THE PSYCHOLOGY AND EDUCATION OF ENTREPRENEURIAL DEVELOPMENT

EDITED BY: Hsiu-Ping Yueh, Yenchun Jim Wu and Wei-Fan Chen
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THE PSYCHOLOGY AND EDUCATION OF ENTREPRENEURIAL DEVELOPMENT

Topic Editors:
Hsiu-Ping Yueh, National Taiwan University, Taiwan
Yenchun Jim Wu, National Taiwan Normal University, Taiwan
Wei-Fan Chen, Penn State Wilkes-Barre, United States

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EDITORIAL
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Editorial: The Psychology and Education of Entrepreneurial Development

Hsiu-Ping Yueh[1]*, *Yenchun Jim Wu*[2] and *Wei-Fan Chen*[3]

[1] Department of Psychology, Department of Bio-Industry Communication and Development, National Taiwan University, Taipei, Taiwan, [2] Graduate Institute of Global Business and Strategy, National Taiwan Normal University, Taipei, Taiwan, [3] Department of Information Sciences and Technology, Penn State Wilkes-Barre, Dallas, TX, United States

Keywords: psychology of entrepreneurship, psychological constructs, entrepreneurship in education, entrepreneurial education, entrepreneurial development

Editorial on the Research Topic

The Psychology and Education of Entrepreneurial Development

Over the past decade, entrepreneurship education has been a significant transformative change happening in Higher Education Institutions worldwide. Entrepreneurship education is different from management education in many ways; students of business school do not necessarily learn entrepreneurship, despite being well-trained with specialized professional competencies, knowledge, and skills related to management and corporate functions. With different core objectives, entrepreneurship education often goes beyond general business education, for it is often connected to innovation education in the disciplines of engineering and technology, and it also is highly related to global, social, political, and technological environments. While many professions have placed great emphasis on developing future entrepreneurs, and young entrepreneurs are being highly encouraged, entrepreneurship education research also needs to focus attention on the psychological nature of entrepreneurial development.

The call for this special Research Topic was intended to elaborate a broad view of the integration in research of psychological factors and educational design in developing entrepreneurial competency as well as in encouraging students to become entrepreneurs. This collection spans a body of work that represents the efforts of 14 original research papers from 44 contributors. As previous psychological studies have examined the psychological constructs used in entrepreneurship, the first paper reveals the influence of a dark triad of personal traits (narcissism, psychopathy, and Machiavellianism) on entrepreneurial intention (Wu W. et al.). Complementarily, several articles examine concepts and models for measuring entrepreneurial intention (Wu W. et al.; Liu X. et al.; Liu F. et al.; Hou et al.; Wang W. et al.; Wang S.-M. et al.). Some articles test the effects of self-efficacy on entrepreneurial intention (Wu W. et al.; Liu X. et al.). To further explore the relationship with more factors, two studies include role models and entrepreneurial passion as factors in the measurement model (Liu F. et al.; Hou et al.) to identify their influences on entrepreneurial intention. In addition, Wei J. et al. adopt an interpretive structure model (ISM model) to identify and analyze entrepreneurial failure learning, and they further propose a multilevel hierarchy of the factors that include both a cognitive dimension–self-efficacy–and an affective dimension–emotion regulation–as two important factors that influence entrepreneurial learning from failure. Wang W. et al. chooses another approach in testing the model of network embeddedness and sense of opportunity identification efficacy on students' social entrepreneurial intention.

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Douglas F. Kauffman, Medical University of the Americas – Nevis, United States

***Correspondence:**
Hsiu-Ping Yueh
yueh@ntu.edu.tw

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Other articles document cognitive factors such as general and specific knowledge, management ability, and business strategy, along with policy issues in entrepreneurial development. For example, Wang looks into law–business compound competency and law–business interdisciplinary entrepreneurship education. Her study suggests that this kind of program should cultivate legal–business intelligence by integrating legal thinking into business logics, building legal awareness in the commercial spirit, preventing legal risk in business competition, and strengthening the application of legal personnel in commercial activities. Another paper, by Zichu, looks at the entrepreneurial opportunity and group intelligence and suggests that joint decision making and constructive controversy are positively related to entrepreneurial opportunity evaluation. For policy issues, Dong et al. explore what entrepreneurial followers need and the difficulties they consider in entrepreneurship cultivation at the start-up stage. Wei X. et al. finds that political skills and entrepreneurial opportunity recognition individually play mediating roles between perceived entrepreneurship education and education.

While 9 studies target university/college students (Wu W. et al.; Liu X. et al.; Liu F. et al.; Hou et al.; Wu W.-H. et al.; Wu and Chen; Wang W. et al.; Wei X. et al.; Wang S.-M. et al.), five papers focus on industry entrepreneurs (Wang; Zichu; Wu W. et al.; Dong et al.; Wei J. et al.). Those studies in the higher education context focus on the curriculum, instruction, and pedagogy in entrepreneurial education. For example, Liu F. et al. adopts storytelling in teaching in entrepreneurship education programs and examines the effects of successful role model stories and failure role model stories together with self-efficacy, entrepreneurial passion, and distance between role model and audience on entrepreneurial intention. Wu W.-H. et al., on the other hand, present the design of an entrepreneurial 9-week social entrepreneurship MOOCs program to teach students with low- to mid- and high-level affective skills and evaluate its effectiveness. Wu and Song implement social media in online entrepreneurial groups of online courses for entrepreneurs, and their research identifies four gratification factors as key incentives for applying social media in such courses. Wu and Chen, employing another approach, present their efforts in partnering with industrial and business experts in entrepreneurial course design and collaborative teaching. They consider this jointly-designed course to be more effective in terms of elevating students' entrepreneurial capabilities and professional competitiveness. Finally, on a more advanced level, Wang S.-M. et al. compare the effects of two paths of entrepreneurial education–a Creativity and Entrepreneurship Program (CEP) and management education–on the development of students' entrepreneurial competencies and intention. They also explore the context limits or facilitations in the entrepreneurship education of university students in different academic disciplines of a management school.

In conclusion, we believe that this Research Topic presents a conceptually broad work and that the papers included in this collection clearly contribute to our understanding of the psychology and education of entrepreneurial development.

Given the fact that higher education institutions worldwide are still increasing the number of entrepreneurial education programs, this Research Topic may not embrace all facets associated with the entrepreneurship research arena. We suggest that future research could focus on the engagement of more psychological and management theories, not only to make better connections between academic training and industrial practice but also to enrich the understanding of the impacts of entrepreneurship on both individual and organizational development. Moreover, it is recommended that more research efforts be directed to those issues needing greater attention, such as the relationships of entrepreneurial development to leadership, path to success, epistemology, and multidisciplinary learning experiences. Furthermore, different research approaches, such as meta-analysis, multi-case study, comparative international entrepreneurship, and mix-method research, are also recommended so as to cast light on entrepreneurship and its impacts on education and society.

AUTHOR CONTRIBUTIONS

H-PY conceived of the idea and coordinated the Research Topic. YW and W-FC carried out support tasks for the coordination of the Research Topic and Edition of Articles.

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ORIGINAL RESEARCH
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Effect of Narcissism, Psychopathy, and Machiavellianism on Entrepreneurial Intention—The Mediating of Entrepreneurial Self-Efficacy

*Wenqing Wu[1], Hongxin Wang[1], Chundong Zheng[1] and Yenchun Jim Wu[2]**

[1] College of Management and Economics, Tianjin University, Tianjin, China, [2] Graduate Institute of Global Business and Strategy, National Taiwan Normal University, Taipei, Taiwan

The driving factors behind the exploration and search for entrepreneurial intention (EI) are critical to entrepreneurship education and entrepreneurial practice. To reveal in depth the influence of personality traits on EI, our study introduces the opposite of proactive personality—the dark triad that consists of narcissism, psychopathy and Machiavellianism. Our study used the MBA students of Tianjin University as a sample to analyze the relationship between the dark triad, entrepreneurial self-efficacy (ESE) and EI. A total of 334 MBA students aged 24–47 years participated and the participation rate is 95.71%. The data collection was largely concentrated in the period from May 15 to June 5, 2018. From the overall perspective of the dark triad, the results show that the dark triad positively predicts EI, and ESE has a partial mediating effect on the dark triad and EI. From the perspective of the three members of the dark triad, the study found that narcissism/psychopathy has a negative effect on ESE and EI; narcissism/psychopathy has a non-linear effect on EI; Machiavellianism has a positive effect on ESE and EI; and ESE has a mediating effect on the three members of the dark triad and EI. In short, our research reveals that the three members of the dark triad have different effects on EI in different cultural contexts, and the research findings have certain reference value for further improvement of entrepreneurship education and entrepreneurial practice.

Keywords: dark triad, narcissism, psychopathy, Machiavellianism, entrepreneurial self-efficacy, entrepreneurial intention

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Monica Pellerone,
Kore University of Enna, Italy

Reviewed by:
Giuseppe Mannino,
Libera Università Maria SS. Assunta, Italy
Giuseppe Craparo,
Kore University of Enna, Italy

****Correspondence:***
Yenchun Jim Wu
wuyenchun@gmail.com

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INTRODUCTION

With the rapid development of science and technology, innovation, and entrepreneurial ability are increasingly becoming the main aspects of comprehensive national strength competition. Many global institutions credit entrepreneurship as a key driver of innovation and measurable economic development for their region (Montiel and Clark, 2018). Moreover, the importance of entrepreneurship to the economic, political and social environment of a country/region has been widely recognized, and there is a large amount of evidence related to its effect (Montiel and Clark, 2018). At the same time, an increasing number of studies show that entrepreneurship follows the

formation of entrepreneurial intention (EI) (Zhang et al., 2014). In other words, EI is a strong predictor of entrepreneurial activity for individuals planning to establish a new business in the future (Obschonka et al., 2010). As a decisive factor in the creation of entrepreneurial behavior, EI has received extensive attention in the research field (Liñán et al., 2011).

Entrepreneurial intention is defined as a focused mentality that guides the individual's attention and experience toward planned entrepreneurial behavior (Do and Dadvari, 2017). It refers to potentially enterprising individuals' perception of business opportunities and deciding whether to create new businesses in the future (Thompson, 2009). Recently, the predictive effect of individual personality traits on EI has become a research focus in the field of entrepreneurial research. When talking about why people want to start a business, previous studies largely focused on proactive personality (Hu et al., 2018). Indeed, dark personality traits might also contribute to EI (Miller, 2015) because individuals tend to have multiple personalities, and dark personality traits can have a brighter side (Judge et al., 2009). Previous studies often overlooked the dark side of personality. However, scholars have recently noted that it is necessary to explore the influence of dark personality traits on EI (Denisi, 2015). Moreover, the dark triad has become a focus of the study of dark personality traits.

The dark triad, which consists of three sub-structures (narcissism, psychopathy, and Machiavellianism) (Paulhus and Williams, 2002), is a type of malicious mentality that primarily manifests as self-interest, aggressiveness, and ruthlessness (Mcdonald et al., 2012). Considering that psychopathy and antisocial personality disorder are similar but different in character, this study will emphasize and define psychopathy to distinguish them. Hare believes that the distinction between psychopathy and antisocial personality disorder is very important for clinicians and society (Hare, 1991; Gori et al., 2014). According to DSM-5, the basic characteristics of antisocial personality disorder are neglect and violation of the rights of others, manifested in irresponsibility, lack of self-accusation, pathological lying, lack of compassion, and aggressiveness (Gori et al., 2014; Gervasi et al., 2017). Psychopathy (or "primary psychopathy") is a personality disorder characterized by lack of social norms, empathy and remorse. It is usually manifested by lack of anxiety, low withdrawal, impulse, guilt, manipulativeness and a persistent violation of social norms (Hare, 1991; Craparo et al., 2013; Gori et al., 2014).

Individuals with a high level of the dark triad tend to be oriented toward achievement (Jones and Figueredo, 2013). When faced with high challenges and uncertain situations, they are more confident and more outgoing than are others (Jonason et al., 2009). At the same time, entrepreneurship is a profession that requires a high degree of self-confidence and leadership and involves a high degree of uncertainty (Mathieu and St-Jean, 2013), which to some extent reflects the match between the dark triad and entrepreneurship. According to a recent study on the dark triad in the entrepreneurial field, the dark triad can positively influence the individual's intention to start a risky endeavor, and the dark triad is one of the predictors of EI. For example, Kramer et al. (2011) believed that the dark triad had a positive effect on entrepreneurial innovation and achievement intentions. In addition, a high manifestation of the dark triad is related to the attractiveness of status and prestige, which might be reflected in entrepreneurial careers.

However, these empirical results and research conclusions are based on Western samples. Because China's innovation environment system is incomplete and there are large cultural differences with the West, if we use China's research samples for analysis, would doing so allow reaching a consistent conclusion? This question motivates our interest; thus, this study considers further exploration and verification in the context of China. Furthermore, studies suggest that the three members of the dark triad are distinguishable (Jonason and Webster, 2010). Other studies have argued that the relationship between the three members of the dark triad is moderately relevant, consistent, and mutually influential. Therefore, how do we treat the three members of the dark triad in the study? Should they be combined into one variable or interpreted as three independent variables to be analyzed separately (Adrian et al., 2013)? This question illustrates another issue that our study addresses.

In addition, the critical role of entrepreneurial self-efficacy (ESE) in entrepreneurial research has attracted the attention of scholars. ESE is a derivative concept of self-efficacy in the field of entrepreneurship (Chen et al., 1998). Entrepreneurship self-efficacy is defined as individuals' belief in their ability to successfully start a business (Mcgee et al., 2009). Previous research on ESE has focused on whether ESE has a mediating role between proactive personality and EI. For example, Wang et al. (2015) analyzed the relationship between personality traits, ESE and EI through research on 295 students from an agricultural college in Central Taiwan. The study found that ESE has a mediating effect on positive personality traits (e.g., extraversion, openness, conscientiousness, and agreeableness) and EI.

Existing studies have performed research work on the mediating of ESE and have achieved remarkable results. Nevertheless, because human personality is often multi-faceted and complex, it is limiting to analyze the role of ESE only from a proactive personality perspective. Therefore, our study attempts to introduce the dark triad, analyzes the influence of the dark triad on ESE, and explores the mediating effect of ESE on the dark triad and EI. In summary, considering the existing research gaps and practical needs, our study attempts to explore the effect of the dark triad (including narcissism, psychopathy, and Machiavellianism) on EI and to analyze the mediating role of ESE.

The theoretical contribution of this study is primarily reflected in three aspects. First, this study addresses the gap in China's research on EI and provides new insights into the relationship between the dark triad and EI. The influence of the dark triad on EI has obtained verifications and conclusions in the context of Western samples. However, in the Chinese context, there is a lack of corresponding research. Therefore, this study uses Chinese students as the sample objects to explore the relationship between the dark triad and EI. Second, this study explores its role in ESE and EI from the overall and local perspectives of the dark triad. This study uses the three members of the dark triad as a whole variable, but for comparison, they are included in the study as three independent predictors.

Through comparative analysis, this study more comprehensively analyzes the effect of the three members of the dark triad on EI. Third, this study explores the influence path of the dark triad on EI from the perspective of mediating effect and provides new research ideas, laying the foundation for future research. Previous studies have focused on the mediating role of ESE in positive personalities and on EI using positive personalities (such as the five-factor model of personality) as pre-variables (Wang et al., 2015). However, our study uses the dark triad as a pre-variable, further explores the effect of ESE on EI, and further explores the influence mechanism of the dark triad on EI.

The content of this paper includes four aspects. First, we review the literature, use the life history theory as the theoretical basis, and propose the hypotheses of this study to be tested. Second, we use multiple regression analysis and use the MBA students of Tianjin University as a sample to verify the hypotheses that have been advanced. Third, we analyze and discuss the results of the empirical analysis, compare them with those from previous studies, and conjecture possible reasons for inconsistent research findings. Fourth, combined with the findings of this study, we propose the theoretical contributions and practical implications, summarize limitations and point to future research directions.

Theoretical Background and Hypothesis Development

Dark Triad and EI

The dark triad is a socially malignant characteristic that is believed to be related to manipulative behaviors, selfishness, and exploitation (Jonason and Webster, 2010). From the perspective of social psychology, the dark triad is often considered unfavorable and abnormal (Do and Dadvari, 2017), but there is evidence that some dark-side traits might be beneficial in the business environment (Robie et al., 2008). Recent research has turned to the positive aspects of the dark triad.

Based on the life history theory, we try to understand the influence of the dark triad on EI. The theory holds that individuals choose behavioral strategies based on their environmental needs to maximize the likelihood of survival (Buss, 2009). If the future is uncertain and unpredictable, individuals with the dark triad often focus on meeting immediate needs and short-term relationships and adopting a fast-life strategy (Carter et al., 2015; Mannino and Faraci, 2017; Mannino et al., 2017). On the one hand, individuals with a high level of the dark triad are considered to adopt a fast-life strategy (Jonason et al., 2015), and they are more likely to try to initiate new venture creation (Hmieleski and Lerner, 2016). In other words, individuals high on the dark triad tend to regulate their behavior through fast-life styles, and they might choose to take risks such as creating start-ups (Jonason et al., 2010a). On the other hand, individuals with a high level of the dark triad are usually full of confidence, lack fear, disregard authority and the status quo, and adapt to operate in an unstructured and dynamic environment, which might make entrepreneurship an attractive career choice for these people (Jonason et al., 2010b).

Narcissism

The characteristics of narcissism are dominance, exhibitionism, and desire for sense of entitlement and superiority (Lee and Ashton, 2014). Compared with Machiavellianism and psychopathy, the highlighted contribution of narcissism to the dark triad is the feelings of entitlement and superiority toward others. Narcissists not only feel good about themselves but also feel that they are more worthy of respect from others (Jonason et al., 2013; Jones and Paulhus, 2014). Narcissists tend to be self-centered and constantly seek attention and admiration from others (Twenge et al., 2008), and they gain self-esteem, power, and status through the effective use of social relationships (Brunell et al., 2008). At the same time, narcissists lacks human values and desires to control others (Boddy, 2015), they are good at acquiring resources through their own charisma, letting other people adopt their plans (O'Reilly et al., 2014), and expecting others to accept their world view.

The influence of narcissism on EI is largely reflected in two aspects. On the one hand, narcissists tend to be leaders (or entrepreneurs). They usually have the ability to become dominant, a strong sense of control and grand self-awareness, and some qualities (e.g., charisma and strength) of narcissists overlap with the characteristics of leaders (O'Reilly et al., 2014). At the same time, entrepreneurship has become an admirable and individualized career choice that satisfies the psychological needs of narcissists, namely self-display and others' admiration. Thus, individuals high in narcissism can immediately become leaders through entrepreneurship to live the fast life (Hmieleski and Lerner, 2016). On the other hand, narcissistic individuals prefer adventures. Individuals high in narcissism usually focus on gaining achievement and power and are not afraid of failure. Moreover, risky behavior can bring greater benefits, so unlike non-narcissistic individuals, they are more inclined to take risks (Jones and Figueredo, 2013) or to make higher-risk financial investments (Foster et al., 2011). The traits of narcissists that tend to be risky are highly relevant to participating in nascent start-ups and following fast-life strategies (Buss, 2009). In short, individuals high in narcissism consider themselves clever and attractive, they constantly seek admiration and superiority, and they tend to find leadership positions in an organization (Campbell and Campbell, 2009) and gain greater benefits and achievements through risk. Because entrepreneurship can better satisfy these motivational needs of narcissists, entrepreneurship can attract narcissistic individuals more than other career options might (Mathieu and St-Jean, 2013).

Psychopathy

Psychopathy refers to the inability to perceive, understand, or address emotions due to lack of emotional intelligence and empathy. Its main features are manipulativeness, deception, ruthlessness, and the pursuit of high excitement and stimulation (Akhtar et al., 2013; Crysel et al., 2013). Although psychopathy has negative connotations, individuals high in psychopathy are fully capable of successfully operating in daily life. Psychopathy might even motivate entrepreneurial intent, and there are good reasons to believe that psychopathy can be an important predictor of EI.

First, psychopaths are troubled by feelings about emotions. This defect causes them to be insensitive to loss or risk, which reduces or eliminates the risk suppression associated with fear of failure (Morgan and Sisak, 2015); thus, psychopaths dare to take risks. Although they cannot experience emotional empathy, this limitation does not prevent them from understanding the factors that drive people (that is, cognitive empathy) and makes them very capable of using other people to achieve their goals (Jonason and Krause, 2013). Second, individuals high in psychopathy hate social norms and are willing to oppose the status quo (Mathieu et al., 2013). They are good at concentrating and performing well in uncertain situations and are often drawn to exciting activities. Individuals high in psychopathy can avoid reporting to other people through entrepreneurship (Rindova et al., 2009) and can form their own corporate culture and norms. Third, the performance of psychopaths can often be related to positive attributions (Akhtar et al., 2013). Psychopaths are considered smart, charming and interesting people, and there are more "successful" psychopaths in top management (Mullins-Sweatt et al., 2010; Boddy, 2015). Successful psychopaths tend to balance impulsiveness and antisocial behavior with a higher sense of responsibility, thus playing a fairly successful role in the organization (Mullins-Nelson et al., 2006; Fennimore, 2017). Therefore, being high in psychopathy may help individuals become attractive leaders in start-ups. In short, the above analysis suggests that entrepreneurship provides a suitable and consistent opportunity for psychopaths to satisfy their personality traits; thus, psychopathy might contribute to entry into entrepreneurship.

Machiavellianism

Machiavellianism is a self-interested, deceptive, strategic, and manipulative personality trait (Zettler et al., 2011; Al Ain et al., 2013). Compared with narcissism and psychopathy, individuals high in Machiavellianism usually follow their own purpose, they are constantly pursuing the maximization of interests and have strong desire to control others (Zheng et al., 2017). They devote less emotion in interaction, primarily self-care, and rarely consider consequences to the people around them (Zettler et al., 2011). And they lack affinity and responsibility and tend to use persuasion and self-disclosure (Liu, 2008). In general, strong persuasiveness can help motivate others toward certain desirable outcomes (Do and Dadvari, 2017). In addition, individuals high in Machiavellianism have the desire to control and pursue status (Dahling et al., 2008), preferring to manipulate and utilize others to realize personal interests (Zheng et al., 2017).

