarat, 2010). Similarly, performance is measured as R&D alliances (Hsu, 2006) or medium-term equity financing (Baum & Silverman, 2004).

Context emerged as an important factor in the entrepreneurship support literature; however, these studies fail to substantiate how different environments may influence results. For instance, Sternberg (2014) concludes that entrepreneurial support programs consisting of business training and learning and physical infrastructure do not influence spin-off creation rate in Germany. In contrast, PSED data reveals that nascent entrepreneurship is amplified by similar programs in the US (Parker & Belghitar, 2006). The combined results are, at best, inconclusive since the nature of entrepreneurship support programs is likely to vary across countries.

Small samples are a perennial issue in research on entrepreneurship support particularly when the sources of support are property based like business incubators and business development centers, or temporary like entrepreneurship support programs.

Another important factor to note is the date of each study. Historical perspectives on entrepreneurship support suggest that sources and types of support change overtime compromising the generalizability and applicability of past results (Bruneel, Ratinho, Clarysse, & Groen, 2012; Jacob, Lundqvist, & Hellsmark, 2003).

Next, we discuss in detail each source of support, the corresponding types of support researched, and the outcomes found in each article. We organized the following section in descending order of frequency of articles found per source of support.

Table 2.7 Sources and primary types of support

Types of support	Business Training	Environmental	Financing	Networking & Collaboration	Physical Infrastructure	Policy discourse	Technology transfer	Total
Source of support	and Learning	Context						
Government	1	1	2	2	1	20	2	29
Support program	22	0	3	1	0	1	0	27
Ecosystem	2	9	1	1	0	3	0	16
Business incubators	12	0	0	0	0	0	0	12
Venture Capitalists	0	0	10	0	0	0	0	10
Business development center	8	1	0	0	0	0	0	9
Universities	1	0	0	0	1	2	5	9
Science Park	4	0	0	0	0	0	0	4
Mixed	0	0	1	0	0	2	1	4
Business angels	0	0	2	0	0	0	0	2
Total	50	11	19	4	2	28	8	122

Table 2.8 Sources of entrepreneurship support (ES) and outcomes studied

Outcomes	Typology										
Source of support	New venture	Survival	Performance	Efficiency of ES	& industry analysis of ES	Economic impact	Technology Transfer	Innovation	Multiple History & Others	Total	
Government	9	0	0	6	5	3	0	4	2	0	29
Support program	3	0	4	12	3	1	1	0	0	3	27
Ecosystem	7	0	1	4	2	0	1	1	0	0	16
Business incubators	1	1	1	5	3	0	1	0	0	0	12
Venture Capitalists	0	1	3	3	2	0	0	0	1	0	10
Business development center	1	0	2	6	0	0	0	0	0	0	9
Universities	3	0	1	1	4	0	0	0	0	0	9
Science Park	0	0	1	1	2	0	0	0	0	0	4
Mixed	1	0	0	0	1	0	0	0	1	1	4
Business angels	0	0	0	2	0	0	0	0	0	0	2
Total	25	2	13	40	22	4	3	5	4	4	122

2.4 What we know about entrepreneurship support: who, what, and impact

Most studies investigate one source of support, the provision of one type of support (Table 2.7), and focus on one single outcome (Table 2.8). Therefore, we structure this section by source of support discussing the types of support found, the most common researched outcome, main findings, and recommendations (Table 2.9).

2.4.1 Government

Governmental support refers to the discourse on policies and regulations designed to support pre-start, startups, and early stages of the entrepreneurial process with the aim of encouraging more people to found new businesses (Lundstrom & Stevenson, 2006).

In our sample, we learn that entrepreneurship policy formulation starts with the identification of an interest area, involves multiple contacts with stakeholders, bolstered by supporting evidence, and ends with a public announcement often simultaneous to the publication of a white paper (Arshed, Carter, & Mason, 2014). Authors recommend that firms' characteristics and specific contextual factors such as economic environmental and local resource endowments should be attended (Mason & Brown, 2013). Studies show that the aim of such policies ranges from promoting new ventures (Gilbert et al., 2004) to supporting inter-firm alliances and collaborations (Aoyama, 1999). We also found evidence of entrepreneurship policy taking the form of direct intervention in building infrastructure (Audretsch, Heger, & Veith, 2015; Van de Ven, 1993) or providing capital to startups (Cowling, 1998; Rothwell, 1985).

Table 2.9 Types of support, outcomes, learned lessons and implications

Source of support	Main types of support	Most studied outcomes	What we learned	Implications
Government	Policy discourse	New venture	High impact entrepreneurship depends more on knowledge spillover and capital availability than on the type of regulatory environment	Capital markets and conditions conducive to knowledge spillovers should be in place
		Efficiency of support	Policies are designed to address historical deficiencies, implement global practices, or accelerate a country's convergence.	Need to craft policies adequate to regional conditions and attributes of the startup population
Support program	Business training and learning	Efficiency of support	Entrepreneurship support programs include many different services designed to achieve different outcomes	Lack of conceptual clarity and defined evaluation of outcomes
		Performance	Effects on growth, sales and survival depend on firm size, nature of training, and age of the entrepreneur	Business training and learning must be customized to each entrepreneur and startup
Ecosystem	Environmental context, Policy discourse	New venture	Entrepreneur's human capital predicts better nascent entrepreneurs than environmental conditions.	Policies should be tailored to local conditions. Entrepreneurs should understand the constraints they may face in each ecosystem
		Efficiency of support	Intangible resources such as role models and leadership are important components of the ecosystem and represent a significant part support received	Entrepreneurs should seek non-specific support

Source of support	Main types of support	Most studied outcomes	What we learned	Implications
Business incubators	Business training and learning, Physical infrastructure	Efficiency of support	Selection criteria, business training and learning, and funding streams impact BIs outcomes	No implications found
		Typologies of support	Historical generations, business training and learning, and geographical scope create different incubation models	Selection criteria impact tenant population.
Venture Capitalists	Financing	Performance	VC backed firms perform better, have higher chances of survival, and cooperate more often with other firms.	No implications found
Business development center	Business training and learning	Efficiency of support, Performance	Aspiring entrepreneurs are more likely to establish firms. Survival rates are higher than off-centre firms. Tax returns compensate investments in the center.	More centers should be established as means to generate employment opportunities.
Universities	Technology Transfer	Typology of support	Universities have several mechanisms to transfer technology ranging from business development assistance to research parks. Network size is identified as an important factor.	Universities interested in spinning-out companies should developed their external networks.
		New venture	Spin-off creation depends on each university's business development capabilities. Graduate students are more likely to create firms than faculty. Low selectivity leads to small businesses.	Professionalization of TTOs is determinant for spinning-out companies. High selectivity and support towards graduate students increases number of spin-offs.

Source of support	Main types of support	Most studied outcomes	What we learned	Implications
Science Park	Business training and learning	Typology of support	SPs have different graduation criteria and strategies to manage the innovation process among its residents.	No implications found
		Performance	On-park firms perform better	Need for inclusion of science parks in regional policy
Mixed	Policy discourse	New venture, Performance, Survival, Typology of Support, History of Support	Government can act as precursor for the establishment of entrepreneurship support sources and types	Need for comprehensive policy design
Business angels	Financing (Angel investments)	Efficiency of support	Informal investments follow geographically new business creation	Policies should create incentives to angel investment in peripheral regions
			Angels are willing to invest more in unlisted companies	Need for reducing barriers to angel investment

Entrepreneurship policy may have different intended targets: the design of national policies can address historical deficiencies, implement global practices, and accelerate a country's convergence. We find examples of technology transfer mechanisms in Saudi Arabia (Alshumaimri, Aldridge, & Audretsch, 2010), and modernizing innovation policy in Russia (Klochikhin, 2012) and Croatia (Švarc, 2006). Developed economies also attempt to increase entrepreneurship levels by promoting technology diffusion (Vekstein, 1999), supporting R&D (Gallaher & Petrusa, 2006), favoring specific industries (e.g., nanotechnology) (Mowery, 2011), and revitalizing manufacturing strategies (Tassey, 2010). On the regional level, scholars observe that entrepreneurship policy is multidimensional, with policies motivated by social and economic factors (Hall, Matos, Sheehan, & Silvestre, 2012; Huggins & Williams, 2011).

Despite the relative abundance of studies about governmental entrepreneurship support, there are few conceptual articles in this topic. Theoretical contributions suggest that governmental entrepreneurship support in the form of policy discourse directly impacts how institutions affect the emergence and growth of new companies. For instance, political structures based on individual and societal factors that emphasize individual rights tend to increase breakthroughs and diffusions of innovations through entrepreneurship (Spencer, Murtha, & Lenway, 2005). This conclusion is consistent with the argument that the need for innovation justifies governmental intervention to promote entrepreneurship (Michael & Pearce, 2009). Also, Van de Ven (1993) argues that infrastructure is a fundamental piece of governmental support of entrepreneurship since it creates a public endowment of knowledge, and a pool of available skilled labor for new firms and aspiring entrepreneurs.

Regardless of an explicit mention to the theoretical contributions, we found, our sample contains a few articles that provide empirical evidence to the arguments of theorists. Contrary to

what Spencer et al. (2005) reasoned, studies find that the combination of high levels of taxation and governmental involvement may amplify the economic impact of entrepreneurship (Bjørnskov & Foss, 2013), and that business regulation has a positive impact on the creation of new businesses (Murdock, 2012). However, these effects are attenuated by other factors such as knowledge spillovers and capital availability (Stenholm, Acs, & Wuebker, 2013).

Audretsch et al. (2015) confirm the insights by Van de Ven (1993) by showing that some types of infrastructure indeed positively impact entrepreneurial activity in certain industries. For instance, broadband availability ignites more startups in technology oriented services than highways or railroads in Germany (Audretsch et al., 2015). Additionally, we found evidence that programs designed to support R&D in new industries facilitate the emergence of entrepreneurial ventures in that same industry (Woolley & Rottner, 2008) and country (Hsu, Shyu, & Tzeng, 2005).

We found further empirical analyses of the impact of entrepreneurship policy. Brown and Mason (2014) find that policies are disproportionally focused on supporting a very rare type of startup characterized by rapid growth (i.e., gazelles), technology-based, and endowed with intellectual property. This means that almost all startups do not enjoy any specific measure of entrepreneurship support policy.

Hall et al. (2012) found that policies supporting tourism entrepreneurship in a Base of the Pyramid context represent an opportunity to improve social welfare, although it can also cause wider social problems. Policies that address both economic and social factors appear to foster more productive and sustainable entrepreneurial outcomes; however, this occurs at the expense of an accelerated pace of economic growth.

Finally, many studies focus on other aspects of governmental entrepreneurship support, such as analyzing country or regional policy instruments (Cowling, 1998; Dodgson & Rothwell, 1988; Dohse, 2000), and comparing countries and regional practices (Ahl & Nelson, 2015; Turok, 1997).

2.4.2 Entrepreneurship support programs

Entrepreneurship support programs include any programmatic expenditure that assists entrepreneurs in developing a business (McMullan, Chrisman, & Vesper, 2002). Among these is the Small Business Innovation Research Program (SBIR) which finances R&D and commercialization activities of small firms (Audretsch, 2003). We found other examples of programs designed to build regional networks (Jayawarna, Jones, & Macpherson, 2011; Major & Cordey-Hayes, 2000), promote technology transfer (Theodorakopoulos, Preciado, & Bennett, 2012) or loan guarantee programs (Riding & Haines, 2001).

We did not find a single theoretical article for entrepreneurship support programs. A significant portion of articles merely describe a typical instance of an entrepreneurship support program in a specific country or region (Gibb & Haas, 1996; Ladzani & Van Vuuren, 2002; Martin, Wech, Sandefur, & Pan, 2006; Masten & Kandoole, 2000; Obeng & Blundel, 2015; Skuras, Dimara, & Vakrou, 2000; Thakur, 1999). However, we did find articles explaining how to design better entrepreneurship support programs that address the challenges of an entrepreneur's competitive environment (Bradford, 2007; Klofsten & Jones-Evans, 1996; Kourilsky & Walstad, 1998) and help startups advance through their stages of growth (Gorman & McCarthy, 2006).

Entrepreneurship support programs overwhelmingly focus on providing business training and learning as the main type of support. This is nevertheless diverse: we found examples of business training through state-funded small business advisors (Lambrecht & Pirnay, 2005; Mole & Keogh, 2009), general entrepreneurship support to minorities (Benson, Lies, Okunade, & Wunnava, 2011; Ram & Smallbone, 2003) or gender specific support (Pernilla, 1997). Only one article discusses the implication of providing support programs online (Evans & Volery, 2001).

The lack of a common theoretical background investigating this source of support may result in inconclusive findings. For instance, Sternberg (2014) found that location has a stronger effect on a firm's growth, sales, and profit than entrepreneurship support programs. This finding suggests that entrepreneurship support programs do not always reverse adverse environmental conditions. However, studies do show a positive association between public advisory services and sales growth (Cumming & Fischer, 2012) and survival (Rotger, Gørtz, & Storey, 2012; Solomon, Bryant, May, & Perry, 2013). Overall, these studies conclude little about the effectiveness of entrepreneurship support programs since support ranges from governmental programs targeted at spin-offs (Sternberg, 2014) to generic business advisory services (Cumming & Fischer, 2012; Rotger et al., 2012) that include technical support (Solomon et al., 2013). Other results show that support programs encourage people to pursue business ownership (Parker & Belghitar, 2006). Specific programs like the SBIR were found to support high-technology entrepreneurship (Qian & Haynes, 2014).

We did find explicit practical implications in most articles that research entrepreneurship support programs. However, the recommendations are specific to the program researched (e.g., Ram and Smallbone (2003); Riding and Haines (2001)), seldom offering more than generic advice of more or better support (e.g., Jayawarna et al. (2011); Qian and Haynes (2014); Thakur

(1999)), or calls for adapting programs to entrepreneurs' needs (e.g., Gorman and McCarthy (2006); Skuras et al. (2000); Sternberg (2014)).

2.4.3 Ecosystem

The existence of hot beds of innovation and entrepreneurship in places like Silicon Valley in California and the Route 128 in Massachusetts (Castells & Hall, 1994) has encouraged considerable research to understand how an economic ecosystem and the local context support entrepreneurship. The emphasis of this research is to explain how regional characteristics have direct or indirect effects on entrepreneurs' decisions to launch a venture, innovate, and germinate novel industries. Additionally, many of these studies attempt to assess and compare the entrepreneurial advantages of a certain location, often at the national level, which may be too broad to explain the true effects of an ecosystem on an entrepreneur. Doing so would require considerable longitudinal data and a historical context typically absent in this literature.

The term entrepreneurial ecosystem is becoming increasingly common in entrepreneurship literature. Inspired by the business ecosystem used in management literature (Autio et al., 2014; Zahra et al., 2014), scholars and practitioners apply this metaphor to emphasize the importance of context, the relationships between the several actors, and their interdependence to understand entrepreneurship (Autio et al., 2014; Zahra et al., 2014). We found two important theoretical contributions to the study of this source of support. Venkataraman (2004) posits that while tangible risk capital, infrastructure and legal systems are necessary conditions for entrepreneurship, intangibles such as access to novel ideas, role models, informal forums, and region specific opportunities are determinant for regional prosperity. This view suggests that diverse businesses, ranging from startups to established companies, with varied degrees of

performance attract talent and sustain entrepreneurship in a given location (Venkataraman, 2004). Others have discussed that entrepreneurs must constantly align the development of their venture idea with the ecosystem's goals (Nambisan & Baron, 2013). The assumption is that the interdependence of multiple actors is crucial to entrepreneurship. The implication for entrepreneurship support is that the ecosystem may not always be a facilitating environment.

Empirical studies do not share a common view on how the entrepreneurial ecosystem supports entrepreneurship. Some articles use a partial operationalization of ecosystem investigating only specific networks and its impact on resource acquisition (Meyskens, Carsrud, & Cardozo, 2010), innovation (Vuola & Hameri, 2006), technology transfer (Laranja, 2009), localized technology commercialization (Wonglimpiyarat, 2010), or entrepreneurs' motivations (Dubini, 1989). Most studies found in our sample do not refer explicitly to an ecosystem but rather have in common the view that entrepreneurs are passively supported by a mix of institutions, structural factors, regional conditions, and organizations (Hanlon & Saunders, 2007).

Empirically, we learned that regional socio-economic conditions are found to have an indirect impact on the intention to start a business (Kibler, 2013) as well as on subsequent growth (Rotefoss & Kolvereid, 2005). Further, studies in developed countries (Hawkins, 1993; Suzuki, Kim, & Bae, 2002), transitioning economies (Smallbone & Welter, 2001) and developing countries (Lu & Tao, 2010; Shabbir & Di Gregorio, 1996) collectively show that entrepreneurship is better understood using a systemic approach and that support, either passive or active, is necessary but not sufficient for the emergence of new firms.

An important contribution to the notion of ecosystem is by Clarysse, Wright, Bruneel, and Mahajan (2014), who show that business ecosystems do not necessarily emerge automatically from knowledge ecosystems (Clarysse et al., 2014). While knowledge ecosystems revolve around anchor organizations that do not compete or otherwise encourage collaboration (e.g., university), business ecosystems revolve around a few established corporations and sets of small businesses that cooperate to deliver final products to customers (Clarysse et al., 2014).

2.4.4 Business incubators

Business incubators are a popular form of entrepreneurship support. Since their emergence, business incubators provide support to tenant companies by providing space, business assistance, and access to networks, attempting to lower chances of failure for startups (Adkins, 2002; Hackett & Dilts, 2004; Phan, Siegel, & Wright, 2005). We have not found any theoretical contribution regarding business incubators as a form of entrepreneurship support. While some articles borrow other management theories to study business incubation (Aaboen, 2009; Amezcua, Grimes, Bradley, & Wiklund, 2013; Bruneel et al., 2012; Carayannis & Von Zedtwitz, 2005), most remain largely atheoretical citing only previous literature on this topic (Hackett & Dilts, 2004).

We found only one study investigating the impact of business incubation on firm creation, survival, or performance. Amezcua et al. (2013) use a comprehensive US based dataset of university-based incubators and their respective tenants to show that incubated firms' survival depends on the fit of resources made available and the location of the incubator (Amezcua et al., 2013). Contrary to the common assumption, abundance of resources does not lead to higher chances of survival (Amezcua et al., 2013).

We found a few articles discussing incubation typologies mostly using project consortium data. Carayannis and Von Zedtwitz (2005) discussed five business incubators archetypes based on each incubator's competitive scope and strategic objectives. Bruneel et al. (2012) advanced the notion of generations of business incubators based on the qualitative and quantitative analyses of both incubators and representative samples of tenant companies. Findings show that three generations of incubators exist and are distinguished by the mix of infrastructure, business support, and networking services supplied to tenant companies (Bruneel et al., 2012). Finally, we learned that universities have deployed different strategies to incubate new ventures relying on varied entrance criteria, resources available, infrastructure, and financial support schemes (Clarysse, Wright, Lockett, Van de Velde, & Vohora, 2005).

All other articles are qualitative, relying on small samples, perceptual data, or localized case studies merely describing the internal functioning of incubators and not adding much to the understanding of outcomes of business incubation (Adegbite, 2001; Carayannis et al., 2006; Chan & Lau, 2005; Hisrich & Smilor, 1988; Mian, 1997). Prior attempts to systematize research in incubators have called for theoretical refinements of this topic as means to better establish BIs' efficacy in support of the nascent venture (Hackett & Dilts, 2004; Phan et al., 2005).

Business training and learning represents the main support type associated with business incubation. Contrary to what we found in other sources of support (e.g., entrepreneurship support programs), business incubation research operationalizes business training and learning uniformly and consists of coaching (Bergek & Norrman, 2008) and workshops (Bruneel et al., 2012). We also see that business incubators encourage firms and entrepreneurs to network and collaborate more than other support sources.

Parallel to business learning and training, and networking and collaboration, some articles consider physical infrastructure as essential to business incubation ranging from office space to dedicated specialized facilities such as research laboratories or micro manufacturing (Carayannis et al., 2006; Carayannis & Von Zedtwitz, 2005).

2.4.5 Venture capitalists

Venture capital (VC) refers to investments made early in a firm's trajectory in exchange for company equity. Although not commonly seen as entrepreneurship support, receipt of VC regularly includes intense coaching as means of increasing growth prospects and therefore maximizing the investor's return on investment (Hellmann & Puri, 2002).

Despite the absence of any specific theory for VC research, most articles found in this category use established management or finance theories as the basis for their studies. We also observe that all these articles look at financing as the only type of support where financing ranges from seed, start-up and early stage investment (e.g., del-Palacio, Zhang, and Sole (2012)) to more substantial investments in growing start-ups (e.g., Baum and Silverman (2004); Florida and Kenney (1988)). It is also noteworthy that only two articles investigate state-sponsored VC (Cumming & MacIntosh, 2006; Grilli & Murtinu, 2014).

Empirical results analyzing the impact of VC investment on start-up performance consistently show that VC-backed firms experience a positive impact in performance and survival. VC-backed firms are more likely to undertake an IPO (Hsu, 2006), have higher sales growth (Grilli & Murtinu, 2014), higher revenue and employment growth and higher chances of survival (Baum & Silverman, 2004). These effects are contingent upon the relationship between the investor and the start-up (Busenitz, Fiet, & Moesel, 2004). Of course, due to their very

critical selection criteria, it is difficult to isolate the impact of the VC support from any subsequent success.

The remainder articles do not investigate specifically the impact of VC investment on start-ups. For instance, Florida and Kenney (1988) discuss several typologies of VC existent in different locations across the US. Others discuss the emergence of VC capital industry in emerging economies (Pandey, 1998). A cluster of articles seems devoted to understanding the efficiency of VC funds focusing on the performance of each investor (Brophy & Guthner, 1988; del-Palacio et al., 2012; Kleiman & Shulman, 1992).

2.4.6 Business development centers

Small business development centers (SBDC) exist to support small business and pre-venture entrepreneurs. Hosted by universities and or regional development agencies, and partially funded by governments, SBDCs provide free consultation about writing business plans, accessing capital, or general management assistance. Research about SBDCs dates mostly from the 1990s and most of the studies found are based on the work of Chrisman and colleagues (Chrisman, 1989, 1999; Chrisman, Carsrud, DeCastro, & Herron, 1990; Chrisman, Hoy, & Robinson, 1987; Chrisman & Katrishen, 1994).

We found no theoretical articles in this category; most studies cite prior literature on this specific topic. This can explain the lack of both practical and theoretical implications in these articles. The overwhelming majority of studies investigated business training and learning as the main type of support provided by SBDCs.

Two studies investigated the impact of SBDCs on firm performance concluding that, in three years or less, firms generate tax returns that may exceed the funds invested in SBDCs (Chrisman et al., 1987; Chrisman & Katrishen, 1994). Also, we see that aspiring entrepreneurs who receive help from a SBDC are more likely to transition into business ownership in comparison to those who receive help from other sources (Chrisman, 1999).

Most studies found in this category investigate the internal functioning of centers and fail to add anything to our understanding of how SBDCs help start-ups. We learn that male and female entrepreneurs report similar assistance needs when aspiring to start a business (Chrisman et al., 1990) although those results change when studying minority populations (Jones & Tullous, 2002). Entrepreneurs also underestimate the amount of legal support needed to start a business (Brown, Colborne, & McMullan, 1988). Further, entrepreneurs seemingly value strategic assistance over help with administrative or operational issues (Chrisman, 1989). Finally, two studies present results about specific programs in Central and Eastern Europe (Bateman, 2000) and promoted by a governmental agency (Becerra-Fernandez et al., 2000).

2.4.7 Universities

Entrepreneurship support by universities takes place mainly through technology commercialization and has increasingly captured the attention of policy makers. Despite the popularity and the multitude of programs established globally, we only found nine articles discussing this in the context of entrepreneurship support.

We found no theoretical contributions in this category, as in the other sources of support. Most articles merely reference prior literature on the topic. Thus, this literature is void of theoretical implications and practical implications appear in only half the articles.

There are a few noteworthy empirical results to understand university entrepreneurship support. We see claims that universities with a clear policy of selectivity and high levels of support are able to overcome a weak infrastructure and lack of entrepreneurial culture (Degroof & Roberts, 2004). Also, we learn that spin-off firm creation and subsequent success within universities is associated not only with intellectual property protection but also with business development capabilities often present in technology transfer offices (Lockett & Wright, 2005). Further, Åstebro, Bazzazian, and Braguinsky (2012) show that university graduates are more likely to build spin-off companies of superior quality in comparison to faculty. This suggests that universities should exercise caution when transforming their missions and practices to stimulate entrepreneurship and economic prosperity (Åstebro et al., 2012). These findings are consistent with earlier studies which suggested that university links may be detrimental to spin-off growth overtime (Doutriaux, 1987).

The remainder of studies found in this category discuss several different typologies for university based entrepreneurial support based on

- (i) degree of involvement of the university (active vs. passive) (Schoenecker, Myers, & Schmidt, 1989),
- (ii) planned vs. spontaneous (Steffensen, Rogers, & Speakman, 2000),
- (iii) use of surrogate entrepreneurs (Franklin, Wright, & Lockett, 2001), and
- (iv) overall university strategy (Lockett, Wright, & Franklin, 2003).

Finally, one study discussed the positive impact of an early example of university entrepreneurship support (McMullan, Long, & Graham, 1986).

2.4.8 Science parks

Science parks (SPs) represent a popular infrastructure that promotes university-industry interaction (Massey, Quintas, & Wield, 1992). Literature on this topic agrees that, despite the lack of a universally accepted definition, science parks are managed property-based organizations focused on supporting businesses through knowledge intensification and resource sharing (Phan et al., 2005).

The four reviewed articles on science parks consistently list business training and learning as the main type of support offered; only one article refers to technology transfer as a secondary type of support (Löfsten & Lindelöf, 2002). We find this somehow surprising given that science parks are established to concentrate research organizations and innovate existing firms under the assumption that this geographical proximity would facilitate technology transfer (Amirahmadi & Saff, 1993).

The literature on SPs lacks theoretical contributions and thinly discusses prior studies in science parks or similar organizations such as business incubators. In fact, one article merely lists a new (at the time of publishing) online tool available for park residents (Durão, Sarmiento, Varela, & Maltez, 2005).

Empirical findings confirm that firms located in SPs are also more likely to have a link with a local university than off-park firms (Löfsten & Lindelöf, 2002), which should not be surprising given the working definition of science parks. More importantly perhaps is that residing firms perform better in sales and employment than off-park firms (Löfsten & Lindelöf, 2003). Finally, we found one study comparing American and Russian science park practices (Bruton, 1998).

Given that the reviewed SPs articles only use previous research as a point of entry, we unsurprisingly found a void of significant practical or theoretical implications in this area. The one exception, Löfsten and Lindelöf (2002) offer that science parks fulfill an important aspect of regional policy (employment creation) while claiming that their paper does not investigate the role of science park in regional development.

2.4.9 Business angels

Informal investors like business angels represent a common funding source for startups. We found two articles explicitly researching this entrepreneurship support mechanism and both focus on angel financing as the type of support. One article describes barriers faced by angel investors in the UK and concludes that tax incentives should be in place to increase business angels' investing (Mason & Harrison, 2002). The other article talks about how informal capital markets that are disproportionally located in metropolitan areas are mostly interested in investing in tech-based companies (Avdeitchikova, 2009).

We note that, similarly to research in other sources of support, there is no solid theoretical basis in both articles. Further, the authors that discuss aspects related to the business angel industry largely ignore the impacts of these kinds of investment in startup performance. The implications found are superficial and merely recommend policy makers to create the conditions that counter the findings, i.e., remove tax barriers for business angels (Mason & Harrison, 2002), and improve geographical distribution of informal capital (Avdeitchikova, 2009). Our findings are consistent with those by Politis (2008), who noted that our knowledge of the role business angels play in the entrepreneurial process is still very limited.

2.4.10 Mixed sources

We found a few articles that investigate several sources of support simultaneously. The results do not add to those found in research dealing with one single source of support but can provide insights about antecedents of specific sources of support. For instance, Xiao (2011) researches the government as a precursor to VCs or R&D networks. Others provide a historical perspective on the creation of an undisputed entrepreneurial university – Chalmers in Sweden – analyzing multiple levels of intervention, ranging from governmental policies to university based practices (Jacob et al., 2003). We also found articles researching the creation of an entrepreneurial ecosystem in France (Delapierre, Madeuf, & Savoy, 1998) as well as prescribing best practices for Eastern Europe (Tyson, Petrin, & Rogers, 1994).

2.5 Research opportunities

In this section, we outline research opportunities in the topic of entrepreneurship support. First, we suggest three domains of entrepreneurship support to guide researchers to a more comprehensive way of investigating this phenomenon. Next, we discuss how using mainstream management theories can inform entrepreneurship support research. Finally, we offer practical guidance for future research projects in entrepreneurship support.

2.5.1 Domains of entrepreneurship support

Our review clearly shows that entrepreneurship support became an umbrella term used to describe a multitude of efforts ranging from governmental regulatory and legal frameworks to venture capitalist investments. Over the past decades, scholarly research sought to explain why and how particular sources and types of support impact startups and steer the entrepreneurial

process. However, by narrowing down the analyses, research gaps emerged, which altogether reveal non-generalizable results with little or no practical application.

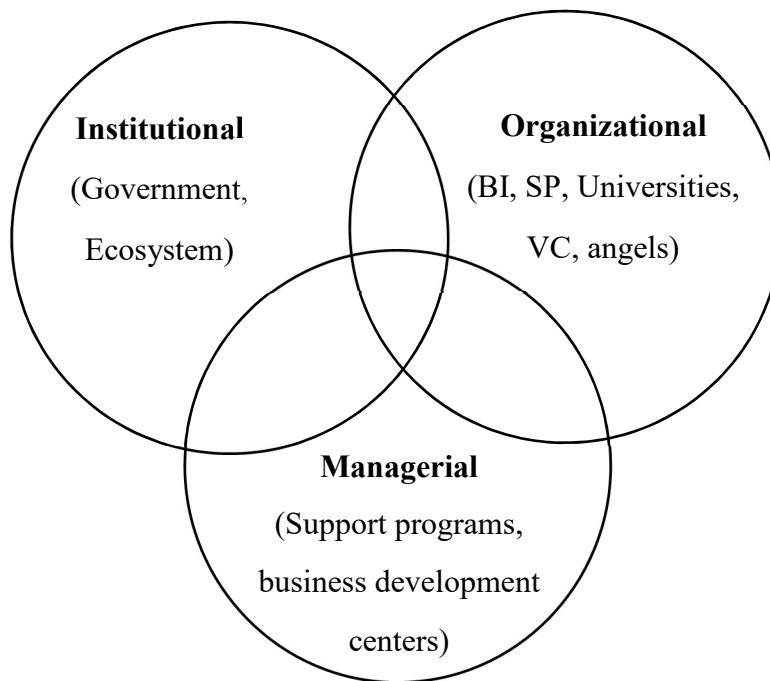
Based on our review, we propose that entrepreneurship support manifests itself in three domains: institutional, organizational, and managerial (Figure 2.2, Table 2.10). While each domain designs unique support mechanisms to assist entrepreneurs and startups in some fashion, their interventions are disparate in scope, duration, and delivery mode. For instance, changes in regulatory environments designed by governments may affect all businesses (startup and existing companies), its effects are only observable in the long term, and are delivered in a rather passive way. Conversely, managerial entrepreneurship support programs judiciously select startups to support, deliver programs in a short period, and actively support entrepreneurs and startups.