Perhaps based on the above characteristics, individuals with Machiavellianism might be inclined to start a business. First, individuals high in Machiavellianism emphasize that the ends justify the means and have a strong imperative for money, power, and competition (Zettler and Solga, 2013). These people adopt short-term strategies that require immediate satisfaction and that are closely related to a fast-life approach (Jonason et al., 2017). Entrepreneurship might be one of the best methods for them to achieve these goals, because if entrepreneurship is successful, they will soon gain significant wealth and power. Machiavellian entrepreneurs can use the potential benefits (e.g., employment and taxation) provided by start-ups to prove the reasonableness of suspicious competitive means and behaviors, which are manifestations of short-term views and fast-life approaches (Hmieleski and Lerner, 2016). Second, Machiavellians have strong adaptability and can hide their true intentions and prejudices against others. Entrepreneurs with this personality show better strategic capabilities when making decisions (Ricciardi et al., 2018). This ability is very favorable for entering the entrepreneurial environment, because entrepreneurship is uncertain and unpredictable. Entrepreneurs are required to have a certain strategic vision and appropriate response capabilities. Third, Machiavellians tend to manipulate and use any necessary means to achieve their goals (Al Ain et al., 2013). They might make unethical decisions, and even win at the expense of others (Buckels et al., 2013). However, these behaviors can be useful in a new entrepreneurial environment (Klotz and Neubaum, 2016). Therefore, we propose the following:

H1: Dark triad has a significantly positive effect on EI.
H1a: Narcissism has a significantly positive effect on EI.
H1b: Psychopathy has a significantly positive effect on EI.
H1c: Machiavellianism has a significant positive effect on EI.

Dark Triad and ESE

The relationship between the dark triad and ESE has only received the attention and research of a few scholars. The dark triad is composed of three members (narcissism, psychopathy, and Machiavellianism), so we try to propose hypotheses from the overall and local perspectives of the dark triad. From the overall perspective of the dark triad, its three members are malicious mentalities or behaviors largely embodied in personal interests, aggressiveness, grandiosity, and callousness (Mcdonald et al., 2012). Some scholars have found that most entrepreneurs are characterized by manipulation, lack of compassion and obsession with status, which are very compatible with the characteristics of the dark triad. The scholars believe that these traits can play a vital role in self-efficacy (Zhao et al., 2010). Combining the above analysis of personality traits, we believe that these personality traits can enhance the belief that individuals with the dark triad would start a business in the future.

From the local perspective of the dark triad, narcissism emphasizes a high degree of self-recognition and desire to be concerned, although with some blind self-confidence, and highly narcissistic managers are good at creating and seizing opportunities (Do and Dadvari, 2017). Psychopathy is more manifested as indifference and low sensitivity to risk, but psychopaths can gain high social status and are considered smart, attractive and more efficient (Brunell et al., 2008). Machiavellianism is largely embodied in a strong desire for control and achievement, and individuals with high Machiavellianism are results-oriented and firmly pursue their goals (Zettler et al., 2011). Existing academic research has supported this view from a certain perspective. The researchers believe that entrepreneurs can be narcissistic and psychopathic, or they exhibit strong self-efficacy beliefs related to these personality traits (Marshall and Ojiako, 2015). The following

sections demonstrate the relationship between the three members of the dark triad and ESE.

Narcissism

The main feature of narcissism is a sense of grandiosity, self-love and an expansive self-view (Foster and Campbell, 2007). Individuals with high levels of narcissism tend to have a high degree of self-recognition, are eager to receive attention, and are very good at creating and seizing opportunities (Do and Dadvari, 2017). Moreover, people high in narcissism have a strong motivation to pursue personal goals and are eager to self-improve and seek attention (O'Boyle, 2012). Generally speaking, narcissistic individuals have a full view of their abilities (Campbell et al., 2011); even when faced with opposing facts, it appears that individuals with high levels of narcissism believe they can do better than others will in the future (Mathieu and St-Jean, 2013). These qualities of narcissism encourage narcissists to have a higher confidence and belief in making something for themselves. For example, Brookes (2015) indicates that people with a higher level of narcissism tend to have a higher level of trust in their ability to achieve their goals, significantly promoting and actively predicting self-efficacy.

Psychopathy

Psychopathy is primarily characterized by deception, ruthlessness and a quest for stimuli (Crysel et al., 2013). Psychopathic people manifested more as being indifferent to others and less sensitive to risks, but they often gain high social status and are considered smart, attractive and more efficient (Do and Dadvari, 2017). On the one hand, psychopathic people have a certain maneuverability and ability to deceive, which helps them to achieve their goals through the ability and resources of others and can contribute to raise their belief in their ability to achieve entrepreneurial goals in the future. On the other hand, psychopathic people are less sensitive to risk (that is, even when they face the same risk, their perceived risk will be lower than it is to others). When facing an entrepreneurial environment full of uncertainty and risk, they are able to conduct objective analysis and address risk situations more calmly. These characteristics would enhance their ability to resolve entrepreneurial risks to a certain extent and improve their confidence in creating businesses in the future. In fact, psychopathic people can anticipate entrepreneurial careers that experience less debilitating anxiety and have a higher likelihood of obtaining positive returns, resulting in greater self-efficacy (Zhao et al., 2005). They are likely to weaken their concerns about their entrepreneurial career and have a stronger sense of control over the outcome. At the same time, they expect to receive positive returns and thus possess higher self-efficacy.

Machiavellianism

The main characteristics of Machiavellianism are the promotion of self-interest, deception, strategy and maneuverability (Al Ain et al., 2013). Individuals with high levels of Machiavellianism primarily show a strong desire for control and achievement, and they have a high degree of result orientation and of firm determination to pursue goals. On the one hand, individuals with Machiavellianism have a strong desire to control and a desire to pursue status (Dahling et al., 2008), preferring to use opportunities to maximize their own interests (Liu, 2008). They can adopt disreputable methods to achieve goals or maximize their own interests (Do and Dadvari, 2017). For example, they can use deceptive persuasion to guide and motivate others to the results they expect. This trait might raise the likelihood that individuals with Machiavellian would achieve their entrepreneurial goals. On the other hand, individuals with Machiavellianism generally have a higher demand for achievement. Individuals with higher achievement needs prefer to solve problems independently, like to take acceptable risks, and have a strong interest in the results of their efforts or decisions (Sesen, 2013). Moreover, greater demand for achievement will motivate individuals to courageously cope with challenging situations and pursue excellence (Sesen, 2013). To a certain extent, achievement needs could become a powerful driving force and an important belief for individuals with Machiavellianism. In other words, achievement needs are significantly positively correlated with ESE.

H2: Dark triad has a significantly positive effect on ESE.
H2a: Narcissism has a significantly positive effect on ESE.
H2b: Psychopathy has a significantly positive effect on ESE.
H2c: Machiavellianism has a significant positive effect on ESE.

Mediating of ESE

The theory of planned behavior is an important theoretical basis for demonstrating the relationship between ESE and EI. The theory of planned behavior assumes that the intent of a particular target behavior depends upon perception (Prabhu et al., 2012). This type of perception in an entrepreneurial context includes a perception of one's own skills and abilities, an attitude toward entrepreneurship, and a belief in starting a business in the future. In other words, the theory of planned behavior argues that attitudes, subjective norms, and perceptual control (self-efficacy) predict EI. In essence, ESE is primarily reflected in the recognition and perception of opportunities. When individuals have high opportunity recognition skills, they are more confident in perceived business opportunities and more accurately locate the products and services that consumers need; thus, they have stronger EI.

In fact, some studies have explored the relationship between ESE and EI through different perspectives and different samples. For example, Pittaway et al. (2011) studied self-efficacy in entrepreneurial situations and found that individuals have the belief that they can start a business when they have a high level of ESE. The research fully demonstrates that self-efficacy can predict an individual's intention to start a new business.

Combining the arguments of Hypothesis 1 and Hypothesis 2 and the above analysis, we believe that the dark triad not only directly affects EI but also indirectly affects EI through ESE. Specifically, on the one hand, individuals with high levels of dark triad can have higher EI because they usually have a high appetite for risk and are keen to challenge uncertainty and risk in the field of entrepreneurship. More importantly, individuals with higher dark triad are confident in completing their business in the future and are good at debating and manipulating to achieve

their entrepreneurial goals. On the other hand, individuals with high levels of dark triad usually have higher self-efficacy in entrepreneurship and further promote EI. Individuals with a high level of dark triad have a high degree of recognition for themselves and are eager to complete difficult and challenging things to receive attention. At the same time, their low sensitivity to risk motivates them to cope with risks in their entrepreneurial ventures. Their strong desire for control and achievement also motivate them to have a firm belief in starting a business in the future. Furthermore, these firm beliefs and high affirmation of themselves help to stimulate the creation of EI. Similarly, the three members of the dark triad also have direct and indirect effects on EI. Therefore, in our research model, we try to view ESE as the mediating mechanism linking the dark triad (including the three members of the dark triad) with EI.

H3: ESE will mediate the relationship between the dark triad and EI.
H3a: ESE will mediate the relationship between narcissism **and EI.**
H3b: ESE will mediate the relationship between psychopathy **and EI.**
H3c: ESE will mediate the relationship between Machiavellianism **and EI.**

MATERIALS AND METHODS

Data Collection and Sample

This study conducted anonymous surveys on the dark triad, ESE, and EI of the MBA students at Tianjin University through a questionnaire survey. Multiple regression analysis was used to test whether the hypotheses were established. The reason for using this group as a sample for research is primarily based on (Hmieleski and Lerner, 2016). They believe that it is appropriate to use students studying business management as a sample to study the dark triad and EI because they represent business-oriented people generally. Moreover, they believe that doing so is unlikely to show omitted variable bias and endogeneity threats.

Questionnaire Design and Pilot Survey

A preliminary questionnaire was formed based on the existing mature scale. This study measures the dark triad, ESE, and EI. Given that each construct has been measured with a mature and validated scale, we adjust and integrate these mature scales as a final questionnaire for the study. Prior to the formal investigation, we randomly selected 20 volunteers to complete pre-test questionnaires. Based on their feedback and combined with the language expression habits in the Chinese context, the final questionnaire was established; it included 21 questions. The study and those questions did not involve any potential risks for participants. In this study, a seven-point Likert scale was used for the measurement of each item, ranging from 1 to 7, with "one" indicating that they "highly disagree" and "seven" indicating that they "highly agree."

Sampling and Subjects

First, we selected the study sample. We obtained a list of all students who are currently enrolled in the MBA Education Center of Tianjin University, totaling 600 students. According to different grades, we selected 420 students as the subjects of the questionnaire survey through stratified sampling. Second, we performed data collection. The data collection was largely concentrated in the period from May 15 to June 5, 2018. Trained researchers informed participants that participation was voluntary and anonymous, and that the data collected were protected by applicable laws. Researchers distributed questionnaires and collected them during the students' free time to ensure the quality of the answers to the questionnaire. Third, we initially screened and organized the data. A total of 402 questionnaires were returned and the participation rate is 95.71%. After eliminating 69 questionnaires that were incomplete and invalid, the final sample consisted of 334 valid questionnaires, with an effective rate of 83.08%. Among the valid questionnaires, 163 (48.80%) were completed by males and 171 (51.20%) by females. The age range is 24 to 47 years old, the mean age is 31.02, and the standard deviation (SD) is 4.088; 183 (54.79%) are married, and 151 (45.21%) are unmarried. Individuals whose relatives own businesses number 92 (27.54%), whereas 242 (72.46%) individuals have no relatives who own their own business.

Measurement

Table 1 presents the measurement items for each construct. The items include narcissism, psychopathy, Machiavellianism, ESE, and EI.

Dark Triad

This study used the Dark Triad Dirty Dozen scale developed by Jonason and Webster (2010) to measure dark personality. The measurement scale consists of 12 items, and each personality characteristic of the dark triad is measured by four items. Based on the traits of narcissism (e.g., eager to be appreciated and expected to receive attention), the items for measuring narcissism include, for example, "I tend to want others to admire me," and "I tend to want others to pay attention to me." According to the prominent features of psychopathy, such as indifference and cynicism, the items that measure psychopathy include, for example, "I tend to lack remorse," and "I tend to be unconcerned with the morality of my actions." Combining the essential features of Machiavellianism, such as manipulating others and deceitfulness, measuring Machiavellianism's items include, for example, "I have used deceit or lied to get my way," and "I tend to manipulate others to get my way." We use the arithmetic average of the four items for measuring narcissism, psychopathy, and Machiavellianism, respectively, as the final score of each construct. The higher the score is, the more prominent the corresponding personality characteristics are. Similarly, we use the arithmetic average of 12 items as the final score of the dark triad, and the higher the score, the higher is the level of the dark triad.

TABLE 1 | Measurement items and reliabilities.

Variables		Items	Factor loading	Alpha
The dark triad	Narcissism	I tend to want others to admire me.	0.704	0.801
		I tend to seek prestige or status.	0.742	
		I tend to expect special favors from others.	0.859	
		I tend to want others to pay attention to me.	0.860	
	Psychopathy	I tend to be callous or insensitive.	0.817	0.799
		I tend to be unconcerned with the morality of my actions.	0.855	
		I tend to lack remorse.	0.866	
		I tend to be cynical.	0.613	
	Machiavellianism	I tend to manipulate others to get my way.	0.704	0.823
		I have used deceit or lied to get my way.	0.845	
		I have used flattery to get my way.	0.850	
		I tend to exploit others toward my own end.	0.833	
Entrepreneurial self-efficacy		I am convinced that I can successfully discover new business opportunities.	0.919	0.921
		I am convinced that I can successfully create new products.	0.923	
		I am convinced that I can think creatively.	0.875	
		I am convinced that I can successfully commercialize ideas.	0.879	
Entrepreneurial intention		I am ready to do anything to be an entrepreneur.	0.829	0.937
		My professional goal is to become an entrepreneur.	0.878	
		I will make every effort to start and run my own firm.	0.923	
		I am determined to create a firm in the future.	0.920	
		I have the firm intention to start a firm someday.	0.914	

This study measures all items with a seven-point Likert scale.

Entrepreneurial Self-Efficacy

We used the scale of Zhao et al. (2005) to measure ESE. ESE is a subjective measure of entrepreneurs' ability to successfully accomplish something or achieve a certain goal in the future—for example, "I am convinced that I can successfully discover new business opportunities," and "I am convinced that I can successfully create new products." Calculating the arithmetic mean of the four items yields the final ESE score. A higher score indicates that the degree of ESE is higher.

Entrepreneurial Intention

For the measurement of EI, we use the measurement items developed by Liñán and Chen (2009), and the items have been verified. The measurement of entrepreneurial intent consists of five items that evaluate whether the research object has an intention to start a business—for example, "I will make every effort to start and run my own firm," and "I am determined to create a firm in the future." We calculate the arithmetic average for each item, and the higher the score, the more intense the EI.

Control Variable

Following existing studies on the factors that can affect EI combined with the study of Hmieleski and Lerner (2016), this study selects age, gender, marital status, and whether the family has an enterprise as a control variable. Older students usually have more work experience and broader social connections, which might cause them to consider starting their own business (Kautonen et al., 2015). With respect to existing studies, compared with women, men are more likely to start a business (Gupta et al., 2008). Given that entrepreneurship tends to have higher risks, married individuals might have a relatively low intention to start a business (Schiller and Crewson, 1997). The family environment usually has significant effects on individuals; therefore, if an individual's relative owns a business, that individual might be more inclined to consider starting a business (Carr and Sequeira, 2007).

Reliability and Validity

Through reliability analysis, we find that the Cronbach's alpha coefficients of all constructs in this study are greater than 0.70 (as shown in **Table 1**), indicating that each construct's measurement results showed good consistency (Cronbach, 1951). At the same time, these results show that the theoretical structure has good psychometric characteristics and meets the requirements of reliable internal consistency.

Based on factor analysis, a factor loading greater than 0.70 indicates that approximately one-half of the item's variance can be attributed to constructs, which is a sign of construct validity (Fornell and Larcker, 1981). In this study, the factor loadings of the items are greater than 0.7 except for one item (as shown in **Table 1**), which fully demonstrates that the relationship between the items and the constructs is closer and that the questionnaire conforms to the aggregation validity requirement. In short, the reliability and validity of the overall questionnaire meet the requirements for further research.

RESULTS

Based on the Pearson correlation analysis, **Table 2** presents descriptive statistics and correlations for variables. Observation shows that there is a significant correlation between the

TABLE 2 | Mean, standard deviation, and correlation of study variable.

	Mean	*SD*	1	2	3	4	5	6	7	8	9
(1) Sex	1.510	0.501	1								
(2) Age	31.020	4.088	−0.195**	1							
(3) Married	1.450	0.498	0.213**	−0.478**	1						
(4) Family business	1.720	0.447	0.001	−0.168**	0.075	1					
(5) Narcissism	4.500	1.282	−0.200**	−0.058	−0.047	−0.076	1				
(6) Psychopathy	2.939	1.424	−0.143**	−0.160**	0.057	0.007	0.433**	1			
(7) Machiavellianism	3.180	1.452	−0.151**	−0.072	−0.018	−0.082	0.552**	0.756**	1		
(8) ESE	4.779	1.265	−0.199**	0.156**	−0.103	−0.205**	0.025	0.097	0.251**	1	
(9) EI	4.335	1.628	−0.200**	0.222**	−0.183**	−0.193**	0.058	0.166**	0.333**	0.680**	1

*N = 334. **$p < 0.01$.*

variables. The causal relationship between them will be verified through hierarchical regression analysis. At the same time, we note that the correlation coefficient between variables is less than 0.75 except for one, which can avoid the problem of multicollinearity to some extent.

This section verifies each hypothesis through multiple regression analysis. When we formally test the hypothesis, we must use the variance inflation factor (VIF) to examine the possibility of multicollinearity. The results show that the maximum VIF value is 3.004, well below the threshold of 10; thus, there is no obvious multicollinearity problem (Neter et al., 1996). **Table 3** presents the causal relationships among the dark triad, ESE, and EI.

The first hypothesis predicts that the dark triad (H1) and the three personality traits of the dark triad, i.e., narcissism (H1a), psychopathy (H1b), and Machiavellianism (H1c), all have a significantly positive relationship to EI. Model 4 is used to verify the relationship between the dark triad and EI. In this model, we use EI as the dependent variable and use the dark triad as the independent variable. The results show that the dark triad has a significantly positive effect on EI ($\beta = 0.290$, $p < 0.001$); thus, H1 is verified. Model 3 is used to verify the relationship between the three personality traits of the dark triad and the EI. The model uses EI as the dependent variable and narcissism, psychopathy, and Machiavellianism as the independent variables. The results show that there is a significantly negative correlation between narcissism and EI ($\beta = -0.256$, $p < 0.001$), and there is a significantly negative correlation between psychopathy and EI ($\beta = -0.166$, $p < 0.1$). However, there is a significantly positive correlation between Machiavellianism and EI ($\beta = 0.595$, $p < 0.001$); therefore, H1c is supported, but H1a and H1b are not supported.

The second hypothesis predicts that the dark triad (H2) and the three personality traits of the dark triad, i.e., narcissism (H2a), psychopathy (H2b), and Machiavellianism (H2c), all have a significantly positive relationship to ESE. Model 2 is used to verify the relationship between the dark triad and ESE. The regression results show that there is a significantly positive correlation between the dark triad and ESE ($\beta = 0.129$, $p < 0.05$); therefore, H2 was verified. Model 1 was used to verify the relationship between the three personality traits of the dark triad and ESE. In this model, we use ESE as a dependent variable, and narcissism, psychopathy and Machiavellianism are used as independent variables. The results show that there is a significantly negative correlation between narcissism and ESE ($\beta = -0.199$, $p < 0.001$), and there is a significantly negative correlation between psychopathy and ESE ($\beta = -0.145$, $p < 0.05$). Machiavellianism is significantly positively correlated with ESE ($\beta = 0.392$, $p < 0.001$); thus, H2c was supported, but H2a and H2b are not supported. In other words, the higher the level of narcissism and psychopathy, the lower is the ESE, possibly because in the context of China, due to cultural differences, differences in value concepts, and differences in the entrepreneurial environment, the findings of this study are different from the existing conclusions.

The third hypothesis predicts that ESE has a mediating effect on the dark triad and EI (H3). At the same time, ESE has a mediating effect on narcissism and EI (H3a), ESE has a mediating effect on psychopathy and EI (H3b), and ESE has a mediating effect on Machiavellianism and EI (H3c). Models 2, 4, 5, and 7 jointly verify the mediating effects of ESE on the dark triad and EI. Model 7 uses the dark triad and ESE as independent variables and EI as a dependent variable. Models 2, 4, and 5 show that ESE has a mediating effect on the dark triad and EI. Models 4 and 7 show that ESE has a partial mediating effect on the dark triad and EI; therefore, H3 is supported. Models 1, 3, 5, and 6 jointly verify the mediating effects of ESE on the three personality traits of the dark triad and EI. Among these models, Model 6 uses ESE as a dependent variable and narcissism, psychopathy and Machiavellianism as independent variables. Models 1, 3, and 5 show that ESE has a mediating effect on the three personality traits of the dark triad and EI. Models 3 and 6 show that ESE has a partial mediating effect on narcissism and EI. Self-efficacy has a completely mediating effect on psychopathy and EI. ESE has a partial mediating effect on Machiavellianism and EI. Therefore, H3c is supported, but H3a and H3b are not supported. The assumption predicts that narcissism and psychopathy will positively affect ESE and thus promote EI, but the results show that narcissism and psychopathy negatively affect ESE, thereby inhibiting EI. In other words, although ESE has a mediating role between narcissism/psychopathy and EI, there is a negative

TABLE 3 | Results of multiple regression analysis.