Table 2.10 Characteristics of domains of entrepreneurship support

Domain	Scope	Duration	Delivery	Examples of sources
Institutional	May affect all companies and industries	Long	Passive	Government, Ecosystem
Organizational	Judicious selection	Medium	Active and Passive	Business incubators, Science Parks, Universities, Venture Capitalists, Business angels
Managerial	Judicious and self selection	Short	Active	Entrepreneurship support programs, business development centers

Figure 2.2 represents the three domains of entrepreneurship support and Table 2.10 summarizes the characteristics of each domain. Sources of support in the institutional domain create and shape the environmental conditions that affect startup development. Governmental policymaking affecting changes in regulations, fiscal or legal frameworks are examples of this

Figure 2.2 Entrepreneurship support domains



kind of sources. While there are clear examples of governmental policies dedicated to startups – for instance in the US (Gilbert et al., 2004) – we also found evidence of policies that affect whole industries regardless of company age (Aoyama, 1999; Mowery, 2011). The duration of this source of support tends to be long term and its effects observable after decades.

The organizational domain offers unidirectional entrepreneurship support from one organizational sponsor to a startup (Flynn, 1993). For instance, investments by VCs or business angels provide financing to grow the company. Judicious selection is common to these sources of support. Business incubators are known to have complex selection criteria actively curating the population of supported startups (Aerts, Matthyssens, & Vandenbempt, 2007; Bergek & Norrman, 2008). Venture capitalists also carefully select which startups receiving funding according to personal and professional characteristics of the entrepreneurial team (Chen, Yao, & Kotha, 2009). The duration of this source of support is limited from a few years in the case of

incubators to longer timeframes depending on investment conditions, in the case of business angels. Finally, the intervention of organizational sources of support in startups can be active like in the case of more recent models of business incubation (Bruneel et al., 2012) or rather passive like in the case of science parks (Phan et al., 2005).

Managerial sources of support directly assist entrepreneurs. Intended to guide aspiring entrepreneurs to enter business ownership by accelerating their learning curve, these sources of support have different selection practices (Chrisman et al., 2005). Some support programs are designed to help a specific population of aspiring entrepreneurs (Benson et al., 2011; Pernilla, 1997; Ram & Smallbone, 2003) while others rely on each entrepreneur's desire to seek advice (Cumming & Fischer, 2012; Lambrecht & Pirnay, 2005). The duration of managerial sources of support is short and even incidental in some cases. Such support is delivered actively often through one-to-one consultation.

2.5.2 Theory development

The study of entrepreneurship support has been mostly phenomenological and atheoretical, as our review shows. A plausible historical explanation for the finding could be that their popularity occurred prior to the emergence of an academic field dedicated to entrepreneurship. For instance, early studies of business incubators, science parks or venture capital were merely descriptive (Amirahmadi & Saff, 1993; Smilor & Gill, 1986) or survey-based (Gorman & Sahlman, 1989), often failing to make any significant theoretical contributions to the field of entrepreneurship research. These early works sought to demarcate the origins, functions, and value of each form of support. Additionally, these authors were likely attempting to shed light on the value of the phenomena due to their practical policy and management importance.

Overall, we found only ten conceptual articles that directly fit our proposed framework for disentangling the sources, types of support, and outcomes of entrepreneurship support. This leaves the field open for major contributions that can improve our theoretical and scientific understanding of entrepreneurship support.

We now discuss the richest theoretical areas that can help scholars enrich and illuminate the importance and relevance of this field. While we based our review in searching for entrepreneurship support theoretical background, we now take a step back and consider applying other existing theoretical backgrounds to understand, study, and formulate support systems to entrepreneurs.

We chose the resource-based view of the firm and dynamic capabilities due to its widespread use in entrepreneurship literature in particular to study which resources entrepreneurs need at inception and to succeed (Hitt, Ireland, Camp, & Sexton, 2001). Resource dependence theory changes the perspective from managerial to environmental and helps us understanding how entrepreneurship support can work in different contexts. Finally, we discuss the use of economics of agglomeration to introduce the effects of industry in entrepreneurship support systems. Our choice of theories is not exhaustive and should be seen a mere illustration of how to apply an existing theoretical lens to entrepreneurship support rather than trying to generate specific ones. Also, we relate each of these theories to the proposed dimensions of entrepreneurship support presented above in Figure 2.2.

Resources and their dynamic capabilities

Scholars have now extensively scrutinized, adopted, and deepened our understanding of entrepreneurship using the perspectives of dynamic capabilities (DC) (Barreto, 2010; Zahra,

Sapienza, & Davidsson, 2006) and the resource based view of the firm (RBV) (Lado, Boyd, Wright, & Kroll, 2006). DCs, through action of the entrepreneur and his/her team, allow firms to change or reconfigure existing substantive capabilities due to external change, new insights on external conditions, and internal pressures (Zahra et al., 2006). Use of DCs, while costly in the short-run, can pay off in stronger performance long-term, especially in dynamic environments (Zahra et al., 2006) because DCs require practice to maintain. Similarly, the RBV argues that firms can sustain a competitive advantage when they control valuable, rare, imperfectly imitable, and not substitutable resources (VRIN) (Barney, Wright, & Ketchen, 2001). Similar to the logic of DCs, the RBV argues that VRIN resources come about through insights and actions of the entrepreneur and her team (Barney et al., 2001). Because entrepreneurs are heterogeneous, the creation of sustained competitive advantages among new firms is highly dependent on the human capital of a firm's leadership (Barney et al., 2001).

We encourage further application of these two perspectives—DCs & RBV—in this literature because scholars are beginning to grapple with the implications of these concepts as it relates to entrepreneurial support given to entrepreneurs. In our sample, two articles mention this theoretical perspective to generate theory (Carayannis & Von Zedtwitz, 2005; Van de Ven, 1993) and many others mention it as part of the literature background to investigate several sources of support such as ecosystems (Suzuki et al., 2002), business incubation (Bruneel et al., 2012) or entrepreneurship support programs (Gorman & McCarthy, 2006). However, the use of RBV and DC translates mostly into positing that entrepreneurship support helps entrepreneurs to deal with changing environments by providing them with resources from inception.

Many unaddressed questions exist in these theoretical perspectives, especially in the managerial dimension of entrepreneurship support: which type of resources is more important for

startups? For example, while most entrepreneurs actively seek financing, would networks, better suppliers and distributors, or improved marketing be more beneficial to start-up performance? When is each type of resource more important, and can resource deficits lead to innovative activity? Is legal advice most critical prior to incorporation or after incorporation? Can better performance tracking indicate higher long-term performance than investments in marketing after a first sale? How does the heterogeneity of the entrepreneur, or her venture, impact the RBV or DC support environment?

Thinking about the importance of dynamic capabilities, are there training and management practices that can create the capabilities early on in a startup? Are there unique resources like owning a patent or a developing an organizational culture that can sustain dynamic capabilities? Can they scale up? Most importantly, are entrepreneurship support programs with unique resources and dynamic capabilities themselves be more successful than those with generic resources?

The fact that entrepreneurship support aims to infuse new ventures with resources to sustain their longevity and diminish quickly their liabilities of newness points to the relatively close connections between this phenomena and existing organizational theories. However, resource constraints may also act as inspirations for innovative activity (Lampel, Honig, & Drori, 2014). Examining closely the interventions that new ventures receive while being supported and how they alter the development of their capabilities and resources falls in line with the premise of these two theories.

Resource dependence theory

Resource dependence theory highlights the reality that all organizations need to extract resources from their environment and other organizations for their own survival (Davis & Cobb, 2010; DiMaggio & Powell, 1983). Given that entrepreneurship support programs exist to transfer resources and knowledge to entrepreneurs to increase their likelihood of survival, resource dependency theory is rich with insights for the study of these phenomena, particularly in the institutional dimension. Considering the many research papers on the liabilities of newness where entrepreneurs need to rapidly gain technical, management, and market expertise to commence and sustain resource exchanges, we were surprised to have only seen two papers in this literature using this theory (Meyskens et al., 2010; Woolley & Rottner, 2008). This is a major weakness in this research domain given that the local context and environment may even be more determinant in entrepreneurial firms (Daily, McDougall, Covin, & Dalton, 2002).

In the start-up economy, entrepreneurship support programs constitute a unique field of organizations purposively devoted to assisting entrepreneurs surmount a resource exchange challenge. Thus, by the resource dependence theory, what are the resource exchange advantages and disadvantages of start-ups that bind themselves to entrepreneurship support programs? Further, are there any unintended dependencies (positive and negative) after an entrepreneur engages with an entrepreneurship support program? Finally, given the selection practices and power of entrepreneurship support programs to advance a start-up's business, to what extent do these programs behave benevolently and aligned with market forces?

Given the legitimacy concerns of the resource dependence theory and institutional theory, scholars should also ponder which “resource exchange” matters most to the entrepreneur when receiving assistance from entrepreneurship supporters. Do bricks and mortar as in the case of

business incubation and science parks matter more than receiving financial assistance from an angel or venture capital firm? On the other hand, is receiving a government contract or grant from a program like SBIR matter more than participating network opportunities? Regardless of the transferred resource from an entrepreneurship support program to the entrepreneur, these resources all likely carry different and important value when it comes to raising legitimacy of a start-up.

Economies of agglomeration

Economies of agglomeration through urbanization and industrial clustering represent another rich area of theory for the study of entrepreneurship support programs, especially at the institutional level. These theories emphasize the importance of locations as a determinant factor for company performance (Gordon & McCann, 2005; Marshall, 1890; Porter, 1990). Also, these theories argue that a start-up's choice of location especially within a densely populated cluster benefits new firms due to larger pools of potential customers, suppliers, and skilled labor (Pe'er & Keil, 2013; Saxenian, 1996). Because we did not find any articles where these theories played a central role in the study of entrepreneurship support, we recommend them in future research. This is especially true given the growing interest in the creation and management of entrepreneurship ecosystems.

Possible areas of study include the trade-off between entrepreneurship support mechanisms that seek to diversify the industrial base of an urban economy versus those that seek to specialize the industrial base. Additionally, how can entrepreneurship programs better grapple with the unique resources and strengths of its location to foster entrepreneurship? What kinds of regional attributes can be used to foster entrepreneurial development (Florida, 2002a, 2002b)?

Given the plethora of entrepreneurship support programs, are there economies of scale to the creation of these in a specific location? In addition, how can entrepreneurship support mechanisms better integrate and coordinate their services? Finally, how does competition among entrepreneurship support mechanisms aid the advancement of the local entrepreneurship economy?

2.5.3 Practical guidance

Entrepreneurship support, the provision of tangible and intangible resources to new firms to increase their survival and growth rates, prevails across many sectors of the global economy. However, the scholarship on this activity lacks palpable evidence of its effectiveness. Despite the importance of entrepreneurship support to policy-makers, its widespread popularity across research institutions, and its intervention in the launching activities of entrepreneurs, we found limited evidence of the impact on entrepreneurs and entrepreneurial activity. Decades of research on the varied sources of entrepreneurship support fail to offer strong empirical evidence encouraging the design, provision, management, and growth of similar programs. Thus, this field is rich with research opportunities, which we outline by describing practical and substantive approaches for making contributions.

Impactful research requires inspiration and motivation from novel and clear theoretical insights. Practical considerations inspired most of papers in this review. While impactful research should be relevant to practitioners, it cannot do so at the expense of a theoretical contribution. Future research should grapple with theory to make stronger contributions.

We also recommend that improvements in methods and empirical design can make major contributions in this field. Ideally, studies would employ comparison and control groups to

examine and monitor nascent entrepreneurial activities longitudinally. With few exceptions, longitudinal studies are rare in this field (see for instance Amezcua et al. (2013)) as well as studies using control groups (see for instance Rotger et al. (2012); Löfsten and Lindelöf (2002)).

Further, unlike many entrepreneurship studies where entire populations of emerging industries are observed, the empirical work in this field is fragmented, based on small samples, and not generalizable. By avoiding one-time measures of activities and collecting comprehensive data on entrepreneurship support programs, studies will increase in rigor and relevance.

We note this suggestion with caution, given the unfortunate demands of contemporary scholarly production. At most universities, these require consistent significant output over a short tenure evaluation period (Honig, Lampel, Siegel, & Drnevich, 2014). In general, the academic system fails to support the kind of long-term research that would help illuminate the relative contributions of entrepreneurial support mechanisms.

Additionally, scholars should collaborate more strongly with the local, regional, and national promoters of entrepreneurship support programs. Unfortunately, while some of them are generously resourced, they often fail to incorporate systematic monitoring and evaluation procedures in their program design. Stronger collaborations will likely improve the quality and timeliness of data on these programs. Further, collaborations may reduce the biases that arise when the sponsors and providers of these programs produce their own research. Often such studies are subjective and lend themselves towards demonstrating strong performance as opposed to testing practices so that weaknesses in their programs can be highlighted and addressed.

Overlapping domains of support

Despite the many studies found investigating business training and learning, policy discourse, and financing (Table 2.7), we find clear gaps in our understanding of these more popular areas of study. For example, business training and learning research has largely ignored this type of support provided by business angels or venture capitalists, at the intersection of organizational and managerial domains. A distinguishing characteristic of this kind of investors is their hands-on and mentoring approach seeking to professionalize the startup management.

The research examining policy discourse attempts to evaluate how changes in laws and regulations support or deter entrepreneurial action. Most of this work focuses on how governments affect policies. However, some sources of support also engage and influence policy discourse operating in both organizational and institutional domains. For example, business incubators in the U.S. and Europe lobby national and local governments for policies that increase their funding and aid entrepreneurs. In doing so, they may make exaggerated claims not supported by research (European Commission Enterprise Directorate-General, 2002; Lewis, 2005; Monkman et al., 2010). Universities also often affect policy discourse by speaking for policies that increase funding for innovations, new technologies, and technology transfer. However, they frequently fail to document the economic impact of their entrepreneurial promotion activities. Policy discourse frequently takes place at higher levels of government. However, local jurisdictions also control many purse strings, which, with better regulation or management may lead to major improvements in the quality of outcomes from entrepreneurship support programs.

Finally, we note that some sources of support are integrating types of support commonly offered by others. For instance, financing is mostly linked to venture capitalists and very rarely,

perhaps affecting one in 20,000 startups. Increasingly, business incubators and accelerators often trade services and resources with their clients, in exchange for a minor percentage of equity (Cohen & Hochberg, 2014; Isabelle, 2013). Finally, one common service offered by business development centers is assistance in applying for loans through local banks, community development corporations, and government programs. However, firms in debt are not necessarily successful firms.

Underdeveloped sources and types of support

This review illuminates several research areas poised for a major contribution due to a lack of attention. These include research on physical infrastructure, networking, and technology transfer.

When a city or region seeks to promote itself as friendly to entrepreneurs and business, it usually promotes its business incubation facilities, science parks, and cohesive entrepreneurial ecosystem. Economists have regularly found that physical infrastructure in the form of transportation and utilities often spurs economic development (Chandra & Thompson, 2000; Michaels, 2008). However, this research measures infrastructure too broadly to capture the true value of physical infrastructure changes in any specific location to the emergence of new firms. Further, the kind of general infrastructure referenced has global commercial applications over the life of any business. Studies that examine how the creation of new business incubators and science parks specifically affect new firm creation could complement this established field of study. Additionally, as more cities and regions begin to examine the entrepreneurship ecosystem, efforts to evaluate how the ecosystem is both a physical and social phenomenon may prove fruitful.

Many entrepreneurship support sponsors facilitate networking because they believe that it helps entrepreneurs' access external resources, legitimacy, and knowledge. It can also have distinct advantages at different stages of the start-up phase (Greve & Salaff, 2003). Further, support providers like business incubators and universities prioritize networking. How entrepreneurs learn to network and the ways in which they harvest useful knowledge and resources from their network is an area that needs greater attention.

Despite its long-standing presence in the field of entrepreneurship, we were surprised to have seen such few studies on the provision of technology transfer advice and assistance and its effects on entrepreneurs. Clearly, the major players in technology transfer advising would be universities and science parks. However, we did not find a single study on science parks and technology transfer support in the context of entrepreneurship support. Thus, this represents a fruitful area of research. Additionally, venture capitalists are key players in shaping the direction and strategy in how entrepreneurs leverage their technological innovations and intellectual property. Thus, we encourage further development of research on this topic. Finally, business incubators and accelerators often play a role in technology transfer decisions and their specific advising and assistance with this process needs investigation.

One new area of research that applies to all sources and types of support would examine which entrepreneurs a variety of programs should target. Many advocates of entrepreneurship support provide their assistance to only those who are most promising (Shane, 2008). However, promise and innate talent is not the same as directing services to the entrepreneurs who have the most to learn. In fact, no guidance exists on how to match the qualitative differences in types of support to the actual needs of entrepreneurs. Most of these programs and researchers assume that entrepreneurs will benefit similarly to all the types of support and from the same sources of

support. However, we know that the entrepreneurship processes are not universally the same across individuals, industries, or environments. Thus, an opportunity exists to make a lasting impact in this area of research by studying how to match qualitative differences in programs to the distinct needs of entrepreneurs.

Entrepreneurship education as an outcome of entrepreneurship support

Our review shows that only about a third of the studies found investigate the outcomes we conceptualized (Figure 2.1). While we discussed our concerns about the excessive focus on studying internal mechanisms of sources and types of support, and the large number of articles deriving support typologies, we believe that other outcomes of entrepreneurship support are possible.

We suggest using entrepreneurial education as an outcome of entrepreneurial support to assess its effectiveness. Entrepreneurial education has increased exponentially in the past decades. It is important to differentiate formal education, non-formal education, and informal education (Colardyn & Bjornavold, 2004; Eshach, 2007), focusing only on the latter two. Formal educational institutions, such as colleges, universities, and high schools, have embraced entrepreneurship by providing courses, degrees, and programs worldwide as part of their academic credentialing. Typically, research on the impact of formal education focuses either on general human capital factors, such as type of degree as a control variable, or otherwise on the impact of specific courses of study on entrepreneurial intentions (Martin, McNally, & Kay, 2013). The focus on intentions as opposed to entrepreneurial behavior occurs because of the considerable lag between undertaking formal education and occupational activity—universities and high schools engage in extensive efforts to ensure that their students complete programs before investing the considerable time necessary to begin a business enterprise. These activities

normally occur after graduation. Further, while some efforts exist to expand higher education to encompass entrepreneurship and commercialization activities (e.g., Etzkowitz (2002); Etzkowitz, Webster, Gebhardt, and Terra (2000)), universities continue to provide other important roles including citizenship training and a broad range of educational and scholarly pursuits. Finally, investments in human capital in formal education are meant to be observed across a broad range of organizational and occupational life (Becker, 1962; Schultz, 1962). In this study, we are targeting only support designed specifically for entrepreneurial promotion, and so do not examine formal education.

Informal learning is experiential learning, whereby individuals learn by actively engaging in a particular activity, in our case, entrepreneurship (Kolb & Kolb, 2005; Vygotsky, 1980). This might include targeted apprenticeships, active mentoring, and business incubation and acceleration activities, all frequently designed and provided by entrepreneurship promotion programs. In the case of informal learning, the time between the experience and the application is normally quite short, and the design of teaching seeks to improve entrepreneurial success.

Finally, non-formal education, while it may occur in a classroom and encompasses institutional learning, is not accredited, nor part of a recognized degree or diploma. For example, entrepreneurship programs may teach basic bookkeeping, marketing skills, communication skills, web design, and other internet skills. These courses intend to motivate students to apply their learning immediately in their start-up activities. Thus, this makes them highly relevant in assessing the impact of entrepreneurship support.

2.6 Conclusion

We conclude with the full quote cited at the beginning of our review.

“Entrepreneurship is neither a science nor an art. It is a practice. It has a knowledge base, of course ... but as in all practices, medicine, for instance, or engineering, knowledge in entrepreneurship is means to an end. Indeed, what constitutes knowledge in a practice is largely defined by the ends, that is by the practice.” (Drucker, 1985)

This review of the research on entrepreneurship support clearly demonstrates that this field is lagging behind on how to help entrepreneurs effectively (means) to succeed (end). We not only need stronger empirical results and robust theoretical development but also should build on practices and in turn contribute to improve current entrepreneurship support offers. A considerable body of work reoriented as entrepreneurship support is currently failing to inform adequately whether the widespread practice of supporting entrepreneurs delivers what it promises. We encourage future entrepreneurship scholars to focus on measurable and achievable quality variations that balance theoretical development, empirical validity, and framing. While larger samples and variable collection are always desirable, more important are sound data and rich theoretical contributions.

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Chapter 3 How should entrepreneurship be taught to students with diverse experience? A set of conceptual models of entrepreneurship education

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Abstract

Entrepreneurship education has been largely treated as a pedagogical “black box”. Despite the emergence of popular entrepreneurship models such as business planning, the lean startup, or business model canvas, neither theoretical nor pedagogical foundations are typically evident. This limits the accumulation of useful evidence that could inform better teaching practices. In this chapter, we develop a set of conceptual models anchored in learning theory regarding how entrepreneurship education should be taught to students. These conceptual models are built on the techniques of entrepreneurship pedagogy such as experiential education. They are developed for three groups of students: students without any entrepreneurship experience, students with previous entrepreneurship experience, and students who are currently running their start-ups. A set of potential variables that could be used for course evaluation purposes is also included. The proposed models meet the needs of students with different levels of entrepreneurship experience. Theoretically, we demonstrate that entrepreneurship students should not be treated as a homogeneous group, as they have different levels of startup experience and different educational needs. Lecturers of entrepreneurship programs could choose the suitable model proposed in this chapter in teaching based on the characteristics of their students. The chapter provides novel insights regarding how entrepreneurship programs should be designed for students with different levels of entrepreneurship experience.

3.1 Introduction

In recent decades, entrepreneurship education and training has grown rapidly in universities and colleges worldwide (Honig, 2004; Kauffman Foundation, 2008), with the aim of helping students develop knowledge and skills to become better entrepreneurs (Katz, 2007; Pittaway & Cope, 2007a). While the contents of entrepreneurship courses may vary depending on factors such as the lecturers, the students, and the institutional and programmatic context, writing a business plan is usually one of the important components in most entrepreneurship classes (Bliemel, 2014; Solomon, 2007). Students are carefully taught how to create a business plan and may learn how to present their work in business plan competitions and elevator pitches. The business plan is typically a static document that includes the illustration of an existing business problem, an opportunity embedded in the problem, a proposed solution provided by the startup, and typically a five-year financial projection for potential revenues and profits (Blank, 2013). Advocates of business plan education claim that a plan allows entrepreneurs to show stakeholders the business opportunities they have and the way they intend to exploit them, while at the same time serving as a road map for entrepreneurs themselves to follow (Matlay, Jones, & Penaluna, 2013). It is believed that if entrepreneurs conduct their planning carefully, they increase their chances to achieve their business goals (Hisrich, Peters, & Shepherd, 2009).

The underlying assumption of writing a business plan is that entrepreneurs can predict what is likely to happen in advance, before they carry out their ideas (Blank, 2013). However, opponents of business planning criticize this assumption, suggesting that such activities are “a work of fiction” (Matlay et al., 2013; Mullins & Komisar, 2009). First, they point out that entrepreneurs usually face a lot of uncertainties in their businesses, and therefore, it is impossible to forecast the unknown conditions to make a detailed plan to deal with so many contingencies in

advance (Blank, 2013). Second, rather than trying to plan the future, entrepreneurs are subjected to institutional forces such as coercion and mimetic pressures to produce written business plans (Honig & Karlsson, 2004). Such plans are often produced to satisfy the demands of external actors. Hence, they may play primarily a symbolic, loosely coupled role for new organizations without positively contributing to successful business outcomes (Karlsson & Honig, 2009). Third and foremost, there is very little empirical evidence supporting the link between prior business planning and increased eventual performance (Honig & Samuelsson, 2012; Matlay et al., 2013). For example, a six-year longitudinal study shows that neither formal planning nor changes in the business plan enhance startup performance (Honig & Samuelsson, 2012). Of course, it may be the case that individuals who develop a comprehensive plan may discover, through the planning process, that their initial idea lacks potential, and so abandon the effort or radically change their idea. Research in this volume examines this very point (Honig & Hopp, 2016). Measuring this process from a pedagogical angle would be very difficult, however, as it would be virtually impossible to estimate the odds of activities not pursued.

Recognizing the weakness of business planning, a new approach called the lean startup has quickly emerged in recent years, asserted to make the venture creation process less risky and more manageable. In this paradigm, the lean definition of a startup is “a human institution designed to create a new product or service under conditions of extreme uncertainty” (Ries, 2011, p. 8). Rooted in the lean manufacturing principles of Toyota and adapted to the context of entrepreneurship, the lean startup is claimed to provide a new methodology to create innovation and manage new ventures. Instead of focusing on traditional elaborate planning and long-term product development, the lean startup approach favors validated testing, fast customer feedback, and iterative product design (Ries, 2011).

Ries claims that from the moment they start a venture, entrepreneurs tend to build assumptions about their businesses. For example, one important assumption might be that customers need their products. However, from the lean startup perspective, all these assumptions are considered as a series of untested hypotheses. It is a waste of time if entrepreneurs take these statements for granted and develop something that nobody wants. To solve this problem, the lean startup references another adopted framework called the business model canvas (Blank, 2013; Osterwalder, 2004; Osterwalder & Pigneur, 2010), published as a diagram that helps entrepreneurs organize their hypotheses within the following nine parameters: key partners, key activities, key resources, value proposition, customer relationship, channels, customer segments, cost structure, and revenue streams (Osterwalder & Pigneur, 2010). Each element in the business model canvas represents a set of hypotheses that need to be tested as early as possible (Blank & Dorf, 2012; Müller & Thoring, 2012). In addition, the lean startup applies a concept called a validated learning experiment to guide the hypothesis-testing process (Ries, 2011), in which entrepreneurs build a minimum viable product (MVP), present it to customers quickly soliciting feedback from them, measuring their response, learning from the results, and deciding whether to preserve the original hypothesis or pivot to a new one. Through this Build-Measure-Learning feedback loop, entrepreneurs are said to engage in an iterative process of continually adding value that customers care about regarding specific products or services. Although the lean startup methodology is still very new, it has rapidly achieved popularity in the startup world. Many business schools have already started to teach the lean startup approach in their entrepreneurship courses (Blank, 2013). Yet, the appeal of the lean startup approach is not just recognized by business schools. Quickly extending its influence outside the university, the lean startup approach has even been adopted by the National Science Foundation (NSF) as the

entrepreneurship model for teaching faculties and students in science, technology, engineering and mathematics fields (Blank, 2015; National Science Foundation, 2016). Notably, Blank and Ries have no formal research or pedagogical experience, and there is no research attesting to their model's success. Their credibility seems to come from their face validity as being entrepreneurs themselves.

Despite the attractive concepts introduced by the lean startup to the market, it seems that this approach is not built on solid theoretical foundations, any more than previous models built on the business planning paradigm. In other words, much like the previous veneration for business planning, where there is a stream of research which largely failed to support the investment in time and energy, there appears to be little clear theoretical or empirical evidence to support the proposed arguments embedded in the lean startup model. Although the core concepts, that is, running tests and learning from customer experience, imply that the lean startup approach may be connected to experiential learning theories to some extent, more rigorous research is required to examine its scope, framework, potential connection to theories, and the contexts where it could be applied.

Despite the plethora of untested models, the view that entrepreneurship education and teaching should become an evidence-based practice continues to grow (Biesta, 2007). The evidence referred to in this perspective includes the strength and pattern of relationships between different variables that impact the processes and outcomes of education (Davies, 1999). Good evidence is based on at least several observations in different studies, and has the power to inform entrepreneurs' actions (Frese, Bausch, Schmidt, Strauch, & Kabst, 2012). Evidence-based education has its pedagogical roots in the field of medicine (Rousseau, 2006). After gaining acceptance in many medical programs, it has gained influence in other health fields such as

nursing and dentistry, and even to the more distant fields of professional activity such as management, social work, and education (Biesta, 2007; Cook, Smith, & Tankersley, 2012).

While there is some debate as to whether evidence-based practices in medicine can be directly generalized to the field of education, including how it should be properly implemented (Pirrie, 2001; Simons, 2003), the importance and value of the practice has attracted considerably more attention from educational scholars. Many believe that evidence-based practices in education can help create a culture in which evidence is valued over subjective opinion, and progressive and systematic improvement in both research and teaching can be realized (Baba & HakemZadeh, 2012; Slavin, 2002). These advocates suggest that solid evidence could enhance decision making in organizations, and should be at the core of management education and training. They point out that the key to building strong evidence is the alignment of methodological fit, contextualization, replicability, transparency, and scholarly and experts' consensus.

Despite many benefits, Hargreaves (1996) warns that there are existing problems in the education field that require immediate attention before we can fully take advantage of evidence based practice. First and foremost, there is a lack of agreed upon theory in the entrepreneurship field, and research seldom employs unique theory in entrepreneurship scholarship (Kuratko, 2005; Sorenson & Stuart, 2008). Kuratko (2005) suggests that this is the sign of immaturity in entrepreneurship field. This lack of theoretical foundation may threaten the reliability and generalizability of obtained results, and further prevent the accumulation of useful evidence in the field. It is worthwhile to note that there is a difference of opinion on this matter. Using three key indicators proposed by Dess, Lumpkin, and Eisner (2003) to analyze the maturity level of entrepreneurship field, Katz (2008) shows that entrepreneurship is a fully mature discipline, characterized by academics' ability to handle multiple inconsistencies in research. Explicitly

refuting Kuratko (and implicitly Sorenson and Stuart), he further suggests that the entrepreneurship field can embrace different ideas, theories and insights (Katz, 2008). Second, a gap exists between teaching and research communities. Instead of being informed by research evidence and pedagogical theory, the entrepreneurship teaching agenda is usually driven by conventional wisdom, political ideology, personal interests, financial expediency or opportunity, or even parental choice (Biesta, 2007; Honig, 2014, 2015; Oakley, 2002). Further, it appears to be somewhat uncommon for entrepreneurship lecturers to utilize research to inform their everyday teaching practices (Hillage, Pearson, Anderson, & Tamkin, 1998; Honig & Martin, 2014). To overcome these obstacles, evidence should be generated through the guidance of solid theories, and should be relevant and accessible to teaching practice (Atkinson, 2000; Hargreaves, 1996).

In this chapter, we develop a set of conceptual models anchored in learning theory regarding how entrepreneurship education should be taught to students. These models are built on the techniques of entrepreneurship pedagogy such as experiential education. We make two contributions in this chapter. First, we contribute to the advancement of fundamental theory and teaching practice in entrepreneurship education. Second, Collins, Hannon, and Smith (2004) suggest that different students have diverse experience and diverse needs toward entrepreneurship learning. Hence, it is inappropriate to use a one-size-fits-all approach to teach all of them. These scholars call for a change in the entrepreneurship education model to meet the different needs of students. Instead of treating all entrepreneurship students as one homogeneous group, we answer this call by dividing them into three groups based on their entrepreneurship experience: students without any entrepreneurship experience, students with previous entrepreneurship experience, and students who are currently running their own businesses.

Whether students are qualified to be considered as having previous entrepreneurship experience depends on whether they, alone or with others, previously tried to start a new independent firm and completed at least one gestation activity (See³ Table 3.1 for the assessment questions of students' level of entrepreneurship experience). Following these criteria, students who were previously engaged in business activities such as selling products on eBay, offering babysitting services, providing tutoring services, or offering computer repairs may not be considered as having entrepreneurship experience unless they clearly indicate that they tried to build a new firm with the products or services they offered. By this we mean creating a new organization, and planning to hire staff (Aldrich, 1999). The reasons we choose to divide students into these three groups are as follows: First, research has shown that people with previous entrepreneurship experience are more likely to perform better than their counterparts who have no experience, because their previous involvement in new venture creation enables them to develop a better understanding of business and entrepreneurship (Davidsson & Honig, 2003; Jo & Lee, 1996; Stuart & Abetti, 1990). Hence, students with entrepreneurship experience and those without this experience should be in separate classes because they have different levels of relevant knowledge and skills (Vygotsky, 1980). More advanced programs might want to separate those with extensive experience, such as serial entrepreneurs, however we do not make that specific distinction in our models. Second, students who are currently running a business are different than those with previous entrepreneurship experience in the sense that their experience is fresher and more updated, because they keep accumulating new experiences and receiving feedback from their everyday practices. Therefore, we argue that entrepreneurship teaching should also take these characteristics of experience into consideration and put these students into different

³ All tables in this chapter are presented in Section 3.A Appendix: Tables.

groups. Based on the above reasons, we generate the three student groups. A conceptual model is proposed for each of these three groups, respectively.

3.2 Conceptual models

3.2.1 Model 1: students without any entrepreneurship experience

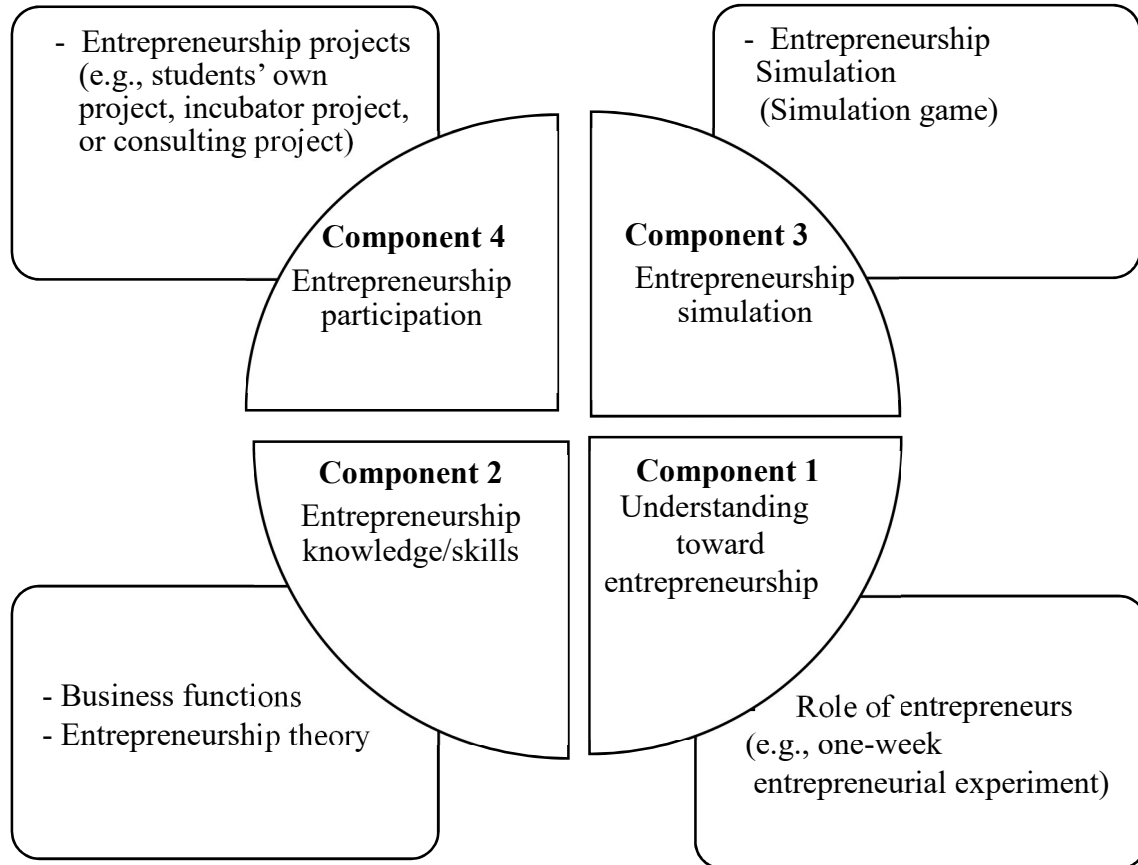
Students in Figure 3.1 have no previous entrepreneurship experience. Although they may get some influence from their family members or friends who engage in entrepreneurial activities, given the fact that they lack direct experience, they may not have sufficient understanding, knowledge or skills regarding entrepreneurship. Some people may argue that there is heterogeneity within this group, because some students with no entrepreneurship experience may attend the entrepreneurship program with a goal or a strong passion to start a business, while others may just consider the entrepreneurship class as something interesting to explore. These arguments suggest that students with passion should be separated from those who lack it, with different teaching models proposed for each group. However, we argue that this idea has a flaw. There is no guarantee that students with strong enthusiasm while entering a program will continue their passion for entrepreneurship until the end. They may find that there is a poor fit between them and the entrepreneurship career after they take the courses, and then they gradually lose passion for start-up activities. Similarly, a student who lacks passion for entrepreneurship at the beginning may change his/her attitude later. We argue that it is unsuitable to further divide students without entrepreneurship experience into two subgroups based on their passion or goal to start a business. They should be included in the same group because they both face the same big challenge—a lack of entrepreneurship experience.

Based on the characteristics of these students, we propose four components in this model: understanding toward entrepreneurship, entrepreneurship knowledge/skills, entrepreneurship simulation, and entrepreneurship participation.

Component 1: Understanding toward entrepreneurship

Different people have different social roles in their daily lives (e.g., musicians, professors, aircraft pilots). Role theory suggests that each social role is associated with a set of duties, rights, norms, and thinking, which is considered as a cluster of social cues that guide and shape a person's behavior in a given context (Biddle, 1986; Sarbin & Allen, 1954; Thomas & Biddle, 1966). Different roles rarely share the same expectations for role behavior (Biddle, 2013). Hence, without fully understanding a role position, people are unlikely to demonstrate behaviors that meet with the socially defined expectations associated with this role. Education is one way in which we prepare individuals for specific roles and activities.

Figure 3.1 Students without any entrepreneurship experience



An entrepreneur is a type of social role, however, very difficult to define or specify.

Depending on the entrepreneurial activity in question, different social roles may be required—there is no “one size fits all” entrepreneurial set of social roles. An entrepreneur may need to satisfy a range of expectations placed on him/her: to exploit market opportunity through technical or organizational innovation (Schumpeter, 1965), be willing to take risks (Drucker, 1970), to build something of recognized values around perceived opportunities (Bolton & Thompson, 2004), to demonstrate initiative and creative thinking, be able to effectively organize resources into practical use (Hisrich, 1990), be able to confront failure (Ucbasaran, Shepherd, Lockett, & Lyon, 2013), and more. Students who have no entrepreneurship experience are unlikely to have sufficient understanding toward the entrepreneurial role. This lack of understanding, if left unhandled, may influence the quality of the entrepreneurship learning

because students may find it difficult to fit themselves into the “entrepreneurial context” (Harrison & Leitch, 2005; Kempster & Cope, 2010). We argue that lecturers of entrepreneurship courses should familiarize their students with the entrepreneurial role at the beginning of the class. Students should understand what a self-employed career looks like, what the general characteristics of entrepreneurs are (e.g., workload), and how entrepreneurs usually motivate themselves. Further, it is important to understand how they perceive risks. Risk-taking lies in the heart of entrepreneurship. This is not because entrepreneurs prefer to take more risks than non-entrepreneurs, but because they view risks as a source of new opportunities and new ideas (Palich & Bagby, 1995). In addition, students should know that failures in the process of starting a business are inevitable because of the unpredictable nature of entrepreneurship (Politis & Gabrielsson, 2009). Of course, this doesn’t mean that all entrepreneurs will fail in the end. But it suggests that most entrepreneurs should experience many failures before they eventually make their way to success. Therefore, it is important to develop a positive attitude toward failures and start to learn how to manage it.

The importance of this component in the model is it not only that it helps students develop sufficient knowledge toward the role of the entrepreneur, but also that it reduces students’ positive illusion associated with entrepreneurship (e.g., it is easy to be a boss and make a lot of money!). Positive illusion has been reported to have harmful effects on students’ performance (Gresham, Lane, MacMillan, Bocian, & Ward, 2000; Kwan, John, Robins, & Kuang, 2008).

In this component, for example, lecturers could invite students to participate in a simple one-week entrepreneurial experiment in which students are randomly divided into groups, and each group is offered \$20 as seed capital. Students are required to use this amount of money to start a small business and try to make a profit out of it in a week. The experiment enables students to

play and get familiar with the role of an entrepreneur, as well as to experience some of the challenges of team activity, and possible failures along the way. In addition, lecturers may use entrepreneurs and practitioners (EPs) in the class to help students enhance their educational experience. By sharing their start-up experiences grounded in realities and complexities of the real world, entrepreneurs and practitioners play an important role in facilitating student developing a basic understanding toward entrepreneurship. However, a critique of this approach is that there may be no theoretical framework, and while entertaining, it may fail to increase students' entrepreneurial skills or abilities (Fiet, 2001a, 2001b). Therefore, in this process, lecturers need to learn to work with these EPs, and make their presentations relevant and helpful for students (Katz, 1995).

Component 2: Entrepreneurship knowledge/skills

Human capital is defined as skills, knowledge, and the abilities possessed by people (Becker, 2009). According to human capital theory, entrepreneurs' knowledge and skills are positively associated with their performance (Coff, 2002; Davidsson & Honig, 2003). Hence, one of the goals of entrepreneurship courses is to provide students with skills and knowledge related to self-employment (Kourilsky, 1995). Although what should be taught in entrepreneurship courses is under continuous debate (Fiet, 2001b; Ronstadt, 1987; Solomon, 2007), several major themes have emerged and have been widely recognized as the most significant subjects in entrepreneurship education (Kuratko, 2005). Some of these themes are venture financing, entrepreneurial strategies, entrepreneur cognition, entrepreneurship ethics, business strategic management (e.g., innovation management, entrepreneurship networking, internationalization, organizational learning, human resource management, new venture growth; see Ireland, Hitt, Camp, and Sexton (2001)), corporate entrepreneurship, social entrepreneurship, and family

business management.

In addition to the subjects mentioned above, it is believed that entrepreneurship lecturers should also teach students entrepreneurship theory. Entrepreneurship theory is defined as “a set of empirical generalizations about the world, economy, and how entrepreneurs should behave that allows for the prediction of true outcomes” (Fiet, 2001a). Fiet (2001b) argues that theory is an essential part of an entrepreneurship course because it offers rules and frameworks which allow students to better anticipate the future and make better entrepreneurial decisions.

Based on the discussions above, we suggest that in Component 2, lecturers should teach students important entrepreneurial knowledge/skills, and relevant theories that guide and direct students to properly apply their knowledge/skills to real-world occasions.

Component 3: Entrepreneurship simulation

Entrepreneurs often need to interact with other stakeholders. These people may be the entrepreneur’s start-up team members, customers, investors, suppliers, social contacts or friends. The interactions are usually continuous over the whole start-up process. During these interactions, both the entrepreneurs and the stakeholders need to follow rules and adjust their conduct for the interests of the group. In his education theory, Dewey (2007) defines such interactions as a social control process in which a group of individuals are involved and their actions are governed by the rules that are agreed by members of the group. At the same time, they both share and participate as cooperative and interacting parts of the common experience that benefits the whole group. One example of the social control process is a soccer game. To get good performance in the game, players need to conform to the rules set by the game, and work closely with their coaches and their team members. Dewey (2007) states that “it is not the will or desire of any one person which establishes order but the moving spirit of the whole group. The

control is social, but individuals are parts of a community, not outside of it.” (Dewey, 2007, p. 52). He further emphasizes that students should participate in activities that allow them to experience the social control process, and he believed that this kind of experience helps students improve their function in the social setting. Moreover, this process enables students to develop their team work skills. Although there are a growing number of solo self-employed entrepreneurs running their own businesses (van Stel & de Vries, 2015), many start-ups are formed by entrepreneurial teams (e.g., start-ups pursued by public policy advocates) (Cooper & Daily, 1997; Ensley, Carland, & Carland, 2000; Kamm, Shuman, Seeger, & Nurick, 1990). Profit opportunities can be more efficiently discovered and exploited if entrepreneurs share common interest and combine their efforts to pursue the same goal (Harper, 2008). However, forming a team doesn’t guarantee a business success. Hoegl and Gemuenden (2001) show that the teamwork quality is positively associated with the success of joint projects. That is, how members of an entrepreneurial team communicate, coordinate and support each other has an important impact on the outcome of the venture creation process, particularly entrepreneurial activities that are designed around high growth prospects, such as gazelles (Acs & Mueller, 2008; Henrekson & Johansson, 2010). In fact, research findings show that team-founded ventures show better performance than individually founded ventures (Chandler, Honig, & Wiklund, 2005; Cooper & Bruno, 1977; Weinzimmer, 1997). Hence, by participating in activities that allow them to practice and build up their teamwork skills, students can develop more confidence and competence in handling team-related issues in the start-up process.

In an entrepreneurship course for students without any experience, it is important that we provide our students with an opportunity to contribute and participate in such social control activities. One of the potential opportunities could be a computer-based entrepreneurship

simulation game in the class. A simulation game is defined as a dynamic model of the real entrepreneurial process in which a balanced number of decision variables require strategic integration (Keys & Wolfe, 1990). Entrepreneurship education can benefit from using simulations as an integral component of the educational process because simulations, designed to reflect the realities and complexities of running a business, provide a chance for students to learn through contact with the real world (Bellotti et al., 2012; Hindle, 2002; Katz, 1995; Katz, Gundry, Low, & Starr, 1994). As an advanced pedagogical tool, simulation facilitates student understanding toward the entrepreneurial process as well as developing problem-solving skills (Katz, 1999, 2008). It also helps ‘inoculate’ students against future failure (Sitkin, 1992). Recognizing the value of gamed simulations in entrepreneurship education, an increasing number of entrepreneurship classes have started to incorporate this component in their curricula (Bellotti et al., 2012; Katz, 1999). Usually, students play a game simulation with a group. The game enables students to apply the knowledge/skills they have learned, to acquire firsthand experience of managing complex business interrelationships and to experience competition in one common marketplace. Students allocate their virtual resources, process the market information, follow the rules set by the virtual business world, communicate and coordinate with their team members, interact with other stakeholders, and make their decisions (Huebscher & Lendner, 2010). The results of the game are usually evaluated in terms of profit, loss, or market share compared to other competitors. This dynamic process mirrors the whole real entrepreneurial process and teaches students how to properly function in a business world and work as a team. Despite many potential benefits brought by the use of simulations in the classroom, lecturers should recognize that simulations are supplementary to the conventional method of instruction, rather than its replacement (Feldman, 1995). Besides, there is no one-size-

fits-all simulation content that could satisfy the needs of all entrepreneurship classes (Katz, 1999). When lecturers choose gamed simulations for pedagogical purpose, they need to base their judgment on the objectives of the class and take the following factors into consideration: validity of the simulation, the level of its connection to the reality, the richness of human experience embedded in the simulation, the thought-provoking context, and the reliance on theories to achieve particular outcomes (Chin, Dukes, & Gamson, 2009; Katz, 1999).

Because a simulation component is included in Figure 3.1, we suggest that the evaluation of simulations should be conducted after the course by lecturers to get a better understanding of how simulations influence student learning. Simulations should connect to reality, provide values for students, and allow them to practice their knowledge and skills (Katz, 1999). Student satisfaction could reflect the quality of the selected simulation (Chin et al., 2009). Here, we suggest the use of a simulation satisfaction scale adapted from Feingold, Calaluce, and Kallen (2004) (see Table 3.2). This instrument has three dimensions including realism, transferability, and value. It has 10 items in total. Respondents are asked to indicate to what extent they agree or disagree with each item on a 5-point Likert scale with 1=strongly disagree and 5=strongly agree. The scale has been adapted to fit into the entrepreneurship context. Some sample items are: “Scenario used with the simulation recreates real-life business situations.”, “My interaction with the entrepreneurship simulator improved my start-up competence.”, and “Overall, the simulation experience enhanced my learning.”

Component 4: Entrepreneurship participation

At this stage, students have learned useful knowledge and skills related to starting a business, and have gained the preliminary experience from the simulation game, thus, it is time for them to participate in real-world entrepreneurial projects. Experiential learning theory suggests that

students learn by doing, and they create knowledge from the combination of grasping and transforming experience they gained in reality (Dewey, 2007; Kolb, 2014; Kolb, Boyatzis, & Mainemelis, 2001; Piaget, 1952; Vygotsky, 1980). The experience itself as well as the feedback and self-reflection on the experience are vital to the experiential learning process (Corbett, 2005; Jennings & Wargnier, 2010; Neck, Greene, & Brush, 2014). Actual experience gained from the real business world plays an important role in entrepreneurship education, and contributes significantly to sustainable learning (Higgins & Elliott, 2011; Politis, 2005). Teaching entrepreneurship should be considered as a method that focuses on encouraging students to practice entrepreneurship and to learn through experience (Neck & Greene, 2011). Students learn new venture creation not only by memorizing the relevant knowledge and skills, but also by applying what they have learned and taking real actions (Cooper, Bottomley, & Gordon, 2004). These actions contribute to the development of experience, and serve as a base for further learning. Hence, lecturers should provide opportunities for students which allow them to fully participate in entrepreneurship practice (Neck et al., 2014). Students could engage in the experiential learning by participating in their own start-up projects or assume a role as a consultant for other people's new ventures to solve real-world problems (e.g., an incubator project). For example, students at Chalmers University of Technology in Sweden build teams around selected intellectual property, and begin developing start-up activities both for academic credit, as well as for eventual emergence⁴. Only a subset of participating students continues with any specific business, but they are all exposed to the challenges. For students who haven't obtained their start-up ideas, acting in the role of consultants to help other new ventures can also

⁴ Visit by one author with Chalmers school of entrepreneurship program, Jan. 13, 2016

provide them opportunities to fully experience the start-up process (Fontenot, Haarhues, & Hoffman, 2015; Wolverson & Cook, 2000). For example, entrepreneurship students at the University of Limerick are offered a chance to work with small businesses at the start-up or early growth stages. Students teams provide consulting service to these owners and help them deal with management-related issues such as product development and marketing (O'Dwyer, Birdthistle, Hynes, & Costin, 2011). There are many benefits associated with this entrepreneurship participation process. Studies show that students with experiential learning have improved interpersonal and other non-cognitive skills (Gentry, 1990; Pittaway & Cope, 2007b). Besides, experiential learning enables students to enhance their skills in the areas of problem solving, decision making, planning, oral and written communication, and creativity (Bobbitt, Inks, Kemp, & Mayo, 2000). In addition to skill improvement, students' learning abilities are improved while they involve in the experiential learning process (Morgan, Allen, Moore, Atkinson, & Snow, 1987). As an entrepreneur, both cognitive and non-cognitive skills, as well as the ability to learn, are significant for the survival of the business. Real entrepreneurial projects help students develop their competence in managing a new venture.

To evaluate the effectiveness of the model, there is a need to test the link between the proposed model and the educational outcomes. Although we are not going to empirically test the model in this chapter, we would like to propose a set of potential variables that could be used for course evaluation purposes for our readers. There are four variables that are widely used to evaluate the effectiveness of entrepreneurship education: entrepreneurial self-efficacy, entrepreneurial attitude, entrepreneurial intentions, and learning outcomes (Souitaris, Zerbinati, & Al-Laham, 2007). We will discuss these four variables in the following section. To enable comparisons and detect the true effect of the entrepreneurship model, the four measures below

should be tested before and after the entrepreneurship class (i.e., both pre- and post-course). To ameliorate the potential social desirability issues in the survey, students should be allowed to make their responses anonymous (Joinson, 1999).

Entrepreneurial self-efficacy

Entrepreneurial self-efficacy refers to an individual's belief in his/her personal capability to accomplish a job or a specific set of tasks related to a new venture creation (Bandura, 1977). We suggest the use of the entrepreneurial self-efficacy (ESE) scale proposed by Chen, Greene, and Crick (1998) (see Table 3.3). This scale contains 22 items in five dimensions (i.e., marketing, innovation, management, risk-taking, and financial control dimension). Respondents are asked to indicate their degree of certainty in performing each of the roles/tasks on a 5-point Likert scale with 1= completely unsure and 5=completely sure. Some sample items are “set and meet market share goals”, “Reduce risk and uncertainty”, and “New products and services”.

However, self-assessment of entrepreneurial capability is often flawed when it is used to reflect a student's objective competence in creating a new venture (Dunning, Heath, & Suls, 2004). Achieving accurate self-evaluation is inherently difficult since people tend to make self-judgments based on opinions and information they favor (Dunning, 2005). This creates a concern for evidence-based education. When self-assessment biases are introduced into the capability evaluation process, the results of the evaluation may fail to reflect the true quality of the entrepreneurship courses and the true learning outcomes of students. If people mistakenly take these results as useful evidence to inform further research or practice, it may deteriorate the quality of evidence-based education. To ameliorate the problem of self-assessment capability, lecturers could supplement the entrepreneurial self-efficacy evaluation with other relatively

objective measures. For example, lecturers could use a knowledge test which covers important entrepreneurship topics. We recommend the Entrepreneurship Knowledge Inventory (EKI) developed by Besterfield-Sacre et al. (2013) This is a tool containing 105 items that assesses students' familiarity with fundamental entrepreneurship concepts and terms.

Entrepreneurial attitude

Students' entrepreneurial attitude influences their chance to become entrepreneurs (Ajzen, 1991; Kolvereid, 1996). One important goal of entrepreneurship education is to change people's established attitude to entrepreneurship, hopefully, in a positive way (Garavan & O'Cinneide, 1994; Gorman, Hanlon, & King, 1997). We suggest the use of the attitude to self-employment scale proposed by Kolvereid (1996) (see Table 3.4). This scale contains 33 items. Respondents are asked to indicate to what extent they agree or disagree with each item on a 5-point Likert scale with 1=strongly disagree and 5=strongly agree. Some sample items are: "job security", "to keep a large proportion of the result", "to create something".

Entrepreneurial intentions

Like entrepreneurial attitude, entrepreneurial intentions also have an important influence on students' initiation of start-up behaviors (Ajzen, 1991; Krueger, Reilly, & Carsrud, 2000). It is also one of the important outcomes of entrepreneurship education (Souitaris et al., 2007). Here, we suggest the use of the entrepreneurial intentions scale proposed by ASTEE (Assessment Tools and Indicators for Entrepreneurship Education), a common European framework for measuring entrepreneurship education across all formal education levels (Moberg et al., 2014) (see Table 3.5). This scale contains 3 items. Respondents are asked to indicate to what extent they agree or disagree with each item on a 5-point Likert scale with 1=strongly disagree and 5=strongly agree.

A sample item is: “I often think about starting a business”.

Learning outcomes

We suggest the use of the learning outcomes scale proposed by Souitaris et al. (2007) (see Table 3.6). This scale includes 5 items. Respondents are asked to indicate to what extent the entrepreneurship program has enhanced their ability listed in each item on a 7-point Likert scale with 1=Not at all and 7=To a large extent⁵. A sample item is: “enhance your practical management skills to start a business.”.

3.2.2 Model 2: Students with entrepreneurship experience

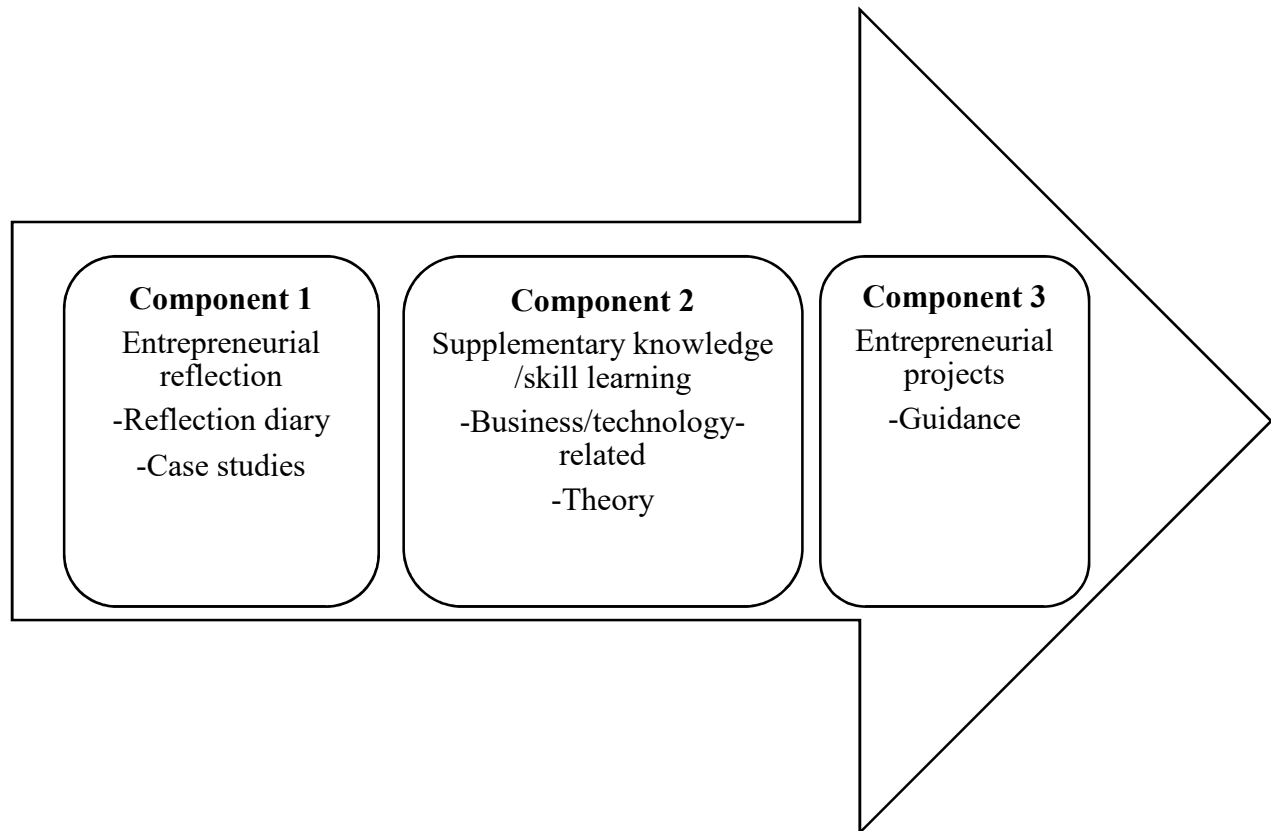
Compared to students in Figure 3.1, students in Figure 3.2 have some entrepreneurship experience. As we have pointed out before, students need to satisfy two requirements to be considered as having entrepreneurship experience: (1) they explicitly indicate that they have previously, alone or with others, tried to start a new independent firm; and (2) they have completed at least one start-up activity in their previous start-up effort (See Table 3.1 for the list of start-up activities). Given these criteria, students who have engaged in business activities such as selling products on Amazon, washing cars for customers may not be considered as having entrepreneurship experience, unless they clearly indicate that they have tried to create a new firm with the products or services they offered. For students who have some entrepreneurship experience, they usually have a clearer understanding of what a self-employment career looks like, and what their strengths and weakness are in pursuing entrepreneurship.

Based on the characteristics of these students, we propose three components in Figure 3.2:

⁵ When this measurement is used in a pre-course survey, respondents are asked to indicate to what extent they expect the entrepreneurship program enhance their ability listed in each item on a 7-point Likert scale with 1=Not at all and 7=To a large extent.

Entrepreneurial reflection, supplementary knowledge/skills learning, and entrepreneurial projects.

Figure 3.2 Students with entrepreneurship experience



Component 1: Entrepreneurial reflection

Students have accumulated entrepreneurial experience from their previous start-up activities. However, the quality of the experience is not always guaranteed. Experience can be good or bad. Good experience refers to those that enable learners to achieve growth and creativity in their subsequent activities, while bad experience usually prevents or distorts a learner's further development (Dewey, 2007). Hence, lecturers of entrepreneurship courses should help students distinguish between different types of experience, and decide what should be kept and what should be abandoned. This process is called as "reflection" (Dewey, 2007). The importance of

reflection in the learning process has been covered extensively in the literature. Reflection is a vital process which turns acquired experience into knowledge (Boud, Keogh, & Walker, 2013; Kolb, 2014). During this process, people think about their previous experience, trying to make sense of what has happened and why, which usually leads to thoughts or ideas that are more insightful (Baker, Jensen, & Kolb, 2005; Kolb & Kolb, 2005). The main goal of reflection is deep learning, in which students develop a stronger desire and a more proactive attitude to grasp and synthesize information for long-term use (Neck & Greene, 2011). This kind of learning is particularly important for students, because they are now facing a world of ever-increasing turmoil, and the experience acquired from it is usually perplexing (Neck & Greene, 2011; Neck et al., 2014). In fact, students who engage in reflection processes have better course-specific learning outcomes (Bringle & Hatcher, 1999; Moon, 2013). With proper reflection of their study, students can achieve a higher development of their learning skills (Cope, 2003; Main, 1985).

Lecturers of entrepreneurship courses should assist students in conducting reflective activities. For example, lecturers could encourage students to keep a reflection diary of previous experience. The goal of the diary is to provide students' an opportunity to express inner thoughts, record experience of past events, and reflect on what they did by re-experiencing the processes and feelings associated with those events (Atkins & Murphy, 1993; Lindström et al., 2006). Entrepreneurs use professional understanding and knowledge, which are usually theoretic and rooted in technical rationality, to inform their business actions and to solve problems (Schön, 1983). However, such professional awareness has its limitation because it is not always situated in practice. To overcome this weakness, reflection is important since it allows entrepreneurs to develop real-life awareness of the problems, to reframe the knowledge and understanding that accounts for the problems, and to inform new actions and new ideas that are rooted in their own

practice (Jarvis, 1992). A reflection diary is considered as an important means of releasing thoughts, feelings and emotions on the experience, through which insight can be gained (Nadin & Cassell, 2006). However, there is a tendency that students may sometimes get stuck in their self-reflection process by focusing too much on discharging unpleasant feelings, which can hamper their effective learning from experience (Burt, 1994). To better make use of this approach, reflection should include self-awareness and self-appraisal (Cardon, Wincent, Singh, & Drnovsek, 2009), the context of the experience (Nadin & Cassell, 2006), and problem-solving linked to the experience (Grant, Franklin, & Langford, 2002). Self-awareness here refers to the question “what am I feeling physically?” and self-appraisals refer to “what is the cause of this feeling?” (Cardon et al., 2009). Answering these two questions allows students to record their thoughts and emotions for the specific experience. The context of the experience should also be examined. The interpretations and understanding of a certain component of experience cannot happen without contexts (Cutcliffe, 2003). When describing their experience, students should clearly document the particular setting under which thoughts and feelings occur (Cutcliffe, 2003). As well, reflection on grief and business loss provides students a chance to examine and learn from their failure (Politis & Gabrielsson, 2009; Shepherd, 2004). However, students should avoid describing their unpleasant feelings or emotions related to the business failure excessively because the purpose of a reflection diary is not just providing an outlet for students to air their grievance (Burt, 1994). To maximize the experience of learning from failure, a problem-solving approach should be incorporated into the reflection process. That is, in addition to show their real feelings regarding the experience, students should be required to provide tentative solutions which address their failure in their diary. Through this, students will be able to increase their level of insight (Grant et al., 2002). The reflection diary strategy has many benefits. Richardson

and Maltby (1995) show that a reflective diary increases students' learning performance in a community setting. Also, reflection-on-action is associated with more effective practice (Brockbank & McGill, 2007; Schön, 1983). In the class, lecturers should encourage students to exchange their reflection diaries (maybe in anonymous form), provide comments, and facilitate the student discussions of the contents in the diaries.