	ESE		EI				
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**
Sex	−0.457***	−0.394**	−0.443**	−0.351*	−0.116	−0.098	−0.032
Age	0.029	0.035^{+}	0.058*	0.067**	0.028	0.036*	0.039*
Married	0.021	0.016	−0.204	−0.212	−0.239	−0.221	−0.224
Family business	−0.463**	−0.494***	−0.512**	−0.556**	−0.186	−0.163	−0.155
Dark triad		0.129*		0.290***			0.185***
Narcissism	−0.199***		−0.256***			−0.106^{+}	
Psychopathy	−0.145*		−0.166^{+}			−0.057	
Machiavellianism	0.392***		0.595***			0.299***	
ESE					0.832***	0.755***	0.810***
R^2	0.173	0.100	0.239	0.147	0.491	0.527	0.508
ΔR^2	0.155	0.086	0.223	0.133	0.483	0.515	0.499
F-Statistic	9.481***	7.069***	14.259***	10.977***	61.525***	44.021***	54.686***
Durbin–Watson statistic	1.762	1.752	1.847	1.860	2.172	2.131	2.154

N = 334. $^{+}p < 0.10$; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

conduction relationship between them; therefore, H3a and H3b are considered not supported.

Based on the research review of Smith et al. (2018), he emphasized that exploring the non-linear effects in dark triad has important theoretical value. Therefore, this paper attempts to expand research and analyze the non-linear relationship between the dark triad and EI in the field of entrepreneurial research (as shown in **Table 4**). We are pleasantly surprised to find that the square of narcissism has a significant positive impact on EI ($\beta = 0.098$, $p < 0.01$), that is, narcissism and EI is a U-shaped relationship, and the relationship between psychopathy and EI is a U shape ($\beta = 0.069$, $p < 0.033$). In other words, with the improvement of psychopathy/narcissism level, EI would gradually weaker, but when it exceeds a certain threshold, EI would gradually increase. This research did not find a non-linear relationship between Machiavellianism and EI ($\beta = 0.038$, $p < 0.241$).

DISCUSSION

Research on the relationship between the dark triad and EI has been verified and discussed by Western scholars. However, personality is influenced by culture and environment. In the Chinese context, almost no studies analyze the relationship between the dark triad and EI. Our research conclusions show that there are similarities between the dark triad and EI in the context of Eastern and Western cultures, but there are also great differences and inconsistencies. This section discusses these points in detail in terms of the following aspects.

TABLE 4 | Examining the non-linear relationship between the dark triad and entrepreneurial intention.

	EI			
	Model 8	**Model 9**	**Model 10**	**Model 11**
Sex	−0.443**	−0.427*	−0.438**	−0.447**
Age	0.058*	0.050*	0.060**	0.059*
Married	−0.204	−0.234	−0.194	−0.194
Family business	−0.512**	−0.532**	−0.492**	−0.503**
Narcissism	−0.256***	−1.089***	−0.248***	−0.252***
Psychopathy	−0.166^{+}	−0.165^{+}	−0.635**	−0.181*
Machiavellianism	0.595***	0.586***	0.567***	0.328
Narcissism—quadratic effect		0.098**		
Psychopathy—quadratic effect			0.069*	
Machiavellianism—quadratic effect				0.038
R^2	0.239	0.255	0.250	0.243
ΔR^2	0.223	0.237	0.231	0.224
F-Statistic	14.259***	13.548***	13.191***	12.664***
Durbin–Watson statistic	1.847	1.850	1.849	1.849

N = 334. $^{+}p < 0.10$; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

Some of this study's findings are consistent with those found in Western scholars' mainstream research. The dark triad has a significantly positive relationship with EI, which is consistent with the existing academic views in the West (Jonason et al., 2010b; Smith et al., 2018). The results prove that the dark triad has a certain predictive effect on EI. Although the dark triad is a socially malignant feature that is often thought to be related to manipulability and deception (Jonason and Webster, 2010), the dark triad might be advantageous in a business environment. Based on the life history theory, individuals with a high level of dark triad traits will be more inclined to choose a fast-life strategy and be better at taking risks (Jonason et al., 2015). Moreover, people with dark triad traits often lack a fear of risk, despise authority, and are good at operating successfully in an unpredictable environment. Thus, entrepreneurship could become the most attractive career choice for these people (Jonason et al., 2010b).

More importantly, other findings in this study differ from the conclusions in Western mainstream studies. The mainstream research of Western scholars indicates a positive correlation between narcissism and EI (Hmieleski and Lerner, 2016); that is, individuals with higher levels of narcissism are more likely to take risks (Mathieu and St-Jean, 2013) and have higher EI. There is a positive correlation between psychopathy and EI (Kramer et al., 2011), or there is no significant relationship (Hmieleski and Lerner, 2016); Western scholars found that there is no significant correlation between Machiavellianism and EI through empirical research (Kramer et al., 2011; Hmieleski and Lerner, 2016). However, this study found that narcissism/ psychopathy negatively affects EI. In other words, the higher the level of the individual's narcissism and psychopathy, the lower the EI is. In addition, previous studies have shown that narcissism (Brookes, 2015) and psychopathy (Zhao et al., 2005) have a positive effect on ESE. The conclusion of this study is the opposite: narcissism/psychopathy and ESE have a significantly negative relationship.

Based on preliminary conjecture, we believe that these discrepancies might be due to differences in ethnic characteristics, differences in culture (or values) (Shinnar et al., 2012), and differences in the entrepreneurial environment (primarily entrepreneurial education) (Bae et al., 2014). First, in terms of ethnic characteristics, Chinese are more reserved and implicit, tend to rely on groups, and pursue stability. However, Westerners are more outward going, tend to be independent and free, and show strong aggressiveness. Second, in terms of cultural differences (or values), Chinese focus more on collective interests and advocate controlling their own desires. They oppose extreme individualism and heroism and often make personal interests subordinate to collective interests. In contrast, Westerners advocate personal will. They want to be appreciated and admired by others and have a strong desire to conquer. Third, in terms of entrepreneurial environment, China remains in the initial stages of creating an entrepreneurial environment. The relevant supporting business mechanisms and systems remain imperfect. Entrepreneurship education remains at the stage of exploration. However, Western countries have relatively perfect entrepreneurial support mechanisms and have a good entrepreneurial environment and atmosphere. These factors would more or less make the Chinese people's EI lower, even when individuals show higher levels of narcissism and psychopathy.

CONCLUSION

Research Implications

The theoretical contribution of this study is largely reflected in three aspects. First, our study provides new insights into the relationship between the dark triad and EI in the Chinese context. Existing research findings show that the dark triad has a positive predictive effect on EI (Jonason et al., 2010a), and narcissism and psychopathy are both positive predictors of EI (Kramer et al., 2011; Hmieleski and Lerner, 2016). However, we found that although the dark triad has a positive predictive effect on EI, there is a significantly negative correlation between narcissism/psychopathy and EI in the Chinese context. We also found an interesting conclusion that narcissism/psychopathy and EI is a U-shaped relationship, which is the first time to analyze the non-linear relationship between the dark triad and EI through empirical research. In addition, existing studies have found that Machiavellianism has no significant effect on EI (Kramer et al., 2011; Hmieleski and Lerner, 2016), but we found that Machiavellianism has a significantly positive correlation with EI. In short, there is a certain difference between the findings of this study and the existing Western research conclusions. This study provides new insights for existing research and lays the foundation for further research.

Second, our study explores the roles of the dark triad on ESE and EI from the overall and local perspectives of the dark triad, which expands and enriches the existing research dimensions and research framework. This study uses the three members of the dark triad as a whole variable, and for comparison, they are included in the study as three independent predictors. Based on a comparative analysis, this study more comprehensively analyzes the effect of the three members of the dark triad on EI.

Third, our study explores the influence mechanism of the dark triad on EI through the perspective of mediating effect and addresses the gaps in existing research. Previous studies have focused on the mediating role of ESE in positive personalities and EI, using positive personalities (such as the five-factor model of personality) as pre-variables (Wang et al., 2015). However, our study uses the dark triad as a pre-variable, further explores the effect of ESE on EI, and further explores the influence mechanism of the dark triad on EI. The study finds that ESE has a mediating effect on the dark triad and EI. This study provides new ideas and perspectives for follow-up research.

Implications for Practice

Our research findings have provided potential implications for business schools to conduct entrepreneurship education and government departments to build entrepreneurial systems. First, when conducting entrepreneurship education,

business-school teachers should not only notice students' proactive personalities but also focus on the understanding of students' dark triad. The predictive effect of proactive personality on EI has been widely confirmed; the positive influence of the dark triad on EI has also received increasing attention. Therefore, in the specific practice, business-school teachers should teach students in accordance with their aptitude based on mastering their personality characteristics. In other words, according to the students' personality traits, business-school teachers should formulate targeted entrepreneurship education programs, thereby giving full play to students' personality advantages in entrepreneurship and innovation.

Second, in the Chinese context, business-school teachers should conduct appropriate intervention and guidance for students with a high level of the dark triad. From the overall characteristics of the dark triad, individuals with a dark triad are more inclined to start a business. Business-school teachers should give special attention to these students and provide entrepreneurial encouragement and assistance when they can. Because they are less fearful than ordinary students are and tend to take risks, they have more intense EI. Most importantly, they dare to use entrepreneurship as their career choice. Based on the local characteristics of the dark triad, if students are high in narcissism and psychopathy, business-school teachers should use certain measures and education methods to intervene and to reduce their level of narcissism and psychopathy, which will help to enhance their EI.

Third, when undertaking entrepreneurship education and building an entrepreneurial system, relevant departments must combine Chinese cultural characteristics and environmental characteristics. In view of the great differences between the findings of this study and the Western mainstream research conclusions, we preliminarily speculated that these differences are due to cultural differences and differences in values. Thus, business-school teachers should consider the differences between Eastern and Western cultures when conducting entrepreneurship education and combine the personality traits of local students to teach them in accordance with their aptitude. At the same time, the relevant government departments should fully integrate the Chinese cultural tradition and characteristics when constructing the entrepreneurial system and give full play to the promotion and leading role of the entrepreneurial system to potential entrepreneurs.

Limitations and Suggestions for Future Research

We now summarize a few limitations of the current study and provide suggestions for future research. First, the findings of our study are different from those of existing studies. However, the factors behind these differences have not been explored. The findings of this study are different from the Western research findings. We tentatively believe that these differences might be due to differences in the research context (e.g., our study is primarily based on the Chinese context) and sample selection. We suspect that these differences might be due to differences in ethnic characteristics, cultural differences (or values), and differences in the entrepreneurial environment (e.g., entrepreneurial education). However, due to the limited purpose of our study, we did not discuss the reasons behind the differences in detail. Therefore, future research might further explore the key factors that lead to the differences by conducting horizontal comparative analysis of the East–West samples.

Second, our study did not consider the effect of the combination of proactive personality and the dark triad on EI. Existing studies not only find that a proactive personality has an important influence on EI but also show that the dark triad has important effects on EI. Because individuals often have complex personality dimensions, to more fully explore the influencing factors of personality traits on EI, future research might consider introducing proactive personality and the dark triad into the research model at the same time to analyze their interaction (Smith et al., 2018) and explore their effect on EI.

Third, the measurement method adopted in this study have displayed adequate psychometric properties in existing research, but self-report questionnaires can cause the research results to be affected by common method variance (Do and Dadvari, 2017), social desirability and cultural bias (Granieri et al., 2017). Our study controls the effect of common method variance by adjusting the order of items in the questionnaire and reducing the research object's guess concerning the purpose of the measurement. Moreover, the study's low-stakes setting is sufficient to overcome the problem of faking-good (i.e., participants have no incentive to falsify their response) (Akhtar et al., 2013). In addition, considering time perception has important influence on human behavior and choice (Mannino and Caronia, 2017; Mannino et al., 2017), future studies might consider measuring at different time points (e.g., re-answering the same question at intervals). Future studies also can try different methods of collecting data on the same research object (e.g., online questionnaires, offline scales, and interviews). Especially for the measurement of psychopathy, due to psychopaths use manipulation, the use of a structured or semi-structured interview (e.g., PCL-R) is more adequate. Therefore, future studies can adopt the above measures to more objectively and comprehensively reflect the personality characteristics of the surveyed people in future studies, thus providing more-powerful support for the research results.

Fourthly, this study only involves MBA students from Tianjin University as volunteers to participate in the survey, which limits the generalizability of the results. Future studies ought to expand the sample to study individuals in different cultural backgrounds. In addition, Hare believes that the clinical concept of psychopathy is far more salient and robust than many researchers have imagined (Hare, 1980). Therefore, inspired by the research methods of Lo Coco et al. (2018), future research can analyze the influence mechanism of dark triad (Machiavellianism, psychopathy, narcissism) on EI through comparative analysis of clinical group samples and non-clinical group samples.

ETHICS STATEMENT

Ethics approval for this research was not required as per institutional and national guidelines. Consent from all research participants was obtained by virtue of survey completion.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

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REFERENCES

Adrian, F., Richards, S. C., and Paulhus, D. L. (2013). The dark triad of personality: a 10year review. *Soc. Personal. Psychol. Compass* 7, 199–216. doi: 10.1111/spc3.12018

Akhtar, R., Ahmetoglu, G., and Chamorro-Premuzic, T. (2013). Greed is good? Assessing the relationship between entrepreneurship and subclinical psychopathy. *Pers. Individ. Dif.* 54, 420–425. doi: 10.1016/j.paid.2012.10.013

Al Ain, S., Carre, A., Fantini-Hauwel, C., Baudouin, J. Y., and Besche-Richard, C. (2013). What is the emotional core of the multidimensional Machiavellian personality trait? *Front. Psychol.* 4:454. doi: 10.3389/fpsyg.2013.00454

Bae, T. J., Qian, S., Miao, C., and Fiet, J. O. (2014). The relationship between entrepreneurship education and entrepreneurial intentions: a meta-analytic review. *Entrep. Theory Pract.* 38, 217–254. doi: 10.1111/etap.12095

Boddy, C. R. (2015). Organisational psychopaths: a ten year update. *Manag. Decis.* 53, 2407–2432. doi: 10.1108/MD-04-2015-0114

Brookes, J. (2015). The effect of overt and covert narcissism on self-esteem and self-efficacy beyond self-esteem. *Pers. Individ. Dif.* 85, 172–175. doi: 10.1016/j.paid.2015.05.013

Brunell, A. B., Gentry, W. A., Campbell, W. K., Hoffman, B. J., Kuhnert, K. W., and Demarree, K. G. (2008). Leader emergence: the case of the narcissistic leader. *Pers. Soc. Psychol. Bull.* 34, 1663–1676. doi: 10.1177/0146167208324101

Buckels, E. E., Jones, D. N., and Paulhus, D. L. (2013). Behavioral confirmation of everyday sadism. *Psychol. Sci.* 24, 2201–2209. doi: 10.1177/0956797613490749

Buss, D. M. (2009). How can evolutionary psychology successfully explain personality and individual differences? *Perspect. Psychol. Sci.* 4, 359–366. doi: 10.1111/j.1745-6924.2009.01138.x

Campbell, W. K., and Campbell, S. M. (2009). On the self-regulatory dynamics created by the particular benefits and costs of narcissism: a contextual reinforcement model and examination of leadership. *Self Identity* 8, 214–232. doi: 10.1080/15298860802505129

Campbell, W. K., Hoffman, B. J., Campbell, S. M., and Marchisio, G. (2011). Narcissism in organizational contexts. *Hum. Resour. Manage. Rev.* 21, 268–284. doi: 10.1016/j.hrmr.2010.10.007

Carr, J. C., and Sequeira, J. M. (2007). Prior family business exposure as intergenerational influence and entrepreneurial intent: a theory of planned behavior approach. *J. Bus. Res.* 60, 1090–1098. doi: 10.1016/j.jbusres.2006.12.016

Carter, G. L., Campbell, A. C., Muncer, S., and Carter, K. A. (2015). A Mokken analysis of the Dark Triad 'Dirty Dozen': sex and age differences in scale structures, and issues with individual items. *Pers. Individ. Dif.* 83, 185–191. doi: 10.1016/j.paid.2015.04.012

Chen, C. C., Greene, P. G., and Crick, A. (1998). Does entrepreneurial self-efficacy distinguish entrepreneurs from managers? *J. Bus. Ventur.* 13, 295–316. doi: 10.1016/S0883-9026(97)00029-3

Craparo, G., Schimmenti, A., and Caretti, V. (2013). Traumatic experiences in childhood and psychopathy: a study on a sample of violent offenders from Italy. *Eur. J. Psychotraumatol.* 4:10.3402/ejt.v4i0.21471. doi: 10.3402/ejpt.v4i0.21471

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika* 16, 297–334. doi: 10.1007/BF02310555

Crysel, L. C., Crosier, B. S., and Webster, G. D. (2013). The dark triad and risk behavior. *Pers. Individ. Dif.* 54, 35–40. doi: 10.1016/j.paid.2012.07.029

Dahling, J. J., Whitaker, B. G., and Levy, P. E. (2008). The development and validation of a new Machiavellianism Scale. *J. Manage.* 35, 1–39. doi: 10.1177/0149206308318618

Denisi, A. S. (2015). Some further thoughts on the entrepreneurial personality. *Entrep. Theory Pract.* 39, 997–1003. doi: 10.1111/etap.12168

Do, B. R., and Dadvari, A. (2017). The influence of the dark triad on the relationship between entrepreneurial attitude orientation and entrepreneurial intention: a study among students in Taiwan University. *Asia Pac. Manage. Rev.* 22, 185–191. doi: 10.1016/j.apmrv.2017.07.011

Fennimore, A. (2017). Natural born opportunists. *Manag. Decis.* 55, 1629–1644. doi: 10.1108/MD-11-2016-0786

Fornell, C., and Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *J. Mark. Res.* 18, 39–50. doi: 10.2307/3151312

Foster, J. D., and Campbell, W. K. (2007). Are there such things as "Narcissists" in social psychology? A taxometric analysis of the narcissistic personality inventory. *Pers. Individ. Dif.* 43, 1321–1332. doi: 10.1016/j.paid.2007.04.003

Foster, J. D., Reidy, D. E., Misra, T. A., and Goff, J. S. (2011). Narcissism and stock market investing: correlates and consequences of cocksure investing. *Pers. Individ. Dif.* 50, 816–821. doi: 10.1016/j.paid.2011.01.002

Gervasi, A. M., La Marca, L., Lombardo, E., Mannino, G., Iacolino, C., and Schimmenti, A. (2017). Maladaptive personality traits and internet addiction symptoms among young adults: a study based on the alternative DSM-5 model for personality disorders. *Clin. Neuropsychiatry* 14, 20–28.

Gori, A., Craparo, G., Sareri, G. I., Caretti, V., Giannini, M., and Meringolo, P. (2014). Antisocial and psychopathic personalities in a sample of addicted subjects: differences in psychological resources, symptoms, alexithymia and impulsivity. *Compr. Psychiatry* 55, 1580–1586. doi: 10.1016/j.comppsych.2014.05.023

Granieri, A., La Marca, L., Mannino, G., Giunta, S., Guglielmucci, F., and Schimmenti, A. (2017). The relationship between defense patterns and DSM-5 maladaptive personality domains. *Front. Psychol.* 8:1926. doi: 10.3389/fpsyg.2017.01926

Gupta, V. K., Turban, D. B., and Bhawe, N. M. (2008). The effect of gender stereotype activation on entrepreneurial intentions. *J. Appl. Psychol.* 93, 1053–1061. doi: 10.1037/0021-9010.93.5.1053

Hare, R. (1991). *The Psychopathy Checklist—Revised Manual*. Toronto: Multi-Health Systems.

Hare, R. D. (1980). A research scale for the assessment of psychopathy in criminal populations. *Pers. Individ. Dif.* 1, 111–119. doi: 10.1016/0191-8869(80)90028-8

Hmieleski, K. M., and Lerner, D. A. (2016). The dark triad and nascent entrepreneurship: an examination of unproductive versus productive entrepreneurial motives. *J. Small Bus. Manage.* 54, 7–32. doi: 10.1111/jsbm.12296

Hu, R., Wang, L., Zhang, W., and Bin, P. (2018). Creativity, proactive personality, and entrepreneurial intention: the role of entrepreneurial alertness. *Front. Psychol.* 9:951. doi: 10.3389/fpsyg.2018.00951

Jonason, P. K., Baughman, H. M., Carter, G. L., and Parker, P. (2015). Dorian Gray without his portrait: psychological, social, and physical health costs associated with the Dark Triad. *Pers. Individ. Dif.* 78, 5–13. doi: 10.1016/j.paid.2015.01.008

Jonason, P. K., Foster, J. D., Egorova, M. S., Parshikova, O., Csatho, A., Oshio, A., et al. (2017). The dark triad traits from a life history perspective in six countries. *Front. Psychol.* 8:1476. doi: 10.3389/fpsyg.2017.01476

Jonason, P. K., Koenig, B. L., and Tost, J. (2010a). Living a fast life: the dark triad and life history theory. *Hum. Nat. Interdiscip. Biosoc. Perspect.* 21, 428–442. doi: 10.1007/s12110-010-9102-4

Jonason, P. K., and Krause, L. (2013). The emotional deficits associated with the Dark Triad traits: cognitive empathy, affective empathy, and alexithymia. *Pers. Individ. Dif.* 55, 532–537. doi: 10.1016/j.paid.2013.04.027

Jonason, P. K., Li, N. P., and Teicher, E. A. (2010b). Who is James Bond?: The dark triad as an agentic social style. *Individ. Dif. Res.* 8, 111–120.