Besides the reflection diary, lecturers could also use case studies in the class to help students conduct reflection activities. Thomas (2015) defines case studies as “analyses of persons, events, decisions, periods, projects, policies, institutions, or other systems that are studied holistically by one or more method.”. This type of study usually provides a comprehensive image of the companies under research over time for consideration and discussion by students (Theroux & Kilbane, 2004). By introducing some reality into the classroom and providing a risk-free environment for students, the case study method enables students to broaden their experience and develop their decision-making skills (Wolverton & Cook, 2000). Studies show that the case method is effective in enhancing students' ability to analyze and synthesize information as well as improving their communication skills (Andrews & Noel, 1986; McEwen, 1994). Positioning themselves into the context of a case study students use theoretical paradigms to analyze the case to answer critical questions (e.g., What is the main issue faced by the company? What did the company do right? What did it do wrong? What experience helps the company make good decisions? What experience biases the company's understanding toward the market? Why some experiences are not working in some occasions? How to evaluate the quality of the acquired experience?) (McDade, 1995). Through this process, students are presented with opportunities to objectively look at the problems confronted by other companies and to practice their analysis skills (Theroux & Kilbane, 2004). These skills are also useful for students when they conduct

reflection on their own experience because an effective reflection cannot happen without good analyses (Neck et al., 2014).

In addition to case studies, lecturers should also encourage students to share and discuss their experience in the class (Solomon, 2007). These in-class discussions may be organized in a structured way (Fiet, 2001a). At the beginning of each class, Fiet recommends that lecturers assign students to lead the discussion of a specific concept and its relevant activities. Students are encouraged to express their thoughts toward the selected topic, but the points they make should be supported by proper theories they have previously learned. That is, students are offered a chance in the classroom discussion to use theories to explain business concepts and experiences. During these student-led discussions, lecturers may act as a coach instead of an evaluator of student performance (Fiet, 2001a). Through this way, lecturers facilitate students' understanding of underlying course concepts while at the same time, students could acquire more helpful feedback which allows them to better distinguish among different experience.

Because a reflection component is included in this model, we suggest that the evaluation of reflections should be conducted by lecturers to get a better understanding of how reflections influence students' learning. We suggest the use of the reflection scale developed by Kember et al. (2000) (see Table 3.7). This scale has 16 items. Respondents are asked to indicate to what extent they agree or disagree with each item on a 5-point Likert scale with 1=strongly disagree and 5=strongly agree. A sample item is: "I like to think over what I have been doing and consider alternative ways of doing it". To enable comparison and detect the true effect of reflection on learning, this measure should be tested both before and after class (i.e., both pre- and post-course).

Component 2: Supplementary knowledge/skills learning

Students should be able to apply their knowledge and skills in creating a new business. Entrepreneurs with a higher level of human capital are more likely to succeed in the business world (Coff, 2002; Davidsson & Honig, 2003). For students without any entrepreneurship experience, lecturers should help them build a basic and solid understanding of entrepreneurship by exposing the students to a variety of important knowledge topics. However, students with previous entrepreneurship experience are more likely to know where their knowledge/skill gap is because they steadily receive such feedback from their environment during the venture creation process. For example, an entrepreneur may find himself having difficulty handling financial issues due to insufficient knowledge/skills in the relevant field. Therefore, the entrepreneur may feel that there is a need for him to bridge the gap. Some thought might be given to assessing not only students, regarding their previous experience, but lecturers as well, who may, themselves, have gaps in their own entrepreneurial knowledge.

Entrepreneurship education programs should allow these students to select courses supplementary to their current knowledge and skills. But this doesn't mean that students are offered a completely free choice to choose courses. Ideally, lecturers should work with students figuring out their strengths and weaknesses in their knowledge/skills base. Lecturers can prepare a list of topics of entrepreneurship knowledge/skills, and ask students to indicate their level of ability in these areas (Angelo & Cross, 1993). Through this, lecturers may be able to assess students' strengths and weaknesses. For example, a student may indicate that he/she is very strong in finance, but very weak in marketing. In addition, students' level of aspiration to growth should also be taken into consideration in this process. Some students are easily satisfied with their present status while the others are more willing to take challenges and make great efforts to

achieve their own growth. For students who show a desire to learn more, lecturers could recommend extra courses that satisfy students' interests. Bird (1995) suggests that entrepreneurial competencies such as business knowledge and entrepreneurial skills are learnable with proper training and guidance. In the course-selection process, lecturers should provide enough instruction and consultation to each student, and make sure that students can receive appropriate trainings. That is, to make sure that the courses selected by the students add value to the students' current knowledge base.

Like Component 2 in Figure 3.1, the courses offered here should cover important topics related to business functions as well as entrepreneurship theory. Suggested by Kuratko (2005), several major topics have emerged and have been widely considered as the most significant subjects in entrepreneurship education, including venture financing, entrepreneurial strategies, entrepreneur cognition, entrepreneurship ethics, business strategic management, corporate entrepreneurship, social entrepreneurship, and family business management. Also, to prepare students for anticipating future and making better entrepreneurial decisions, entrepreneurship theories teaching is indispensable in the classroom (Fiet, 2001a). In addition, some students may be interested in technology start-ups. For example, a student may want to start a clean-tech startup developing solar energy products. However, he/she may not have sufficient technological knowledge. To provide learning support for students, entrepreneurship programs could work with other schools or faculties (e.g., engineering) to offer technology-related courses based on the technical needs of students.

Component 3: Entrepreneurial projects

Students at this stage should be encouraged to pursue their own entrepreneurship projects. They have had a clear reflection on their previous experience, and have acquired important

knowledge and skills previously lacking. They should apply what they have learned to real projects. Dewey (2007) suggests that one of the important sources of experience is from actual life experience of the individual. Entrepreneurship projects provide students opportunities to grow their actual experience in starting a business. Obviously, an expanding experience repertoire is important for students because they are more likely to gain useful information from it. We present three examples of entrepreneurial projects here. The first example is Chalmers School of Entrepreneurship in Chalmers University of Technology in Sweden. In this entrepreneurship program, students are required to form teams to start a new venture with a research-based idea. The ideas can come from students themselves or researchers at the university. Students take responsibility for their new venture and experience the whole start-up process, from idea identification and selection, team composition, seeking funding, and venture formation (Rasmussen & Sørheim, 2006). The second example is Jonkoping International Business School in Jonkoping University. The school offers a summer-entrepreneur program in which students are required to establish a new venture based on a new idea obtained from a company in the regional industry. Students form teams and carry out the entrepreneurial activities, such as building products and attracting customers (Rasmussen & Sørheim, 2006). The Third example is the Monmouth University Entrepreneurial Studies program. Students are also required to start their own businesses. During the program, students select start-up ideas, build teams, develop products or services, and make contingent marketing plan to achieve their goals (DeSimone & Buzza, 2013).

The role of a lecturer in this stage is to provide guidance and assistance to students with their start-up projects. Vygotsky (1980) suggests that learning takes place in the Zone of Proximal Development. That is, students need to receive guidance from lecturers to handle tasks they

cannot complete on their own. Lecturers can conduct one-to-one meetings with each student, learn about their problems, help them reflect on the new experience acquired, and detect the new gap in the student's knowledge base.

To evaluate the effectiveness of Figure 3.2, there is a need to test the link between the proposed model and the educational outcomes. Here, we propose four variables that are widely used to evaluate the effectiveness of entrepreneurship education: entrepreneurial self-efficacy, entrepreneurial attitude, entrepreneurial intentions, and learning outcomes. To enable comparisons and detect the true effect of the entrepreneurship model, the four measures below should be tested before and after the entrepreneurship class (i.e., both pre- and post-course).

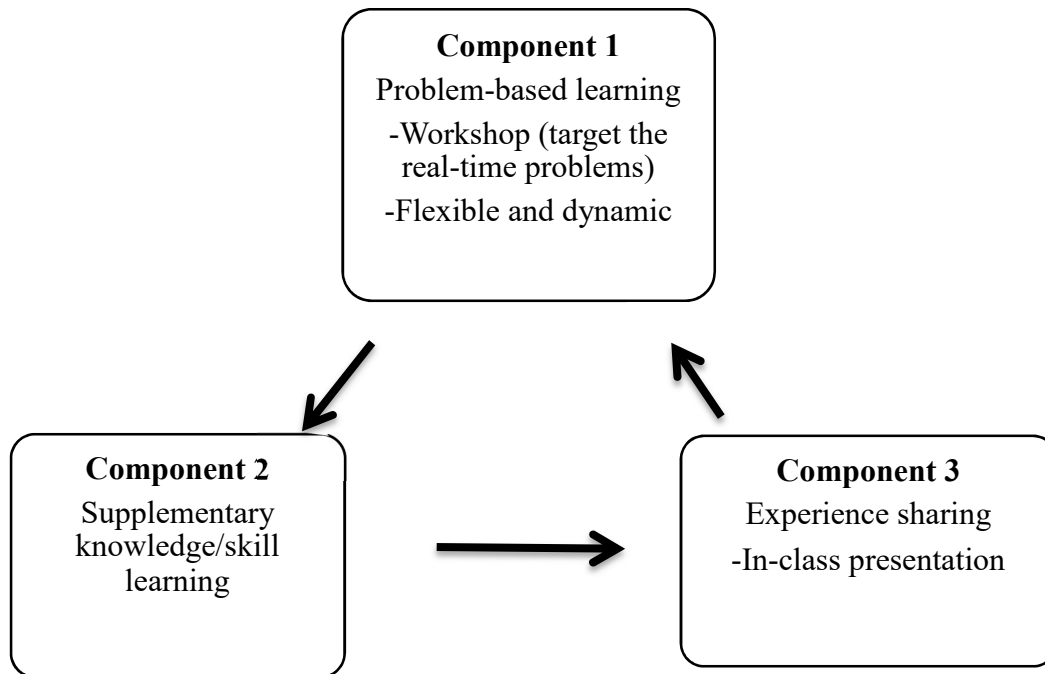
- Entrepreneurial self-efficacy: See Table 3.3 for the details of the scale.
- Entrepreneurial attitude: See Table 3.4 for the details of the scale.
- Entrepreneurial intentions: See Table 3.5 for the details of the scale.
- Learning outcomes: See Table 3.6 for the details of the scale.

3.2.3 Model 3: Students who are currently running their own businesses

Running their own businesses, students in this model are distinct from the first two types of people. In fact, very little literature in entrepreneurship education discusses the needs of such students because entrepreneurship courses are usually assumed to help students pursue self-employment careers and launch their new ventures (Kuratko, 2005). Although some accelerators offer a certain level of entrepreneurship education to their tenants who have fledging ventures, this education often takes the form of seminars or workshops, and the contents are usually fragmented and unstructured (Cohen, 2013). We argue that the needs of students with running businesses should also be taken care of, and a different type of education program should be

designed for them based on their unique characteristics. We propose three components in Figure 3.3: Problem-based learning, supplementary knowledge/skills learning, and experience sharing. This model is a dynamic cycle model.

Figure 3.3 Students currently running their own businesses



Component 1: Problem-based learning (PBL)

Entrepreneurs confront many problems in maintaining their businesses (Aldrich & Fiol, 1994). For those who are currently running their start-ups, their problems are real-time. Hence, the value of entrepreneurship courses is to provide them help with their real-time issues. Problem-based learning (PBL) enables students to embed their learning in real-life problems (Hanke, 2009; Hung, Jonassen, & Liu, 2008). During this process, students develop their problem-solving skills as well as their self-directed learning skills (San Tan & Ng, 2006). PBL also trains students to actively look for problems in their ventures and take cognitive ownership of their projects (Krueger, 2007). This problem-detecting ability is important for entrepreneurs

because they are facing a world of high uncertainty, extreme time pressures and competing demands (Krueger, 2007). Hence, failing to identify problems in time may lead to business failures (Corbett, Neck, & DeTienne, 2007). The benefits of problem-based learning are widely covered in the literature. Students with PBL are more capable of integrating new information with existing knowledge structures to find solutions (Capon & Kuhn, 2004). Similarly, studies show that PBL increases students' problem solving ability, critical thinking skills, and teamwork skills (Hoffmann & Ritchie, 1997; Morales - Mann & Kaitell, 2001).

Lecturers of entrepreneurship education programs should act primarily in the role of facilitators, collect real-time problems from students and divide them into different topics based on their similarities (Hanke, Kisenwether, & Warren, 2005). The course can take the form of workshops, which we consider as brief intensive educational programs for people that focus especially on techniques and skills in a certain field. Each workshop targets different real-time needs, and students could choose to attend the ones most relevant to their problems. At the same time, students are encouraged to seek advice or mentorship from lecturers on specific problems in class, or via the Internet (Hanke et al., 2005).

Component 2: Supplementary knowledge/skills learning

During the problem-based learning stage, students apply and practice their skills in developing solutions. The focus of the first stage is dealing with problems that have appeared in their businesses. However, there is no guarantee that the knowledge and skills students have learned are sufficient for them to handle future potential problems, especially when the types of those problems are very different from what they are familiar with. For example, a student may be weak at dealing with finance and human resource related issues. So far he/she has only come across financial problems, and has acquired solutions from the relevant workshop. However,

he/she may confront other problems not in his/her repertoire. To better prepare for future uncertainties, students should further develop their human capital in the relevant field (Skaggs & Youndt, 2004). We suggest that lecturers should help students analyze their strengths and weaknesses, and assist them in choosing supplementary courses that could bridge their knowledge/skill gap. However, it is difficult to identify all competencies possessed by a student (Morris, Webb, Fu, & Singhal, 2013). Hence, lecturers could first recommend courses for students to deal with their strengths and weaknesses that have already been identified, and later if new gaps show up, lecturers could then move on to help students tackle the new knowledge/skill gap (Sarasvathy, 2001). Further, programs that involve both team teaching (by faculty, and where possible, entrepreneurs) and team entrepreneurial experiences are more likely to provide bridges over student entrepreneurial gaps. While it would be impossible to inoculate or train students for every unanticipated entrepreneurial activity, a good training program might provide tools, resources, and experience facilitating adaptability and ingenuity.

Component 3: Experience sharing

Social capital consists of resources that are embedded in social relationships. Individuals get access to and mobilize social capital to achieve desired outcomes (Gedajlovic, Honig, Moore, Payne, & Wright, 2013). Students participating in the same entrepreneurship education program can establish social contacts with their classmates. (Davidsson & Honig, 2003) suggest that these kinds of social ties serve as a powerful channel through which individuals get useful information related to their businesses. Some scholars have argued that this is reflected in the organizational measurement of “Entrepreneurship orientation (EO)”, although they largely avoid how, in practice, EO is facilitated (Covin, Green, & Slevin, 2006; Lumpkin & Dess, 2001; Walter, Auer, & Ritter, 2006). In Figure 3.3, all students are currently running their start-ups. Different people

tend to have different strengths, experience, and problems. Students enjoy many benefits by sharing their experience with each other. For example, they can share their strategies in dealing with real-life business problems. This is a good learning process for them because students are exposed to different knowledge, skills, and techniques to handle different issues. Consequently, they are better prepared to deal with different kinds of situations.

However, as Dewey (2007) suggests, students need to distinguish between bad and good experience. Therefore, a lecturer in the class should serve as a facilitator who assists and guides students in the experience discussion process. For example, lecturers could use the form of in-class presentation. Students are required to present their problems, their experience in handling similar issues, and their thinking and strategy toward the generation of potential satisfactory solutions. Ideally, each student should present a different topic in each class and should provide comments for their classmates' presentations. In this process, lecturers organize the presentation and discuss sessions, and are also responsible for providing feedback for each of the students. The feedback is important for students because it can help students differentiate between good and bad experiences. Bad experiences are usually connected to business failure. It is suggested that failure provides valuable learning opportunities and is necessary for effective adaptation (Corbett et al., 2007; Sitkin, 1992). Learning from failure is a process during which individuals analyze and reflect on their unsuccessful experience, gather the right and wrong information out of it, and get adjusted (Sitkin, 1992). Hence, lecturers should guide students to carefully examine their previous failures and transfer failure into learning.

Because this component also involves reflection, we suggest that the evaluation of reflections should be conducted by lecturers to get a better understanding of how reflections influence student learning. We suggest the use of the reflection scale developed by Kember et al. (2000)

(See Table 3.7 for the details of the scale). To enable comparison, the reflection measure should be tested both before and after the entrepreneurship class (i.e., both pre- and post-course).

As we mentioned earlier, Figure 3.3 is a dynamic cycle model. Students in the experience sharing stage (Component 3) may generate new problems that may be potential topics of future workshops. That is, after Component 3, the model can be moved back to Component 1 again, and start a new cycle. This model is consistent with the idea of a learning cycle by Kolb (1984), in the sense that we both consider learning as a dynamic and integrated process with each stage supporting and providing input for the next one.

To evaluate the effectiveness of Figure 3.3, there is a need to test the link between the proposed model and the educational outcomes. Here, we propose five variables that can be used to evaluate the effectiveness of entrepreneurship courses. They are entrepreneurial self-efficacy, entrepreneurial attitude, entrepreneurial intentions, learning outcomes, and career satisfaction. The first four variables are widely used in entrepreneurship course evaluation, and are also recommended to be tested in Figure 3.1 and Figure 3.2. The fifth variable is unique in Figure 3.3, because different from students in Figure 3.1 and Figure 3.2, students in Figure 3.3 have already chosen their career as entrepreneurs, and we think it is important to know how entrepreneurship education influences their views toward their self-employment career. To enable comparisons and detect the true effect of the entrepreneurship model, the five measures below should be tested before and after the entrepreneurship class (i.e., both pre- and post-course).

- Entrepreneurial self-efficacy: See Table 3.3 for the details of the scale.
- Entrepreneurial attitude: See Table 3.4 for the details of the scale.
- Entrepreneurial intentions: See Table 3.5 for the details of the scale.

- Learning outcomes: See Table 3.6 for the details of the scale.

Career satisfaction: We suggest the use of the career satisfaction scale developed by Greenhaus, Parasuraman, and Wormley (1990) (See Table 3.8 for the details of the scale). This scale has 5 items. Respondents are asked to indicate to what extent they agree or disagree with each item on a 5-point Likert scale with 1=strongly disagree and 5=strongly agree. A sample item is: “I am satisfied with the success I have achieved in my career”.

3.3 Discussions

Evidence-based education has gained in prominence in recent years (Biesta, 2007). Rooted in the field of medicine and quickly promoted to other fields of professional activity (Cook et al., 2012). It emphasizes the importance of using solid and reliable evidence to inform teaching decisions, and to challenge the traditional approach in which the teaching agenda is driven by conventional wisdom, political ideology, interest of administration, parental choice, or financial or economic requirements (Biesta, 2007; Oakley, 2002). Despite some debate on the proper implementation of evidence-based practice in entrepreneurship education (Pirrie, 2001; Simons, 2003), the belief that this model can contribute to progressive and systematic improvement of both teaching and research is widely held by some scholars in the field (Slavin, 2002). However, the lack of solid theories in entrepreneurship education research and the disconnect between teaching and research communities hinders the accumulation and utilization of good evidence to inform decisions (Hargreaves, 1996; Kuratko, 2005; Sorenson & Stuart, 2008). What is more, entrepreneurship education usually overlooks the diverse experience and diverse demands of different students (Collins et al., 2004). Using a one-size-fits-all approach, schools are rarely capable of meeting the real needs of students. In this paper, we seek to bridge the gap by proposing

a set of conceptual models of entrepreneurship education for three different types of students.

The models proposed in this chapter are primarily built on John Dewey's theories of education (Dewey, 2007), together with other theories including human capital theory and role theory. The merits of our models are that they explain how entrepreneurship should be taught to students in entrepreneurship courses, and provide solid theoretical evidence to support their foundation. We also propose a set of variables that can be used by lecturers to evaluate their courses based on our proposed models.

The categorization of students is based on their entrepreneurship experience. For the first group of students who have almost no experience in start-up process, the first step is to familiarize them with the role of an entrepreneur. It is also important to provide an opportunity for them to build their teamwork skills and practice their proper function in a social control process (e.g., a simulation game). Some introduction to 'what is an entrepreneur' might be appropriate for this group. For students who have entrepreneurship experience, facilitating them to conduct reflective activities on previous events is the first and major responsibility of lecturers. For example, a lecturer in the class could encourage students to keep a logbook in which they provide a close examination of their past entrepreneurial experience as well as their thoughts and feelings (Honig, Karlsson, & Hägg, 2013). Because the logbook practice is post-hoc, to better facilitate students to retrieve memories of the past, certain techniques can be applied. Mandler (1978) suggests that students should use a story-telling strategy when they try to recall what has happened before. That is, the outline of the story (e.g., When did you first start your business? What kind of business? Where? How long did you run it? How did it go? What was the outcome?) should first be described. The outline is important because it provides basic nodes people use to connect information. In the next step, students can start to expand their outline by providing more information retrieved from

memories. During this process, it is likely that some students may avoid unpleasant memories because they are usually connected to business frustrations or failures. To ameliorate this problem, (Shepherd, 2004) suggests that lecturers of the entrepreneurship program should guide students to manage emotions associated with failure, and he further offers several useful approaches for lecturers to use in the classroom such as emphasizing the point to students that failure represents a good opportunity to learn. For the students who are currently running their own businesses, a dynamic and flexible teaching framework enables them to bring their real-time problems to class, share experience, and receive firsthand feedback and comments. In all three models, students are required to take classes in relevant topics of entrepreneurship knowledge, which enables students to further develop their human capital in this field. Some examples are entrepreneurship theory, start-up finance, marketing strategy, and human resource management. For the first two groups of students, they are encouraged to participate in real start-up projects which could be their own or others.

3.4 Conclusions

This research has both theoretical and practical implications. Theoretically, we demonstrate that entrepreneurship students should not be treated as a homogeneous group, as they have different levels of startup experience and different educational needs. We take students' experience and needs into consideration, proposing three different educational models that target students without any entrepreneurial experience, students with previous entrepreneurial experience, and students currently running their businesses, respectively. The models proposed in this chapter are derived from John Dewey's theories of education (Dewey, 2007), and combined with other

pedagogical, human capital, and role theories, present a systematic set of conceptual models for designing entrepreneurship education. We hope that the reader agrees with us regarding the merits of our models and that they facilitate the design of more effective educational programs.

Future research will be an important aspect in improving entrepreneurship education. Scholars might examine the effectiveness of the three proposed models introduced in this chapter. The studies could adopt a pretest-post-test and control group design to explore the influences of the models on educational outcomes such as students' entrepreneurial self-efficacy, entrepreneurial attitude, and entrepreneurial intentions. By comparing students who are taught with these models and those without, we could have a better understanding of the potential strengths and weaknesses of the models in the practical use.

Research could also examine the long-term effect of these models on fostering students' entrepreneurship behavior. Studies could adopt a longitudinal design to delve into the changes of students' entrepreneurial attitude, intentions, and start-up behaviors over time. For example, researchers can compare students' attitude, intentions, and entrepreneurship behavior recorded at the time they enter the entrepreneurship program (Time 1), the time they leave the program (Time 2), one year later (Time 3), and four years later (Time 4). The long-term effects of these models are important. Because there is no guarantee that students will choose to start their businesses right after they finish entrepreneurship courses, longitudinal research is necessary to examine if and how students pursue their start-ups a few years after graduation. If these models have short-term positive influences on students (e.g., students' entrepreneurial attitude and intentions are enhanced after they finish the courses), but these influences fail to last long (e.g., students' entrepreneurial attitude and intentions get back to the original level one year later), then the models may not be able to cause "real changes" in students.

Finally, future research might study the impact of entrepreneurship education on career satisfaction. For example, researchers can examine whether entrepreneurs who have received entrepreneurship education before have a higher satisfaction toward their career compared to their counterparts who haven't received this education.

3.A Appendix: Tables

Table 3.1 Assessment questions of students' level of entrepreneurship experience

1. Have you, alone or with others, previously tried to start a new independent firm? Yes/No

2. If the answer is Yes, how many following start-up activities have you completed?

(The list of start-up activities is proposed by Alsos and Kolvereid (1998))

-Prepared business plan

-Organized start-up team

-Looked for facilities/equipment

-Acquired facilities/equipment

-Developed product/service

-Conducted market research

-Devoted full time to the business

-Saved money to invest

-Invested own money

-Applied for bank funding

-Received bank funding

-Applied for government funding

-Received government funding

-Applied for license, patent etc.

-Hired employees

-Conducted sales promotion activities

-Registered business

-Received first payment

-Received positive net income

(Only students who answer "Yes" to the first question, and have completed at least one start-up activity listed in the second question are considered as having previous entrepreneurship experience.)

Table 3.2 Measurement instrument for simulation satisfaction

Simulation Satisfaction Items (10 items adapted from Feingold et al. (2004))
<i>Realism</i>
1. Scenario used with the simulation recreates real-life business situations.
2. The simulation resembles a real entrepreneurship setting.
3. The simulator model provides a realistic entrepreneurship simulation.
<i>Transferability</i>
4. Increase my confidence about going into the real entrepreneurship setting.
5. My interaction with the entrepreneurship simulator improved my start-up competence.
6. Prepared me to perform in the “real-life” entrepreneurship setting.
<i>Value</i>
7. Scenario adequately tests technical entrepreneurship skills.
8. Scenario adequately tests entrepreneurship decision-making.
9. Working with the entrepreneurship simulator was a valuable learning experience for me.
10. Overall the simulation experience enhanced my learning.
<i>Respondents were asked to what extent they agreed or disagreed with each item. The answer was measured by a 5-point Likert Scale with 1=strongly disagree and 5=strongly agree.</i>

Table 3.3 Measurement instrument for entrepreneurial self-efficacy

Entrepreneurial Self-Efficacy Items (22 items from Chen et al. (1998))
<i>Marketing</i>
1. Set and meet market share goals
2. Set and meet sales goals
3. Set and attain profit goals
4. Establish position in product market
5. Conduct market analysis
6. Expand business
<i>Innovation</i>
7. New venturing and new ideas
8. New products and services
9. New markets and geographic territories
10. New methods of production, marketing and management
<i>Management</i>
11. Reduce risk and uncertainty
12. Strategic planning and develop information system
13. Manage time by setting goals
14. Establish and achieve goals and objectives
15. Define organizational roles, responsibilities, and policies
<i>Risk-taking</i>
16. Taking calculated risks
17. Make decisions under uncertainty and risk
18. Take responsibility for ideas and decisions
19. Work under pressure and conflict
<i>Financial control</i>
20. Perform financial analysis
21. Develop financial system and internal control
22. Control cost
<i>Respondents were asked to what extent they agreed or disagreed with each item. The answer was measured by a 5-point Likert Scale with 1=strongly disagree and 5=strongly agree.</i>

Table 3.4 Measurement instrument for entrepreneurial attitude

Entrepreneurial Attitude Items (33 items in 11 sub-scales from Kolvereid (1996))
<i>A. Reasons for becoming organizationally employed</i> 1. Security (two items): job security, job stability 2. Work load (five items): not having to work long hours, to have leisure, to have fixed working hours, not to have a stressful job, have a simple, not complicated job 3. Social environment (two items): participate in a social environment, to be a member of a social “milieu” 4. Avoid responsibility (three items): avoid responsibility, not taking too much responsibility, avoid commitment 5. Career (two items): have opportunity for career progress, promotion <i>B. Reasons for becoming self-employed</i> 6. Economic opportunity (three items): economic opportunity, to receive compensation based on merit, to keep a large proportion of the result 7. Challenge (four items): to have a challenging job, to have an exciting job, to have an interesting job, to have a motivating job 8. Autonomy (four items): freedom, independence, to be your own boss, be able to choose your own work tasks 9. Authority (two items): have power to make decisions, have authority 10. Self-realization (four items): self- realization, realize one's dreams, to create something, to take advantage of your creative needs 11. Participate in the whole process (two items): to participate in the whole process, to follow work-tasks from a to z <i>Respondents were asked to what extent they agreed or disagreed with each item. The answer was measured by a 5-point Likert Scale with 1=strongly disagree and 5=strongly agree.</i>

Table 3.5 Measurement instrument for entrepreneurial intentions

Entrepreneurial Intentions Items (3 items from ASTEE, proposed by Moberg et al. (2014))

1. I often think about starting a business.
2. I have many ideas for making money.
3. My goal is to become my own boss.

Respondents were asked to what extent they agreed or disagreed with each item. The answer was measured by a 7-point Likert Scale with 1=strongly disagree and 7=strongly agree.

Table 3.6 Measurement instrument for learning outcomes

Learning Outcomes Items (5 items from Souitaris et al. (2007))

To what extent did the entrepreneurship program (When this measurement is used in a pre-course survey, the wording should be changed into “To what extent do you expect the entrepreneurship program”)

1. Increase your understanding of the attitudes, values and motivation of entrepreneurs.
2. Increase your understanding of the actions someone has to take in order to start (maintain) a business.
3. Enhance your practical management skills in order to start (maintain) a business.
4. Enhance your ability to develop networks.
5. Enhance your ability to identify an opportunity.

Respondents were asked to what extent they agreed or disagreed with each item. The answer was measured by a 7-point Likert scale with 1=Not at all and 7=To a large extent.

Table 3.7 Measurement instrument for reflection

Reflection Items (16 items from Kember et al. (2000))
<i>Habitual Action</i>
1. When I am working on some activities, I can do them without thinking about what I am doing.
2. In this course we do things so many times that I started doing them without thinking about it.
3. As long as I can remember handout material for examinations, I do not have to think too much.
4. If I follow what the lecturer says, I do not have to think too much on this course.
<i>Understanding</i>
5. This course requires us to understand concepts taught by the lecturer.
6. To pass this course you need to understand the content.
7. I need to understand the material taught by the lecturer in order to perform practical tasks.
8. In this course you have to continually think about the material you are being taught.
<i>Reflection</i>
9. I sometimes question the way others do something and try to think of a better way.
10. I like to think over what I have been doing and consider alternative ways of doing it.
11. I often reflect on my actions to see whether I could have improved on what I did.
12. I often re-appraise my experience so I can learn from it and improve for my next performance.
<i>Critical Reflection</i>
13. As a result of this course I have changed the way I look at myself.
14. This course has challenged some of my firmly held ideas.
15. As a result of this course I have changed my normal way of doing things.
16. During this course I discovered faults in what I had previously believed to be right.
 <i>Respondents were asked to what extent they agreed or disagreed with each item. The answer was measured by a 5-point Likert Scale with 1=strongly disagree and 5=strongly agree.</i>

Table 3.8 Measurement instrument for career satisfaction

Career Satisfaction Items (5 items from Greenhaus et al. (1990))
1. I am satisfied with the success I have achieved in my career.
2. I am satisfied with the progress I have made toward meeting my overall career goals.
3. I am satisfied with the progress I have made toward meeting my goals for income.
4. I am satisfied with the progress I have made toward meeting my goals for advancement.
5. I am satisfied with the progress I have made toward meeting my goals for the development of new skills.
<i>Respondents were asked to what extent they agreed or disagreed with each item. The answer was measured by a 5-point Likert Scale with 1=strongly disagree and 5=strongly agree.</i>

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Chapter 4 The temporal consistency of entrepreneurship attitudes and intentions: Do early stage entrepreneurship courses matter?

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Abstract

Considerable previous entrepreneurship literature has examined the antecedents of entrepreneurial intentions as a means of predicting entrepreneurial activity among potential entrepreneurs. The current study argues that the theoretical and practical value of this body of research hinges on the temporal stability of the attitudinal and intentional constructs used, and these have not been studied to date. Findings from the current approximate four-year longitudinal study of entrepreneurial attitudes and intentions stability have implications on interpreting extant entrepreneurial literature and for policy and practice related to nascent entrepreneurship development and support.