Jonason, P. K., Li, N. P., Webster, G. D., and Schmitt, D. P. (2009). The dark triad: facilitating a short-term mating strategy in men. *Eur. J. Personal.* 23, 5–18. doi: 10.1002/per.698

Jonason, P. K., and Webster, G. D. (2010). The dirty dozen: a concise measure of the dark triad. *Psychol. Assess.* 22, 420–432. doi: 10.1037/a0019265

Jonason, P. K., Webster, G. D., Schmitt, D. P., Li, N. P., and Crysel, L. (2013). The antihero in popular culture: life history theory and the dark triad personality traits. *Rev. Gen. Psychol.* 16, 192–199. doi: 10.1037/a0027914

Jones, D. N., and Figueredo, A. J. (2013). The core of darkness: uncovering the heart of the dark triad. *Eur. J. Personal.* 27, 521–531. doi: 10.1002/per.1893

Jones, D. N., and Paulhus, D. L. (2014). Introducing the short Dark Triad (SD3): a brief measure of dark personality traits. *Assessment* 21, 28–41. doi: 10.1177/1073191113514105

Judge, T. A., Piccolo, R. F., and Kosalka, T. (2009). The bright and dark sides of leader traits: a review and theoretical extension of the leader trait paradigm. *Leadersh. Q.* 20, 855–875. doi: 10.1016/j.leaqua.2009.09.004

Kautonen, T., Gelderen, M. V., and Fink, M. (2015). Robustness of the theory of planned behavior in predicting entrepreneurial intentions and actions. *Entrep. Theory Pract.* 39, 655–674. doi: 10.1111/etap.12056

Klotz, A. C., and Neubaum, D. O. (2016). Research on the dark side of personality traits in entrepreneurship: observations from an organizational behavior perspective. *Entrep. Theory Pract.* 40, 7–17. doi: 10.1111/etap.12214

Kramer, M., Cesinger, B., Schwarzinger, D., and Gelléri, P. (2011). "Investigating entrepreneurs' dark personality: how narcissism, Machiavellianism, and psychopathy relate to entrepreneurial intention," in *Proceedings of the 25th Conference on ANZAM*. Wellington: Australia and New Zealand Academy of Management.

Lee, K., and Ashton, M. C. (2014). The Dark Triad, the Big Five, and the HEXACO model. *Pers. Individ. Dif.* 67, 2–5. doi: 10.1016/j.paid.2014.01.048

Liñán, F., and Chen, Y. W. (2009). Development and cross-cultural application of a specific instrument to measure entrepreneurial intentions. *Entrep. Theory Pract.* 33, 593–617. doi: 10.1111/j.1540-6520.2009.00318.x

Liñán, F., Rodríguezcohard, J. C., and Ruedacantuche, J. M. (2011). Factors affecting entrepreneurial intention levels: a role for education. *Int. Entrep. Manag. J.* 7, 195–218. doi: 10.1007/s11365-010-0154-z

Liu, C. C. (2008). The relationship between machiavellianism and knowledge sharing willingness. *J. Bus. Psychol.* 22, 233–240. doi: 10.1007/s10869-008-9065-1

Lo Coco, G., Mannino, G., Salerno, L., Oieni, V., Di Fratello, C., Profita, G., et al. (2018). The Italian version of the inventory of interpersonal problems (IIP-32): psychometric properties and factor structure in clinical and non-clinical groups. *Front. Psychol.* 9:341. doi: 10.3389/fpsyg.2018.00341

Mannino, G., and Caronia, V. (2017). Time, well-being, and happiness: a preliminary explorative study. *World Futures* 73, 318–333. doi: 10.1080/02604027.2017.1333849

Mannino, G., and Faraci, E. (2017). Morphogenesis of work. application to the psychological well-being and psychosocial health. *Riv. Int. Sci. Soc.* 137, 315–334.

Mannino, G., Montefiori, V., Faraci, E., Pillitteri, R., Iacolino, C., Pellerone, M., et al. (2017). Subjective perception of time: research applied on dynamic psychology. *World Futures* 73, 285–302. doi: 10.1080/02604027.2017.1333850

Marshall, A., and Ojiako, U. (2015). A realist philosophical understanding of entrepreneurial risk-taking. *Soc. Bus. Rev.* 10, 178–193. doi: 10.1108/SBR-10-2014-0047

Mathieu, C., Hare, R. D., Jones, D. N., Babiak, P., and Neumann, C. S. (2013). Factor structure of the B-Scan 360: a measure of corporate psychopathy. *Psychol. Assess.* 25, 288–293. doi: 10.1037/a0029262

Mathieu, C., and St-Jean, É. (2013). Entrepreneurial personality: the role of narcissism. *Pers. Individ. Dif.* 55, 527–531. doi: 10.1016/j.paid.2013.04.026

Mcdonald, M. M., Donnellan, M. B., and Navarrete, C. D. (2012). A life history approach to understanding the Dark Triad. *Pers. Individ. Dif.* 52, 601–605. doi: 10.1016/j.paid.2011.12.003

Mcgee, J. E., Peterson, M., Mueller, S. L., and Sequeira, J. M. (2009). Entrepreneurial self-efficacy: refining the measure. *Entrep. Theory Pract.* 33, 965–988. doi: 10.1111/j.1540-6520.2009.00304.x

Miller, D. (2015). A downside to the entrepreneurial personality? *Entrep. Theory Pract.* 39, 1–8. doi: 10.1111/etap.12130

Montiel, O., and Clark, M. (2018). The dark side of entrepreneurship: a reflection on their multidimensionality *2017-2018 OFFICERS President President-Elect*. 158–176.

Morgan, J., and Sisak, D. (2015). Aspiring to succeed: a model of entrepreneurship and fear of failure. *J. Bus. Vent.* 31, 1–21. doi: 10.1016/j.jbusvent.2015.09.002

Mullins-Nelson, J. L., Salekin, R. T., and Leistico, A.-M. R. (2006). Psychopathy, empathy, and perspective-taking ability in a community sample: implications for the successful psychopathy concept. *Int. J. Forensic Ment. Health* 5, 133–149. doi: 10.1080/14999013.2006.10471238

Mullins-Sweatt, S. N., Glover, N. G., Derefinko, K. J., Miller, J. D., and Widiger, T. A. (2010). The search for the successful psychopath. *J. Res. Pers.* 44, 554–558. doi: 10.1016/j.jrp.2010.05.010

Neter, J., Kutner, M. H., Nachtsheim, C. J., and Wasserman, W. (1996). *Applied Linear Statistical Models*, 4th Edn. New York, NY: WCB McGraw-Hill.

O'Boyle, E. H. (2012). A meta-analysis of the Dark Triad and work behavior: a social exchange perspective. *J. Appl. Psychol.* 97, 557–579. doi: 10.1037/a0025679

Obschonka, M., Silbereisen, R. K., and Schmitt-Rodermund, E. (2010). Entrepreneurial intention as developmental outcome. *J. Vocat. Behav.* 77, 63–72. doi: 10.1016/j.jvb.2010.02.008

O'Reilly, C. A. III, Doerr, B., Caldwell, D. F., and Chatman, J. A. (2014). Narcissistic CEOs and executive compensation. *Leadersh. Q.* 25, 218–231. doi: 10.1016/j.leaqua.2013.08.002

Paulhus, D. L., and Williams, K. M. (2002). The Dark Triad of personality: narcissism, Machiavellianism, and psychopathy. *J. Res. Pers.* 36, 556–563. doi: 10.1016/S0092-6566(02)00505-6

Pittaway, L., Rodriguez-Falcon, E., Aiyegbayo, O., and King, A. (2011). The role of entrepreneurship clubs and societies in entrepreneurial learning. *Int. Small Bus. J. Res. Entrep.* 29, 37–57. doi: 10.1177/0266242610369876

Prabhu, V. P., Mcguire, S. J., Drost, E. A., and Kwong, K. K. (2012). Proactive personality and entrepreneurial intent: Is entrepreneurial self-efficacy a mediator or moderator? *Int. J. Entrep. Behav. Res.* 18, 559–586. doi: 10.1108/13552551211253937

Ricciardi, M. R., Widh, J., Barbieri, B., Amato, C., and Archer, T. (2018). Dark triad, locus of control and affective status among individuals with an entrepreneurial intent. *J. Entrep. Educ.* 21, 1–18.

Rindova, V., Barry, D., and Ketchen, D. J. (2009). Entrepreneuring as emancipation. *Acad. Manage. Rev.* 34, 477–491. doi: 10.5465/amr.2009.40632647

Robie, C., Brown, D. J., and Bly, P. R. (2008). Relationship between major personality traits and managerial performance: moderating effects of derailing traits. *Int. J. Manag.* 25:131.

Schiller, B. R., and Crewson, P. E. (1997). Entrepreneurial origins: a longitudinal inquiry. *Econ. Inq.* 35, 523–531. doi: 10.1111/j.1465-7295.1997.tb02029.x

Sesen, H. (2013). Personality or environment? A comprehensive study on the entrepreneurial intentions of university students. *Educ. Train.* 55, 624–640. doi: 10.1108/ET-05-2012-0059

Shinnar, R. S., Giacomin, O., and Janssen, F. (2012). Entrepreneurial perceptions and intentions: the role of gender and culture. *Entrep. Theory Pract.* 36, 465–493. doi: 10.1111/j.1540-6520.2012.00509.x

Smith, M. B., Hill, A. D., Wallace, J. C., Recendes, T., Judge, T. A., Smith, M. B., et al. (2018). Upsides to dark and downsides to bright personality: a multidomain review and future research agenda. *J. Manage.* 44, 191–217. doi: 10.1177/0149206317733511

Thompson, E. R. (2009). Individual entrepreneurial intent: construct clarification and development of an internationally reliable metric. *Entrep. Theory Pract.* 33, 669–694. doi: 10.1111/j.1540-6520.2009.00321.x

Twenge, J. M., Konrath, S., Foster, J. D., Campbell, W. K., and Bushman, B. J. (2008). Egos inflating over time: a cross-temporal meta-analysis of the narcissistic personality inventory. *J. Pers.* 76, 875–902. doi: 10.1111/j.1467-6494.2008.00507.x

Wang, J.-H., Chang, C.-C., Yao, S.-N., and Liang, C. (2015). The contribution of self-efficacy to the relationship between personality traits and entrepreneurial intention. *High. Educ.* 72, 209–224. doi: 10.1007/s10734-015-9946-y

Zettler, I., Friedrich, N., and Hilbig, B. E. (2011). Dissecting work commitment: the role of Machiavellianism. *Career Dev. Int.* 16, 20–35. doi: 10.1108/13620431111107793

Zettler, I., and Solga, M. (2013). Not enough of a 'Dark' trait? Linking Machiavellianism to job performance. *Eur. J. Personal.* 27, 545–554. doi: 10.1002/per.1912

Zhang, Y., Duysters, G., and Cloodt, M. (2014). The role of entrepreneurship education as a predictor of university students' entrepreneurial intention. *Int. Entrep. Manag. J.* 10, 623–641. doi: 10.1007/s11365-012-0246-z

Zhao, H., Seibert, S. E., and Hills, G. E. (2005). The mediating role of self-efficacy in the development of entrepreneurial intentions. *Entrep. Res. J.* 90, 1265–1272. doi: 10.1037/0021-9010.90.6.1265

Zhao, H., Seibert, S. E., and Lumpkin, G. T. (2010). The relationship of personality to entrepreneurial intentions and performance: a meta-analytic review. *J. Manage.* 36, 381–404. doi: 10.1177/0149206309335187

Zheng, W., Wu, Y.-C. J., Chen, X., and Lin, S.-J. (2017). Why do employees have counterproductive work behavior? The role of founder's Machiavellianism and the corporate culture in China. *Manag. Decis.* 55, 563–578. doi: 10.1108/MD-10-2016-0696

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Research on the Effects of Entrepreneurial Education and Entrepreneurial Self-Efficacy on College Students' Entrepreneurial Intention

Xianyue Liu[1], Chunpei Lin[1], Guanxi Zhao[1] and Dali Zhao[2]*

[1] Business School, Huaqiao University, Quanzhou, China, [2] College of Economics and Management, North China University of Technology, Beijing, China

Entrepreneurship is one of the important engines of economic development. Under the influence of policy encouragement and economic situation, college students have become the emerging entrepreneurial subjects. Studying the factors influencing their willingness to innovate is conducive to improving the entrepreneurial status and performance. From the perspective of planned behavior theory, this paper analyzes the effects of college students' entrepreneurship education and self-efficacy on their entrepreneurial intention. Using a sample of 327 college students in China, we test the hypotheses, and get some results. Firstly, college students' entrepreneurial education has a significant positive effect on their entrepreneurial intention, but has no obvious effect on the entrepreneurial attitude. Secondly, college students' entrepreneurial self-efficacy has a significant positive effect on the entrepreneurial attitude and entrepreneurial intention, and the entrepreneurial attitude plays a partial intermediary role in the relationship between entrepreneurial self-efficacy and entrepreneurial intention.

Keywords: entrepreneurial education, entrepreneurial self-efficacy, entrepreneurial attitude, entrepreneurial intention, college students

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****Correspondence:***
Xianyue Liu
xianyueliu@126.com

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INTRODUCTION

Following the support of the Internet and mobile technologies, an increase in entrepreneurship has been observed among the college students in China. The trend is further intensified by encouragement from the government. A report indicated that, in China the proportion of college graduates engaged in entrepreneurship rose steadily, from 2.0% in 2012 to 3.0% in 2016, and 2.9 percent of college graduates started their own businesses 6 months later in 2017, with an increase of 1.9 percentage points over the past decade, compared with 1.0 percent in MyCOS (2018). Moreover, the government calls for 'mass entrepreneurship and innovation' and 'optimizing the environment and providing uninterrupted services to increase the proportion of the college students' employment and entrepreneurship. Under this context, the universities in China have begun to offer innovative entrepreneurship training courses and services in the form of entrepreneurship programs, competitions, and sandbox simulations to raise the entrepreneurial intention among college students and improve their success rates.

Entrepreneurial intention is the most important predictor for an individual's entrepreneurial behavior (Lüthje and Franke, 2003). From various perspectives, numerous studies have examined the factors that influence entrepreneurial intention. Studies examining entrepreneurship characteristics have identified age, gender, level of education, personality traits, entrepreneurial knowledge and ability, desire for achievement, spirit of adventure, and value orientation as critical factors (Brockhaus, 1980; Krueger and Brazeal, 1994; Murry and MacMillan, 1998; Becherer and Maurer, 1999). Meanwhile the opposite of proactive personality also have important effect on entrepreneurial intention, such as narcissism, psychopathy and Machiavellianism (Wu et al., 2019). Also, from the perspective of entrepreneurial environment, studies have identified family education, market accessibility, entrepreneurial orientation from the government and related incentive policies and training services, and regional entrepreneurial atmosphere as fundamental factors (Bruno and Tyebjee, 1982; Gartner, 1985; Westhead and Batstone, 1999). Additionally, regarding the interactive internal and external factors, researchers have proposed many psychological models of entrepreneurship to explain the entrepreneurial intention and behaviors of an individual. Of these models, the Theory of Planned Behavior is the most influential (Bird, 1988; Ajzen, 1991). In the Theory of Planned Behavior, entrepreneurial intention is determined by an individual's attitude and subjective norm attitude, subjective norms, and perceived behavioral control. Although entrepreneurial education provided by universities is a primary source of entrepreneurial knowledge and skills to improves an individual's quality of entrepreneurship and a key factor in entrepreneurial success (Chusimir, 1988; Galloway and Brown, 2002), it has not received due attention in the aforementioned psychological models. Therefore, this paper applied the Theory of Planned Behavior to examine the effects of entrepreneurial education and self-efficacy on college students' entrepreneurial intention.

THEORETICAL ANALYSIS AND RESEARCH HYPOTHESES

The Effect of Entrepreneurial Education on the College Students' Entrepreneurial Attitude and Intention

Drucker (1985) stated that entrepreneurship can be learned through training. Kuratko (2014) also confirms that the personality traits, abilities, and skills required to become entrepreneurs can be acquired through training. In this paper, it was hypothesized that entrepreneurship can be learned from 'learning by doing' in the process of becoming an entrepreneur, and also from related entrepreneurship courses. Entrepreneurial education aims to develop and enhance the quality of entrepreneurship, ambition, drive, and pioneering and adventurous spirit for the college students to prepare for a certain career, enterprise, or business plan. It also aims to develop the strategic resources and abilities required by an entrepreneur and help him discover and recognize the business opportunities. In recent years, the universities and related external institutions have hosted various entrepreneurial training program, and these program have gradually gained attention. And the participants in such program are mostly the prospective entrepreneurs or the entrepreneurs who perceive that they lack the related knowledge and abilities after starting a business. These participants expect to improve their entrepreneurial capabilities through such programs, and acquire the ability to create, grasp, and pursue opportunities (Roomi and Harrison, 2008).

In social psychology, attitude is defined as the characterisation of personal cognition, including the subjective assessment of self, others, affairs, activities, events, and so on. And it has an important influence on an individual's reactions and behavior. Entrepreneurial education is believed to inspire an individual's entrepreneurism and further affect their perception of and passion for entrepreneurship (O'Cinneide and Garavan, 1994). Lundström and Stevenson (2005) also argued that entrepreneurial education and training can affect people's attitudes and behavioral intentions toward entrepreneurship, and improve their management abilities. In summary, the purpose of entrepreneurial education is to help people to develop entrepreneurial capability, which is a combination of knowledge, attitude, and numerous abilities (Fiet, 2001). Therefore, this paper suggests that the attitude toward entrepreneurship is closely related to an individual's entrepreneurial experience, and the self-learning of and external training in entrepreneurship can strengthen college students' cognition of the entrepreneurial process, and imbue them with a proactive attitude.

The entrepreneurs consider a strong entrepreneurial intention as a prerequisite in starting a new business. Entrepreneurial intention is an individual's conviction to make preparations for a new business and actually follow through on this goal (Krueger et al., 2000). It can be regarded as the planned behavior for starting a new business, which is a prerequisite for potential entrepreneurs (Wu and Jung, 2008; Premalatha, 2010). McMullan et al. (2002) found that entrepreneurial education can stimulate the ideas and behavior necessary for entrepreneurship. Botha (2006) suggested that the goal of entrepreneurial education should be to foster the individuals' entrepreneurial intention. Through empirical research, Katz (2007) revealed that entrepreneurial education and training can strengthen an individual's entrepreneurial intention. Through a similar research approach, Barbosa et al. (2008) found that entrepreneurial training can strengthen the entrepreneurs' entrepreneurial intention and behavior and improve their entrepreneurial performance. Therefore, we believe that for college students with entrepreneurial intention or potential, entrepreneurial education can help them develop entrepreneurial knowledge and skills, and improve their success rate of starting a business.

Based on the above analysis, this paper proposes the following hypotheses:

> Hypothesis 1: Entrepreneurial education for college students has a positive effect on their entrepreneurial attitude.

Hypothesis 2: Entrepreneurial education for college students has a positive effect on their entrepreneurial intention.

The Effect of the College Students' Entrepreneurial Self-Efficacy on Their Entrepreneurial Attitude and Intention

Bandura (1986) defined self-efficacy as the self-judgment on one's ability to execute a series of actions to achieve a desired goal. In other words, it does not emphasize the skills an individual possesses, but rather an individual's self-assessment on the ability to use these skills to achieve a goal. Later, Benight and Bandura (2004) further proposed that an individual's self-efficacy can regulate the action through his or her own cognitive, motivational, affective, and decisional processes. As such, an individual's self-perception self-efficacy of the ability to complete a task has a significant effect on their actual ability to play (Bandura, 1978). Drawing on these studies, we define entrepreneurial self-efficacy as an entrepreneur's self-confidence regarding their ability to start business and his or her belief in possessing the abilities required to do so, that is, the entrepreneur's self-confidence that he should be able to complete a certain task related to entrepreneurship.

According to the Expectancy-Value Theory, attitude is positively correlated with the product of behavioral beliefs and outcome evaluation. As stated by Ajzen (1991), when individuals believe that performing a certain action can achieve a positive result, they would exhibit a stronger preference toward this action, and then develop the intention to perform it. As we know, individuals' self-efficacy can affect their goal-setting behavior and their conviction to achieve this goal. For the entrepreneurs, their self-efficacy has a high correlation with their perceived self-ability and entrepreneurial actions (Boyd and Vozikis, 1994). Thus, in this study, it is suggested that when entrepreneurs believe they have the ability to perform and achieve an entrepreneurial task, they will be more resolute in their entrepreneurial attitude.

An effective behavior not only requires appropriate knowledge, skills, and good attitude, but also need a conviction in the ability to making full use of them (Bandura, 1999). Krueger and Brazeal (1994) believe that self-efficacy is a predictor of entrepreneurial achievement, and entrepreneurial intention is, to some extent, determined by the attraction to entrepreneurship and individuals' entrepreneurial self-efficacy. In other words, self-efficacy is the key factor that can help the entrepreneurs to overcome difficulties and face challenges in the process of entrepreneurship, and has a significant influence on their entrepreneurial intention. Furthermore, the existing studies have also revealed that entrepreneurial self-efficacy has a positive effect on entrepreneurial intention (Kolvereid, 1996; Miller et al., 2012; Martin et al., 2013). Therefore, in this study, we believe that, for the college students, self-efficacy is also positively correlated with entrepreneurial intention; that is, their confidence in having the requisite resources and abilities for starting a new business has a positive effect on the intention to achieve this goal. Hence, the college students who have a higher level of self-efficacy will also have a stronger entrepreneurial intention.

Based on the above analysis, this paper proposes the following hypotheses:

Hypothesis 3: College students' entrepreneurial self-efficacy has a positive effect on their entrepreneurial attitude.
Hypothesis 4: College students' entrepreneurial self-efficacy has a positive effect on their entrepreneurial intention.

Mitchell et al. (2003) considered entrepreneurial attitude to be the entrepreneurs' opinions about the adaptability, abilities, and actions in the entrepreneurial process. Wyk et al. (2003) defined entrepreneurial attitude as changeable but predictable entrepreneurial thoughts and emotions. According to the Theory of Planned Behavior proposed by Ajzen and Fishbein (1980), individuals' attitude affects their ultimate behavioral intention. Additionally, individuals' behavioral attitude is a predictor of their behavioral intention (Petty and Briñol, 2010), as behavioral attitude can explain more than 50% of the variances in behavioral intentions (Prodan and Drnovsek, 2010). Koh's (1995) empirical study on 200 business college students in Hong Kong demonstrated that entrepreneurial intention is significantly associated with the need for achievement, propensity to take risks, tolerance of ambiguity, and innovativeness. From a combined analysis of these studies, we propose that entrepreneurial attitude is formed from an individual's subjective cognition of entrepreneurship and their emotions, and it has an important effect on an individual's behavioral intention.

In the Theory of Reasoned Action and Theory of Planned Behavior, behavioral attitude is regarded as a key variable that explains behavioral intention. Both theories suggest that the basic belief in behavior and the evaluation of the possible consequences of performing that behavior are the antecedents of behavioral attitude (Ajzen and Fishbein, 1980; Ajzen, 1991). Entrepreneurial self-efficacy reflects an individual's confidence in and judgment of the resources, abilities, and desired results involved in an entrepreneurial process (Bandura, 1986; Benight and Bandura, 2004). Additionally, Davidson (1995) considered entrepreneurial attitude as a mediator between personal background and entrepreneurial beliefs to investigate how they affect entrepreneurial intention and personal background included the persons' educational status and related entrepreneurial experiences. While the entrepreneurial education in this paper, which encompasses both college students' entrepreneurial self-learning and the entrepreneurial courses and training provided by universities or relevant educational institutions, can provide these students with Entrepreneurship education, training, knowledge and ability, and can reflect an individual's entrepreneurial learning behavior more comprehensively. That is, the entrepreneurial education actually reflects the individuals' entrepreneurship background. Therefore, in this paper, college students' entrepreneurial attitude is considered to mediate the influence of both of entrepreneurial education and entrepreneurial self-efficacy on entrepreneurial intention.

Based on the above analysis, this paper proposes the following hypotheses:

> Hypothesis 5: College students' entrepreneurial attitude mediates the relationship between entrepreneurial education and entrepreneurial intention.
> Hypothesis 6: College students' entrepreneurial attitude mediates the relationship between entrepreneurial self-efficacy and entrepreneurial intention.

RESEARCH DESIGN

Measurement of Variables

Existing studies mostly measure entrepreneurial education from individual's level of education and entrepreneurial experiences and knowledge (Davidson, 1995). In this study, entrepreneurial education not only encompassed the entrepreneurial courses and practical training provided by external entities such as schools, but also college students' entrepreneurial self-learning. These are measured by four question items, such as 'I invest much time and energy in studying the latest developments in business management' and 'I have received some entrepreneurial education or training,' and so on. Entrepreneurial self-efficacy is measured by four question items adopted from the scales in the studies of Cooper and Lucas (2006) and Barakat et al. (2014) such as 'I am able to choose suitable employees for my own business' and 'I am able to apply innovative ideas to inspire entrepreneurial partners' initiative, and so on. Entrepreneurial attitude is measured by five question items adopted from the study of Robinson et al. (1991) such as 'I am strongly motivated to achieve career success' and 'I keep looking for new methods that can improve my performance,' and so on. Entrepreneurial intention is measured by four question items adopted from the study of Thompson (2009), such as 'I think I will start my own business in the future' and 'If given the chance to make a free decision, I will choose to start my own business, and so on. All of these items are modified to suit Chinese cultural context, and the measurement is based on a 5-point Likert scale, with 1 point denoting 'strongly disagree' and 5 points denoting "strongly agree."

In addition, Brockhaus (1980) suggested that age, gender, and level of education could affect an individual's entrepreneurial intention. And the grade year of college students can to some extent reflect their level of education. Thus, the age, gender, and grade of college students were used in this paper as control variables. The reported age of the responders is introduced into the model in the form of a natural logarithm; their gender is converted into a dummy variable, with 1 denoting male and 0 denoting female; and their grade is converted by using a 7-point scale, with 1 representing a freshman and 7 representing a 3rd-year graduate student.

Sample Distribution

The data used in this study are collected through a questionnaire survey. More than 800 copies of the questionnaire were distributed among the students of universities in the Fujian Province, and a total of 412 copies are returned, posting a recovery rate of approximately 51.5%. After excluding 85 invalid copies that omitted answer more than five question items or where students gave the same answer to at least 10 consecutive question items, we get 327 valid copies, posting an effective response rate of 79.3%. The sample properties are shown in **Table 1**.

EMPIRICAL RESULTS AND ANALYSES

Reliability and Validity Analysis

We test the reliability by using internal consistency reliability and composite reliability. **Table 2** shows that all the Cronbach's alpha are greater than 0.70, and all the value of composite reliability are all exceeds the 0.60 benchmark.

The majority of items used in the present study are adopted from tested and proven scales, and are modified to suit the Chinese cultural context, so the scale exhibites good content validity. Then exploratory factor analysis (EFA) conducted by AMOS 22.0 is used to test the construct validity of the questionnaire. The Kaiser-Meyer-Olkin value of the 17 items is 0.908, and the chi-square value in the Bartlett's test of sphericity is 3131.839 (degree of freedom = 136), which showed statistical significance. All of these indicate that there are common factors among the correlation matrices, and it's suitable for factor analysis. The factors are identified by using the methods of principal component analysis and varimax rotation, and the number of factors is determined by the Eigenvalue greater than one. These analyses provided four factors: entrepreneurial attitude, entrepreneurial intention, entrepreneurial self-efficacy, and entrepreneurial education. Their cumulative explained variance is 70.159%, and the factor loadings after rotation

TABLE 1 | Statistics of features of students sample.

Gender		Age		Grade		Major	
Male	66.3%	<21	7.9%	1	1.5%	Arts and Humanities	81%
female	36.7%	21	16.8%	2	7.3%	Science and Engineering	19%
		22	37.0%	3	27.2%		
		23	26.0%	4	63.3%		
				5	0.3%		
				6	0		
				7	0.3%		

TABLE 2 | Results of reliability and validity analysis.

Variables	Items	Factor loading	CITC	Cronbach's α if item deleted	Cronbach's α	CR	AVE
Entrepreneurial education	I invest much time and energy in studying the latest developments in business management.	0.648	0.595	0.851	0.853	0.856	0.601
	I have received some entrepreneurial education or training.	0.839	0.749	0.788			
	I have a lot of knowledge about management (entrepreneurship).	0.838	0.756	0.788			
	I have many entrepreneurial experiences.	0.760	0.690	0.815			
Entrepreneurial self-efficacy	I am able to choose suitable employees for my own business.	0.734	0.656	0.839	0.858	0.859	0.605
	I am able to apply innovative ideas to inspire entrepreneurial partners.	0.810	0.736	0.806			
	I can write a clear and complete business plan.	0.770	0.697	0.822			
	I can make a clear plan for the future development direction of entrepreneurship.	0.795	0.726	0.810			
Entrepreneurial attitude	I am strongly motivated to achieve career success.	0.717	0.659	0.826	0.850	0.854	0.540
	The pursuit of innovation is my style of doing things.	0.758	0.685	0.813			
	I believe that as long as I work hard, things will be successful.	0.720	0.666	0.819			
	I can do anything well.	0.731	0.661	0.822			
	I keep looking for new methods that can improve my performance.	0.748	0.664	0.819			
Entrepreneurial intention	I think I will start my own business in the future.	0.863	0.794	0.829	0.881	0.883	0.656
	I've considered running my own company.	0.823	0.752	0.844			
	If given the chance to make a free decision, I will choose to start my own business.	0.824	0.760	0.841			
	Considering the current situation and various restrictions (such as capital), I will still choose to start my own business.	0.724	0.668	0.876			

TABLE 3 | Descriptive statistics and Pearson's relation among variables.

Variable	Mean	SD	1	2	3	4	5	6	7
(1) Gender	1.37	0.483	–						
(2) Age	22.19	1.215	008	–					
(3) Grade	3.55	0.729	099	0.300**	–				
(4) Entrepreneurial education	2.652	0.968	−0.125*	0.093	0.065	0.775			
(5) Entrepreneurial self-efficacy	3.376	0.799	0.006	0.066	0.128*	0.512**	0.778		
(6) Entrepreneurial attitude	3.557	0.822	−0.046	−0.051	0.151**	0.271**	0.554**	0.735	
(7) Entrepreneurial intention	3.055	0.986	−0.100	0.003	0.043	0.490**	0.615**	0.445**	0.810

**Correlation is significant at the 0.05 level (2-tailed); **Correlation is significant at the 0.01 level (2-tailed); numbers on the diagonal are the square roots of AVE.*

all exceed 0.563. Therefore, the scale is of good construct validity. Additionally, a confirmatory factor analysis is used to test the discriminant validity of the four-factor model. Compared with the one-factor and three-factor models, the four-factor model is the most ideal for the fitting with actual data (χ^2/df = 2.75; CFI = 0.935; GFI = 0.898; TLI = 0.922; IFI = 0.936; RMSEA = 0.073). It indicates that the four factors exhibited favorable discriminant validity and they genuinely represented four different constructs. Therefore, it's suitable to proceed to the next step: correlation and regression analyses.

Table 3 presents the mean and standard deviation of the variables and the Pearson's correlation coefficient between the variables. These correlation analysis results reveal that the correlation coefficients among entrepreneurial education, entrepreneurial self-efficacy, and entrepreneurial attitude and entrepreneurial intention are all statistically significant at different statistical levels. The average variances extracted (AVE) are greater than 0.50, and exceed the absolute value of other variables' correlation coefficients, so all the above measures demonstrate adequate validity and reliability.

TABLE 4 | Regression analysis on the effects of entrepreneurial education and entrepreneurial self-efficacy on entrepreneurial attitude and entrepreneurial intention.

Variable	Entrepreneurial attitude		Entrepreneurial intention		
	Model 1	Model 2	Model 3	Model 4	Model 5
Gender	0.065	0.064	0.105	0.072^{+}	0.063
Age	−0.106^{+}	−0.121*	−0.017	−0.050	−0.031
Grade	0.191**	0.125*	0.058	−0.014	−0.033
Entrepreneurial education		−0.018		0.229***	0.231***
Entrepreneurial self-efficacy		0.556***		0.504***	0.420***
Entrepreneurial attitude					0.150**
R^2	0.037	0.331	0.013	0.428	0.443
Adjusted R^2	0.028	0.320	0.004	0.420	0.433
F	4.132	31.712	1.414	48.117	42.491

*Model 2 vs. Model 1; Model 4 vs. Model 3; Model 5 vs. Model 4. ***denotes $p < 0.001$; **denotes $p < 0.01$; *denotes $p < 0.05$; and $^{+}$denotes $p < 0.1$.*

Common Method Bias Test

Although mature scales were selected in this study, the problem of data source identity could not be completely avoided, which may lead to the emergence of common method deviation. So common method bias needs to be further verified. By using Harman single factor test, the results showed that all the items are aggregated into four factors without rotation, each factor has an Eigenvalue greater than one, and the cumulative variance contribution rate is 70.159%, the first Eigenvalue is 7.246, variance contribution rate is 42.623%, the proportion is less than 50% of the total explanatory variables. Also, the results of collinearity test show that, $1.039 \leq \text{VIF} \leq 1.840$, $0.544 \leq \text{TOL} \leq 0.962$. Therefore, this study is not greatly affected by the common method bias and collinearity.

Regression Analysis and Discussion

According to hierarchical regression procedure, we first set gender, age, and grade as control variables, and then set entrepreneurial education and entrepreneurial self-efficacy as independent variables, and entrepreneurial attitude and entrepreneurial intention as dependent variables. After that, we carried out the regression analysis. And the results are presented in **Table 4**.

Models 1 and 2 are used to examine the direct effect of entrepreneurial education and entrepreneurial self-efficacy on college students' entrepreneurial attitude. Model 1 investigate the effects of the three control variables of gender, age, and grade on entrepreneurial attitude, whereas Model 2 analyzed the effects of the control variables and the two independent variables of entrepreneurial education and entrepreneurial self-efficacy. Apparently, based on the control variables, entrepreneurial education and entrepreneurial attitude do not exhibit a significant correlation ($\beta = -0.018$, $p > 0.7$). Therefore, Hypothesis 1 is not supported. A possible reason could be that the college students still require a psychological transformation mechanism to internalize the entrepreneurial knowledge, skills, and experiences acquired from entrepreneurial education into entrepreneurial attitude. And this may be related to entrepreneurial self-efficacy. This is because, as an individual's perspective and preference over entrepreneurship, entrepreneurial attitude is largely decided by the individual's affections and cognition of entrepreneurship. Therefore, the impact of entrepreneurial education on entrepreneurial attitude may need to be demonstrated through the impact of entrepreneurial self-efficacy. Additionally, Davidson (1995) also pointed out that an individual's attitude toward 'playing the game of entrepreneurship" is a spontaneous motivation arising from an individual's psychological orientation, i.e., entrepreneurship traits. Thus, proactive personality can be included in the model to explore the effect of entrepreneurial education on entrepreneurial attitude and intention. The results also demonstrated that college students with higher entrepreneurial self-efficacy exhibited greater entrepreneurial attitude ($\beta = 0.556$, $p < 0.001$). This supported Hypothesis 3, and the views of Ajzen (1991); Boyd and Vozikis (1994), that is, when college students are fully confident in their entrepreneurial resources and abilities, they are more resolute in their entrepreneurial attitude.

Models 3 and 4 are used to examine the direct effect of entrepreneurial education and self-efficacy on college students' entrepreneurial intention. Model 3 investigate the effects of the three control variables of gender, age, and grade on entrepreneurial intention, whereas Model 4 examined the effects of the control variables and the two independent variables of entrepreneurial education and entrepreneurial self-efficacy on entrepreneurial intention. The results show that, based on the control variables, the more intensive the entrepreneurial education was, the stronger the entrepreneurial intention would be ($\beta = 0.229$, $p < 0.001$). This supported Hypothesis 2, and achieved empirical results similar to those of McMullan et al. (2002); Botha (2006), and Katz (2007). Thus, extensive entrepreneurial education can greatly stimulate college students' entrepreneurial intention. Similarly, when college students exhibit high entrepreneurial self-efficacy, they also have strong entrepreneurial intentions ($\beta = 0.504$, $p < 0.001$), which supported Hypothesis 4. This suggests that adequate entrepreneurial self-efficacy can strengthen college students' confidence in their entrepreneurial abilities, and further inspire their conviction and intention in entrepreneurship. These results support the view of Krueger and Brazeal (1994), and are consistent with the findings of Kolvereid (1996); Miller et al. (2012), and Martin et al. (2013).

Finally, the mediating effect of entrepreneurial attitude is tested according to the procedure proposed by Baron and Kenny (1986). First, the significant correlation between the independent and dependent variables is confirmed, followed by the significant correlation between independent variables and the mediator. As is known from the preceding analysis, based on the control variables, the significant correlation between entrepreneurial education and college students' attitude is not confirmed, which don't satisfied the prerequisite for mediation analysis, and Hypothesis 5 is not be proved; while college students' entrepreneurial self-efficacy is positively correlated with entrepreneurial attitude and intention, ensuring their feasibility for mediation analysis. Further, entrepreneurial attitude is introduced on the basis of Model 4 to examine its mediating effect, and the results are provided in Model 5 in **Table 3**. Compared with Model 4, the regression coefficient of entrepreneurial self-efficacy has an obvious decline ($\beta = 0.504 \rightarrow 0.420$) and reached statistical significance. This indicated a partial mediating effect, and Hypothesis 6 is supported. This result demonstrates that college students' entrepreneurial self-efficacy not only has a direct and significant positive effect on entrepreneurial intention, but also exercises an indirect positive effect through entrepreneurial attitude.

DISCUSSION AND CONCLUSION

This study revealed that entrepreneurial education has a significant and positive effect on college students' entrepreneurial intention, but does not have a significant effect on entrepreneurial attitude; entrepreneurial self-efficacy has a significant and positive effect on both entrepreneurial attitude and entrepreneurial intention, and entrepreneurial attitude further partly mediates the relationships between entrepreneurial self-efficacy and entrepreneurial intention. These findings contribute to the development of entrepreneurship theories, and provide important inspiration for Chinese college students' entrepreneurship and the practice of entrepreneurship education in universities and related training institutions.

The findings indicate theoretical significance. First, entrepreneurial education and entrepreneurial self-efficacy play critical roles in stimulating college students' entrepreneurial intention, but the psychological model used in this study did not enable an adequate exploration of their relationships. Previous models of entrepreneurial psychology mainly focused on the influence of individual's inherent characteristics, education level, family business experience, entrepreneurial career expectation prediction and other aspects on the entrepreneurial intention. This study uses entrepreneurial education and self-efficacy as independent variables, and entrepreneurial attitude as a mediator, to construct an influencing mechanism model to determine college students' entrepreneurial intention. It further tested and supplemented the Theory of Planned Behavior from the perspective of learning and self-efficacy. The findings provide empirical evidence to support existing theories, and will also serve as a valuable reference for follow-up studies.

Concerning management practices, these findings suggest that entrepreneurial education and self-efficacy can effectively inspire college students' entrepreneurial intention. Entrepreneurship is an activity that requires management, and through the provision of entrepreneurial education in the form of self-learning and taught courses, college students are able to acquire the knowledge, skills, and practical experience required for the entrepreneurial process which can then improve their entrepreneurial intention. The stronger the perceived entrepreneurial self-efficacy, the more effective will college students exert their innate entrepreneurial abilities, strengthen their entrepreneurial potential, and inspire their entrepreneurial confidence and passion. These conclusions suggest that universities and other relevant educational institutions should pay more attention to the combination of self-learning and external training in entrepreneurship, as well as the perception of entrepreneurial self-efficacy, so as to enrich the connotation of entrepreneurship education and improve its effectiveness.

LIMITATIONS AND FUTURE RESEARCH

This study has some limitations. First, sample selection of this study used convenience sampling instead of random sampling, and all the students are come from single province, which may affect the representativeness and universality of the results. Future research might expand sample or compare samples from cross-region in the same country or different countries, which have different culture, social norms and other socioeconomic contexts (Zampetakis et al., 2015; Gorgievski et al., 2017; Dukhon et al., 2018). These contextual factors might have significant influence on special sample's entrepreneurial intention. For example, Arshad et al. (2019) studied the influence of collectivist orientation in students' entrepreneurial intention with Pakistani sample.

Second, this study did not consider the effect of educational background on entrepreneurial attitude and intention. Existing studies have found that major and entrepreneurship courses are important contextual factors in educational system, which might influence students' thinking about their future careers and career options, and result in different attitude and intention (Misoska et al., 2016). Meanwhile some comparative analysis showed that subjective norms have different influence on entrepreneurial intention in separate categories of students, who have different educational background (Maresch et al., 2016). Sample of this study did not classify the educational background detailed, which maybe the reason why Hypothesis 1 was not supported in this study. Therefore, future research can analyze the influence mechanism of entrepreneurial education on attitude and intention in different educational background, which might helpful to entrepreneurial educational system in curriculum design, and policy provision.

Third, entrepreneurial education is the combination of entrepreneurship and pedagogy, therefore, which have been measured by extant research. In this study, the measurements of entrepreneurial education use four items, including courses, practical training provided by schools and self-learning. In future,

dividing these items into two variables according to the Theory of Planned Behavior, and also introducing personality traits variables that can affect entrepreneurial attitude and intention (e.g., proactive personality), might be worthy study.

ETHICS STATEMENT

This research was carried out in accordance with the recommendations of moral rule for empirical research, and approved by the Academic Committee of Business School of Huaqiao University; meanwhile all the survey respondents were given written informed consent.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

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REFERENCES

Ajzen, I. (1991). The theory of planned behaviour. *Organ. Behav. Hum. Decis. Process.* 50, 179–211. doi: 10.1016/0749-5978(91)90020-T

Ajzen, I., and Fishbein, M. (1980). *Understanding Attitudes and Predicting Social Behaviour*. Englewood Cliffs, NJ: Prentice-Hall.

Arshad, M., Farooq, O., and Farooq, M. (2018). The effect of intrinsic and extrinsic factors on entrepreneurial intentions: the moderating role of collectivist orientation. *Manag. Decis.* 57, 649–668. doi: 10.1108/MD-04-2016-0248

Bandura, A. (1978). Self-efficacy: toward a unifying theory of behavioural change. *Adv. Behav. Res. Ther.* 4, 139–161. doi: 10.1016/0146-6402(78)90002-4

Bandura, A. (1986). *Social Foundations of Thought and Action: A Social Cognitive Theory*. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1999). Self-efficacy: the exercise of control. *J. Cogn. Psychol. Ther.* 13, 158–159. doi: 10.1016/0146-6402(78)90009-7

Barakat, S., Boddington, M., and Vyakarnam, S. (2014). Measuring entrepreneurial self-efficacy to understand the impact of creative activities for learning innovation. *Int. J. Manag. Educ.* 12, 456–468. doi: 10.1016/j.ijme.2014.05.007

Barbosa, S. D., Kickul, J., and Smith, B. R. (2008). The road less intended: integrating entrepreneurial cognition and risk in entrepreneurship education. *J. Enterp. Cult.* 16, 411–439. doi: 10.1142/S0218495808000181

Baron, R. M., and Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *J. Pers. Soc. Psychol.* 51, 1173–1182. doi: 10.1037/0022-3514.51.6.1173

Becherer, R. C., and Maurer, J. G. (1999). The proactive personality disposition and entrepreneurial behavior among small company presidents. *J. Small Bus. Manag.* 37, 28–36.

Benight, C. C., and Bandura, A. (2004). Social cognitive theory of posttraumatic recovery: the role of perceived self-efficacy. *Behav. Res. Ther.* 42, 1129–1148. doi: 10.1016/j.brat.2003.08.008

Bird, B. (1988). Implementing entrepreneurial ideas: the case for intention. *Acad. Manag. Rev.* 13, 442–453. doi: 10.1017/CBO9781107415324.004

Botha, M. (2006). Measuring the effectiveness of the women entrepreneurship programme, as a training intervention, on potential, start-up and established women entrepreneurs in South Africa. *Study Teach. S. Afr.* 10, 163–183.