4.1 Introduction

An extensive body of previous literature has examined the antecedents of entrepreneurship intention (Bae, Qian, Miao, & Fiet, 2014), a construct that indicates motivation to undertake the entrepreneurial activity. This literature is underpinned by motivation theories, such as theory of planned behavior (TPB) (Ajzen, 1985), which predicts that attitudes lead to intentions, and intentions lead to behavior. Thus, this literature attempts to demonstrate the impact of various factors on entrepreneurship outcomes, such as personality traits (e.g., De Clercq, Honig, and

Martin (2013)) and entrepreneurship education (EE) (e.g., Souitaris, Zerbinati, and Al-Laham (2007)). Rather than using the arguably most valuable indicators, such as nascent gestation behaviors or achieving start up, these studies stop at the intentional point of the causal chain. However, for this learning to be of value, two further phenomena must be confirmed. First, heightened intentions lead to behaviors in the entrepreneurship context, a claim for which is evidenced by certain studies (e.g., Kolvereid and Moen (1997); Souitaris et al. (2007)), although most of which have relatively short time frames. Second, intentions must be stable over time, such that those whose intentions are heightened, for instance by an EE intervention, maintain this heightened intention until such time that they can act. To the researchers' knowledge, there is no evidence of the stability of entrepreneurial intentions, and there appears to be limited study available of this in the wider management literature, which also often uses intentional constructs as dependent variables (Hiemstra, Otten, & Engels, 2012). This important issue is addressed in this paper.

Overall the study makes two main contributions to the entrepreneurship and wider management literature. The first and most valuable contribution is the learning derived from the study on the stability of attitudes and intentions over time (i.e., approximately four years). This has not been studied in the entrepreneurship field to-date, and limited research is available even in the broader motivational literature. The theoretical and practical value of this learning is considerable. The examination of expectancy-value theory (Fishbein & Ajzen, 1977) and mere exposure theory (Zajonc, 1968) through a novel test of EE impact contributes to understanding the boundaries and parameters of these two established theories in the entrepreneurship domain. The study also helps to identify parameters for generalizing theories that employ attitudinal and intentional constructs to motivation, such as the theory of planned behavior (Ajzen, 1985) and the

theory of reasoned action (Fishbein & Ajzen, 1977). The learning from the study indicates that time is an important parameter, potentially limiting the efficacy of interventions designed to motivate specific behaviors, such as entrepreneurial activity.

As regards practice, understanding the temporal stability of entrepreneurship attitudes and intentions has direct implications for interpreting, and acting on, the large body of extant EE research that uses these constructs to assess entrepreneurial outcomes. Further, this informs EE program design and public policy regarding timing, and ultimately funding, of entrepreneurship courses.

In the study, EE intervention is used to examine the stability of attitudes and intentions over time in a context relevant to extant literature. The study also contributes in the EE domain by replicating and extending the results in the current EE effectiveness literature. The second contribution of the study is to provide one of the few rigorous and temporally appropriate longitudinal tests of EE impact on entrepreneurship attitudes and intentions. This adds significant value to the limited but important set of EE studies that can begin to provide insight into the causal relationships, rather than simple correlations between EE courses and student outcomes, while building entrepreneurship theory.

The paper is organized as follows. First, the study explores theories to derive the hypotheses. Second, the paper describes the data collection process and the scales used to measure the variables researched. Third, the data analysis is presented to interpret the results. The paper concludes with a discussion of the study's contributions, implications, limitations, and future research directions.

4.2 Theory and hypotheses

4.2.1 Theory of Planned Behavior

The theory of planned behavior (TPB) proposes that an individual's actual behavior can be

predicted by his/her intention to perform this behavior, and this intention can be predicted by attitudes, consisting of: attitude toward the behavior, subjective norm, and perceived behavioral control (PBC) (Ajzen, 1991, 2002; Ajzen & Fishbein, 1980; Ajzen & Madden, 1986). Attitude refers to an individual's favorability level of performing the behavior, subjective norm refers to the social pressures exerted by people who are close to or important to an individual, and PBC refers to the individual's perception of the ease or difficulty of performing the behavior (Ajzen, 1991). Finally, behavioral intention is defined as a person's subjective probability of performing the behavior (Fishbein & Ajzen, 1977)

TPB has attracted considerable attention in the literature, and has shown good efficacy in predicting intentions and behaviors (Armitage & Conner, 2001; Godin & Kok, 1996; Sutton, 1998). For example, in a meta-analysis study conducted by Armitage and Conner (2001), they revealed that attitude, subjective norm and PBC are all significantly associated with behavioral intentions. In the entrepreneurship context, if a person has a more favorable attitude toward starting a business, he/she is more likely to have a stronger intention to pursue entrepreneurship (Krueger & Carsrud, 1993). Moreover, subjective norms toward entrepreneurship reflect a person's beliefs on whether referent individuals think that he/she should perform the entrepreneurial behavior. Referent individuals are people whose opinions for the person's behavior are important to this person (Conner & Armitage, 1998). It has been observed that if this person receives several approvals from his/her reference group on pursuing entrepreneurship, he/she should have a stronger intention to create a new venture. Third, PBC in entrepreneurship reflects a person's level of perceived control over entrepreneurial behavior. When people have a higher PBC over creating a startup, they are more likely to have a higher intention to engage in entrepreneurial activities. In addition, a few studies have confirmed that a favorable attitude toward entrepreneurship, a higher subjective

norm, and a higher PBC are related to higher intention to pursue entrepreneurship (Morianio, Gorgievski, Laguna, Stephan, & Zarafshani, 2011; Souitaris et al., 2007). Based on the discussion above, the following hypotheses are proposed:

Hypothesis 1a: *Students' attitude toward self-employment is positively associated with their intention to become self-employed.*

Hypothesis 1b: *Students' perceived behavioral control (PBC) is positively associated with their intention to become self-employed.*

Hypothesis 1c: *Students' subjective norm is positively associated with their intention to become self-employed.*

4.2.2 Entrepreneurship Courses and Attitude

Attitude towards self-employment refers to an individual's favorability of becoming self-employed as compared to organizationally employed (Kolvereid, 1996a). Expectancy-value (EV) theory suggests that information provides the basis for attitude formation, and attitude can be changed through active participation (direct experience) and persuasive communication (information acquired from outside source) (Fishbein & Ajzen, 1977).

Entrepreneurship courses are designed to further students' understanding of entrepreneurship and help develop better entrepreneurs (Gorman, Hanlon, & King, 1997; Katz, 2007; Pittaway & Cope, 2007). These courses usually cover important entrepreneurial knowledge and skills (e.g., planning, financing, product development) (Kuratko, 2005). Although different instructors may adopt different styles to teach entrepreneurship and include different pedagogical components (Marton, Tsui, Chik, Ko, & Lo, 2004) in their courses, the sources students use to acquire relevant knowledge/skills can be divided into two groups: (1) external sources such as an entrepreneurship textbook, lectures, case studies, guest speakers, etc. and (2) internal sources such as a simulation

and participation in a startup project. The first source is referred to as “persuasive communication” by Fishbein and Ajzen (1977). It is characterized by the students’ exposure to information related to entrepreneurship by some outside source. For example, the textbook may tell students that it is important to make a business plan to access funding. The second source is what the authors have termed as the “active participation”, which allows the students to gain information by observing and trying out different things related to entrepreneurship (Fishbein & Ajzen, 1977). For example, participation in actual startup projects (Honig, 2004).

EV theory also suggests that a positive or negative attitude change depends on the students’ evaluation of entrepreneurship based on the attributes they associate with entrepreneurship. Thus, the purpose of EE is to make claims that connect entrepreneurship to salient attributes (e.g., entrepreneurship drives economic growth and innovation; entrepreneurship is an alternate career choice) (Fishbein, 1963). Because entrepreneurship courses are aimed at encouraging more individuals to become entrepreneurs, it is unlikely that these courses will include too much negative information (e.g., failure) which might make students develop many negative attributes toward entrepreneurship (Shepherd, 2004).

In addition to EV theory, Zajonc’s mere exposure theory claims that repeated exposure of the individual to a stimulus can enhance his/her attitude to it (Zajonc, 1968). The study considers EE as a stimulus that affects students’ views of entrepreneurship. While taking courses, students are repeatedly exposed to knowledge/skills related to entrepreneurship, which serves as a condition for them to develop more favorable attitudes toward entrepreneurship. Some research shows that entrepreneurship courses have a positive impact on students’ attitude to self-employment (Mueller, 2011; Peterman & Kennedy, 2003). For example, Peterman and Kennedy (2003) showed that entrepreneurship training can enhance students’ attitude to self-employment. This study used a

pretest-post-test control group design, and found that students develop a higher level of desirability toward entrepreneurship after taking entrepreneurship courses. However, this is not a persistent finding in the extant literature, and there are studies claiming the positive role of entrepreneurship courses on attitude improvement, but without empirically testing it or failing to find the support (Fayolle, Gailly, & Lassas-Clerc, 2007; Liñán, 2004; Potter, 2008; Souitaris et al., 2007). For example, Souitaris et al. (2007) suggested that at the end of EE programs, students may have a more positive attitude toward self-employment compared to the beginning of the programs, but they didn't find enough evidence to support their claim. Besides, Mento and Friedrich (2007) found that undergraduate students in South Africa have a less positive attitude toward entrepreneurship after taking courses⁶.

Although entrepreneurship courses may be able to raise the students' attitude towards self-employment at the end of courses, it is uncertain, how this attitude may change with time on course completion. The EV theory and Zajonc's mere exposure theory provide two different predictions to the potential attitudinal change. The attitude change process described by Zajonc is a cognition-free process, which only emphasizes importance of repeated exposure of the individual to stimulus (Fishbein & Middlestadt, 1995; Zajonc, 1968). Accordingly, on the completion of entrepreneurship courses, the stimulus is removed and the exposure to it is reduced unless students keep taking the same courses again and again. As time progresses, students' attitudes may start to lessen due to the lack of condition for constant exposure to entrepreneurship (Harmon-Jones & Allen, 2001; Zajonc, 2001). Contradictory to Zajonc's viewpoint, EV theory suggests that the original evaluative responses which students associate with the entrepreneurship attributes are used to form an attitude

⁶ If students learn it is a high-risk proposition, and so elect out of it, that is not necessarily a negative outcome.

(Fishbein & Ajzen, 1977). Such cognitive-affective evaluations allow students to develop a deeper level of organization that can facilitate memory retrieval. Even though some specific details related to entrepreneurship may be lost from memory over time, the overall corresponding attitude may not be affected (Krishnan & Smith, 1998; Ornstein & Trabasso, 1974). That is, the attitude toward entrepreneurship may be able to resist the decline over time. If the entrepreneurship students develop a more positive attitude toward pursuing self-employment, this attitude should be relatively stable and remain over time.

There is little research, if any, directly examining the process of change in attitude with time after taking entrepreneurship courses. Since there is a clear need to empirically test both the short-term effect of EE on attitude (i.e., before-after course), and the long-term effect (i.e., a couple of years later), based on the two different predictions suggested by the two theories above, the following hypotheses are proposed:

Hypothesis 2a: Compared to the beginning of an entrepreneurship course (T1), students have a more positive attitude toward entrepreneurship at the end of the entrepreneurship course (T2).

Hypothesis 2b: Students' attitude toward entrepreneurship after completing an entrepreneurship course will decline over time (T3).

Hypothesis 2c: Students' attitude toward entrepreneurship after completing an entrepreneurship course will remain the same over time (T3).

See Figure 4.1 for information of T1, T2, and T3.

4.2.3 Entrepreneurship Courses and Subjective Norms

In the entrepreneurship context, subjective norms refer to an individual's perception of what important people in his/her life think about him/her becoming self-employed (Kolvereid, 1996a). By the theory of planned behavior, subjective norms are determined by the perceived expectations

of the people in the referent group, and the strength of the individual's motivation to comply with these expectations (Fishbein & Ajzen, 1977; Kolvereid, 1996a; Terry, Hogg, & White, 1999).

Subjective norms can be altered through two ways: (1) the expectations and perceptions of the referent people change; and (2) the level of the individual's compliance motivation changes. The entrepreneurship course may trigger students' subjective norms to change in two ways. First, signaling theory suggests that people will interpret and make inferences based on the messages (i.e., signals) imparted in a practice (Connelly, Certo, Ireland, & Reutzel, 2011; Spence, 1973, 2002). Taking an entrepreneurship course is a signal to the audience that the person is learning entrepreneurship. Therefore, it is reasonable for them to interpret this signal as "the person is taking entrepreneurship courses, he/she may be interested in entrepreneurship or he/she is trying to build some businesses.". On observing efforts by that individual on learning entrepreneurship, they may expect the person to try out some entrepreneurial activities. Second, Fishbein and Ajzen (1977) suggest that when people need to make decisions in an unfamiliar field they tend to seek advice from their referent groups and also comply with their feedback. Correspondingly, EE can increase the students' familiarity toward this subject (Hills, 1988; Kuratko, 2005). When students develop a certain understanding of entrepreneurship, they tend to rely more on their own opinions than their referent groups' ideas to judge the appropriateness of performing the behavior (Fishbein & Ajzen, 1977; Montano & Kasprzyk, 2002). In this case, even if the referent group may think that the person should not pursue self-employment, this person may have a lower motivation to comply with these expectations.

In fact, several studies in the entrepreneurship field have found a positive impact of EE on students' subjective norms (Mueller, 2011; Souitaris et al., 2007). For example, Souitaris et al. (2007) found that students have a higher subjective norm in self-employment at the end of EE

programs, compared to the beginning of the programs. However, there are other studies which proposed the importance of EE in enhancing students' subjective norms, but lacked enough empirical support (Fayolle, Gailly, & Lassas-Clerc, 2006; Oosterbeek, Van Praag, & Ijsselstein, 2010).

Although entrepreneurship courses may be able to raise the students' subjective norms towards self-employment at the end of courses, the probably change in subjective norms after course completion is unclear. Decay theory suggests that memory fades with time, therefore, the knowledge/skills learned previously become less available for later retrieval as time progresses (Baddeley, 1997; de Holan, Phillips, & Lawrence, 2004; Krishnan & Smith, 1998). After finishing entrepreneurship courses, students' familiarity level toward entrepreneurship may drop due to memory decay (Baddeley, 1997; Custers, 2010). Therefore, they may rely more on their referent groups' opinions to decide the appropriateness of performing startup behaviors and also tend to have a higher motivation to comply with their expectations (Fishbein & Ajzen, 1977).

Limited research is available in examining how subjective norms change with time after taking entrepreneurship courses. The reason for this is the lack of long-term longitudinal research in examining students' subjective norms toward entrepreneurship in this field. Because there is a clear need to empirically test both the short-term effect of EE on subjective norms (i.e., before-after courses), and the long-term effect (i.e., a couple of years later), the following hypotheses are proposed:

Hypothesis 3a: *Compared to the beginning of an entrepreneurship course (T1), students have a higher subjective norm toward entrepreneurship at the end of the entrepreneurship course (T2).*

Hypothesis 3b: *Students' subjective norm toward entrepreneurship after completing an entrepreneurship course will decline over time (T3).*

Hypothesis 3c: Students' subjective norm toward entrepreneurship after completing an entrepreneurship course will remain the same over time (T3).

4.2.4 Entrepreneurship Courses and Perceived Behavioral Control

In the entrepreneurship context, perceived behavioral control (PBC) refers to the perceived ability to become self-employed (Kolvereid, 1996a). The PBC is the third factor to be introduced in the theory of planned behavior to predict behavioral intentions (Ajzen & Madden, 1986). PBC can be influenced by two kinds of factors: (1) internal factors, such as knowledge/skills; and (2) external factors, such as time and opportunity (Ajzen & Madden, 1986). To increase PBC towards pursuing self-employment, one can choose to increase his/her level of knowledge/skills, or try to devote more time or create more opportunities in the entrepreneurship field. Entrepreneurship courses may be able to influence a person's PBC by enhancing his/her understanding of entrepreneurship. In accordance with human capital theory, entrepreneurship training can increase the students' entrepreneurial knowledge/skills (Becker, 1962; Davidsson & Honig, 2003; Martin, McNally, & Kay, 2013). Hence, students may have a higher level of understanding of entrepreneurship after course completion, and this increase in knowledge/skills may contribute to the increase in their PBC toward entrepreneurship. Several studies have confirmed the positive impact of EE on students' PBC (Cooper, Gordon, & Lucas, 2007; Fayolle et al., 2006, 2007; Peterman & Kennedy, 2003). For example, Fayolle et al. (2007) found that students' PBC significantly improved after the entrepreneurship training. However, the span of the training was very short, i.e., 3 days.

Although entrepreneurship courses may be able to raise students' PBC towards self-employment at the end of courses, how the PBC may change with time after finishing courses is unclear. Decay theory suggests that memory fades over time, therefore, the knowledge/skills

learned previously become less available for later retrieval as time progresses (Baddeley, 1997; de Holan et al., 2004; Krishnan & Smith, 1998). Custers (2010) reported in a review paper that in the general education domain, more than 50% knowledge will be lost in two years after taking courses due to the memory decay effect. When a person's knowledge/skills in entrepreneurship wear off, his/her level of PBC may decline, because he/she is likely to feel less capable of pursuing self-employment. Although memories fade automatically as a function of time, theories suggest that the long-term retention of knowledge/skills can be achieved under the condition that learners keep strengthening the memory trace for the information that they recall (Custers, 2010; Halpern & Hakel, 2003). To put it simply, knowledge/skills that are frequently used becomes more retrievable. Hence, students may be able to retain their entrepreneurship knowledge/skills if they apply them more often in the domain of entrepreneurship. If a person keeps the same entrepreneurship knowledge/skills level, his/her PBC is likely to remain constant.

The researchers are unable to identify any research examining how the PBC changes with time after taking entrepreneurship courses. The reason for this, researchers believe, is the lack of longitudinal research in examining students' PBC toward entrepreneurship in this field. Since there is a clear need to empirically test both the short-term effect of EE on PBC (i.e., before-after course), and the long-term effect (i.e., a couple of years later), based on the discussions above, the following hypotheses are proposed:

Hypothesis 4a: *Compared to the beginning of an entrepreneurship course (T1), students have a higher PBC toward entrepreneurship at the end of the entrepreneurship course (T2).*

Hypothesis 4b: *Students' PBC toward entrepreneurship after completing an entrepreneurship course will decline over time (T3).*

Hypothesis 4c: *Students' PBC toward entrepreneurship after completing an entrepreneurship*

course will remain the same over time (T3).

4.2.5 Entrepreneurship Courses and Intentions

Intention to self-employment refers to the state of mind directing an individual's attention and action towards becoming self-employed (Bird, 1988). It reflects the person's subjective probability that he/she will engage in entrepreneurial activities (Kolvereid, 1996a, 1996b). According to the theory of planned behavior (TPB), intention to self-employment is determined by an individual's attitude towards self-employment, subjective norms concerning entrepreneurship, and perceived behavioral control (PBC) in entrepreneurship (Lüthje & Franke, 2003). The previous sections propose that the students may have a more positive attitude, a more positive subjective norm, and a more positive PBC towards entrepreneurship at the end of entrepreneurship courses, compared to the beginning of the courses. Hence, corresponding to the increase in attitude, subjective norm, and PBC, there should be a concurrent increase in the entrepreneurial intentions. Correspondingly, some research reveals the positive impact of EE on students' intention to self-employment (Fayolle et al., 2006, 2007; Krueger, Reilly, & Carsrud, 2000; Souitaris et al., 2007). For example, Souitaris et al. (2007) found that at the end of EE programs, students have a higher intention to self-employment compared to the beginning. There are also studies that did not find enough evidence to support the positive impact of EE on intention, or found that entrepreneurship training has a negative effect on students' intention (Oosterbeek et al., 2010; Von Graevenitz, Harhoff, & Weber, 2010). For example, Oosterbeek et al. (2010) found that the college students had a lower intention to self-employment after taking entrepreneurship courses.

Although entrepreneurship courses may be able to raise students' intention toward self-employment at the end of courses, how the intention may change with time after finishing courses is unclear. The researchers were unable to identify any research examining this relationship. There

is barely any literature on this issue because of the lack of longitudinal research in examining students' intention toward entrepreneurship in this field. The researchers propose that intention may (1) remain constant with time, or (2) decline with time. The intention will change when attitudes, subjective norms, and PBC change (Ajzen, 1991). In the previous sections, it is proposed that these three variables (i.e., attitudes, subjective norms, and PBC) may remain or decline with time. Therefore, it is reasonable to predict that intention change will also follow this pattern.

Since there is a clear need to empirically test both the short-term effect of EE on intentions (i.e., before-after course), and the long-term effect (i.e., a couple of years later), based on the discussions above, the following hypotheses are proposed:

Hypothesis 5a: *Compared to the beginning of an entrepreneurship course (T1), students have a higher intention toward entrepreneurship at the end of the entrepreneurship course (T2).*

Hypothesis 5b: *Students' intention toward entrepreneurship after completing an entrepreneurship course will decline over time (T3).*

Hypothesis 5c: *Students' intention toward entrepreneurship after completing an entrepreneurship course will remain the same over time (T3).*

4.2.6 The Role of Learning Outcomes

Learning outcomes reflect the overall evaluation of what students have learned during entrepreneurship courses (Souitaris et al., 2007), covering five aspects: (1) attitudes, values and motivation (i.e., why do entrepreneurs act?); (2) actions that need to be undertaken to start a business (i.e., what needs to be done?); (3) practical management skills to start a business (i.e., how do I start the business?); (4) network developing (i.e., who do I need to know?); (5) business opportunity identification (i.e., when do I need to act) (Johannisson, 1991; Souitaris et al., 2007).

Research shows that individuals' abilities to build network ties are positively associated with

their entrepreneurial intentions and their level of engagement in entrepreneurial activities (Kreiser, Patel, & Fiet, 2013; Sequeira, Mueller, & McGee, 2007). People with more social ties tend to have better accesses to resources, and they usually have a higher confidence in pursuing self-employment (Davidsson & Honig, 2003; Sequeira et al., 2007). Since network developing knowledge/skills are usually covered in entrepreneurship courses (Kuratko, 2005), we suggest that this specific knowledge/skill learned in an EE program would enhance students' abilities to develop social networks, and therefore improve their attitudes and intentions. In addition, research suggests that EE can enhance students' abilities to identify business opportunities, and therefore, contribute to the improvement of students' attitudes and intentions to self-employment (Souitaris et al., 2007).

Learning outcomes may be positively associated with students' attitudes, subjective norms, PBC, and intentions to entrepreneurship. It is logical and reasonable to make this claim because when students have a high evaluation of what they have learned in entrepreneurship courses, they are more likely to have high scores in these four variables. In addition, Souitaris et al. (2007) proposed that compared to students' attitudes, subjective norms, PBC, and intentions at the beginning of entrepreneurship courses, the higher learning outcome is connected to higher improvements of attitude, subjective norms, PBC, and intentions at the courses completion. However, they failed to find the empirical support for this claim. Furthermore, learning outcomes may influence the change of these psychological factors after finishing courses. In the previous sections, the study has proposed that attitudes, subjective norms, PBC, and intentions may decline with time after finishing courses. If this is the case, then it is logical to assume that students with a higher learning outcome at the end of courses tend to have a lower decrease in attitudes, subjective norms, PBC, and intentions. Based on the discussions above, the following hypotheses

are proposed:

Hypothesis 6a: *The higher the learning outcome at the end of an entrepreneurship course, the higher increase in attitude to self-employment, subjective norm, PBC, and intention to self-employment between the beginning of the course and the end of the course.*

Hypothesis 6b: *The higher the learning outcome at the end of an entrepreneurship course, the lower the decrease in attitude toward self-employment, subjective norm, PBC, and intention to self-employment between the end of the course and three years after they finish their course.*

4.3 Methods

4.3.1 Participants and Procedures

Participants were recruited as part of the International Study of Entrepreneurship Education Outcomes research project (ISEEO, 2016), led by researchers in Canada. Designed to systematically examine short- and long-term effects of EE on university students, ISEEO employed a longitudinal control group design, with data collection at several points over approximately four years. Students were recruited via entrepreneurship instructors from 22 universities in 14 countries (e.g., Canada, USA, UK, Germany), all of which offered entrepreneurship courses to at least some of their students. From each university, for study purpose, students who took entrepreneurship courses and those who did not, were recruited to participate in a short online survey. The first survey (T1) was sent to 3,167 students, with those taking entrepreneurship courses completing it prior to course commencement. A total of 2,039 students completed the T1 survey, with a response rate being 64.4%. At the end of each course, the second survey (T2) was sent to those who had completed the first survey. A total of 354 students completed the T2, with a response rate being 17%. The average time span from T1 to T2 was approximately 5 months. The third survey (T3) was sent to those who completed T2 approximately 3 years later.

A total of 108 completed and matched surveys were received, with a response rate being 30.5% (See Figure 4.1 for the time frame of this study). We chose a three-year gap for the following reason. According to the decay theory, memory fades due to the mere passage of time (Brown, 1958). The knowledge retention rate will drop heavily in the first three years, but the drop tends to slow down after this time (Custers, 2010). This research design allows us to detect the remaining influence that entrepreneurship education has on students. Among these 108 respondents, 84 respondents belonged to the treatment group (i.e., students who took entrepreneurship courses), and the other 24 respondents were in the control group (i.e., students who did not take entrepreneurship courses). These 108 matched responses were included as sample in the current study. In this sample, 44 respondents were female, and 64 were male. A series of chi-square analyses were conducted to test the difference between respondents and non-respondents in terms of gender, previous startup experience, country, course type (i.e., required or elective), and group type (i.e., treatment group or control group). The results showed that the study respondents and study non-respondents had a similar proportion of male and female cases, a similar proportion of people with and without previous startup experience, and a similar proportion of Canada cases and non-Canada cases. Therefore, in terms of gender, startup experience and country, the study respondents are representative of the study non-respondents. However, in terms of course type and group type, the study respondents are not representative of the non-respondents because the analysis sample has a greater proportion of individuals from elective course group and the treatment group. This suggests that people who took an elective entrepreneurship course were more likely to take the survey.

Figure 4.1 Time frame of the current study



Time 1 (T1): At the beginning of entrepreneurship courses

Time 2 (T2): At the end of entrepreneurship courses

Time 3 (T3): Three years after taking entrepreneurship courses

4.3.2 Measures

The Cronbach's alpha coefficients were calculated for each of the following scales to evaluate its reliability. The alpha values for these scales exceed the minimum acceptable value of 0.7 for the sample.

Attitude to self-employment. A measure proposed by Kolvereid (1996a) was adopted. This measure includes six reasons in favor of self-employment and five reasons in favor of organizational employment, complemented with indexes for each of the eleven employment choices (Souitaris et al., 2007). There are a total of eleven indexes, and each index is treated as a sub-scale. Respondents were asked to what extent they agreed or disagreed with each item (sample item: "Job security"). The answer was measured by a 5-point Likert Scale with 1=strongly disagree and 5=strongly agree. Following Kolvereid's suggestions (1996b), indexes for each of the eleven employment status choice reasons were created, and a score for each index was calculated by averaging the item scores. A measure of self-employment choice was calculated by adding the six index scores of the reasons for becoming self-employed. Similarly, a measure of organizational employment choice was obtained by adding the five index scores of

the reasons for organizational employment. Finally, the numerical difference between the self-employment choice and the organizational employment choice is defined as the indicator of employment status choice attitude. A high score in this indicator means that the individual has a favorable attitude toward becoming self-employed, and a low score indicates a favorable attitude toward organizational employment.

Subjective norm. The subjective norm measure proposed by Souitaris et al. (2007) was adopted. This scale contains two subscales. The first subscale measures the perceived social pressures on pursuing self-employment, and includes 3 items. It was originally proposed by Kolvereid (1996a). In this subscale, respondents were asked to what extent they agreed or disagreed with each item on a 5-point Likert Scale with 1=strongly agree and 5=strongly disagree. A sample item is: “I believe that my closest family think that I should not pursue a career as self-employed.”. The second subscale measures the respondents’ motivation to comply with the social pressures, and includes 3 items which refer to each of the belief questions respectively. In this subscale, respondents were asked about to what extent they cared about how people who are important to them think about them becoming self-employed on a 5-point Likert scale with 1=I do not care at all and 5=I care very much. A sample item is: “I care a lot about what my closest family thinks about whether or not to pursue a career as self-employed.”. Each item in the first subscale was recoded into a bipolar scale (from -2 to +2), then multiplied with the corresponding motivation to comply item. Finally, the scores were added in order to obtain an overall measure of subjective norm.

Perceived behavioral control (PBC). The perceived behavioral control measure proposed by

Kolvereid (1996a) was adopted. This scale includes 6 items. Respondents were asked to indicate to what extent they agreed or disagreed with each item on a 5-point Likert scale with 1=Strongly disagree and 5=Strongly agree. A sample item is: “If I wanted to, I could easily pursue a career as self-employed.”.

Intention to self-employment. The intention to self-employment scale proposed by Chen, Greene, and Crick (1998) was adopted. This scale contains 5 items. Respondents were asked to indicate to what extent they agreed or disagreed with each item on a 5-point scale with 1=strongly disagree and 5=strongly agree. A sample item is: “I am very interested in setting up my own business.”

Learning outcome. The learning outcome measure proposed by Souitaris et al. (2007) was adopted. This scale includes 5 items. Respondents were asked to indicate to what extent the entrepreneurship program had enhanced their ability listed in each item on a 5-point Likert scale with 1=Not at all and 5=To a large extent. A sample item is: “The program has enhanced your practical management skills in order to start a business.”.

Control variables. Gender and course type were controlled in this study. Research has found that gender impacts entrepreneurship intentions, self-efficacy, and attitudes (Ahl, 2006; Wilson, Kickul, & Marlino, 2007). In addition, research has found differences in entrepreneurship intentions between students in elective courses and those in required courses (Karimi, Biemans, Lans, Chizari, & Mulder, 2016). Because of this, gender and course type were controlled in this study. The control variables are as follows: *Gender*: 1 = females, 0 = males; *Elective Course*: 1 = elective course, 0

= required course.

4.3.3 Analysis and results

To test the relationships between attitude to self-employment, PBC, subjective norm, and intention to self-employment in three time points, correlation analyses and regression analyses were conducted. The means, standard deviations, and Pearson correlations of the measured variables are presented in Table 4.1. In the correlation table, it was observed that at T1, T2, and T3, intention to self-employment was positively associated with the attitude to self-employment (T1: $r=0.51$, $p<0.01$; T2: $r=0.64$, $p<0.01$; T3: $r=0.58$, $p<0.01$), to PBC (T1: $r=0.50$, $p<0.01$; T2: $r=0.54$, $p<0.01$; T3: $r=0.33$, $p<0.01$), and to subjective norm (T1: $r=0.41$, $p<0.01$; T2: $r=0.31$, $p<0.01$; T3: $r=0.21$, $p<0.05$).

Table 4.1 Descriptive statistics and Pearson correlations for the total sample (N=108)

	Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11	12
1	Attitudes (T1)	6.66	4.50	1											
2	Perceived behavioral control (T1)	3.02	0.86	0.28***	1										
3	Subjective norm (T1)	6.27	10.28	0.44***	0.27***	1									
4	Intention (T1)	3.08	1.21	0.51***	0.50***	0.41***	1								
5	Attitudes (T2)	7.10	3.74	0.58***	0.40***	0.48***	0.59***	1							
6	Perceived behavioral control (T2)	2.93	0.77	0.21**	0.63***	0.19*	0.47***	0.37***	1						
7	Subjective norm (T2)	4.63	10.79	0.32***	0.29***	0.46***	0.21**	0.36***	0.21**	1					
8	Intentions (T2)	3.07	1.22	0.40***	0.54***	0.33***	0.73***	0.64***	0.54***	0.31***	1				
9	Attitudes (T3)	6.72	3.95	0.58***	0.24**	0.38***	0.55***	0.65***	0.35***	0.26***	0.51***	1			
10	Perceived behavioral control (T3)	2.81	0.81	0.22**	0.43**	-0.03	0.35***	0.23**	0.61***	0.03	0.37***	0.31***	1		
11	Subjective norm (T3)	4.06	11.64	0.12	0.13	0.43***	0.10	0.21**	0.09	0.39***	0.08	0.18*	0.08	1	
12	Intentions (T3)	2.79	1.16	0.50***	0.27***	0.38***	0.62***	0.50***	0.35***	0.22**	0.60***	0.58***	0.33***	0.21**	1
N=108, M is mean. SD is standard deviation. ***p < 0.01 (two-tailed tests); **p < 0.05 (two-tailed tests); *p<0.1															

Table 4.2 Regression models of attitudes on intentions at T1, T2, and T3 for the total sample (N=108)

Predictor variables	Intention (Model at T1, T2, T3, standardized coefficients)		
	T1	T2	T3
Attitude to self-employment	0.34***	0.50***	0.51***
Perceived behavioral control	0.36***	0.34***	0.16**
Subjective norm	0.16*	0.05	0.10
R ²	0.42***	0.52***	0.37***
***p < 0.01 (two-tailed tests); **p < 0.05 (two-tailed tests); *p<0.1 (two-tailed test)			

To further test H1a, H1b, and H1c, three regression analyses were conducted. The dependent variables are intention to self-employment at T1, T2, and T3. The independent variables are attitude to self-employment, PBC, and subjective norm in T1, T2, and T3. The regression results are presented in Table 4.2. The results are significant in three time points (T1: $R^2=0.42$, $p<0.01$; T2: $R^2=0.52$, $p<0.01$; T3: $R^2=0.37$, $p<0.01$). At T1, T2, and T3, the standardized coefficients for attitude to self-employment are all significant (T1: $\beta=0.34$, $p<0.01$; T2: $\beta=0.50$, $p<0.01$; T3: $\beta=0.51$, $p<0.01$). Hence, H1a is supported. At T1, T2, and T3, the standardized coefficients for PBC are all significant (T1: $\beta=0.36$, $p<0.01$; T2: $\beta=0.34$, $p<0.01$; T3: $\beta=0.16$, $p<0.05$). Hence, H1b receives support. At T1, the standardized coefficient for subjective norm is significant (T1: $\beta=0.16$, $p<0.1$). However, the standardized coefficients of subjective norm at T2 and T3 are not significant (T2: $\beta=0.05$, $p>0.1$; T3: $\beta=0.10$, $p>0.1$). Hence, H1c is partially supported.

To test whether there are mean differences in attitude to self-employment, PBC, subjective norm, and intention to self-employment at T1, T2, and T3 between the treatment group and the control group, several independent t-tests were employed. The results are presented in Table 4.3. The results showed that at T1, T2, and T3, students in the treatment group have a higher attitude

to self-employment compared to the students in the control group. Students in these two groups have a similar PBC at T2 and T3, but students in the treatment group have a significant higher PBC compared to the students in the control group at T1. In addition, students in the treatment group have a higher subjective norm and a higher intention to self-employment compared to students in the control group at T1 and T2.

Table 4.3 Differences in attitudes and intentions at T1, T2, and T3 between treatment group and control group

Variable	Time	Mean		t-value
		Treatment (n=84)	Control (n=24)	
Attitude to self-employment	T1	7.33	4.34	2.97***
	T2	7.45	5.90	1.80*
	T3	7.18	5.10	2.32**
Perceived behavioral control	T1	3.10	2.72	1.92*
	T2	2.97	2.80	0.93
	T3	2.86	2.62	1.55
Subjective norm	T1	7.63	1.55	2.62**
	T2	5.93	0.08	2.39**
	T3	4.68	1.92	1.03
Intention to self-employment	T1	3.28	2.41	3.24***
	T2	3.23	2.52	2.58**
	T3	2.92	2.35	2.16**
***p < 0.01 (two-tailed tests); **p < 0.05 (two-tailed tests); *p<0.1 (two-tailed test)				

To test whether entrepreneurship courses can change students' attitude to self-employment, PBC, subjective nom, and intention to self-employment, and whether these variables change over time, the GLM repeated measured ANOVA analysis was used. The merit of this method is that it

can reduce the unsystematic variability in the design, and therefore, provides great power to detect effects (Field, 2000). The results of the GLM repeated measures ANOVA for the treatment group are presented in Table 4.4. It was observed that there are significant results for intention to self-employment (Wilks' Lambda=0.88, $F(2,82)=5.74$, $p<0.01$, $\eta^2=0.12$), PBC (Wilks' Lambda=0.93, $F(2,82)=3.00$, $p<0.1$, $\eta^2=0.07$), and subjective norm (Wilks' Lambda=0.93, $F(2,82)=3.04$, $p<0.05$, $\eta^2=0.07$). These significant results suggest that there are changes in students' intention to self-employment, PBC, and subjective norm in three different time points (i.e., T1, T2, T3). However, the result for attitude to self-employment is not significant (Wilks' Lambda=0.99, $F(2,82)=0.32$, $p>0.1$, $\eta^2=0.01$). This suggests that there is no change in students' attitude to self-employment at the three time points. In addition, the GLM repeated measure ANOVA analysis for the control group students was conducted. The study analysis did not reveal any significant results in attitude to self-employment, PBC, subjective norm, and intention to self-employment. This suggests that there are no changes across time in these four variables for students in the control group.

Table 4.4 The Effect of time on attitudes and intentions: GLM repeated measures ANOVA for the treatment group (N=84)

	Attitude to self-employment			Perceived Behavioral Control			Subjective Norm			Intention to self-employment		
	<i>F</i>	<i>p</i>	η^2	<i>F</i>	<i>p</i>	η^2	<i>F</i>	<i>p</i>	η^2	<i>F</i>	<i>p</i>	η^2
Time	0.32	0.73	0.01	3.00	0.055*	0.07	3.04	0.05**	0.07	5.74	0.005***	0.12
*** $p < 0.01$ (two-tailed tests); ** $p < 0.05$ (two-tailed tests); * $p < 0.1$ (two-tailed test)												

Next, the pairwise comparisons of GLM repeated measure ANOVA approach was conducted to understand how these variables change with time. The comparison results of the treatment group are presented in Table 4.5. In Table 4.5, it is observed that there is no significant mean difference in attitude to self-employment at T1, T2, and T3. This suggests that students have a relatively stable attitude to self-employment across time, and it seems that taking entrepreneurship courses has very limited influence on increasing students' attitude to self-employment. Hence, the study rejects H2a and H2b, but accepts H2c. It was observed that students' PBC in T3 is significantly lower than their PBC in T1, and there is no significant difference in their PBC between T1 and T2, and between T2 and T3. This suggests that entrepreneurship courses did not increase students' PBC. What is more, they were unable to sustain students' original PBC level because as time progresses, students' PBC continued to drop and reached the same level as control-group students at T3. Hence, the study rejects H4a and H4c, but accepts H4b. It was observed that there is a declining trend in students' subjective norm, especially between T3 and T1. The subjective norm in T3 is significantly lower than the subjective norm in T1 ($p < 0.05$). This suggests that the entrepreneurship courses may not be able to improve students' subjective norm, and the level of their subjective norm declines with time. Hence, the study rejects H3a and H3c, but accepts H3b. In terms of the intention to self-employment, it was found that there are significant mean differences between T1 and T3 ($p < 0.01$), T2 and T3 ($p < 0.05$), but not between T1 and T2. These results suggest that taking entrepreneurship courses may have a very limited influence on improving students' intention to self-employment because students have a similar level of intention to self-employment at the beginning and at the end of the courses. In addition, the study also revealed that students' intention to self-employment tends to decline with time. Hence, the study rejects H5a and H5c, but accepts H5b.

Table 4.5 Pairwise comparisons of GLM repeated-measure ANOVA approach for the treatment group (N=84)

Time	Attitude to self-employment			Perceived behavioral control			Subjective norm			Intention to self-employment		
	M	SE	p-value	M	SE	p-value	M	SE	p-value	M	SE	p-value
T2-T1	0.12	0.34	0.99	-0.13	0.08	0.25	-1.70	1.17	0.45	-0.05	0.08	0.99
T3-T2	-0.27	0.34	0.99	-0.11	0.08	0.53	-1.25	1.33	0.99	-0.31	0.11	0.02**
T3-T1	-0.15	0.41	0.99	-0.24	0.10	0.05**	-2.95	1.22	0.05**	-0.36	0.11	0.004***
M: mean difference; SE: standard error. ***p < 0.01 (two-tailed tests); **p < 0.05 (two-tailed tests); *p<0.1 (two-tailed test)												

Next, regression analyses were conducted to test whether the learning outcome of entrepreneurship courses is associated with the changes in attitude to self-employment, PBC, subjective norm, and intention to self-employment. The results are presented in Table 4.6. The study analysis did not reveal any effects of learning outcome in the differences in attitude to self-employment, PBC, subjective norm, and intention between T2 and T1. In addition, the study analysis also failed to find the effects of learning outcome in the differences in these four variables between T3 and T2. Hence, both H6a and H6b were rejected.

4.4 Discussions

This four-year longitudinal study reveals that EE cannot further improve students' attitude, PBC, subjective norm, and intention to self-employment. Students' level of these four factors was very similar at the beginning and at the end of taking entrepreneurship courses. Moreover, the study also shows that EE cannot even sustain students' original level of PBC, subjective norm, and intention, because three years after they completed their course, students' PBC, subjective norm, and intention all dropped to the same level as control-group students.

Table 4.6 Regression analyses on the effect of learning outcome on the attitudes and intention across time for the treatment group (N=84)

	Difference in attitude to self-employment		Difference in PBC		Difference in subjective norm		Difference in intention to self-employment	
	(T3-T2)	(T2-T1)	(T3-T2)	(T2-T1)	(T3-T2)	(T2-T1)	(T3-T2)	(T2-T1)
R²	0.02	0.03	0.06	0.01	0.02	0.01	0.001	0.01
F	0.62	0.94	1.57	0.29	0.53	0.24	0.03	0.22
(Constant)	1.83	0.19	-0.24	-0.19	1.94	-1.92	-0.36	-0.09
Learning outcome	-0.59	-0.21	-0.01	0.002	-1.01	-0.32	0.01	0.002
Control Variable								
Female	-0.05	0.22	0.36**	-0.05	-1.81	1.61	-0.02	-0.06
Selective Course	0.22	1.13	0.07	0.13	2.28	1.48	0.06	0.11
***p < 0.01 (two-tailed tests); **p < 0.05 (two-tailed tests); *p<0.1 (two-tailed test)								

The study shows that for students in the treatment group, their attitude toward self-employment is higher than that of control group students' at all three time points (i.e., T1, T2, T3). In addition, their PBC, subjective norm, and intention to self-employment are also higher than that of control group students at T1. These results suggest that there is a self-selection issue in this process, which means that students with a higher attitude, a higher PBC, a higher subjective norm, and a higher intention to self-employment are more inclined to take entrepreneurship courses. However, at least in this study, entrepreneurship courses are unable to further improve their attitudes and intentions at the end of courses.

In fact, Bae et al. (2014) show in their meta-analysis that EE has a small positive relationship with entrepreneurial intentions; however, when students' pre-education entrepreneurial intentions are controlled, the authors are unable to find any significant relationships. It is suggested that the

often-claimed positive impact EE has on students is most likely due to a selection effect. These findings are consistent with the arguments made by other scholars such as Kolvereid and Moen (1997), Liñán (2004), and Noel (2002), who call on the need to pay attention to the “self-selection bias”.

Furthermore, according to the current study, EE cannot sustain students’ original level of PBC, subjective norm, and intention in a long-term perspective. This means that these factors are not durable. Three years after students had completed their entrepreneurship courses, they became almost no different than their counterparts who did not take any university-level entrepreneurship courses. These results are worrying, challenging the established belief that EE is useful in encouraging more entrepreneurship behaviors.

In terms of PBC, the sustainable impact of EE on students is lacking, probably because students have fewer opportunities to be exposed to entrepreneurship knowledge, skills, and environment after finishing entrepreneurship courses. Further, this may gradually weaken their PBC in undertaking entrepreneurial activities (Fishbein & Ajzen, 1977). To improve this situation, it is suggested that entrepreneurship programs need to be improved first, and then these programs should keep connecting students to entrepreneurship-relevant aspects (e.g., send out relevant materials to students after they finish courses on a regular basis). The goal is to keep students familiar with entrepreneurship, and hopefully, reduce the drop of PBC in a long run. In terms of subjective norm, the decrease in the subjective norm in self-employment may be due to another factor: other available job opportunities. When students perceive other job opportunities (e.g., work in a company) as more favorable, they may be less likely to comply with the expectations from their significant others to pursue a self-employed career. In addition, it was observed that students in the treatment group have a higher intention to self-employment across time, compared

to students in the control group. However, EE has a very limited influence on improving students' intention to self-employment. Three years after the courses, although their intention to self-employment was still a little bit higher than that of students in the control group, it was significantly lower than their intention level at the beginning and at the end of entrepreneurship courses. This result is not surprising: According to the planned behavior theory, intention to self-employment is determined by attitude to self-employment, PBC, and subjective norm (Rhodes & Courneya, 2003). Given the fact that both PBC and subjective norm dropped in three years, it is normal that the intention to self-employment also had a decrease.

Overall the study makes two main contributions to the entrepreneurship and management literature. The first and most valuable contribution to the literature is the learning on the stability of attitudes and intentions over time (i.e., approximately four years). This has not been studied in the entrepreneurship field to-date, and limited research is available even in the broader motivational literature. The theoretical value of this learning is considerable. First, the study contributes to the expectancy-value theory (Fishbein & Ajzen, 1977) and mere exposure theory (Zajonc, 1968) through a novel test of the two theories in a rigorous longitudinal study. The findings indicate that mere exposure theory better explains the stability of attitudes and intentions over extended time periods than expectancy-value theory. The study shows that students' lack of exposure to additional EE over a three-year period resulted in a decline of attitudes and intentions toward entrepreneurship, as predicted by mere exposure theory. Although this aspect of the study is novel and the findings are obtained via rigorous methods, further research should be conducted to validate this learning in additional contexts, and to establish what level and what types of additional exposure might be necessary to maintain elevated entrepreneurial attitudes and intentions.

The study also helps to identify parameters for generalizing theories that employ attitudinal and intentional constructs to motivation, such as the theory of planned behavior (Ajzen, 1985) and the theory of reasoned action (Fishbein & Ajzen, 1977). Learning indicates that time is an important parameter, potentially limiting the efficacy of interventions designed to motivate specific behaviors. With this learning the study suggests further development of motivational theories, such as the theory of planned behavior and theory of reasoned action is warranted, adding a temporal contingency. The study shows that entrepreneurial attitudes and intentions decline over time, but we should also note that in the limited research on temporal stability in other fields, attitudinal constructs, as like perceived behavioural control, can remain stable over time (e.g., Hiemstra et al. (2012)). Hence, it is expected that the stability of attitudinal and intentional constructs will vary by field. This suggests that individual studies will be required to establish the degree of stability in each field, and that further theoretical work should explain the variance in stability by field.

The value of understanding the stability of attitudes and intentions over time to the entrepreneurship literature specifically is also considerable for at least two reasons. First, temporal stability is important to entrepreneurship, generally, due to the lengthy gestation periods often involved (Davidsson & Honig, 2003). For instance, would-be entrepreneurs might consider a new venture idea but not be ready to act on it for some time. If the antecedents to motivation, and thus to behavior, vary considerably over time, then would-be entrepreneurs with potentially valuable new venture ideas might not realize them. Hence, the attitude and intention level stability is important, if they are to lead to significant entrepreneurial behavior.

The second reason why the learning is especially important to EE relates to the context in which most EE research is conducted, and the prevalence of this context in EE growth around the

world. Having started in a few schools often in graduate programs over half a century ago, EE is now offered in university undergraduate programs around the world, and increasingly in high school settings (Gorman et al., 1997; Katz, 2003; Solomon, 2007). In these contexts, students may experience a significant time lapse between taking an EE course and completing their overall studies-the point at which they might be able to devote sufficient attention to creating a new venture. If the value of EE courses is being measured based on the attitudes and intentions they create, such that these will lead to entrepreneurial behaviors, then those enhanced attitudes and intentions must be present when students can undertake the entrepreneurial behavior sought. Given that the time lapse between course completion and graduation can be three or four years in many cases, the issue of attitude and intention stability is especially important for understanding the potential of EE to lead to entrepreneurial behavior. The current literature is essentially silent on this critical element of theory and practice.

If attitudes and intentions are likely to decline over time, as our findings indicate, then practitioners might consider timing EE courses such that they happen later in a program structure. In this way, students are better able to act on their increased attitudes and intentions shortly after course completion. Where courses need to run earlier in a program structure, our learning might be incorporated by modifying courses to include significant practical application, followed by extracurricular practical support after course completion. The in-course practice will help to embed learning, while the ongoing support will provide continued interaction with entrepreneurship experts who will help students further their new venture ideas on a part-time basis until graduation. In this way, the attitudinal and intentional enhancements that may stem from an entrepreneurship course are more likely to manifest intended entrepreneurial behaviors.

Alternatively, entrepreneurship lecturers could set up a Facebook group, inviting students in

the class to join. On the group page, lecturers could update entrepreneurship-related information regularly. Also, administrators of entrepreneurship programs might want to distribute relevant materials (e.g., latest entrepreneurship news, updated knowledge and skills, entrepreneur interviews, recommendations of good entrepreneurship books, potential startup opportunities) to students on a regular basis. This would facilitate students continued familiarity with entrepreneurship.

Future research could examine whether certain types of courses are better at creating lasting changes in attitudes and intentions. It may be that those who incorporate considerably more actual entrepreneurial practice create changes in attitudes and intentions that are more durable, given that the learning has been embedded via experience. Research using experimental, longitudinal designs, such as the current study could examine a range of course content and pedagogy options and provide valuable insight for both scholarship and practice.

The second main contribution of the study has been to provide one of the few rigorous and temporally appropriate longitudinal tests of EE impact on entrepreneurship attitudes and intentions. This adds to the small, but important set of EE studies that can begin to provide insight into the causal relationships, rather than simple correlations, between EE courses and student outcomes. Consistent with Bae et al. (2014) and in contrast to Martin et al. (2013)—two recent EE meta-analyses—the overall finding of the current study was that EE interventions had no significant impact on entrepreneurial attitudes and intentions of students. Entrepreneurship scholars began calling for greater rigour and causal clarity in EE studies more than a decade ago, and continue to do so today (e.g., Van der Sluis, Van Praag, and Vijverberg (2005); Weaver, Dickson, and Solomon (2006); Martin et al. (2013); Bae et al. (2014)). This aspect of the study answers that call with a rigorous longitudinal, quasi-experimental test of EE impact. These learnings can be incorporated

into future meta-analyses that might consist of only such rigorous studies, thereby enhancing the validity and practical value of EE literature overall.

4.5 Limitations and future research

The contribution of this study should be interpreted in view of the study's limitations. First, although the sample size of 108 cases at T3 gave the study analysis sufficient power to examine the phenomena under study, future research should be carried out with larger samples. The researchers recognize that achieving adequate response rates over time is a long-standing challenge in the social sciences, and rates have been declining (Baruch, 1999; Tourangeau, 2004). Hence, it is recommended that studies seeking to provide the larger samples should include tests of alternative methods for generating and maintaining higher survey completion rates over time. Such studies could build in testing designed to better understand and address response rate learning in several areas. For example, recognizing that university students are less inclined to complete online surveys than paper-and-pencil format (Sharkness, 2012); examining personal characteristics, including conscientiousness and gender (DeAngelo, Franke, Hurtado, Pryor, & Tran, 2011) and institutional factors, such as incentives and survey formatting (Sharkness, 2012) impact response rates over time. Future longitudinal research in entrepreneurship should be designed to examine the impact of both personal and institutional characteristics on response rates. If all future studies incorporated some response rate tests as a matter of course, this would benefit the literature substantially.

Second, although the rigorous quasi-experimental, longitudinal study design of the current study can provide causal indications (Cook & Campbell, 1979), a full experiment, with randomized assignment, would improve the validity of any causal claims substantially. Executing random assignment experiments can be difficult for university courses; however, smaller-scale

studies could be designed using random assignment for short courses.

Third, the study is unable to provide insight into the impact of programmatic and pedagogical characteristics of EE. Future research could examine the impact of characteristics such as the type of instructor (e.g., academic, practitioner, both) and the support environment (e.g., regional rates of entrepreneurship, in-school support facilities, such as incubators). By studying these characteristics, there can be an improved understanding of how to design programs and courses to best help develop future entrepreneurs.

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Chapter 5 A qualitative exploration of entrepreneurship education outcomes

Citation: Zhaocheng Zeng, Benson Honig, “A qualitative exploration of entrepreneurship education outcomes”

Abstract

This study examines the learning effects of entrepreneurship education. We seek to understand the important knowledge/skills, which the students learned from the entrepreneurship course(s) that they took, which pedagogical approach seems most effective, whether the course(s) is useful for their startups if they are creating or running their own businesses, and whether it is professionally useful for their company work if they are currently company employed. We adopted a qualitative approach and conducted interviews with 30 study participants who took entrepreneurship course(s) on average for a previous span of five years. The findings show that the qualities of entrepreneurs (e.g., courage, risk-taking), research, planning, and communication skills are the most important things, which the students learned from their entrepreneurship courses. It has been observed through the study that the most effective pedagogical approach is experiential learning approach, as a large majority of participants claimed that they learned those important knowledge/skills through experiential learning. The results also show that entrepreneurship courses can be useful for entrepreneurs as well as company employees. However, the organization size and the types of the jobs may affect people's perceived usefulness of entrepreneurship education in their professional work. This study contributes to the understanding of long-term effects of entrepreneurship education on

students, and the understanding of the effectiveness of the four main pedagogical models including experiential learning, role model learning, lecture-based learning, and problem-based learning. This study has important implications for the design of entrepreneurship education and training (EET) programs. We suggest that EET programs should be designed mainly based on experiential learning, with role model learning and lecture-based learning as supplementary pedagogical approaches.

5.1 Introduction

Entrepreneurship education and training (EET) is getting increasingly popular around the world (Honig, 2004; Katz, 2003). Researchers have examined the relationships between EET and four broad types of outcomes, elaborated as follows.

First, the effect of EET on students' entrepreneurship intention-a measure designed to examine the individual intention to begin an entrepreneurial activity has been studied in an extensive body of literature (Bae, Qian, Miao, & Fiet, 2014; de Janasz, de Pillis, & Reardon, 2007; Gibb & Ritchie, 1982; Kristiansen & Indarti, 2004; Krueger, 1993; Obschonka, Silbereisen, & Schmitt-Rodermund, 2010; Pihie & Akmaliah, 2009; Souitaris, Zerbini, & Al-Laham, 2007; Turker & Sonmez Selçuk, 2009). Some of this body of research is mainly built on the theory of planned behavior (TPB), which suggests that an individual's actual entrepreneurship behaviors are predicted by his/her intention to do entrepreneurship. This, in turn, is predicted by three types of attitude: his/her attitude to entrepreneurship, subjective norm, and perceived behavioral control (PBC) (Fishbein & Ajzen, 1977). Entrepreneurship education research built on TPB generally proposes a positive relationship between EET and these attitudes and intention. For example, using a pre-and post-test control group design, Souitaris et al. (2007)

show that students who participate in the entrepreneurship program have a higher level of subjective norm, and intention to start a business. Other research, built on the self-efficacy theory by Bandura (1977), examines how EET influences students' self-efficacy, which subsequently influences students' intention to pursue entrepreneurship (Bae et al., 2014). For example, a study by Zhao, Seibert, and Hills (2005) reveals that students receiving entrepreneurial formal learning have a higher self-efficacy and a higher intention to become entrepreneurs. Entrepreneurship education scholars believe that when an individual's entrepreneurship intention increases, he/she would later demonstrate more entrepreneurship behaviors and engage in more entrepreneurial activities (Bae et al., 2014). The general assumption is that entrepreneurship education is effective if it can increase students' intention to pursue entrepreneurship (Souitaris et al., 2007). However, there is a large debate on the extent to which such intention can predict the actual behavior (Trafimow, 2004). In fact, intentions are used because it is difficult to measure a student's actual entrepreneurship behavior directly, as people are unlikely to start their businesses at the same time or conduct the start-up activities at the same pace (Lichtenstein, Carter, Dooley, & Gartner, 2007). Therefore, it takes time to observe their actual behaviors (Fayolle, Gailly, & Lassas-Clerc, 2006). However, it is considerably easier to measure a student's entrepreneurial intentions shortly after completing a class. Hence, intention becomes a matter of convenience in the literature as it allows scholars to avoid the difficulty of measuring actual behaviors and saves considerable efforts in data collection.

Second, researchers have taken a step further to examine the impact of EET by looking beyond students' entrepreneurial intentions to their actual entrepreneurship behaviors. Some studies have examined students' entrepreneurial activities after the completion of their entrepreneurship training (Brown, 1990; Charney & Libecap, 2000; Kolvereid & Moen, 1997;

Menzies & Paradi, 2002). For example, Kolvereid and Moen (1997) in their study, collected behavioral data from students seven years after they had graduated from their entrepreneurship programs, showing that these individuals had a higher rate of starting a business compared to those who had graduated from other non-entrepreneurship programs. Also, Menzies and Paradi (2002) find that students who took entrepreneurship courses created more new ventures, and had more serial startups after graduation, compared to their counterparts with no entrepreneurship training. However, this type of study has a significant limitation. A majority of these studies did not collect behavioral data prior to students entering the entrepreneurship and the non-entrepreneurship programs. It is likely that students who chose to enter an entrepreneurship program are more inclined to start a business compared to students who chose a non-entrepreneurship program. Therefore, there may be a selection bias in the findings.

Third, researchers have examined the relationship between EET and students' entrepreneurial knowledge/skills (Martin, McNally, & Kay, 2013). For example, DeTienne and Chandler (2004) examined the number and degree of innovativeness of business opportunities identified by students, and showed that entrepreneurship students are more capable of identifying innovative and higher quality ideas compared to non-entrepreneurship students. Other examples of similar studies are Fayolle, Lassas-Clerc, and Tounés (2009) and Hanke, Kisenwether, and Warren (2005).

Fourth, the three types of outcomes described above are all related to entrepreneurship (e.g., entrepreneurial intention, activities, and skills). In contrast, outcomes that are not solely related to entrepreneurship are seldom examined. There are several research studies examining the relationship between EET and non-entrepreneurship-related outcomes such as GPA performance (Charney & Libecap, 2000; Ohland, Frillman, Zhang, Brawner, & Miller, 2004). For example,

Ohland et al. (2004) have examined how entrepreneurship education may contribute to students' GPA performance. The study shows that engineering students who have undertaken entrepreneurship courses have a significantly higher GPA in their overall study and a higher retention rate in the engineering program, compared to those who did not take any entrepreneurship courses. In addition, Charney and Libecap (2000) found that entrepreneurship graduates have a higher annual income and a relatively higher job satisfaction compared to non-entrepreneurship graduates. However, self-selection bias may be a problem.

However, there are three limitations in these four types of studies. First, the impact of EET on students is largely treated as a "black box", especially in the first and the second types of research. That is, other than entrepreneurship intentions or entrepreneurship behaviors, it is unclear about what students learn from EET, and whether EET is useful for students who choose to become entrepreneurs. Second, the research time frame of most of these studies is very short. That is, whether the proposed positive entrepreneurship education outcomes can be sustained or not remains unknown. For example, DeTienne and Chandler (2004) show that students' opportunity identification skills are improved by the entrepreneurship classroom, however, this improvement was observed right after students completed the courses. Hence, whether this improvement can last over time is not clear. Third, a group of people has been long neglected by researchers in this field. Not all graduates of EET become entrepreneurs. While a minority pursues entrepreneurship careers, the majority choose to work in organizations after receiving EET. There is barely any research done examining whether EET is useful for students who become company-employed. It seems that there is an underlying assumption that the success of EET should be evaluated based on whether it encourages more people to become entrepreneurs (Kuratko, 2005). However, does EET fail to serve its purpose if students choose to work in

organizations or does it provide other benefits? The present study argues that if EET researchers only focus on students who show interest in becoming entrepreneurs, the potential values and positive influences of EET on students who choose to be company-employed, may be missed.

This study contributes to the literature by exploring the learning from EET by students, identifying the most effective pedagogical learning approach, and assessing EET's usefulness for people who become entrepreneurs and those who work in organizations. The study employs a qualitative design at understanding the long-term effect of EET on participants who took entrepreneurship courses on average 5 years previously. The study aims to answer the following research questions.

- (1) What is the most important thing and what are the important skills that students learned from entrepreneurship courses?
- (2) What are the pedagogical techniques specified by the respondent that seem to be most effective?
- (3) Is EET useful to people who are currently running their own businesses or trying to set up their businesses?
- (4) Is EET useful to people who are currently employed in organizations?
- (5) What practicing entrepreneurs or employees of firms wish they had learned in EET but they did not learn?

This article contributes to the entrepreneurship education literature in the following two ways. First, to the best of our knowledge, this article is the first study that investigates the long-term impact of entrepreneurship courses on students. The five-year gap allows us to detect the core knowledge/skills that persist within students. Second, the study contributes to the

understanding of different pedagogical models used in entrepreneurship courses and their long-term effectiveness.

5.2 Theory and Literature

Research on pedagogy in entrepreneurship education has been wide-reaching and extensive (Pittaway & Cope, 2007a). Although the pedagogical models and theories of teaching entrepreneurship have varied vastly, there are several existential key models and theories in this field (Pittaway & Cope, 2007a), which include lecture-based model, experiential learning, problem-based model, and role model learning.

5.2.1 Lecture-based Model

The lecture-based model is considered as a traditional teaching model in education (Boyer, 1990). Under this model, instructors play a dominant role in the classroom by focusing on giving lectures, and impart knowledge to students through a form of information transfer (Michel, Cater, & Varela, 2009). Students learn by passively receiving knowledge from instructors, and are seldom offered opportunities of class participation and interaction (Michel et al., 2009; Wingfield & Black, 2005). Research shows that in the lecture-based group, students' learning motivation, satisfaction, and the level of knowledge acquired are significantly lower than those in the non-lecture-based group (e.g., problem-based learning) (Antepohl & Herzig, 1999; Hwang & Kim, 2006).

5.2.2 Experiential Learning

Experiential learning is defined as a process where knowledge is created through the transformation of experience (Kolb, 1984). Since the early 20th century, scholars have gradually recognized that experience plays an important role in the human learning and development

process (Kolb & Kolb, 2005). For example, Dewey (1938) argued that learning should be considered a continuing process during which experience is accumulated and reconstructed. Piaget (1976) suggested that people acquire new experience into existing concepts and adapt these concepts to new experience during the learning process. Based on the work done by scholars who introduced experience into the human learning theories such as Dewey (1938), Piaget (1952, 1976), and Lewin (1951), Kolb (1984) develops a model of experiential learning which describes how individuals grasp and transform experience in the learning process. The model involves four learning steps including experience, reflection, thought, and experimentation. These four steps form a cycle, and each of them corresponds to one learning mode including concrete experience, reflective observation, abstract conceptualization, and active experimentation. The experiential learning model depicts that people grasp experience through two learning modes—concrete experience and abstract conceptualization, and transform experience through the other two learning modes—reflective observation and active experimentation (Kolb, 1984). Kolb (1984) suggests that there are two ways, by which people grasp information in the world: either by acquiring direct experience or by recreating the experience. Meanwhile, people also transform their experience through two ways—either by actively experimenting with their ideas and experiences in the real world or by engaging in reflection on their experiences and ideas (Kolb, 1984).