Boyd, N. G., and Vozikis, G. S. (1994). The influence of self-efficacy on the development of entrepreneurial intentions and actions. *Entrep. Theory Pract.* 18, 63–77. doi: 10.1080/02640410152475847

Brockhaus, R. H. (1980). Risk taking propensity of entrepreneurs. *Acad. Manag. J.* 23, 509–520. doi: 10.2307/255515

Bruno, A. V., and Tyebjee, T. T. (1982). The environment for entrepreneurship. *Encycl. Entrep.* 2, 288–315.

Chusimir, L. H. (1988). Entrepreneurship and MBA degrees: how well do they know each other? *J. Small Bus. Manag.* 26, 71–74.

Cooper, S., and Lucas, W. A. (2006). Developing self-efficacy for innovation and entrepreneurship: an educational approach. *Int. J. Entrep. Educ.* 4, 141–162.

Davidson, P. (1995). Culture, structure and regional levels of entrepreneurship. *Entrep. Reg. Dev.* 7, 41–62. doi: 10.1080/08985629500000003

Drucker, P. F. (1985). *Innovation and Entrepreneurship: Practice and Principles*. New York, NY: Harper and Row.

Dukhon, A., Zinkovsky, K., Obraztsova, O., and Chepurenko, A. (2018). How entrepreneurship education programs affect the development of small businesses in Russia: empirical analysis in regional contexts. *Educ. Stud. Moscow* 2, 139–172.

Fiet, J. O. (2001). The theoretical side of teaching entrepreneurship. *J. Bus. Ventur.* 16, 1–24. doi: 10.1016/S0883-9026(99)00041-5

Galloway, L., and Brown, W. (2002). Entrepreneurship education at university: a driver in the creation of high growth firms. *Educ. Train.* 44, 398–445. doi: 10.1108/00400910210449231

Gartner, W. B. (1985). A conceptual framework for describing the phenomenon of new venture creation. *Acad. Manag. Rev.* 10, 696–706. doi: 10.2307/258039

Gorgievski, M. J., Stephan, U., Laguna, M., and Moriano, J. A. (2017). Predicting entrepreneurial career intentions. *J. Career Assess.* 26, 457–475. doi: 10.1177/1069072717714541

Katz, J. A. (2007). "Education and training in entrepreneurship," in *The Organizational Frontiers. The Psychology of Entrepreneurship*, eds J. R. Baum, M. Frese, and R. A. Baron (Mahwah, NJ: Lawrence Erlbaum Associates), 209–235.

Koh, H. C. (1995). Factors associated with entrepreneurial inclination: an empirical study of business undergraduates in hongkong. *J. Small Bus. Entrep.* 12, 29–41. doi: 10.1080/08276331.1995.10600487

Kolvereid, L. (1996). Prediction of employment status choice intentions. *Entrep. Theory Pract.* 21, 47–57. doi: 10.1177/104225879602100104

Krueger, N. F. Jr., Reilly, M. D., and Carsrud, A. L. (2000). Competing models of entrepreneurial intentions. *J. Bus. Ventur.* 15, 411–432. doi: 10.1016/S0883-9026(98)00033-0

Krueger, N. F., and Brazeal, D. V. (1994). Entrepreneurial potential and potential entrepreneurs. *Entrep. Theory Pract.* 18, 91–104. doi: 10.2139/ssrn.1505244

Kuratko, D. F. (2014). *Entrepreneurship: Theory, Process, Practice*. Boston, MA: Cengage Learning.

Lundström, A., and Stevenson, L. A. (2005). *Entrepreneurship Policy: Theory and Practice*. New York, NY: Springer.

Lüthje, C., and Franke, D. (2003). The 'making' of an entrepreneur: testing a model of entrepreneurial intent among engineering students at MIT. *R&D Manag.* 33, 135–147. doi: 10.1111/1467-9310.00288

Maresch, D., Harms, R., Kailer, N., and Wimmer-Wurm, B. (2016). The impact of entrepreneurship education on the entrepreneurial intention of students in science and engineering versus business studies university programs. *Technol. Forecast. Soc. Chang.* 104, 172–179. doi: 10.1016/j.techfore.2015.11.006

Martin, B. C., Mcnally, J. J., and Kay, M. J. (2013). Examining the formation of human capital in entrepreneurship: a meta-analysis of entrepreneurship education outcomes. *J. Bus. Ventur.* 28, 211–224. doi: 10.1016/j.jbusvent.2012.03.002

McMullan, W., Chrisman, J., and Vesper, K. H. (2002). "Lessons from successful innovations in entrepreneurial support programming," in *Innovation and Entrepreneurship in Western Canade*, 2nd Edn, eds J. J. Chrisman, J. A. D. Holbrook, and J. H. Chua (Calgary, AB: University of Calgary), 207–223.

Miller, T. L., Grimes, M. G., McMullen, J. S., and Vogus, T. J. (2012). Venturing for others with heart and head: how compassion encourages social entrepreneurship. *Acad. Manag. Rev.* 37, 616–640. doi: 10.5465/amr.2010.0456

Misoska, A. T., Dimitrova, M., and Mrsik, J. (2016). Drivers of entrepreneurial intentions among business students in Macedonia. *Econ. Res.* 29, 1062–1074. doi: 10.1080/1331677x.2016.1211956

Mitchell, R. K., Busenitz, L., Lant, T., McDougall, P. P., Morse, E. A., Smith, J. B., et al. (2003). Toward a theory of entrepreneurial cognition: rethinking the people side of entrepreneurship research. *Entrep. Theory Pract.* 27, 93–104. doi: 10.1111/1540-8520.00001

Murry, B. L., and MacMillanL, C. (1998). Entrepreneurship: Past research and future challenges. *J. Manag.* 14, 139–161. doi: 10.1177/014920638801400202

MyCOS (2018). *Employment Report of Chinese College Students in 2018*. Beijing: MyCOS.

O'Cinneide, B., and Garavan, T. N. (1994). Entrepreneurship education and training programmes: a review and evaluation - Part 2. *J. Eur. Industr. Train.* 18, 3–12. doi: 10.1108/03090599410068024

Petty, E. E., and Briñol, P. (2010). "Attitude structure and change: implications for implicit measures," in *Handbook of Implicit Social Cognition: Measurement, Theory, and Applications*, eds B. Gawronski and B. Keith Payne (New York, NY: Guilford Press), 335–352.

Premalatha, U. M. (2010). An empirical study on the impact of training and development on women entrepreneurs in Karnataka. *IUP J. Soft Skills* 3, 49–64.

Prodan, I., and Drnovsek, M. (2010). Conceptualizing academic-entrepreneurial intentions: an empirical test. *Technovation* 30, 332–347. doi: 10.1016/j.technovation.2010.02.002

Robinson, P. B., Stimpson, D. V., Huefner, J., and Hunt, H. K. (1991). An attitude approach to the prediction of entrepreneurship. *Entrep. Theory Pract.* 15, 13–31.

Roomi, M. A., and Harrison, P. (2008). Training needs for women-owned SMEs in England. *Educ. Train.* 50, 687–696. doi: 10.1108/00400910810917064

Thompson, E. R. (2009). Individual entrepreneurial intent: construct clarification and development of an internationally reliable metric. *Entrep. Theory Pract.* 33, 669–694. doi: 10.1111/j.1540-6520.2009.00321.x

Westhead, P., and Batstone, S. (1999). Perceived benefits of a managed science park location. *Entrep. Reg. Dev.* 11, 129–154. doi: 10.1080/089856299283236

Wu, S., and Jung, J. Y. (2008). Is non-traditional entrepreneurship training helpful to nascent entrepreneurs? Yes and no. *J. Entrep. Educ.* 11, 43–51. doi: 10.1016/j.elstat.2005.02.002

Wu, W., Wang, H., Zheng, C., and Wu, Y. J. (2019). Effect of narcissism, psychopathy, and machiavellianism on entrepreneurial intention—the mediating of entrepreneurial self-efficacy. *Front. Psychol.* 10:360. doi: 10.3389/fpsyg.2019.00360

Wyk, R. V., Boshoff, A. B., and Bester, C. L. (2003). Entrepreneurial attitudes: what are their sources? *S. Afr. J. Econ. Manag. Sci.* 6, 1–24.

Zampetakis, L. A., Kafetsios, K., Lerakis, M., and Moustakis, V. (2015). Investigating the role of self-construal in the formation of entrepreneurial intentions. *Front. Psychol.* 6:1085. doi: 10.3389/fpsyg.2015.01085

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Which Role Model Is More Effective in Entrepreneurship Education? An Investigation of Storytelling on Individual's Entrepreneurial Intention

*Feng Liu[1], Jiangshui Ma[2] and Ran Li[1]**

[1] School of Public Affairs and Law, Southwest Jiaotong University, Chengdu, China, [2] School of Business Administration, Southwestern University of Finance and Economics, Chengdu, China

Entrepreneurial stories, such as the breathtaking experience of Steve Jobs, are often adopted as an effective teaching instrument to promote individuals' entrepreneurial intentions in entrepreneurship education. Prior research highlights the role model's influence and the positive effect of entrepreneurial stories, which is taken for granted in many circumstances. Since most research has treated storytelling in teaching as an undifferentiated whole, few researchers have teased out the distinctive effect of different types of entrepreneurial stories, namely that between successful stories and failure stories, and between idol stories and peer stories. To deepen our knowledge about how distinctive entrepreneurial stories affect entrepreneurial intentions, we conducted two experimental studies on 150 undergraduate students in entrepreneurship education programs (EEPs). Results show that, through the intermediary variable of entrepreneurial passion, both successful stories and failure stories positively influence entrepreneurial intentions as educators presumed, but successful role model stories have a greater impact than failure stories. While idol stories, rather than peer stories, are more inclined to arouse individuals' entrepreneurial intentions. Furthermore, we find that individuals with low entrepreneurial self-efficacy are less affected by the storytelling process.

Keywords: entrepreneurship education, role model story, entrepreneurial intention, entrepreneurial passion, self-efficacy

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****Correspondence:***
Ran Li
974890209@qq.com

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INTRODUCTION

In the past decades, entrepreneurship has become increasingly prominent in reducing youth unemployment, improving financial stability and promoting economic development (Bohlmann et al., 2017). As a critical role in social development, entrepreneurship not only takes academic scholars' notice, but also attracts many government officers' and educators' attentions. In order to inspire entrepreneurship activities, governments and scholars have both made great efforts to assist nascent entrepreneurs, such as establishing incubators, introducing supportive policies and setting up entrepreneurship education programs (EEPs). Such undertakings have been based on

the implicit premise that these efforts will inspire entrepreneurial spirit (Obschonka et al., 2018), enhance nascent entrepreneur's self-efficacy and promote entrepreneurship motivation (Syam et al., 2018). Indeed, many studies show that entrepreneurship education contributes to people's entrepreneurial intentions and reinforces their entrepreneurial activities.

Even though many studies have shown the positive relationship between entrepreneurship education and entrepreneurial intention, there is no consensus on what and how entrepreneurship education actually influences people in practice (Pittaway and Cope, 2007). Besides, some scholars like Oosterbeek et al. (2010) find that entrepreneurship education is negatively related to entrepreneurial intention. A critical reason for this contradictory notion is that many scholars treated entrepreneurship education as an undifferentiated whole, ignoring the variety in content and pedagogy in different EEPs (Piperopoulos and Dimov, 2015). It warrants a closer look at the entrepreneurship education mechanisms, especially the popular content, such as Steve Jobs' entrepreneurial story, which is widely taught in college curriculums. Drawing upon the extensive use of storytelling in entrepreneurship education, we provide a deeper investigation of different types of entrepreneurial stories in this paper, arguing that the effects of different role models vary extensively.

Using metric conjoint analysis, we tested our hypotheses in two experiments through 150 undergraduate students who enrolled in a 6-week EEP. The two experiments, which were carried out in a Chinese university, demonstrated that through the intermediary variable of entrepreneurial passion, both successful stories and failure stories have positive impacts on entrepreneurial intentions. However, the successful role model stories have a greater impact than failure stories. Furthermore, rather than idol stories, which are frequently utilized by educators worldwide, peer stories are more inclined to arouse individuals' entrepreneurial intentions. In addition, we find self-efficacy moderates the storytelling process, whereas audiences with low entrepreneurial self-efficacy are less affected by entrepreneurial stories.

The paper is organized as follows. In the first section, we raise the question and discuss the theory background. We present the status of current research which relates to the evaluation and impact of case-based teaching in EEPs and, in a broader sense, on the antecedents of entrepreneurial intention as studied in the literature. The second section is devoted to our theoretical and methodological approaches, while the third section describes the samples and research experiments utilized in this paper. The following sections outline and discuss our results. We also look into the limitations of our work. In conclusion, we underline our main findings, derive their theoretical and practical implications, and then present possible directions for future research.

Theoretical Development

According to the Global Entrepreneurship Monitor (GEM) 2015/2016 Report, China's entrepreneurial activities index was 12.84%, which was relatively high compared with other countries in the G20, such as the United States (11.88%), the United Kingdom (6.93%), Germany (4.70%), and Japan (3.83%). However, only 2.93% of Chinese college graduates chose to undertake entrepreneurial activities in 2016, whereas this ratio is up to 20–23% in United States[1]. Such a remarkable disparity motivated us to consider the entrepreneurship education in China, especially the teaching process in universities. Why does the entrepreneurship education in China not achieve the same outcome, of arousing entrepreneurial intention, as well as other countries?

With this question in mind, researchers have explored diverse factors in determining entrepreneurial participation, including individual factors, such as demographics (e.g., experience in some area), behavioral (e.g., management style), psychological and/or personality (e.g., risk propensity and dark triad) cognitive traits (e.g., entrepreneurial alertness) (Busenitz and Barney, 1997; Miner, 2000; Shane and Venkataraman, 2000; Gaglio and Katz, 2001; Hu et al., 2018; Wu et al., 2019), and external environment factors (Lee et al., 2011; Alessandro and Vita, 2016). In the literature, SCT (social cognition theory) is a commonly used tool for analyzing the impact of external and personal factors on entrepreneurial intentions. Planned behavior theory (Ajzen, 1991) and SCT are probably the most widely used models in prior literature, improving our understanding of the entrepreneurial intentions (Autio et al., 1997; Tkachev and Kolvereid, 1999; Tounés, 2003; Audet, 2004; Liñán, 2004; Boissin and Emin, 2006; Fayolle and Gailly, 2015; Biraglia and Kadile, 2017).

In the same stream, this paper deepens our understanding of this question by exploring the different effects of various role models in the storytelling process and investigating the entrepreneurship education by examining the individual factors and environmental factors jointly. Although storytelling methodology in case-based teaching is a popular choice, limited scholars test whether different types of role models influence similarly or not. The main purpose of this paper is to investigate the entrepreneurial story's influence process, providing an understanding of which entrepreneurial stories take effect through EEPs, and how. We teased out different types of entrepreneurial stories, namely between successful stories and failure stories, and between idol stories and peer stories. In addition, we scrutinized the storytelling's dynamic influencing mechanism by inspecting the mediating role of entrepreneurial passion and the moderating role of audiences' self-efficacy.

Entrepreneurship Education

As both governments and scholars esteem entrepreneurship activities highly, EEPs are exploding across the world, from a handful of universities in the 1970s to the majority of higher education institutions (Katz, 2003). More than 2,200 courses are offered at over 1,600 schools in United States (Kuratko, 2005). According to Fayolle and Gailly (2008), entrepreneurship education fosters entrepreneurial attitudes, skills and mind-set. The principal role of an EEP is to promote students' entrepreneurial intentions and increase their awareness that the entrepreneurial path is a viable career option (Fayolle and Gailly, 2015).

[1]Data Resource: GEM (2014), TEA: includes the business that operate for less than three and a half years.

An abundance of prior research has found that entrepreneurship education impacts entrepreneurial intentions positively (Chen et al., 1998; Zellweger et al., 2011), but the effectiveness and validity of entrepreneurship education is still unclear, as entrepreneurship education is often treated as a single monolith. Given the widely accepted notion that entrepreneurship education is critical for venture creation, relevant questions as regards teaching content and methodologies are brought up: What should be taught and how should it be taught (Kuratko, 2005)? Indeed, a lot of research have been done through various perspectives, from entrepreneurship education evaluation to program implementation. For instance, scholars have provided valuable insights into pedagogies for entrepreneurship education. Solomon et al. (2002) investigated methodologies adopted in the daily teaching curriculums such as experiential learning, business plans, computer simulations, field trips and the use of video and films, and technology application. Whether students are benefited or not relies on the involvement and participation throughout the teaching process (Yar Hamidi et al., 2008).

Storytelling in Entrepreneurship Education

Entrepreneurial stories inspire people's entrepreneurial intentions and encourage the process of emulation (Bouwen and Steyaert, 1997; Laviolette et al., 2012). Storytelling in the curriculums is not only about learning knowledge and skills, but also about developing nascent entrepreneurs' future-oriented imagination and influencing their career choices. Lots of research verifies that EEP is an important methodology to foster entrepreneurial intention (Peterman and Kennedy, 2003; Beugelsdijk et al., 2004). Case-based teaching is frequently adopted as an effective teaching method in EEPs by telling entrepreneurial role model stories, such as those of Steve Jobs, Jack Ma, and Zuckerberg's experiences. After editing and rewriting, their stories are compiled into Harvard or Ivey Cases. Moreover, universities also tried to invite the protagonists of each case to the classrooms in order to present the entrepreneurial stories vividly.

In comparison, little attention has been devoted to investigating the different types of entrepreneurial stories, and no clue is provided for whether different types of role models affect similarly or not. What remains to be verified is whether the positive effect is still robust across the different types of content and pedagogies that are utilized in EEPs. Compared with the consistent agreement that observing successful entrepreneurs can enhance the entrepreneurial intentions (Fellnhofer, 2017), limited studies emphasize the effect of telling failure stories in the teaching process, and scholars hold different views on this. Many studies argue that both successful stories and failure stories facilitate individuals' entrepreneurial intentions (Minniti and Bygrave, 2001; Lockwood et al., 2004), as long as failure is the mother of success.

However, some scholars argue that failure stories may be more effective when the aim is to avoid an undesirable state or result (Laviolette et al., 2012). For instance, failure stories may attenuate audiences' intentions by signaling to them that entrepreneurship requires more than they expected (Oosterbeek et al., 2010). Will failure peer stories raise audiences' caution for risk and diminish their motivations? Such questions are still ambiguous and imprecise, inviting more substantive categorizations for role models and separate investigations into them (Piperopoulos and Dimov, 2015). In this paper, we categorized entrepreneurial stories by two dimensions: successfulness and distance, and four groups of stories are discussed.

Hypotheses

Role Models, defined as those who can encourage others to pursue certain career paths or pursue certain goals (Basow and Howe, 1980), are adopted widely in the field of entrepreneurship education. Heroes like Washington and Napoleon always inspire youths worldwide. Through the role model's experience, individuals may subconsciously develop their mentality, imitate the role model (Biraglia and Kadile, 2017), and strive to become the role model (Laviolette et al., 2012). Krumboltz et al. (1976) suggested that role models have a profound impact on individual's career choices and this proposition was affirmed by other scholars (Krueger et al., 2000; Douglas and Shepherd, 2002). Shapero and Sokol (1982) first introduced the concept of role models to entrepreneurial research and predicated that family members, especially parents, would affect individuals' perceptions as entrepreneurial role models. Narrative and storytelling can potentially influence people's entrepreneurial decisions through knowledge sharing and expression of experiences (Ajzen, 1991; Akerlof and Kranton, 2000; Fellnhofer, 2017).

Undoubtedly, role model education is adopted as a useful teaching instrument in EEPs (European Commission, 2003; Organisation for Economic Co-operation and Development, 2009). A lot of scholars believed that successful role models have positive impacts on entrepreneurial intentions because individuals are motivated by imagining their own achievements as that of a successful role model in the future (Taylor et al., 1996; Aspinwall, 1997; Lockwood and Kunda, 1997, 1999; Chang, 2014). One of the most important incentives is that educators believe role model's stories will arouse audiences' entrepreneurship spirit (Krueger et al., 2000; Van Auken et al., 2006; Bosma and Schutjens, 2011), while many of them propose that this influence is conditional on whether the role model's achievement is achievable for the audiences (Lockwood and Kunda, 1997; Lockwood and Kunda, 2000; Blanton, 2001).

Even though role model education is warmly embraced by educators and students, and covers most entrepreneurship curriculums in universities, some scholars possess different opinions and express mixed comments, especially for failure role models. Compared with successful role models, conclusions for failure role models are much more controversial, and the literature provides mixed results. On the one hand, some studies suggest that the incomplete and ambiguous failure information will raise nascent entrepreneurs' anxiety of entrepreneurial risk and attenuate their passions. On the other hand, failure role models are valuable to entrepreneurs by strengthening their

sensitivity and avoiding potential failure risks (Lockwood et al., 2002; Minniti and Nardone, 2007).

With such conflicting accounts regarding the impact of role model stories, many scholars attempted to resolve this debate from different perspectives. In particular, Lockwood et al. (2002) argued that prior studies have not taken into account that the effect of role models may depend on the goals which audiences intend to pursue. As promotional individuals are more sensitive to successful role models, failure role models have more influence on audiences with prevention goals. Bandura (2010) proposed that self-efficacy plays an important role in an individual's achievement of goals since people with high self-efficacy have more courage to try new things. Moreover, based on the SCT frame work, Bandura (1989) suggested that passion is critical in the role model teaching process. Drawing upon the stream of SCT literature, Geneve et al. (2008) illustrated how women can maintain the passion for the DCI (Digital Content Industry) profession through alternative learning acquired from role models. For the literature review presented above, we propose the following research hypotheses in the rest of this section and detail the theoretical framework.