The experiential learning process focuses on learning by doing (Cope & Watts, 2000), and it emphasizes the importance of “taking action” in the learning process (Lier, 2007). During this process, knowledge is constructed and adapted to the environment (Baker, Jensen, & Kolb, 2005). In entrepreneurship education, the experiential learning pedagogy is usually characterized by activities requiring student participation that provide them with experience of the new venture

creation process. Some of these activities include actual startup-projects, collaboration with actual entrepreneurs, and startup simulations. Some entrepreneurship courses require students to use their own ideas to set up businesses, and bring it to the market. For example, entrepreneurship students at the Chalmers University of Technology in Sweden are required to form teams around a selected business idea and develop start-up activities for the course training purpose as well as for eventual emergence (Rasmussen & Sørheim, 2006). However, there is no guarantee that every student has a valid idea for business creation. Therefore, to allow students a chance to learn by doing, some entrepreneurship courses provide students opportunities to work with actual entrepreneurs (Fontenot, Haahrues, & Hoffman, 2015; Wolverton & Cook, 2000). In this process, students usually serve as consultants for actual entrepreneurs' new ventures. For instance, entrepreneurship students at the University of Limerick are divided into teams and asked to provide consulting advice to local small business owners on management-related issues such as marketing and product development (O'Dwyer, Birdthistle, Hynes, & Costin, 2011). There are also some courses which utilize a simulation method (e.g., computer-based simulation game) (Bellotti et al., 2012; Katz, 1999). Reflecting the realities and complexities of running a business, a simulation is defined as a dynamic model of the real entrepreneurial process in which a balanced number of decision variables require strategic integration (Keys & Wolfe, 1990). In simulations, students experience the startup process by allocating virtual resources, grasping and analyzing market information, communicating to different stakeholders, and making strategic decisions (Huebscher & Lendner, 2010). This provides students with a taste of starting a business and helps them learn to properly function in the business world (Dewey, 1938). Besides the chance of experiencing the new venture creation process, students also get opportunities to engage in team-based learning and to learn something from failure by participating in these

activities. In actual startup projects, or collaboration projects with actual entrepreneurs or simulation games, students usually form teams, consequently, they develop teamwork skills during this process, and learn different sets of skills and knowledge from their team members (Matlay, Hytti, Stenholm, Heinonen, & Seikkula-Leino, 2010).

Several benefits are associated with experiential learning for students. Neck and Greene (2011) report that experiential learning contributes to the deep learning process, in which students are more capable of grasping and synthesizing information for long-term use. In addition, research shows that experiential learning has improved both students' cognitive (e.g., learning ability) and non-cognitive skills (e.g., interpersonal skills) (Bobbitt, Inks, Kemp, & Mayo, 2000; Gentry, 1990; Morgan, Allen, Moore, Atkinson, & Snow, 1987; Pittaway & Cope, 2007a, 2007b; Slavin, 1980).

5.2.3 Problem-based Learning (PBL)

The Problem-based learning (PBL) has its pedagogical roots in the field of medicine education (Donner & Bickley, 1993). After gaining acceptance in many medical programs, PBL has influenced a wide range of educational disciplines including, for instance, engineering, social work, business administration (Boud & Feletti, 1997; Milne & McConnell, 2001). The PBL approach focuses on problems as core in the learning process (San Tan & Ng, 2006). Students identify problems and develop problem-solving skills while searching for and acquiring the relevant knowledge (Barrows & Tamblyn, 1980). It allows students to embed their learning in real-life situations, thereby augmenting their abilities to deal with uncertainties (Krueger, 2007). The problems always come first in the PBL-based learning, usually reflective of the real-world situations (Hanke, 2009; Hanke et al., 2005; Hung, Jonassen, & Liu, 2008). In the PBL-learning process, students are usually organized into groups and motivated to proceed with following

steps: (1) determine whether a problem exists; (2) define the problem; (3) collect the existing information of the problem; (4) identify extra information needed to fully understand the problem; (5) identify useful resources to solve the problem; (6) generate feasible solutions; (7) analyze solutions; and (8) recommend and present a solution (Milne & McConnell, 2001).

In entrepreneurship education, case studies can be used as a pedagogical tool in PBL. McDade (1995) suggests that a case study provides the students with a context, in which they need to identify problems that confront the organization, use existing information to analyze problems, and develop knowledge to solve problems. In PBL, the case problem serves as a stimulus for the acquisition of new knowledge needed to understand the problem-solving mechanism, more than just an exercise for practicing existing knowledge and skills (Barrows & Tamblyn, 1980). The advantages of PBL have been well-reported (Capon & Kuhn, 2004; Hoffmann & Ritchie, 1997; Morales - Mann & Kaitell, 2001). For example, Loyens, Magda, and Rikers (2008) show that PBL can foster and improve students' self-directed learning ability. In addition, Snyder and Snyder (2008) find that PBL improves students' critical thinking, problem-solving skills, and team work participation.

5.2.4 Role Model Learning

Role models are defined as individuals who set examples, that are emulated by others and these role models may further inspire other individuals to make decisions, engage in certain activities, and achieve certain goals (Bosma, Hessels, Schutjens, Van Praag, & Verheul, 2012; Wright, Wong, & Newill, 1997). People are often influenced by the views and behaviors of significant others when they decide on what to do and how to do it (Cordano & Frieze, 2000; Fishbein & Ajzen, 1977). These significant others are role models, and they can be the individual's family members, friends, peers, or even famous people with no personal connection

with this individual (Bosma et al., 2012). The concept of a role model is developed based on two theories: the theory of identification (Gibson, 2003, 2004) and social learning theory (Bandura, 1986; Bandura & Walters, 1977). The theory of identification suggests that an individual tends to identify with other people who have similar motives, characteristics, or goals as him/her, and has a desire to imitate their behaviors (Bell, 1970; Cohen, 2001; Gibson, 2003, 2004; Kagan, 1958). This identification provides the individual with the inspiration and motivation to pursue a specific goal (e.g., earning \$1000 in a month), to make a specific decision (e.g., deciding to become an entrepreneur), or engage in specific activities (Bosma et al., 2012; Krumboltz, Mitchell, & Jones, 1976). These people with whom the individual identifies become role models for this individual. Role models show the individual how certain goals are achieved, and the individual tends to follow the role models' approaches and tries to learn specific knowledge and skills from his/her role model (Gibson, 2003, 2004). Social learning theory suggests that an individual will embed himself/herself in the social context during the learning process, and he/she will learn from other people through observation (Bandura, 1986; Bandura & Walters, 1977; Rosenstock, Strecher, & Becker, 1988). These people usually perform well in certain tasks that are of interest to this individual. The individual considers these people as role models and believes that he/she can learn useful things from them (Bosma et al., 2012). Drawing on these two theories, Gibson (2004) proposes that role models have three functions: to provide learning, to provide inspiration and motivation, and to help individual define their self-concept.

In the entrepreneurship education context, role models can be guest speakers, invited to share their experience with the students. Many entrepreneurship courses invite actual entrepreneurs into the classroom to share their startup activities, the problems they confront, the ways they deal with failures, their personal stories, and their recommendations (Fiet, 2001; Neck & Greene,

2011; Shepherd, 2004). In addition, role models could also be entrepreneur stories in books (Fiet, 2001). People read the stories of successful entrepreneurs, and tend to learn from them to deal with their own startup (Gibson, 2003, 2004). Role model learning has many advantages, for example, Van Auken, Fry, and Stephens (2006) suggests that learning from role models can enhance an individual's perceived self-efficacy to pursue new venture creation. In addition, role models learning can improve people's ability to develop new ideas (Bass & Avolio, 1995; Gong, Huang, & Farh, 2009). Despite these advantages, (Fiet, 2001) suggests exercising caution in using entrepreneurs as role models in the classroom. He worries that when these entrepreneurs share their stories or experiences with the students, they cannot explain the underlying theories that testify to the rationale for their behaviors. This lack of substantiation with theories may have some negative influence on students' learning. For example, students may blindly follow the successful entrepreneurs' formula without having their own thinking.

5.3 Method

5.3.1 Composition of Participants

The participants for this study were recruited from a research project database called "International Study of Entrepreneurship Education Outcomes" (ISEEO, 2016). The ISEEO project was mainly conducted by researchers from McMaster University in Canada, with the purpose of examining the effects of entrepreneurship education on students. The ISEEO project database includes participants who have taken entrepreneurship courses in universities and those who have not. For this study, participants who have taken entrepreneurship courses previously were recruited. Each participant was provided with a compensation of \$30 USD for participating in the interview.

Thirty people in total participated in a one-to-one interview. All participants had taken at least one entrepreneurship course at universities between 2011 and 2013. The average time span since participants took a course(s) was 5 years. Among all 30 participants, 43.3% of participants took entrepreneurship course(s) at the undergraduate level, and 56.7% took courses at the master level. Their current age ranged from 24 to 55 years old ($M=30.7$, $SD=6.8$). 40% of participants were female, and 60 % were male. Participants came from eight different universities in Canada, UK, Denmark, and Belgium, and from diverse disciplines including business administration, engineering, nursing, law, and neuroscience. See Table 5.1 for the descriptive information of the participants.

Table 5.1 The descriptive information of participants in the study

Participant ID	Gender	Previous or current entrepreneurship experience	Organization work	Entrepreneurship experience since taking course(s)	Years after class
1	M	Part-time, legal consulting business	Manager	Yes	5
2	M	Full-time, translation business	No	Yes	5
3	F	No	Marketing analyst	No	5
4	F	No	Nurse	No	5
5	M	Part-time, restaurant business	IT consultant	Yes	5.5
6	M	No	Tax auditor	No	5.5
7	M	No	Bank Customer Representative	No	5
8	F	No	Financial analyst	No	4
9	M	Part-time, software technology business	Business strategy consultant	Yes	5.5
10	F	Full-time, hotels and restaurants businesses	No	Yes	5.5

11	F	Part-time, web application business	Computer engineer	Yes	5
12	M	Part-time, construction business	Sales representative	No	3.5
13	F	No	Project manager in charity	No	5
14	M	No	Software developer	No	5.5
15	F	Part-time, clinical research software business	Medical researcher	Yes	3.5
16	M	No	Neuroscience Researcher	No	3.5
17	M	Part-time, clothing business	Social media specialist	Yes	4
18	F	Part-time, charity entertainment group (not-for-profit organization)	Account coordinator	Yes	5
19	M	No	Cost analyst	No	4
20	M	Full-time, IT consulting business	No	Yes	5
21	M	Part-time, software technology business	Project manager	Yes	5
22	M	No	Account manager in sales	No	5.5
23	F	Part-time, retail business	Business analyst	Yes	5.5
24	M	Part-time, financial planning consulting business	Securities finance specialist	Yes	4.5
25	F	Part-time, online job matching business	Manager	Yes	5.5
26	M	Full-time, game design and publishing consulting businesses	No	Yes	5.5
27	M	Full-time, IT consulting business	No	Yes	5.5
28	F	Full-time, retail business	No	Yes	4
29	F	No	Product development manager	No	5.5
30	M	Full-time, Mobile application business	No	Yes	5

5.3.2 Interview Procedure

The length of each interview session ranged from 31 minutes to 65 minutes. The interviews were conducted on Skype or by phone, depending on each participant's preference. They were conducted in English, as all participants could speak fluent English. Participants were asked for their consent to audio record the interview, and assured of confidentiality and anonymity of their interview responses. The interview was organized as follows: the first three minutes were used to help participants get a brief understanding of the purpose of the interview as well as the interview compensation they would get. Participants were told that they could respond in any way they wanted, and if there were any questions they were unwilling to answer, they could simply let the interviewer know and skip it. Participants were first asked about the entrepreneurship courses they had undertaken previously. During this part, participants described the course characteristics such as the length of the course(s), the contents covered in the course(s) (e.g., what entrepreneurship is, how to do entrepreneurship), course activities (e.g., simulation, actual entrepreneurship projects, guest speakers). Next, participants were asked if they found the entrepreneurship course(s) they had taken useful, and what were the most important things and skills they learned from the course(s). Then, different types of questions were asked for different types of participants. For participants who were running their businesses (either full-time or part-time), it was asked whether taking entrepreneurship course(s) was useful for their businesses. If they answered yes (no), they were asked how (why). For participants who were nascent entrepreneurs (i.e. people who are on their way to set up their own businesses and have engaged in several entrepreneurial activities), they were asked whether taking entrepreneurship course(s) influenced their venture creation process. If they answered yes (no), they were asked how (why). For participants who were working in organizations, they were

asked about their jobs, and whether they thought taking entrepreneurship course(s) was useful for their work. If they answered yes (no), they were asked how (why). Next, participants were asked questions like, “What are the things that you would have liked to learn in the entrepreneurship course(s) but you didn’t?”. Finally, the participants were asked several career satisfaction questions. These questions were designed to serve as general prompts for participants to provide spontaneous examples from their own thoughts and their experiences, and the goal was to get a better understanding of how taking entrepreneurship course(s) might influence the participants. During the interview, participants were encouraged to provide more description by either using their own relevant examples to illustrate their opinions or by confirming the information they just provided for the interviewer. The interviews were recorded, and transcribed.

5.3.3 Data Analysis

In data analysis, three stages of thematic analysis proposed by Smith (1995) were followed to analyze the transcripts inductively. First, all interviews were transcribed into texts and the transcripts were checked against the audio files to ensure accuracy. The coding was conducted using NVivo 10, a qualitative data analysis software (NVivo 10, 2016). Prior to the start of the coding process, the thematic analysis suggestion provided by Braun and Clarke (2006) was followed. To further familiarize themselves with the interview data, the primary researcher of the current study read through the transcripts several times. Ritchie and Spencer (2002) suggest that it is important for qualitative researchers to immerse themselves in the data before commencing a search for meaningful units and start the data coding process.

Second, to look for meaningful units in the transcripts, open coding method was used to allocate meaningful units into categories. Meaningful units here refer to a sentence or short statement provided by the participants having a relevant meaning to the question asked. For

example, the participants were asked about the important skills that they learned from the entrepreneurship courses, some of them provided meaningful units such as “research the customer needs” and “build a plan for the business”. On reading through the meaningful units, the authors added labels to each meaningful unit that summarized categories of experience (e.g., market research, networking). To ensure the inter-coder reliability, the two authors independently looked for the meaningful units in the transcripts, created labels for them, and then compared the results with each other. The few disagreements were discussed until consensus was reached. A coding scheme was developed, including the information of each category. To verify the validity and reliability of the coding scheme, the authors invited a research assistant who did not work on this project to read through five transcripts and go through them line by line to code them in accordance with the coding scheme. Subsequently, the coding done by the authors and the coding done by the research assistant were compared and the results showed a high level of consistency and reliability with more than 87% similarity rate.

In the third stage, the categories were grouped into higher order themes. The authors worked together and discussed how to allocate each category into themes. The few disagreements were discussed until agreement was reached.

During the coding process, the authors followed the suggestion by Locke (2001) by traveling back and forth between data, literature, and theories. For instance, when coding the pedagogical models that participants used to acquire important entrepreneurial knowledge and skills, the pedagogical theories were considered, and based on the theories, the categories were allocated into the relevant overarching higher order themes. An example is that participation in actual startup project is grouped into the theme “experiential learning”, as it is characterized by learning by doing.

5.4 Findings

5.4.1 Motivation to Take Entrepreneurship Course(s)

The study findings identified two types of participants. The first type, comprising 27 participants, was motivated to take the course(s) because they were interested in establishing their own businesses, and they explicitly indicated that they wanted to learn entrepreneurship knowledge and skills which helped them become entrepreneurs.

“It is a path that I see desirable. I am attempting to start my own clothing company, just branded T-shirts and other apparel, so I thought it’s a good opportunity for me to pursue an education (in entrepreneurship).” -Participant 17

“For me, entrepreneurship had always been something that I was interested in and I did the entrepreneurship course because of it.....I need to identify any gaps in my knowledge if I decide at some point to become an entrepreneur.” -Participant 25

Compared to the first type, the second type of participants had less interest in pursuing entrepreneurship. The data analysis revealed that three participants belonging to this group. They saw entrepreneurship course(s) as a chance with which they might be able to learn something related to business that could be applied to work in organizations.

“I always want a little side of business knowledge...Did I go and become entrepreneur after that course? No. I want to, and I now work in a business company.” -Participant 18

“I just thought it would be interesting, actually, just to learn about entrepreneurship. I wasn't really considering starting my own business, but I thought it would be interesting just to learn the basics about it. It may be useful for my career.” -Participant 29

5.4.2 The Most Important Things That They Learned

A total of 102 meaningful units were obtained from the 30 interviews regarding the most important things people learned from their entrepreneurship courses. The inductive thematic analysis resulted in 23 lower order categories, which were grouped into 9 higher order themes: qualities of entrepreneurs, research, planning, communication, handling failure, startup strategy, analysis, knowledge, and leadership (see Table 5.2).

Qualities of Entrepreneurs

The participants reported that the most important thing they learned from entrepreneurship courses was the qualities of entrepreneurs (n=19, 63.3%). These qualities include courage, risk-taking, hard work, flexibility, be creative, passion and commitment, engagement in practice, and being organized. As some of the participants stated:

“You have to dare, and that mistakes are normal. Everyone- when you look at the big influencers, or the big succeeders in business that is because they also dared to do something.” - Participant 1

“Creating a startup needs a lot of hard work and long hours...You have to be willing to work all hours of the day, all hours of the night.” -Participant 6

“It comes from the heart, the passion, people really want to do it in order to be successful.” - Participant 8

“Depending on the market or the product that you're dealing with or the service that you're dealing with, a different approach might be required to be successful each time...You should be flexible enough, you should be able to make changes accordingly.” -Participant 25

Table 5.2 Higher order themes and lower order categories of the important things learned

Theme	Lower category
Qualities of entrepreneurs (n=19, 63.3%)	(1) Courage (n=3, 10%) (2) Risk-taking (n=4, 13.3%) (3) Hard work (n=5, 16.7%) (4) Flexibility (n=6, 20%) (5) Be creative (n=4, 13.3%) (6) Passion and commitment (n=7, 23.3%) (7) Engagement in practice (n=3, 10%) (8) Being organized (n=4, 13.3%)
Research (n=13, 43.3%)	(1) Research the market (n=13, 43.3%) (2) Research the business environment (n=2, 6.7%)
Planning (n=10, 33.3%)	(1) Write business plan (n=9, 30%) (2) Financial planning (n=2, 6.7%)
Communication (n=10, 33.3%)	(1) Networking (n=6, 20%) (2) Communicate ideas to different stakeholders (n=5, 16.7%)
Handling failure (n=4, 13.3%)	(1) Failure inoculation (n=2, 6.7%) (2) Reflection (n=2, 6.7%)
Startup Strategy (n=4, 13.3%)	(1) Team-based (n=2, 6.7%) (2) Goal-setting (n=2, 6.7%)
Knowledge (n=3, 10%)	(1) Accounting (n=1, 3.3%) (2) Finance (n=1, 3.3%) (3) Business law (n=1, 3.3%)
Analysis (n=2, 6.7%)	(1) Analyze a business (n=2, 6.7%)
Leadership (n=1, 3.3%)	(1) Leadership skill (n=1, 3.3%)
Total N=30. Number and percentage of participants are reported.	

The Research

Thirteen of the participants emphasized the importance of research in entrepreneurship. It includes the market research and the business environment research. Market research refers to the examination of the competitors, the customers, and the market niche, on which the product/service should be focused. As one participant stated:

“Researching the market and finding the niche of what you want to do in terms of a product, even now, or when starting a business. I don't know how to word this well, but the idea of thinking of a niche for where you want to go with a certain product or a certain deliverable.”- Participant 16

The business environment research refers to the examination of the legal environment and the business culture of the country where the business will operate. As one participant expressed her view as follows:

“We learned that if you start a business, you have to look at the laws in the country you are living in...So the most important skill you learned is your research skill, research what kind of law they have there, and how you can be prepared to enter the market there.”-Participant 8

The Planning

Ten participants reported the importance of learning business planning, which encompassed creating a business plan and financial planning.

These participants believed that the skill to write a business plan was vital. This is not surprising given the fact that business plan training is usually one of the core components of entrepreneurship courses (Bliemel, 2014; Solomon, 2007). Participants believed that business planning equipped them with an understanding to think through the business they were going to

start, and helped them anticipate the things that might happen in the future. As one participant stated:

“You have to be organized in all your thoughts, in all your plans. You need to write everything down on paper and then you can see what's missing and fill in the blanks, so to say.”-

Participant 23

In addition, participants mentioned that they have a higher chance to obtain funding, with a systematically drafted business plan. This suggests that business plan may also play a symbolic role in the fund-seeking process. In fact, Honig and Karlsson (2002) found that most new organizations prepare business plans because of institutional forces (e.g., coercion forces, mimetic forces). One participant indicated:

“I think for startup it is useful to have a business plan... In general, they come to me, have a business plan well structured, well-thought through, they are the ones that have been properly evaluated... Their business plans are necessary in order to get funding.” -Participant 3

However, some participants indicated that the business plan might be useful in some traditional types of businesses such as opening a restaurant or a shoe store, but not for starting a high-tech business such as a software company because of the constantly evolving nature of technology in this field. One participant expressed his view as follows:

“A lot of times you'd be trying to predict 5 years out for a brand-new business, and I mean, that, especially in the software field, is completely ludicrous.” -Participant 20

An interesting finding was that three participants although considered business plan to be very important, they did not use business planning in their startup business. As one of them stated:

“I guess writing a basic business plan will be one important skill learned...But I don’t do it personally. My business is not like a big business, it is very small, very tiny. I didn’t need a business plan for my startup. ”-Participant 2

The financial planning refers to the evaluation of the financial feasibility of the business and involves the projection of necessary startup capital, business expenses, and potential income. Two participants reported that financial planning was the most important thing learned from entrepreneurship course. As one of them stated:

“The financial feasibility of your plan itself, so financially if you can project your expenses and your income for the next two three years, so if you can do that, that is pretty good, you need to have a clear idea about how much money you need and you are going to use.”-Participant 5

The Communication

Communication is also an important skill, which participants learned from their entrepreneurship courses (n=10, 33.3%). It included networking and communicating ideas to different stakeholders.

Networking here refers to building contacts with other people. Participants stressed the importance of networking in entrepreneurship. As one participant stated:

“Making contact is very important, I mean networking. You get resources from your contacts. I worked with entrepreneurs, I feel that it is important.”-Participant 10

Communicating ideas to different stakeholders refers to the way people present and communicate their business ideas to potential customers or other stakeholders (e.g., investors). Specifically, participants with a limited business education background believed that they needed to learn how to properly introduce their ideas to other people using “business language”, but not “technical language”. As one participant stated:

“I got more into learning to get outside of my comfort zone, because my comfort zone is computer science. I'm very friendly with computers but with real humans, no. It took me a while to be really at ease. And when I mean at ease I mean very good at talking, not only to my computer but also talking to the customers, understanding what they want, especially understanding what people mean, what they expect, even if they don't especially ask for that.”-
Participant 30

Handling Failure

Two participants mentioned that failure inoculation was important. They believed that entrepreneurial success is not easy, and a majority of entrepreneurs face a lot of failure before finally achieving success. Therefore, entrepreneurs need to be prepared to confront and overcome failures in the startup process. Research has suggested that failure provides valuable learning opportunities, and helps “inoculate” students against future failure, often necessary for effective adaptation (Corbett, Neck, & DeTienne, 2007; Sitkin, 1992, 1996).

In addition, two participants reported that self-reflection was the most important thing that they had learned. Self-reflection refers to the process of students reviewing experiences they have acquired from the course, trying to make sense of what has learned, and synthesizing information for long-term use (Baker et al., 2005; Kolb & Kolb, 2005; Neck & Greene, 2011). Participants stated that self-reflection was an essential skill that they had learned from the entrepreneurship course. Self-reflection helped them look at what they did (either right or wrong), distinguish between good experiences and bad experiences, and adjust the approach to do things. As one participant stated:

“It was important to reflect on the decisions that we made through the courses and look at how those decisions led to those certain outcomes. I guess the skill or the notion of being reflective.”-Participant 27

Startup Strategy

Startup strategy was another important thing people learned from their entrepreneurship courses (n=4, 13.3%), and it includes developing team-based strategy and goal-setting strategy.

Two participants reported that entrepreneurs need to form a team to set up a business to advantageously employ the different skill sets possessed by various team members. As one participant stated:

“For me as an individual, the most important thing I learned is that to succeed, it needs to be a team... you need different skill sets to balance out the knowledge and to be able to reach into different categories of strengths or expertise within your business, to be able to be successful.”-Participant 15

Two participants mentioned the importance of goal-setting strategy in building a startup. They considered it vital for entrepreneurs to set up specific goals and to decide in advance what they want to achieve in their business. As one participant stated:

“Some entrepreneurs may be able to become that (Zuckerberg), you need to have goals.”-Participant 3

Knowledge, Analysis, and Leadership:

Three participants mentioned that they learned specific knowledge including financial knowledge, accounting knowledge, and business law in the entrepreneurship courses. Another two participants also reported that the most important thing they had learned was how to analyze a business. Also, leadership was mentioned by one participant.

5.4.3 How They Learned the Important Things

The modes in which participants learned the important things in the entrepreneurship courses can be categorized into four groups: experiential learning, role model learning, lecture-based learning, and problem-based learning. The study aims to understand which learning mode is the most effective. The results are presented in Table 5.3.

Table 5.3 Higher order themes and lower order categories of the ways participants learned the important things

Theme	Lower category
Experiential learning (n=24, 80%)	(1) Actual startup projects (n=5, 16.7%) (2) Collaboration with entrepreneurs (n=5, 16.7%) (3) Market research projects (n=3, 10%) (4) Computer-based simulation (n=1, 3.3%) (5) Startup projects for course training purpose (n=6, 20%) (6) Behavioral practice (n=5, 16.7%)
Role model learning (n=9, 30%)	(1) Guest speaker (n=5, 16.7%) (2) Entrepreneurs stories in books (n=4, 13.3%)
Lecture-based learning (n=5, 16.7%)	(1) Materials directly taught by lecturers (n=5, 16.7%)
Problem-based learning (n=1, 3.3%)	(1) Case study (n=1, 3.3%)
Total N=30. Number and percentage of participants are reported.	

The study found that most of the participants (n=24, 80%) learned important things about entrepreneurship through experiential learning. Five participants reported that they learned from the actual startup project they did in the class. Actual startup projects are assignments in which students are required to set up their own business based on their own idea, and bring the business to the market. Five participants reported that they learned from their collaboration project with actual entrepreneurs. Herein, students were granted a chance to work with actual entrepreneurs

on their businesses, where they served as consultants, and helped actual entrepreneurs deal with management-related issues. The study also found one participant who learned from the simulation he did in the class. Simulation here refers to a computer-based simulation game. In computer-based simulation game, students need to make business decisions based on the scenarios provided by the computer software. Six participants reported that they learned from the startup projects they did for the course training purpose. Startup projects for course training purpose are similar to actual startup projects, except that they are usually hypothetical. Students are required to write business plans based on a hypothetical idea, and they are usually not required to set up a real business. Three participants reported that they learned from their market research projects. For example, one of our participants was required to conduct market research based on a business idea she chose. She stated as follows:

“It is because in the project that we had, in the project we were going out to talk with people. He (the instructor) didn’t mention how to do it, but I just, I think it was a learning moment. The learning moment because you had all of these thoughts and ideas, how you could launch a product for your business, and then, you started thinking the people in the industry, and you have to know what your expectations for the product are. And I think that is a learning moment.”-

Participant 3

In addition, five students learned from the behavioral practices they did in the class. For example, in some classes, students were required to do presentations and practice their communication skill on a regular basis. As one participant indicated:

“That’s the way we did that, we practiced the networking. We also had a lot of activities in the class, a weekly thing, where we practiced, it was pretty informal, the professor asked “Hey,

have you networked with somebody this week”. That’s something we find very useful.”-

Participant 4

It was also found during the study that nine participants learned important things about entrepreneurship through role model learning. Five learned from the stories and experiences of their guest speakers, while four learned from the entrepreneur stories in books. As one participant stated:

“Not the instructor. The guest speakers that they had come in were good at describing how they failed in the beginning, how they dealt with it... They had some real-life examples... I learned to confront failure from their experience.”-Participant 12

Five people reported that they learned important things about entrepreneurship through lecture-based learning. They particularly learned knowledge related to financing, accounting, and business law, which were directly taught by their instructors.

The data analysis also reveals that one participant learned important things about entrepreneurship through problem-based learning. The student was given case studies based on which he needed to identify, analyze, and solve problems.

Table 5.4 provides a comparison of the things participants learned through the four pedagogical models including experiential learning, role model learning, lecture-based learning, and problem-based learning. Results show that qualities of entrepreneurs, startup strategy, and entrepreneurial skills including research, planning, communication, leadership, and handling failure were learned through experiential learning. Compared to experiential learning, only qualities of entrepreneurs, handling failure, and business analysis were learned through role model learning. The study findings show that in lecture-based learning, participants only learned factual knowledge including financial knowledge (e.g., bank loans, venture capital, angel

capital), accounting knowledge (e.g., income statement), and business law. In terms of problem-based learning, participants learned business analysis skill through this model.

Table 5.4 Comparison between things learned through the four pedagogical models

Experiential learning • Qualities of entrepreneurs • Research • Planning • Communication • Handling failure • Startup strategy • Leadership	Role model learning • Qualities of entrepreneurs • Handling failure • Business analysis
Lecture-based learning • Factual knowledge including financial, accounting, and business law knowledge	Problem-based learning • Business analysis

5.4.4 What is Useful for Entrepreneurs

Nineteen participants in the study are currently entrepreneurs or have had entrepreneurial experience since taking courses. Twelve among them claimed that the entrepreneurship courses they took were useful for them in creating or managing their startup businesses. Participants reported that the market research skill, communication skill, coping with failures, and selecting the right partner were most helpful.

Participants who are currently running their businesses or had entrepreneurship experience since taking courses suggested that their entrepreneurship courses helped them better anticipate and deal with failures in their respective businesses. During the courses, participants learned from different sources (e.g., the stories of guest speakers, actual entrepreneurship projects) that

entrepreneurial success is not easy, and a majority of entrepreneurs face a lot of failure before they achieving success. This kind of information served as a “vaccination” for the students, and prepared them to better confront failures. As one participant indicated:

“I feel like I've gotten a lot of rejection and I remember when we brought somebody in to talk about that, said that one of his failures was about rejection, I remember, and how he overcame the rejection for success. In that way, it has influenced me how to deal with my customers with rejection.”-Participant 23

Participants also realized that the right partners for their startups should be the ones who have complementary knowledge and skill sets. For example, one of the study participants was a software engineer, capable of software design and programming. When she created her own web application business, considering her own relatively weak business background, she chose a person with much experience in business and customer engagement as her startup partner. As she stated:

“I chose somebody who has the right skill set, the skill set I need...I am not a business person, I am a technical person. That's why I need a partner because my partner is all about business. She talked to customers. She's basically the CEO and I can be the CTO.”-Participant 11

Participants also mentioned a pitfall in selecting a startup partner, for example, choosing personal friends to be business partners regardless of their ability to do the work.

“My friend and I started up our partnership. I invested some money, my partner didn't end up investing anything which led to some challenges. That's kind of where I learned he wasn't an entrepreneurial spirit...He wasn't well-educated, He wasn't willing to put in work than I was putting in... There was a one-man show...The course influences me in a way that, I know, I kind

of learned from that, you can't go into business with friends, they have to bring value to the business to deserve a stake in it.”-Participant 17

Seven participants mentioned that entrepreneurship courses are not that useful for their startups. They claimed that they had learned more useful things from their actual startup experience than from the entrepreneurship courses, which they took.