Role Model Stories and Entrepreneurial Intention

Role model stories in EEPs not only provide spiritual incentives for audiences, but also offer behavioral guidance for potential entrepreneurs (Gibson, 2004; Bosma et al., 2012). Through spiritual incentives and behavioral guidance, role model stories influence entrepreneurial behaviors in the process of people's career choices (Shapero and Sokol, 1982; Brenner et al., 1991; Lent et al., 1994). Particularly, role model stories can stimulate entrepreneurial intention by providing positive information (Gnyawali and Fogel, 1994) and reference information (Minniti and Nardone, 2007). This information in the role model stories helps individuals to discover entrepreneurial opportunities and reduce risks in the future venture creation process. Depending on the external environment and individual factors, these stories consolidate individuals' entrepreneurial intentions (Stapel and Koomen, 2001; Lockwood, 2006).

Hence, the following research hypothesis was postulated in the present study:

Hypothesis 1: Role model stories have a positive impact on entrepreneurial intentions.

Success/Failure Stories and Entrepreneurial Intention

According to the expectations theory, positive outcomes lead to an increase in the expectation of good results, while negative outcomes have a weakening effect. Individuals enjoy scrutinizing successful entrepreneurship models, which potentially enhances their original entrepreneurial intention (Fellnhofer and Puumalainen, 2017). Comparing this with the agreement on successful role model stories (Chang, 2014), recent entrepreneurship studies cast some doubt about the specific influence of failure role model stories. From the expectation theory, failure role model stories reduce individual's expectations of the event. However, McGrath (1999) find that failure role models influence potential entrepreneurs positively. Given the finds in previous research, we propose that failure role models stories also influence entrepreneurial intentions positively, but less so than successful role model stories.

Hence, the following research hypothesis was postulated in the present study:

Hypothesis 2: Successful role model stories have a greater impact on entrepreneurial intentions than failure role model stories.

The Mediating Role of Entrepreneurial Passion

From the SCT perspective (Bandura, 1986), external environment, personal factors and individual intentions interact with each other dynamically. Mehrabian and Russell (1974) concluded that the external environment's stimulation of behavior must be influenced through emotional responses. Following this guideline, we argue that external environment influences people's intentions through individual factors. More specifically, role model stories influence entrepreneurial intentions through emotional responses. However, the mediating role of the personal factor is not mentioned in many related studies. With regard to the limitation of current conceptualizations of the relationship between the entrepreneurial role model and career choice, Barnir et al. (2011) proposed the possibility of intervening variables which may complement the literature deficient. Their suggestion corresponds to the passion theories, that domain-specific work passion drives motivation and engagement due to its motivational effect (Obschonka et al., 2018). People may generate different emotional beliefs for the same role model story, bringing various conclusions and distinctive entrepreneurial intentions. Consistent with this viewpoint, Obschonka et al. (2018) investigated the mediating effect of entrepreneurial passion between personality and entrepreneurial behavior.

Passion, as an important personal factor for entrepreneurship (Baum et al., 2001), is considered to be a relatively stable personality trait and drive people to react consistently in different situations (Chu, 2011). Tremendous research has explored entrepreneurial passion and its effectiveness (Cardon, 2008; Cardon et al., 2013; Cardon and Kirk, 2015). However, the issue of entrepreneurial passion as a factor for entrepreneurial intention has not yet been revealed in the literature. Whether entrepreneurial passion is a key factor in the potential entrepreneurial intention is worth exploring and verifying (Fellnhofer and Puumalainen, 2017). Deeper examination for the impact of entrepreneurial passion is urgent in this area (Gibson, 2004; Stam and Schutjens, 2004).

Hence, the following research hypothesis was postulated in the present study:

Hypothesis 3: Role models stories have a positive impact on entrepreneurial intentions through the intermediary variable of entrepreneurial passion.

The Moderating Effect of Entrepreneurial Self-Efficacy

Self-efficacy, defined as a person's belief in her/his own ability to achieve a goal (Bandura, 1977), is widely applied to entrepreneurial intention within the field of entrepreneurship (Lent and Hackett, 1987; Krueger et al., 2000; Sequeira et al., 2007). Lee et al. (2011) found that the self-efficacy works as a moderator in the relationship between perceived desirable and entrepreneurial intentions. When facing low job satisfaction, individuals with high self-efficacy are more willing to start a business. Recent research shows that self-efficacy is positively related to many entrepreneurial behaviors. For instance, Chen et al. (1998) found that entrepreneurs possess higher self-efficacy than managers. Hmieleski and Corbett (2008) revealed the positive relationship between self-efficacy and new venture performance. In this study, we concentrate on task-specific self-efficacy, rather than general self-efficacy, since task-specific self-efficacy is more predictive when studying entrepreneurial behaviors (Chen et al., 1998).

Focusing on entrepreneurship education, we argue that individuals with different self-efficacy engender distinctive reactions for the role model stories. More specifically, successful role model stories are more likely to impress audiences with high self-efficacy and failure role model stories are more likely to impress audiences with low self-efficacy. Since empirical studies rarely have examined the moderation effect of self-efficacy (Lin and Si, 2014), this study verifies entrepreneurial self-efficacy's moderating effect. We propose that individuals with high self-efficacy are more sensitive to entrepreneurial role model stories.

Hence, the following research hypothesis was postulated in the present study:

Hypothesis 4: Entrepreneurial self-efficacy plays a positive role in the relationship between entrepreneurial role models' stories and individuals' entrepreneurial intentions. When students' self-efficacy is high, the relationship will be stronger.

The Moderating Effect of the Distance Between Audience and Role Model

Besides personal factors, many researchers have emphasized the influence of environmental factors on entrepreneurial intention (Fayolle and Gailly, 2015). Hite and Hesterly (2001) believed that a close relationship with the role model has a stronger influence on an individual's entrepreneurial intention. Therefore, the relationship between success or failure role models and entrepreneurial intention may be affected by the distance between the audiences and role models. The strength of the relationship depends on the ability to make frequent or accessible connections. For example, children's attitudes toward entrepreneurship are affected by their family members who operate businesses (Carr and Sequeira, 2007), and peers influence individual's entrepreneurial activities among MBA students (Malmendier and Lerner, 2007). Nevertheless, the influence of entrepreneurship models comes from various aspects, not only face-to-face communication but also through the media, magazines and the internet which are far away. Thus, in entrepreneurial education, real contact between role models and the audience is not essential; role models may be proximal individuals, or can be celebrities, fictional characters, or historical figures. Social comparison does not require personal contact but rather identification and motivation to become "like the other" (Wilson et al., 2007).

In this paper, we utilize the distance between audience and role models as criteria and test its moderating effect on the relationship between storytelling and entrepreneurial intentions. Hite (2010) described the relationship between individuals and entrepreneurship as a strong tie or weak tie, and found the stronger tie has a greater impact on individual's entrepreneurial intention in the early stage of entrepreneurship. Peterman and Kennedy (2003) even ranked the role models by the influence process: family members were the most influential models, followed by peers, and idols. To correspond with this, we suggest that the distance between role model and audience is an important factor for storytelling influence process, and hypothesize the following:

Hypothesis 5: The distance between role model and audience influences the relationship between a success or failure story and audience's entrepreneurial intention.

Hypothesis 6: Peer role models have a stronger impact on the relationship between the success or failure story and audience's entrepreneurial intention than idol role models.

METHODOLOGY

Before presenting the sample and collection processing of the data, we give a brief overview of the characteristics of the EEPs under examination here. Two experiments are conducted in the EEPs to explore the validation of our hypotheses.

This study explores the impact of the story-based teaching in EEPs through metric conjoint analysis. The conjoint analysis, which uses a series of profiles to capture participants' assessments are collectively used to decompose the underlying structure of respondents' decisions (Shepherd and Zacharakis, 1999). Conjoint analysis explores the judgments of potential entrepreneurs on whether to conduct entrepreneurship and overcome the shortcomings of other research designs, therefore, it's a good choice in studying the effect of storytelling (Scheaf et al., 2018). In addition, this study uses a 2×2 hybrid design with self-variables for the class (experimental and control groups) by between-subjects design, and the measurement phase (pre-test and post-test) using the subjects (within-subjects design). The experiment process is shown in **Figure 1** while **Figure 2** summarizes the hypothesized relationships and the research design.

Investigating entrepreneurs' psychology is challenging, in part, because psychological variables and causal mechanisms are unobservable (Dan et al., 2017). The experimental method is an effective tool in confirming the causal relationships since it offers good control (reducing or eliminating the possible unrelated factors according to the research purpose), active transformation (actively manipulate experimental

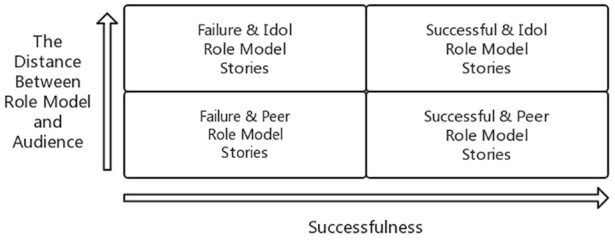

FIGURE 1 | The types of entrepreneurial story.

conditions to meet the needs of the experiment), and more realistic and effective data. As entrepreneurial intention, entrepreneurial passion, and self-efficacy are individual's psychological factors we employ the experimental method in this research. The controllable classroom provides a suitable environment condition to explore the role model's storytelling influence mechanism.

The EEPs named Entrepreneurship Management Course that we have chosen for Study 1 and Study 2 spanned 25 h over 6 weeks. The EEPs in our two experiments have the same content but different participants. Considering that freshmen are relatively naive and lack basic perception of business, the EEPs may be considered as an entrepreneurial awareness program. From a content point of view, the EEP was designed to provide practical guidance by covering a range of entrepreneurial knowledge, including basic concepts, initial mental preparation, opportunity identification and creation, innovation and transformation, and business launching. Issues about self-awareness, identifying opportunities, creative thinking, developing business models, entrepreneurship laws, BPs and securing external funding are all mentioned and discussed.

Entrepreneurship education programs for Study 1 was attended by 74 new students (37 males and 37 females) while EEP for study 2 was attended by 76 students (38 female and 38 male) from various bachelor disciplines in Southwest Jiaotong University in China. Both studies were divided into two parts: *t* pre-test and post-test. Measurements of dependent and independent variables in our model were based on a questionnaire administered to all participants at three different time periods: beginning of the program, immediately after the storytelling course, and after all courses completed.

These questionnaires are directly inspired by those developed and validated by Kolvereid (1996a,b). The three questionnaires in both experiments all included questions related to the measurement of the parameters of Ajzen's intention model and Cardon's entrepreneurial passion scale, including 13 Likert-scale items (with scores ranging from 1- "Totally disagree" to 7- "Totally agree"). In the questionnaires, six items concerned self-efficacy (for instance "I have the ability to solve problems"), three items concerned entrepreneurial passion (for instance "establishing a new company excites me"), and four items concerned entrepreneurial intention (for instance "I already have a business plan.") (see **Appendix: Variable Measurement**).

The first questionnaire also included a specific part with participants' background information concerning socio-demographic variables (Robinson et al., 1991) and other variables related to prior entrepreneurial exposure and experience. Therefore, it allowed us to measure control variables (gender, initial self-efficacy, and initial entrepreneurial intention) in our model. All three questionnaires were administered in the same conditions. A specify member of the research team was designated to answer potential questions and ensure the operation ran smoothly each time (see original data in the **Supplementary Materials**).

MEASURES

Independent Variable

Successful entrepreneurial story and failure entrepreneurial story were used as independent variables in both experiments, the

First Week	Second Week	Third Week	Fourth Week
1. Send e-questionaire to freshment who have already chosen the Entrepreneurship Management Course	1.Organize collected data (T1EI/TISE/Gender). 2.Find and identify two classrooms that are consistent with the experimental requirement	1.Preparation and confirmation of formal experiment 2.Divide students into two experimental group	1.Designate students into each group according to the allocation in advance 2.Conduct formal experiment (classroomA:successful stories /classroomB:failure stories). 3.Send questionaire to student (T2EI/T2SE/EP).

FIGURE 2 | The flow of experiment 1.

successful entrepreneurial story was coded as 1, and the failure entrepreneurial story was coded as 0.

Dependent Variable

Entrepreneurial intention is the dependent variable in current research and the measurement mainly adopts the continuous measurement method of multiple items, among which the four-item scales of Zhao et al. (2005), and the five items of Chen et al. (1998) were most commonly used. In this study, we chose Chen's method to measure entrepreneurial intention. As freshmen have no concept for the question, "When will you set up a new business in the future?", we deleted it from the questionnaire and retested the questionnaires validity (Cronbach's alphas = 0.826).

Control Variable

Some scholars believed that the entrepreneurial intentions for individuals in different stages are highly correlated (Zhao et al., 2005), therefore, this study takes the original entrepreneurial intention as a control variable. Similarly, students' original sense of self-efficacy was employed as another control variable. In addition, gender is also an important variable that affects the role of entrepreneurial stories in individual entrepreneurial intentions (Laviolette et al., 2012). Therefore, this study also took gender as a control variable.

Moderator Variable

In study 1, self-efficacy after the experiment was used as a moderator, and the measurement was the same as used for the original self-efficacy beforehand. In study 2, the distance between students and the entrepreneurial role model was employed as a moderator as well. The idol was coded as 0 and the peer was coded as 1 (0 = idol, 1 = peer).

Mediator Variable

In study 1, we tried to explore the relationship between entrepreneurial stories and a student's entrepreneurial intentions, and entrepreneurial passion was considered as a mediator between these two variables. There were two popular ways to measure entrepreneurial passion. Vallerand and Houlfort (2003) compiled a scale of entrepreneurial passion from two dimensions: forced passion and harmonious passion. In contrast, Cardon et al. (2009) measured entrepreneurial passions based on the different identities of entrepreneurs from three aspects: innovation passion, creation passion, and development passion. Since all participants in this study are students and they have not had entrepreneurial experience, we used the creative passion dimension to measure entrepreneurial passion. Considering that freshmen may have no concept of actual entrepreneurial behavior, we deleted the item: "Is being the founder of a business is an important part of who I am?", then retested the questionnaires validity (Cronbach's alphas = 0.807).

Experiments Design

Procedures for the two experiments are presented in **Figures 2**, **3**.

Study 1 seeks to: (1) verify the different impact of successful/failed stories on students' entrepreneurial intention; (2) verify the mediating role of entrepreneurial passion; (3) verify whether entrepreneurial self-efficacy moderates the relationship between role model stories and entrepreneurial intention. Experiment 1 model is shown in **Figure 4**.

Study 2 seeks to: (1) Re-validate the impact of successful/failure entrepreneurial role model stories on students' entrepreneurial intentions; (2) Re-validate the different effect of successful and failure entrepreneurial role model stories; (3) explore the moderating effect of the distance between students and role models. Experiment 2 model is shown in **Figure 4**.

Both experiments were divided into pre-test and post-test and, to collect data, students filled out the questionnaires 1 month before and after the experiment.

Pre-test

Before the new semester started, an e-questionnaire was sent to freshmen who had already chosen the Entrepreneurship Management Course. The questionnaire mixed the items of entrepreneurial self-efficacy and entrepreneurial intentions into other items about the students' requirements and expectations for the course. In this way, we hoped to achieve the purpose of covering up the experimental intentions. Three data, including student's original entrepreneurial intention (T1EI), original self-efficacy (T1SE), and gender, were collected.

Formal Experiment

In study 1, the teacher informed students that the class was divided into two groups for discussion. According to the random allocation in advance, 37 students were designated to each group. One group stayed in Classroom A and one group went to pre-prepared Classroom B. Students in Classroom A were told a successful entrepreneurship story while students in Classroom B were told a failure story. After storytelling, each group had a discussion with their storytellers to get more information (see **Figure 1**). In study 2, before the course began, students were divided into four groups and assigned separately to classroom A, B, C, and D. The four groups took part in the experiments with almost identical conditions and heard different entrepreneurial role model stories (see **Figure 3**). Also, after storytelling, each group had a discussion with their storytellers to gain more information.

Post-test

After students finished the experiment, teachers issued a questionnaire to them, seeking to understand their feelings and evaluations. The questionnaire also mixed the items related to entrepreneurial intention (T2EI), self-efficacy (T2ES), and entrepreneurial passion with other items about evaluating the course. Items related to entrepreneurial intention and entrepreneurial self-efficacy were changed in expression, and, as pretest was conducted 1 month before the start of the course, the likelihood of exposure for experimental purposes was reduced.

First Week	Second Week	Third Week	Fourth Week
1. Send e-questionaire to freshment who have already chosen the Entrepreneurship Management Course	1.Organize collected data (T1EI/TISE/Gender) 2.Find and identify four classrooms that are consistent with the experimental requirement	1.Preparation and confirmation of formal experiment 2.Divide students into four experimental group	1.Designate students into each group according to the allocation in advance 2.Conduct formal experiment (classroomA:successful & peer stories/ classroomB:successful & idol stories/ classroomC:failure & peer stories/ classroomD:failure & idol stories) 3.Send questionaire to student (T2EI/T2SE/EP)

FIGURE 3 | The flow of experiment 2.

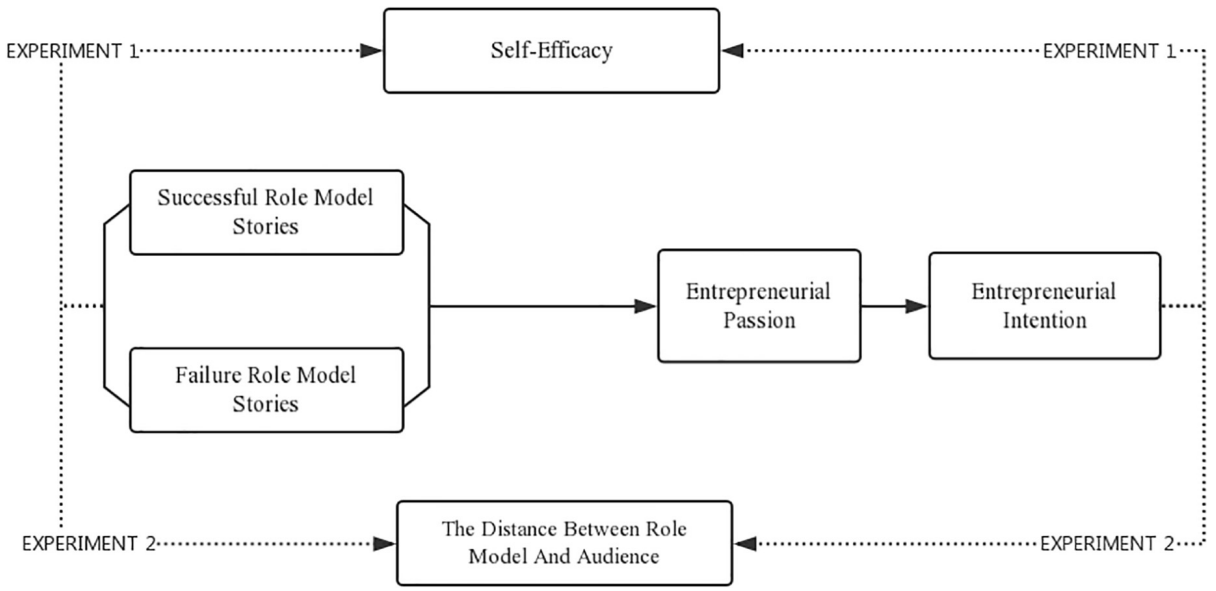

FIGURE 4 | The model of experiments.

ANALYSIS AND RESULTS

Result for Study 1

Appendix Table A1 reports descriptive statistics for study 1. Students' original entrepreneurial intention (2.9196) is lower than post-experimental entrepreneurial intention (3.8678), indicating that entrepreneurial intention was generally improved by the storytelling course. Entrepreneurial intention for students that heard successful entrepreneurial stories (4.2265) is higher than that for students who heard failure entrepreneurial stories (3.5091); Entrepreneurial intention for students who heard successful entrepreneurial stories has increased 1.3319, which is higher than students that heard failure stories (0.5644).

Results of hierarchical linear regression to test hypotheses were showed in **Appendix Table A2**. In Model 1, we examined the baseline model with only control variables: gender, entrepreneurial self-efficacy. Results show that original entrepreneurial intention (T1) ($\beta = -0.112$, $p > 0.05$) has no significant influence. But gender ($\beta = 0.338$, $p < 0.01$) and self-efficacy (T1) ($\beta = 0.296$, $p < 0.01$) before the experiment have a significant impact on students' entrepreneurial intentions (T2) after the experiment.

After independent variables and moderating variables added in Model 2, the influence of the control variables on the entrepreneurial intention (T2) disappeared. The positive and significant effect ($\beta = 0.33$, $p < 0.01$) strongly support hypothesis 1. At the same time, the coefficient for successful

stories is higher than failure stories. Therefore, hypothesis 2 was supported.

Model 3 added the interaction term between independent variable and moderating variable based on model 2. The positive and significant effect for entrepreneurial stories (β = 0.191, $p < 0.01$) proves hypothesis 1 again. In addition, the interaction effect for self-efficacy (β = 0.388, $p < 0.05$) is also positive and significant and hypothesis 4 is supported. The coefficient for self-efficacy (β = 0.406, $p < 0.01$) is no longer significant after interaction item is added in model 3, suggesting the direct effect of self-efficacy is replaced by its moderating effect. When students' self-efficacy is high, the impact of stories on students' entrepreneurial intention will be stronger. Comparing R^2 for the three models, model 3 (β = 0.651, $p < 0.005$) is the best to explain the research problem. Based on the above analysis, hypotheses 1, 2, and 4 are supported.

According to the sequential test of mediator variables (Wen et al., 2004), we examine the mediating effect of entrepreneurial passion as shown in **Appendix Table A3**. Model 1 tests the relationship between entrepreneurial stories and entrepreneurial intention again where coefficient β = 0.511, ($p < 0.01$); In Model 2, success/failure stories are used as an independent variable, and entrepreneurial passion as a dependent variable. The positive has a significant effect β = 0.0.527 ($p < 0.01$) supporting the relationship between these two variables; In Model 3, the positive and significant coefficient β = 0.542 ($p < 0.01$) supports the relationship between entrepreneurial passion and entrepreneurial intention (T2); Model 4 tests the effect of entrepreneurial passion and entrepreneurial stories on entrepreneurial intention. The influence for entrepreneurial passion (β = 0.377, $p < 0.01$), and the influence for entrepreneurial stories (β = 0.313, $p < 0.01$) are both positive and significant. Therefore, the intermediating role for entrepreneurial passion is proved and hypothesis 3 is supported.