5.4.5 What Is Useful for Employees Working in Established Companies

Twenty-three participants in the study sample are currently company-employed. Fifteen among them claimed that the entrepreneurship courses they took were useful for them in their company work. Similar to the people who have entrepreneurship experience, these company employees also indicated that market research skills and communication skills were very useful in their work. In addition to these two skills, they reported two things that were also helpful for their work: dealing with uncertainties at work, and being innovative at work.

Participants indicated that entrepreneurship courses helped them manage changes in their work. They learned from the course(s) that the real world is always changing and it is always full of uncertainties. This learning enabled them to better anticipate and deal with uncertainties arising from their work. As one participant stated:

“Some decisions you make at work, you don't know how they're gonna turn out. Every day I have to make decisions, so I may or may not be doing good or bad in the long run, but I just need to continually monitor and see where I am”-Participant 12

Participants indicated that after taking the entrepreneurship course(s), they applied the entrepreneurial mindset in their own work. For example, they tried to think about how to be more creative and more innovative at work. As one participant stated:

“I absolutely look at things a little bit differently than a lot of people do. I am constantly trying to innovate our strategies and innovate our way of doing things. I like to look at things differently whereas a lot of people tend to look at how it's been done before and they just repeat that...I try to think outside the box, take a different path getting to the end game, I think that's the biggest thing that I would bring to the table.”-Participant 17

Transfer of Learning in Different Work Contexts

The study findings show that entrepreneurship knowledge and skills acquired from entrepreneurship courses can be useful for company work. However, whether they could be applied or not are to be closely related to the sizes of organizations and the types of jobs.

In the study sample, four participants were currently working in small companies, with company employees fewer than 50 individuals. In fact, two of them were working in organizations having less than 20 employees. These participants generally claimed that they could apply more knowledge and skills learned from the entrepreneurship courses to their work. They mentioned that a small company is similar to a startup environment, with a flat organizational structure and a handful of employees. As one participant stated:

“I am working in the regional office, the Canadian office. It is not the San Francisco office. In a lot of ways, it is actually, when you are in that situation with about 20 people, everything is almost acting like a startup. So I think a lot of things that I learned, even when I come to do market research, working for different opportunities, develop approaches to enter the market. I think it has helped me.”-Participant 3

The types of jobs seemed to make little differences in this case. The analysis found that people working in both business functions (e.g., marketing analyst) and technical functions (e.g., programmer) in a small company could appreciate the influences of entrepreneurship courses in

their work. One of the study participants is a computer programmer employed by a small company, and she stated:

“My company was a startup and now it's a small company, like a really, really small company. It still has less than ten employees. What I learned from the entrepreneurship course, such as networking and innovation, can be applied to my current work.” -Participant 11

However, when people are working in large-sized companies, situations appeared a little bit different. The study found that different types of jobs influenced participants' perception of the usefulness of entrepreneurship knowledge and skills in their work. Among participants who claimed that entrepreneurship courses had many influences on their work, their jobs had one thing in common: they involved a lot of interactions with customers. For example, a consultant in an IT company, or a customer account agent in a bank, or a sales representative. They reported that entrepreneurship courses helped them better communicate with their clients and that, like entrepreneurs, they also faced many uncertainties in their work due to the unpredictability of customer problems and reactions. They always needed to be flexible and adaptable to changes. As one participant stated:

“In terms of my own work, I am an IT consultant... Consultants work with people from different industry. So you have to come up with new ways, if one solution doesn't work, you have to come up with different ways, and try to solve the problems.” -Participant 5

For those participants who perceived that entrepreneurship courses had a very limited influence on their work, their jobs usually had a low level of or no direct interaction with customers. Some of the jobs also had the following characteristics: (1) the work was about following routines and had very few variations. For example, a tax auditor in the government. (2) the work required a lot of analytical and technical knowledge and skills. For example, one

participant was a securities analyst who built mathematical models to analyze stock trends.

Another participant was a financial analyst who conducted financial ratio and credit analyses for people applying for personal loans or mortgage. These people explained that they didn't have many opportunities to use the learning from the entrepreneurship courses in their work because they perceived that their work context was very different from a startup context. As some of them stated:

"I work for the government. The actual entrepreneurship knowledge/skill itself would not apply to my job... The government sector you have a fixed salary, you have fixed duties, so it is very easy to plan, in that sense it is very easy to manage your time in that regard, because everything is fairly stable, whereas in the private sector things are always changing, there are always new things that you need to get done."-Participant 6

"I am a cost analyst...I am in a junior role. My work is more like following routines. Well, honestly say, I don't need entrepreneurial skills at work."-Participant 19

"I'm a securities finance specialist...My work requires a lot of technical financial knowledge. There may be a bit of an entrepreneurial factor to my current role, but it's not ... At the end of the day, it's not my thing."-Participant 24

5.4.6 What Is Missing in The Entrepreneurship Education?

Participants on being asked, what they wish they had learned in the entrepreneurship course(s) but they did not, 26 out of 30 participants provided answers. Five themes emerged from their answers: (1) More actual experience; (2) Startup activities; (3) Entrepreneurship types; (4) Startup difficulties; and (5) Intrapreneurship. The results are presented in Table 5.5.

Table 5.5 Higher order themes and lower order categories of what participants think are missing in entrepreneurship courses

Theme	Lower category
Actual experience (n=9, 30%)	(1) More hands-on experience in doing entrepreneurship (n=9, 30%)
Startup activities (n=8, 26.7%)	(1) Access funding (n=4, 13.3%) (2) Develop and grow an idea (n=3, 10%) (3) Negotiation into a startup (n=1, 3.3%)
Entrepreneurship types (n=5, 16.7%)	(1) Technology-based entrepreneurship (n=3, 10%) (2) Female entrepreneurship (n=2, 6.7%)
Startup difficulties (n=3, 10%)	(1) Entrepreneurship is not easy (n=3, 10%)
Intrapreneurship (n=2, 6.7%)	(1) Application of entrepreneurial skills in well-established organizations (n=2, 6.7%)

Total N=30. Number and percentage of participants are reported.

Actual Experience

Nine participants reported that they would have liked to participate in more real-world entrepreneurship projects to get more hands-on experience in doing entrepreneurship. There were two problems in the course(s) that they took. First, some courses didn't include any practical assignments or projects that could provide students with opportunities to participate in the startup process. Second, some courses included startup projects or assignments, but they were largely based on hypothetical scenarios either provided by the instructors or the students themselves. For example, one participant mentioned that in the class he took, the instructor gave students a case scenario in which they were given \$10000 dollars as seed capital to start a gym business. Although the participant felt that this assignment helped him practice his thinking, he pointed out that "it may not reflect the real-world".

Participants wanted to obtain hands-on practical experience in real entrepreneurship projects. For some of them who already had startup ideas, they wanted to get more guidance and chances to develop their ideas during the course. As one participant stated:

“I didn’t actually build my own business during the course...I had a credible idea that’s in progress at that time...I had the actual product, the prototype, and I wanted some feedback (from the instructor), but I didn’t get it from him. ”-Participant 15

Correspondingly, students who did not have a startup idea, they wanted to work with real entrepreneurs in real startups to obtain firsthand experience on running a new venture. As one participant indicated:

“I want to actually go into small businesses, even for a day, you know, just see how everything goes. Spend the day with their owners... I only had theoretical things in the course, I want the opportunity to actually go out and work with small businesses, and see how they start out”-Participant 8

Entrepreneurship Types

Participants mentioned that they would have liked to learn more about technology-based entrepreneurship in the course(s). They pointed out that the courses they took usually focused on traditional small businesses such as retail businesses and restaurant businesses. The course materials, examples, knowledge, and skills taught were more related to these types of businesses. Technology-based entrepreneurship was seldom mentioned and discussed in the course(s). With the rapid advance of technology and its increasing impact on daily lives, more and more people are interested in building technology businesses. As one participant said:

“I know now the new thing is technology, I want to learn more about the software business, you know, developing apps and software, I know it is more on the technology side of the course, but it is so relevant nowadays.”-Participant 6

However, the entrepreneurship course(s), in the eyes of participants, still lack this important technology component. Participants wished that the entrepreneurship courses could incorporate some materials in technology entrepreneurship, and teach students to create or manage a technology-based business because they believed that creating and running technology businesses such as a software company requires a set of knowledge and skills, which are different from those required by traditional low-technology businesses such as opening a shoe store. Participants also mentioned that entrepreneurship courses should include contents related to intellectual property.

In addition to technology-based entrepreneurship, two female participants mentioned that they would have liked to learn more about female entrepreneurship. They believed that females and males use different ways to pursue entrepreneurship, and they would like the course to include more examples and materials of female entrepreneurs.

Startup Difficulties

Three participants mentioned that they would have liked to learn more about how difficult it is to set up a business. Although they claimed that their instructors had mentioned the difficulty of new venture creation, they believed that more emphasis on this is required. As one participant stated:

“I think, it's always really important to just stress how hard it is to be an entrepreneur. I mean, obviously, we heard that. It's always good just to really emphasize that because one in a

hundred will make it or one a thousand will make it or whatever. I think, that's something that's always needs to be stressed a lot. ”-Participant 9

Startup Activities

Eight participants reported that they would have liked to learn more about the startup activities including how to access funding (n=4), how to develop and grow an idea (n=3), and how to negotiate in a startup (n=1). As one participant stated:

“I would be more interested in, like access funding, raising money, I guess, for your business to expand. We went, we went over that a little bit during the course, but we never got into more detail. ”-Participant 2

Application of Entrepreneurial Skills in Well-Established Organizations

Two participants reported that they would have liked to learn more about the application of entrepreneurial knowledge/skills in well-established organizations. They claimed that the entrepreneurship course(s) they took seldom covered this aspect of entrepreneurship, and they considered this a gap because they believed that entrepreneurship course(s) should also be helpful to professionals who are company-employed. As one participant stated:

“The course is not that practical when you work for a big organization, I want to learn more practical things about how to apply them in a big organization. I don’t think we covered anything like how entrepreneurship skills or knowledge could be applied in an organization context, in a big company context. This part is still a black box there for me. ”-Participant 15

5.5 Discussion

The findings of motivation to undertake entrepreneurship courses are consistent with the findings by Block and Stumpf (1992), who suggest that not all individuals taking

entrepreneurship courses are interested in new venture creation and that some of them may just want to explore it on an intellectual level. This creates a challenge for entrepreneurship courses regarding as to how to satisfy the needs of both groups of students as well as the ways to evaluate the effectiveness of the courses. An extensive body of previous literature uses entrepreneurship intention to evaluate the effectiveness of the courses (Bae et al., 2014). However, given the fact that not every student will choose to become entrepreneurs, the study should not just focus on examining entrepreneurship intention.

According to participants' answers, the most important things they learned from their entrepreneurship courses were the qualities of entrepreneurs, followed by research, communication, and planning. The study analysis reveals that experiential learning was reported to be the most effective learning approach. The participants in the study sample took entrepreneurship courses on average 5 years previously. For most of them (n=24, 80%), the ideas and skills they still remembered and considered important were those that they had acquired from participation in actual startup projects, collaboration projects with actual entrepreneurs, market research projects, computer-based simulation projects, startup projects for training purpose, and behavioral practices in classes. The main characteristic of experiential learning is "learning by doing" (Kolb, 1984). It contributes to the deep learning process, in which students are more capable of retaining the knowledge learned and synthesize information for long-term use (Neck & Greene, 2011). The study also found students learned through role models (n=9), lecture-based learning (n=5), and problem-based learning (n=1). However, compared to the experiential learning approach, the percentage of students using these three approaches greatly dropped was very minimal.

In the comparison of things students learned through these four pedagogical models, the analysis found that qualities of entrepreneurs, startup strategy, and entrepreneurial skills including research, planning, communication, leadership, and handling failure were learned through experiential learning. Among all these things, research, planning, and communication were only acquired through experiential learning. Lecture-based learning is only useful in teaching factual knowledge such as financial knowledge, accounting knowledge, and business law. Role model learning is useful in helping students develop an understanding of the qualities of entrepreneurs, handling failures, and analyzing a business. These findings suggest that entrepreneurship courses should be designed mainly based on experiential learning, incorporating more components which provide students opportunities to learn by doing. Role model learning and lecture-based learning could be used as supplementary approaches in entrepreneurship courses.

They study findings show that entrepreneurship courses can be useful for people who become entrepreneurs and people who are company-employed. Market research, communication, and the ability to stay flexible were the most useful things that were mentioned by both entrepreneurs and company employees. However, the analysis reveals that the organization size and the types of jobs influence participants' perceived usefulness of entrepreneurship course on their company work. It was observed that people working in very small companies (with less than 50 employees) usually claimed that they could apply what they learned from entrepreneurship courses to their work. As corroborated by the theory of transfer of learning, transfer includes near transfer and far transfer (Barnett & Ceci, 2002; Perkins & Salomon, 1994). Near transfer is defined as transfer between very similar contexts, while far transfer refers to transfer between contexts that, on appearance, seem remote and alien to one another (Perkins &

Salomon, 1994, p. 4). Students could apply what they learned from the entrepreneurship courses to their startups or to their work in a very small company, because both small companies and startups have very similar contexts. In addition, it was observed that people might apply what they learned from entrepreneurship courses to their work in large-sized companies, particularly when the jobs involve a high level of interaction with customers. Some examples include sales representatives, customer representatives, and business consultants. This finding suggests the effect of near transfer. In entrepreneurship, dealing with the customers is considered the most important activity (Ries, 2011). If there are no customers, a business cannot survive. Similarly, in jobs such as sales representatives and consultants, job incumbents also need to deal with customers with an aim of completing a sale or selling advice. However, the study reveals that the effect of far transfer of entrepreneurship learning is weak. Correspondingly, employees in big companies whose jobs involve a high level of routines, a low level of customer interaction, and technical work usually perceived that the entrepreneurship courses they took had a very limited influence on them.

The study findings show that participants exhibited a preference for more hands-on experience in entrepreneurship activities in the entrepreneurship courses (n=9, 30%). They would have preferred to participate in more actual startup projects or more collaboration projects with actual entrepreneurs. This reflects that participants are in favor of experiential learning, and suggests that future entrepreneurship programs should incorporate more activities which allow students to engage in experiential learning. In addition, it was observed that participants would have liked to learn more about certain startup activities, especially about accessing funding and developing and growing a business idea.

5.6 Future Research and Limitation

Scholars could conduct a longitudinal qualitative research comparing the effectiveness of the different pedagogical models as discussed in this study at different time points. For example, the study can be conducted right after students complete their entrepreneurship courses, and 1 year after, 3 years after, and then 5 years of the course completion. This type of study would allow for a better comprehension of the strength and weakness of different pedagogical models, and serve as a base for the building of more effective entrepreneurship education programs.

The contribution of this study should be interpreted in view of the study's limitations. The first limitation lies in the sample. The study sample was limited to interviews with 30 participants who had completed their courses approximately 5 years ago. Despite the small sample size, the study revealed several significant findings. Second, the participants in our sample took their entrepreneurship courses from universities located in Canada, UK, Belgium, and Denmark. The nature of the sample limits its generalizability. Hence, the study findings cannot be generalized to other students of entrepreneurship courses in universities from other countries.

5.7 Conclusions

Entrepreneurship education and training (EET) is growing fast around the world (Honig, 2004). Researchers have examined the relationships between EET and four broad types of outcomes including entrepreneurship intention, entrepreneurship activities, entrepreneurship knowledge and skills, and general outcomes which are not specifically related to entrepreneurship (e.g., GPA in universities, job satisfaction). However, the learning from the entrepreneurship courses, the learning mechanism, and the usefulness of these courses for startup

career or for company work, remains unclear. In this qualitative study, data were collected from 30 participants who took their entrepreneurship courses approximately 5 years ago. The study aims to understand the long-term impact of EET on students. The study results show that the most important things they learned from the courses are qualities of entrepreneurs, research, communication, and planning. Most of the former students reported that they learned these things through experiential learning, suggesting that experiential learning is the most effective pedagogical approach in EET, and that entrepreneurship courses should be designed based on experiential learning. The results also show that EET can be useful for both entrepreneurs and company employees. This research contributes to the understanding of the long-term influence of EET on students, and the effectiveness of the experiential learning model. It has important implications for the design of entrepreneurship education and training programs.

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Chapter 6 Conclusion

6.1 Discussions

This thesis aims to develop a deeper understanding of entrepreneurship education as a type of entrepreneurship support. We study the overall entrepreneurship support systems, the pedagogical models developed for students with different levels of entrepreneurship experience, and the long-term influences of entrepreneurship education on students. Entrepreneurship education and training has become very popular in universities, colleges, and business development centers world-wide (Honig, 2004; Katz, 2003; Kuratko, 2005; Solomon, 2007). It is also of great interest in academia (Katz, 2003; Kuratko, 2005). However, the entrepreneurship teaching pedagogies are usually not informed by solid theories, and students' different learning needs are not taken into consideration. In addition, the long-term influences of entrepreneurship education on students are unclear.

This thesis consists of four independent studies. Study 1 is the foundation of this thesis, as it systematically reviews the entrepreneurship support literature. Having analyzed 122 articles in the literature sample, we found that government and support programs (e.g., small business development center) are the major sources of entrepreneurship support, and that entrepreneurship training and learning is the most important type of support. Regarding the outcomes and effectiveness of entrepreneurship support, the majority of scholarly research that investigates sources and types of support does not attempt to establish any causal links between attributes of entrepreneurship support and its outcomes. Instead, such research merely focuses on internal mechanisms and generating typologies, and the scholarship on entrepreneurship support lacks palpable evidence of its effectiveness. Regarding the theoretical base of the literature, we found

that very few studies use theories to guide their research, and what is worse, there is almost no entrepreneurship support theory found. Our finding reveals that the study of entrepreneurship support has been mostly phenomenological and atheoretical. The lack of theories and systematic approach to examine the support prevents the accumulation of useful evidence in this field. We suggest that scholars could apply three existing theories to understand and study support systems to entrepreneurs, considering the theories' nature and relevance. These theories are the resource-based view (Barney, 2001), the dynamic capabilities (Teece, Pisano, & Shuen, 1997), and the resource dependence theory (Davis & Cobb, 2010). Resource-based view of the firm and dynamic capabilities are suitable to study which resources entrepreneurs need to start a business and to succeed (Hitt, Ireland, Camp, & Sexton, 2001). Resource dependence theory highlights the reality that all organizations need to extract resources from their environment and other organizations for their own survival (Davis & Cobb, 2010). Given that entrepreneurship support programs exist to transfer resources and knowledge to entrepreneurs to increase their likelihood of survival, resource dependency theory is rich with insights for the study of these phenomena such as resource exchange, particularly in the institutional dimension.

In Study 2, we considered the different learning needs of students with different levels of entrepreneurship experience, and divided them into three groups: students with no entrepreneurship experience, students with previous entrepreneurship experience, and students who are currently running their startups. Three distinct pedagogical models were developed to serve their needs. We recommend that the third model is more suitable to be implemented in incubators than in universities or educational institutions, considering its flexible structure.

We need to recognize that students have different characteristics and different learning needs. Therefore, the “one-size-fits-all” approach in entrepreneurship education should be avoided. In

addition to the entrepreneurship experience, we believe that different motivations to take entrepreneurship training should also be taken into consideration when we design the teaching models. In Study 4, we found that there are two primary types of motivation to take entrepreneurship courses. People with one type of motivation explicitly express their strong interest in becoming entrepreneurs, while people with another type of motivation have no or very weak intention to participate in new venture creation. This finding is consistent with the findings by Block and Stumpf (1992). They suggest that not all individuals taking entrepreneurship courses are interested in new venture creation, and that some people may simply want to explore entrepreneurship on an intellectual level. This creates a challenge for entrepreneurship education regarding how to satisfy the needs of both groups of students. Although entrepreneurship education can help enhance students' attitudes and intention to pursue startup activities to some extent (Bae, Qian, Miao, & Fiet, 2014), we need to realize that such changes are not always successful, as Study 3 shows that students' attitudes and intentions remain at almost the same level before and right after they finished their entrepreneurship courses.

Instead of pushing all entrepreneurship students to create their own businesses, we may take one step back and ponder on what values entrepreneurship education can add to students' professional career even if they choose not to become entrepreneurs. We suggest that two types of entrepreneurship programs be designed. The first type that targets at students who want to become entrepreneurs is the traditional type aimed at preparing them to pursue startup activities in the market (Kuratko, 2005). The second type is for students who have no or very weak interest in choosing the entrepreneurship career. They simply wish to learn some knowledge related to entrepreneurship from courses so that in future they could apply such knowledge to work, and focus on building innovation and creativity in organizations. Entrepreneurship courses should

shift focus from preparing these students for entrepreneurship career to teaching them how to apply entrepreneurial knowledge/skills to company work. That is, teaching them *intrapreneurship*, which refers to entrepreneurship within existing organizations (Antoncic & Hisrich, 2001). People who engage in intrapreneurship activities in corporates are called intrapreneurs. Like entrepreneurs, intrapreneurs also generate and develop new ideas, and try to turn these ideas into profitable businesses (Hisrich, 1990). However, differences exist between entrepreneurship and intrapreneurship. Honig (2001) suggests that intrapreneurs can capitalize on pre-existing organizational structures and resources, but will face procedural and institutional constraints. Compared to intrapreneurs, entrepreneurs usually have fewer organizational constraints to pursue startup activities, but they have fewer resources to rely upon. Honig (2001) finds that because of these differences, the focus of the learning strategies utilized by intrapreneurs and entrepreneurs is also different. Intrapreneurs rely more on learning styles that use structured organizational approaches, focusing on organizational consensus. Compared to intrapreneurs, entrepreneurs depend more on utilizing non-structured organizational processes, which is more flexible and adaptive, and suitable for changing environment. The design of the education for both intrapreneurs and entrepreneurs should reflect the different needs of these two groups. For example, entrepreneurs usually have a low level of legitimacy and face many resource constraints (Aldrich & Fiol, 1994). Entrepreneurship courses usually include components such as how to seek funding and how to build up legitimacy. In fact, venturing financing is one of the most important and widely taught topics in entrepreneurship education (Kuratko, 2005). In this topic, students are taught how to access resources, especially the financial resources such as bank loans, angel capital, and venture capital (Dimov & Shepherd, 2005). This skill may be very useful for entrepreneurs, but it may not be so important for

intrapreneurs as they are less likely to encounter these financial problems. In sum, we argue that to make entrepreneurship education more useful for students, the different learning needs of students should be carefully taken into consideration.

In this thesis, we call on researchers' attention to the long-term effects of entrepreneurship education, which is seldom examined in the existing literature. Most research examines only the short-term influence of entrepreneurship education on students. For example, Bae et al. (2014) show in their review paper that the evaluation of entrepreneurship education is usually conducted right after students finish their entrepreneurship courses. Very few studies seek to explore the long-term influence of entrepreneurship education on students.

It is significant to understand the long-term effects of entrepreneurship education for the following reason. People start their new ventures at different paces. Some may start earlier and some may start later (Lichtenstein, Carter, Dooley, & Gartner, 2007). There is no guarantee that students will start their businesses right after they finish their education. For entrepreneurship education to be truly useful for people, the positive outcomes of it should be sustained until people start to engage in entrepreneurial activities. Because of this, it is important to examine not only the short-term, but also the long-term effects of entrepreneurship education. Study 3 reveals a concern for the long-term effects of entrepreneurship education. We found that students' PBC, subjective norm, and intention to pursue entrepreneurship dropped significantly three years after they finished their entrepreneurship courses. This finding suggests that the positive outcomes proposed by entrepreneurship education scholars may not be sustained over time. Study 4 used a different approach to detect the long-term influence of entrepreneurship education on students. We asked participants who completed their entrepreneurship education on average five years previously regarding what they learned from the courses. We chose a five-year gap for the

following reason. According to the decay theory, memory fades due to the mere passage of time (Brown, 1958). Because of this, the knowledge learned is less available for later retrieval as time goes on. However, this does not mean that all knowledge learned will be forgotten. The knowledge retention rate will drop heavily in the first three to four years, but the drop tends to level out around five years after learning has terminated (Custers, 2010). The knowledge remaining after this period can be assumed to be in permastore, which refers to a state that knowledge forgetting basically stops (Bahrick, 1984; Custers, 2010; Rubin & Wenzel, 1996). This research design allows us to detect the learned knowledge/skills that have a lasting influence on students. The participants reported that they learned important things from their entrepreneurship course such as qualities of entrepreneurs, research skills, communication skills, and planning skills. They believed that the knowledge and skills learned are useful for their entrepreneurship career as well as their career in established organizations.

The results of Studies 3 and 4 seemed contradictory. Study 3 finds that entrepreneurship education has very weak long-term influence on students, while Study 4 finds that students did learn something useful from the entrepreneurship course they took. Such a contradiction arises from the use of different evaluation approaches. In Study 3, the effectiveness of entrepreneurship education is evaluated by measuring students' attitude, PBC, subjective norm, and intention to pursue entrepreneurship career. Built on the theory of planned behavior, this intention-based approach is widely used in the entrepreneurship education literature (Bae et al., 2014; Souitaris, Zerbinati, & Al-Laham, 2007). However, the limitation of this approach is that the impact of entrepreneurship education on students is largely treated as a "black box". That is, other than entrepreneurship attitudes and intentions, we are unclear about what students learn from entrepreneurship education, and whether entrepreneurship education is useful for them. We

argue that to evaluate the influence of entrepreneurship education better, we cannot rely on intention-based approach only. We suggest that a combination of approaches that involves both short-term and long-term influences of entrepreneurship education be utilized. For example, we can evaluate students' attitudes and intentions to start a business, their actual entrepreneurial behaviors, and the knowledge/skills they learn from the entrepreneurship courses. Through this way, we can get a better picture of the influence entrepreneurship education has on students, and to evaluate its effectiveness in a more objective way.

To conduct the long-term evaluation of entrepreneurship education, the collection of long-term data is essential. We suggest that the administrators of entrepreneurship programs or courses should use a systematic approach to collect data. Most of the universities have alumni associations, through which universities can stay in contact with the alumni. To invite students to participate in a long-term data collection process, a prerequisite step is to keep in touch with them. The administrators of entrepreneurship programs or courses can use similar strategy to stay in contact with students who previously received entrepreneurship education. For example, the administrators can set up an association for these students, send out materials related to entrepreneurship on a regular basis, and inform them of potential opportunities to participate in entrepreneurship education research. In this way, researchers may have a greater opportunity of reaching and getting the input from these students, compared to only making hasty efforts at the very last minute.

6.2 Contributions

In this thesis, we make three main contributions to the literature. First, we point out that the existing entrepreneurship education literature tends to treat students as a homogenous group. It fails to consider students' different learning needs, and theories are seldom used to guide the

design of teaching pedagogies. We fill this gap by proposing three conceptual models, anchored in experiential learning theory, for three groups of students with different levels of entrepreneurship experience. In addition to the level of entrepreneurship experience, there are other factors (e.g., students' career orientation: self-employed or company employed) that could be taken into consideration when designing the teaching pedagogies. Our research serves as a first step to call on scholars' attention to incorporate theories and consider students' different attributes in teaching entrepreneurship.

Second, our research adds to the understanding of the long-term effects of entrepreneurship education on students. The short-term influence of entrepreneurship education has been examined extensively in the literature, and many positive outcomes have been proposed such as enhanced attitudes and intention to entrepreneurship (Bae et al., 2014), and increased human capital in entrepreneurship (Martin, McNally, & Kay, 2013). However, these studies usually have a very short time frame ranging from one day to one year (Bae et al., 2014). Therefore, whether these proposed positive outcomes are sustained over time remains unknown. Figuring out the long-term influence of entrepreneurship education is vital. We know that people are unlikely to start their businesses at the same time or conduct start-up activities at the same pace (Lichtenstein et al., 2007). Some start their businesses earlier while the others may start later. There is no guarantee that all people will engage in new venture creation right after they finish their entrepreneurship education and training. If those proposed positive outcomes cannot be sustained until such time that people start to act, it means that the positive influence of entrepreneurship education may only be an illusion.

Third, we advance the understanding of entrepreneurship support literature. Our review of entrepreneurship support disentangles the multiple conceptualizations used to research

entrepreneurship support and introduces a conceptual framework to examine sources, types, outcomes, and effectiveness of support. Given the fact that many studies in this field are not theory-driven, we contribute to the literature by introducing three prevalent management theories which could motivate theoretical refinements in this field.

6.3 Future research directions

Future research could examine the influence and effectiveness of entrepreneurship support at different levels. For example, how does entrepreneurship policy impact the national level, regional level, and the individual level? Incorporating a multilevel analysis into entrepreneurship support enables us to get a clearer picture of how this support takes effects at different levels, and allows us to develop concrete strategies to promote and manage the support.

Future research will be an important aspect in improving entrepreneurship education. Scholars could examine the effectiveness of the three proposed models introduced in the second study. By comparing students who are taught with these models and those without, we would have a better understanding of the potential strengths and weaknesses of the models in practical use.

Future research should be designed to address the potential issue of self-selection bias in entrepreneurship education. That is, it may be that students who enroll in entrepreneurship courses are positively predisposed to entrepreneurship before taking any courses, and this predisposition biases their responses over time. Although pretest-post-test control group design can shed light on the potential outcomes such as entrepreneurial attitudes and intentions before and after an educational intervention, it only provides correlational data and does not fully address the issue of causality. To achieve a satisfactory measure of cause and effect, random assignment to conditions (i.e., to courses) may be required. This obviously represents a relatively

difficult challenge for universities if they use this method, as they would likely face stiff opposition from students resentful of forcibly being placed in courses during registration. However, smaller-scale causal studies could be designed to randomly place potential students into one of two short courses, one focusing on entrepreneurship education and another on a different topic.

Future research could examine the characteristics of entrepreneurship programs, and how these characteristics may influence the quality of learning, and further influence students' entrepreneurial attitudes, intention and behaviors. For example, the characteristics could be: (1) the type of the lecturer (e.g., Is he/she an academic professor or a practitioner or both?); (2) the support environment of the entrepreneurship program (e.g., Is the school which offers the entrepreneurship program/course located in a region with high rates of entrepreneurship? Does the school have support facilities for entrepreneurship such as incubators, business consulting offices, intellectual property offices? Does the school maintain a good connection with entrepreneur communities?). By studying these characteristics, we can develop more understanding about how external factors influence students' perception of the usefulness of entrepreneurship education, and how this perception influences their entrepreneurship attitudes, intentions, and behaviors.

Future research could use a longitudinal qualitative design to evaluate the effectiveness of the different pedagogical models at different time points. There are several popular pedagogical models in teaching entrepreneurship such as experiential learning, lecture-based learning, role model learning, and problem-based learning (Pittaway & Cope, 2007). Experiential learning focuses on learning by doing (Cope & Watts, 2000). In experiential learning, students are given chances to engage in entrepreneurial activities. Lecture-based learning is characterized by

instructors' dominant role in imparting knowledge to students through a form of information transfer (Michel, Cater, & Varela, 2009). Students learn by passively receiving knowledge from instructors. Role model learning focuses on learning from people who set examples to be emulated by others (Bosma, Hessels, Schutjens, Van Praag, & Verheul, 2012; Wright, Wong, & Newill, 1997). An example of role models is successful entrepreneurs. In this learning, students learn from their role models' experience to deal with their own startups. Problem-based learning is characterized by using problems as the core in the learning process (San Tan & Ng, 2006). In this learning, students identify the problems and develop problem-solving skills while searching for and acquiring the relevant entrepreneurial knowledge and skills. Future research can compare the effectiveness of these pedagogical models at different time. For example, the study can be conducted right after students finish their entrepreneurship courses, and 1 year after, 3 years after, and then 5 years after their courses finish. This type of study allows us to understand the strength and weakness of different pedagogical models, and serve as a base for the building of more effective entrepreneurship education programs.

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