Above, hypothesis 1, 2, 3, and 4 are supported.

Result for Study 2

Before the experiment, students' entrepreneurial intentions are similar and the average number is roughly equal to 3.2, however, after the experiment, students' entrepreneurial intentions are obviously different. Average growth rate of entrepreneurial intention for students who listened to the failure-peer story is 0.6339, higher than the rate of students who listened to the failure-idol story, which is 0.2916. Similarly, the average growth rate of entrepreneurial intention for students who listened to the successful-peer story is 1.1045, higher than the rate of students who listened to the successful-idol story, which is 0.4256.

Experiment 2 tested the moderating effect of distance between students and entrepreneurial role models, where distance is measured by variance. Results in **Appendix Table A4** show that an entrepreneurial role model ($F = 13.145$, $P < 0.05$) has a significant impact on the students' entrepreneurial intention as post-experiment students' entrepreneurial intention (3.8387) is higher than students' original entrepreneurial intention (3.2247). The interactions between the entrepreneurial stories and moderating variables have a significant impact on the students' entrepreneurial intention ($F = 4.029$, $p < 0.05$), thus, proving that the distance between student and the role model is the moderating variable between the role model story and the entrepreneurial intention and supporting hypothesis 5.

Before experiment 2, the average numbers of entrepreneurial intention for students in the peer and idol groups were very close. But after entering different groups, the average number of students' entrepreneurial intention in the peers group increased more than the average number of entrepreneurial intention of all students. The growth rate for students in idol group is smaller than students in peers group. Therefore, the distance between students and entrepreneurial role models has a negative effect on the relationship between entrepreneurial stories and students' entrepreneurial intention. The closer the relationship is, the more positive effect between the two variables. In summary, hypothesis 6 is supported.

In summary, the above two experiments prove all hypotheses.

DISCUSSION

This study investigates the effect of storytelling on individuals' entrepreneurial intention. Results show that both successful stories and failure stories positively affect individuals' perceived attitudes. Furthermore, rather than the idol stories which are commonly utilized by educators in entrepreneurship education, peer stories are more effective in arousing individuals' entrepreneurial intention. This result complies with Hite and Hesterly's (2001) proposition that, the closer the entrepreneurial model is, the greater the impact on individuals. It reveals that the distance between audience and role models will decrease the storytelling's persuasiveness. These results highlight that the effects of storytelling vary in relation with different role models. We consider that it is a potential path to optimize EEPs in the future. Educational content of EEPs should be examined cautiously and utilized according to the particular teaching aim, regardless of whether the contents are popular or not.

In addition, our results indicate that individuals' self-efficacy moderates the relationship between entrepreneurial storytelling and entrepreneurial intention. In other words, role model stories are more likely to arouse entrepreneurial intentions for individuals who possess higher self-efficacy. In line with Bandura's theory of self-efficacy, our study shows that individuals with a high sense of self-efficacy often expect more future successes. One explanation is that individuals with high self-efficacy are more sensitive to positive outcomes and neglect the negative signals such as potential problems or risks of failure. Thus, successful stories are more likely to inspire individuals with high self-efficacy. By synthesizing, the current study contributes to entrepreneurship education by providing practical implications for Case-based teaching.

Limitations

First, considering our research topic, the sample size is relatively small. All students are from the same university and the

homogeneity of samples may influence the experimental results. A huge sample size with diverse backgrounds may reduce such influences. Second, freshmen are not the best choice for subjects as they do not face career choices immediately, and starting a business is not a realistic option for them. Thus, relevant empirical researches are needed to test the validity. Third, although we have made great efforts, it difficult to ensure the control groups are really "equivalent" to each other. For instance, even teachers in the experiments give the same story, but the way they describe the story and express themselves creates differences. To avoid or reduce such potential systemic biases, we rehearsed the experiment cautiously, from model stories to declarative languages. Fourth, this study merely predicts entrepreneurial intentions rather than entrepreneurial behaviors. This limitation widely exists in entrepreneurship research as it's very difficult to predict and measure entrepreneurial behaviors. We intend to follow up this sample in a few years, if possible.

CONCLUSION

This research aims to better understand the storytelling in entrepreneurship education. Many previous studies which mentioned the impact of storytelling as role model stories are widely utilized in EEPs. However, many of them treat the storytelling in entrepreneurship education as an undifferentiated whole. Only a few scholars have tried to tease out the distinctive effect from different types of entrepreneurial stories. Within the frame work of our study, we find distinctive educational content influences audiences differently through individuals' entrepreneurial passions. Counterintuitively, rather than idol stories, peer stories are more inclined to increase individuals' entrepreneurial intentions. Although many teachers have spent a lot of time and energy writing biographies for famous idols and telling these stories in their classes, our research shows that such efforts may not reach their expectations. To a certain extent, this insight is coherent with some research results from different fields like health (Lockwood et al., 2004; Hindle and Klyver, 2007; Adekiya and Ibrahim, 2016). Thus, our study provides some theoretical and practical implications for educators who engage in entrepreneurship education.

In addition, we investigated storytelling's influence process by testing the mediating effect of entrepreneurial passion and the moderating effect of self-efficacy. Educators can invoke this model to better understand the teaching mechanism, and thus update their training programs. As noted earlier, individuals with low self-efficacy are less motivated by storytelling. This suggests that in our teaching or training, we should pay attention to students with low self-efficacy, increasing their self-efficacy perception or utilizing more persuasive role models. Such activities will strengthen case studies in the teaching process.

This study advances our knowledge about entrepreneurship education and provides an important foundation for future research. Both contents and methods are important factors for entrepreneurship teaching. More future research is needed to explore the relationship between entrepreneurship education and entrepreneurial behavior. We suggest that entrepreneurship education should not only promote individuals' intention but find the right person who needs it. For instance, we should not overemphasize entrepreneurial success for individuals with high self-efficacy in case they are overconfident, but encourage individuals who possess low self-efficacy. A significant amount of research into entrepreneurship education is necessary to better understand the teaching mechanism, process and influences.

ETHICS STATEMENT

This study was reviewed and approved by the Ethics Committee of Southwest Jiatong university. This study was carried out in accordance with the recommendations of the Ethics Committee of Academic Committee at the Southwest Jiaotong University with informed consent from all participates. All participates gave written informed consent in accordance with the Declaration of Helsinki. The protocol was approved by the Ethics Committee of Academic Committee.

AUTHOR CONTRIBUTIONS

FL, JM, and RL participated in the design of this study and performed the statistical analysis and carried out the study and collected important background information. RL drafted the manuscript. FL, JM, and RL carried out the concepts, design, definition of intellectual content, literature search, data acquisition, data analysis, and manuscript preparation. All authors read and approved the final manuscript.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2019.00837/full#supplementary-material

DATA SHEET S1 | Original data.

REFERENCES

Adekiya, A. A., and Ibrahim, F. (2016). Entrepreneurship intention among students. The antecedent role of culture and entrepreneurship training and development. *Int. J. Manag. Educ.* 14, 116–132. doi: 10.1016/j.ijme.2016.03.001

Ajzen, I. (1991). The theory of planned behavior. *Organ. Behav. Hum. Decis. Process.* 50, 179–211. doi: 10.1016/0749-5978(91)90020-T

Akerlof, G. A., and Kranton, R. E. (2000). Economics and identity. *Quart. J. Econ.* 115, 715–753. doi: 10.1162/003355300554881

Alessandro, B., and Vita, K. (2016). The role of entrepreneurial passion and creativity in developing entrepreneurial intentions: insights from american homebrewers. *J. Small Bus. Manag.* 55, 170–188.

Aspinwall, L. G. (1997). "Future-oriented aspects of social comparisons: a framework for studying health-related comparison activity," in *Health, Coping, and Well-being: Perspectives from Social Comparison Theory*, eds B. P. Buunk and F. X. Gibbons (Mahwah, NJ: Lawrence Erlbaum Associates), 125–165.

Audet, J. (2004). L'impact de deux projets de session sur les perceptions et intentions entrepreneuriales d'etudiants en administration. *J. Small Bus. Entrep.* 17, 221–238. doi: 10.1080/08276331.2004.10593321

Autio, E., Keeley, R. H., Klofsten, M., and Ulfstedt, T. (1997). "Entrepreneurial intent among students: testing an intent model in Asia, Scandinavia and USA," in *Proceedings of the seventeenth annual Entrepreneurship Research Conference*, ed. Paul D. Reynolds (Wellesley, MA: Babson College).

Bandura, A. (1977). Self-efficacy: toward a unifying theory of behavioral change. *Psychol. Rev.* 84:191. doi: 10.1037/0033-295X.84.2.191

Bandura, A. (1986). Social foundations of thought and action: a social cognitive theory. *J. Appl. Psychol.* 12:169.

Bandura, A. (1989). Regulation of cognitive processes through perceived self-efficacy. *Dev. Psychol.* 25, 729–735. doi: 10.1037/0012-1649.25.5.729

Bandura, A. (2010). *General Self-Efficacy and Course Satisfaction in Online Learning: A Correlational Study*. Ph.D. Thesis, University of Missouri-Colombia, Missouri-Colombia.

Barnir, A., Watson, W. E., and Hutchins, H. M. (2011). Mediation and moderated mediation in the relationship among role models, self-efficacy, entrepreneurial career intention, and gender. *J. Appl. Soc. Psychol.* 41, 270–297. doi: 10.1111/j.1559-1816.2010.00713.x

Basow, S. A., and Howe, K. G. (1980). Role-model influence: Effects of sex and sex-role attitude in college students. *Psychol. Women Quart.* 4, 558–572. doi: 10.1111/j.1471-6402.1980.tb00726.x

Baum, J. R., Locke, E. A., and Smith, K. (2001). A multidimensional model of venture growth. *Acad. Manag. J.* 44, 292–303. doi: 10.5465/3069456

Beugelsdijk, S., de Groot, H. L. F., and van Schaik, A. B. T. M. (2004). Trust and economic growth: a robustness analysis. *Oxford Econ. Papers* 56, 118–134. doi: 10.1093/oep/56.1.118

Biraglia, A., and Kadile, V. (2017). The role of entrepreneurial passion and creativity in developing entrepreneurial intentions: Insights from American homebrewers. *J. Small Bus. Manag.* 55, 170–188. doi: 10.1111/jsbm.12242

Blanton, H. (2001). "Evaluating the self in the context of another: The three-selves model of social comparison assimilation and contrast," in *Cognitive Social Psychology: The Princeton Symposium on the Legacy and Future of Social Cognition*, ed. G. B. Moskowitz (Mahwah, NJ: Lawrence Erlbaum Associates Publishers), 75–87.

Bohlmann, C., Rauch, A., and Zacher, H. (2017). A lifespan perspective on entrepreneurship: perceived opportunities and skills explain the negative association between age and entrepreneurial activity. *Front. Psychol.* 8:2015. doi: 10.3389/fpsyg.2017.02015

Boissin, J., and Emin, S. (2006). "Students and entrepreneurship: the effect of training," in *Paper Presented at the Conference of the International Association of Strategic Management*, Annecy.

Bosma, N., Hessels, J., Schutjens, V., Van Praag, M., and Verheul, I. (2012). Entrepreneurship and role models. *J. Econ. Psychol.* 33, 410–424. doi: 10.1016/j.joep.2011.03.004

Bosma, N., and Schutjens, V. (2011). Understanding regional variation in entrepreneurial activity and entrepreneurial attitude in Europe. *Ann. Reg. Sci.* 47, 711–742. doi: 10.1007/s00168-010-0375-7

Bouwen, R., and Steyaert, C. (1997). *Telling Stories of Entrepreneurship. Towards a Narrative-Contextual Epistemology for Entrepreneurial Studies*. Farnham: Ashgate.

Brenner, O. C., Pringle, C. D., and Greenhaus, J. H. (1991). Perceived fulfillment of organizational employment versus. *J. Small Bus. Manag.* 29:62.

Busenitz, L. W., and Barney, J. B. (1997). Differences between entrepreneurs and managers in large organizations: biases and heuristics in strategic decision-making. *J. Bus. Ventur.* 12, 9–30. doi: 10.1016/S0883-9026(96)00003-1

Cardon, M. S. (2008). Is passion contagious? The transference of entrepreneurial passion to employees. *Hum. Res. Manag. Rev.* 18, 77–86. doi: 10.1016/j.hrmr.2008.04.001

Cardon, M. S., Gregoire, D. A., Stevens, C. E., and Patel, P. C. (2013). Measuring entrepreneurial passion: conceptual foundations and scale validation. *J. Bus. Ventur.* 28, 373–396. doi: 10.1016/j.jbusvent.2012.03.003

Cardon, M. S., and Kirk, C. P. (2015). Entrepreneurial passion as mediator of the self–efficacy to persistence relationship. *Entrep. Theor. Pract.* 39, 1027–1050. doi: 10.1111/etap.12089

Cardon, M. S., Wincent, J., Singh, J., and Drnovsek, M. (2009). The nature and experience of entrepreneurial passion. *Acad. Manag. Rev.* 34, 511–532. doi: 10.5465/amr.2009.40633190

Carr, J. C., and Sequeira, J. M. (2007). Prior family business exposure as intergenerational influence and entrepreneurial intent: a theory of planned behavior approach. *J. Bus. Res.* 60, 1090–1098. doi: 10.1016/j.jbusres.2006.12.016

Chang, L. (2014). The difference of social cultural traits influence rural entrepreneurial activity. *Stud. Sci. Sci.* 32, 1888–1896.

Chen, C. C., Gene Greene, P., and AnnCrick, C. (1998). Does entrepreneurial self-efficacy distinguish entrepreneurs from managers? *J. Bus. Ventur.* 13, 295–316. doi: 10.1016/S0883-9026(97)00029-3

Chu, L. (2011). *General Passion Scale (GEN-PS): Toward the Validation of Passion as a General Trait-Like Personality Construct*. Denton: Texas Woman's University.

Dan, K. H., Wiklund, J., and Cotton, R. D. (2017). Success, failure, and entrepreneurial reentry: an experimental assessment of the veracity of self-efficacy and prospect theory. *Entrep. Theory Pract.* 41, 19–47. doi: 10.1111/etap.12166

Douglas, E. J., and Shepherd, D. A. (2002). Self-employment as a career choice: attitudes, entrepreneurial intentions, and utility maximization. *Entrep. Theory Pract.* 26, 81–90. doi: 10.1177/104225870202600305

European Commission (2003). *Guidance Document on Assessment of the Relevance of Metabolites in Groundwater of Substances Regulated Under Council Directive 91/414/EEC*. Brussels: European Commission.

Fayolle, A., and Gailly, B. (2008). From craft to science: teaching models and learning processes in entrepreneurship education. *J. Eur. Indust. Train.* 32, 569–593. doi: 10.1108/03090590810899838

Fayolle, A., and Gailly, B. (2015). The impact of entrepreneurship education on entrepreneurial attitudes and intention: hysteresis and persistence. *J. Small Bus. Manag.* 53, 75–93. doi: 10.1111/jsbm.12065

Fellnhofer, K. (2017). Facilitating entrepreneurial discovery in smart specialisation via stakeholder participation within online mechanisms for knowledge-based policy advice. *Cogent Bus. Manag.* 4:1296802. doi: 10.1080/23311975.2017.1296802

Fellnhofer, K., and Puumalainen, K. (2017). Can role models boost entrepreneurial attitudes? *Int. J. Entrep. Innov. Manag.* 21:274. doi: 10.1504/IJEIM.2017.083476

Gaglio, C. M., and Katz, J. A. (2001). The psychological basis of opportunity identification: entrepreneurial alertness. *Small Bus. Econ.* 16, 95–111. doi: 10.1023/A:1011132102464

Geneve, A., Nelson, K. J., and Christie, R. J. (2008). "Passion, women and the games industry: influences on women's participation in the Australian digital content industry," in *proceedings of the In Women in Games*, Warwick.

Gibson, D. E. (2004). Role models in career development: new directions for theory and research. *J. Vocat. Behav.* 65, 134–156. doi: 10.1016/S0001-8791(03)00051-4

Gnyawali, D. R., and Fogel, D. S. (1994). Environments for entrepreneurship development: key dimensions and research implications. *Entrep. Theory Practice* 18, 43–62. doi: 10.1177/104225879401800403

Hindle, K., and Klyver, K. (2007). Exploring the relationship between media coverage and participation in entrepreneurship: initial global evidence and research implications. *Int. Entrep. Manag. J.* 3, 217–242. doi: 10.1007/s11365-006-0018-8

Hite, J. M. (2010). Evolutionary processes and paths of relationally embedded network ties in emerging entrepreneurial firms. *Entrep. Theory Pract.* 29, 113–144. doi: 10.1111/j.1540-6520.2005.00072.x

Hite, J. M., and Hesterly, W. S. (2001). The evolution of firm networks: from emergence to early growth of the firm. *Strat. Manag. J.* 22, 275–286. doi: 10.1002/smj.156

Hmieleski, K. M., and Corbett, A. C. (2008). The contrasting interaction effects of improvisational behavior with entrepreneurial self-efficacy on new venture performance and entrepreneur work satisfaction. *J. Bus. Ventur.* 23, 482–496. doi: 10.1016/j.jbusvent.2007.04.002

Hu, R., Wang, L., Zhang, W., and Bin, P. (2018). Creativity, proactive personality, and entrepreneurial intention: the role of entrepreneurial alertness. *Front. Psychol.* 9:951. doi: 10.3389/fpsyg.2018.00951

Katz, J. A. (2003). The chronology and intellectual trajectory of American entrepreneurship education: 1876–1999. *J. Bus. Ventur.* 18, 283–300. doi: 10.1016/S0883-9026(02)00098-8

Kolvereid, L. (1996a). Organizational employment versus self-employment: reasons for career choice intentions. *Entrep. Theory Pract.* 20, 23–31. doi: 10.1177/104225879602000302

Kolvereid, L. (1996b). Prediction of employment status choice intentions. *Entrep. Theory Pract.* 21, 47–58. doi: 10.1177/104225879602100104

Krueger, N. F. Jr., Reilly, M. D., and Carsrud, A. L. (2000). Competing models of entrepreneurial intentions. *J. Bus. Ventur.* 15, 411–432. doi: 10.1016/S0883-9026(98)00033-0

Krumboltz, J. D., Mitchell, A. M., and Jones, G. B. (1976). A social learning theory of career selection. *counsel. Psychol.* 6, 71–81. doi: 10.1177/001100007600600117

Kuratko, D. F. (2005). The emergence of entrepreneurship education: development, trends, and challenges. *Entrep. Theory Pract.* 29, 577–597. doi: 10.1111/j.1540-6520.2005.00099.x

Laviolette, E. M., Radu Lefebvre, M., and Brunel, O. (2012). The impact of story bound entrepreneurial role models on self-efficacy and entrepreneurial intention. *Int. J. Entrepr. Behav. Res.* 18, 720–742. doi: 10.1108/13552551211268148

Lee, L., Wong, P. K., Foo, M. D., and Leung, A. (2011). Entrepreneurial intentions: the influence of organizational and individual factors. *J. Bus. Ventur.* 26, 124–136. doi: 10.1016/j.jbusvent.2009.04.003

Lent, R. W., Brown, S. D., and Hackett, G. (1994). Toward a unifying social cognitive theory of career and academic interest, choice, and performance. *J. Vocat. Behav.* 45, 79–122. doi: 10.1006/jvbe.1994.1027

Lent, R. W., and Hackett, G. (1987). Career self-efficacy: empirical status and future directions. *J. Vocat. Behav.* 30, 347–382. doi: 10.1016/0001-8791(87)90010-8

Lin, S., and Si, S. (2014). Factors affecting peasant entrepreneurs' intention in the Chinese context. *Int. Entrep. Manag. J.* 10, 803–825. doi: 10.1007/s11365-014-0325-4

Liñán, F. (2004). Intention-based models of entrepreneurship education. *Small Bus.* 3, 11–35.

Lockwood, P. (2006). "Someone like me can be successful": do college students need same-gender role models? *Psychol. Women Quart.* 30, 36–46. doi: 10.1111/j.1471-6402.2006.00260.x

Lockwood, P., Jordan, C. H., and Kunda, Z. (2002). Motivation by positive or negative role models: regulatory focus determines who will best inspire us. *J. Pers. Soc. Psychol.* 83:854. doi: 10.1037/0022-3514.83.4.854

Lockwood, P., and Kunda, Z. (1997). Superstars and me: predicting the impact of role models on the self. *J. Pers. Soc. Psychol.* 73:91. doi: 10.1037/0022-3514.73.1.91

Lockwood, P., and Kunda, Z. (1999). Increasing the salience of one's best selves can undermine inspiration by outstanding role models. *J. Pers. Soc. Psychol.* 76:214. doi: 10.1037/0022-3514.76.2.214

Lockwood, P., and Kunda, Z. (2000). "Outstanding role models: Do they inspire or demoralize us?," in *Psychological Perspectives on Self and Identity*, eds A. Tesser, R. B. Felson, and J. M. Suls (Washington, DC: American Psychological Association), 147–171. doi: 10.1037/10357-006

Lockwood, P., Sadler, P., Fyman, K., and Tuck, S. (2004). To do or not to do: using positive and negative role models to harness motivation. *Soc. Cogn.* 22, 422–450. doi: 10.1521/soco.22.4.422.38297

Malmendier, U., and Lerner, J. (2007). *Mecca or Mirage? The Determinants and Outcomes of Entrepreneurship of Recent Harvard Business School Graduates*. New York, NY: Social Science Electronic Publishing.

McGrath, R. G. (1999). Falling forward: real options reasoning and entrepreneurial failure. *Acad. Manag. Rev.* 24, 13–30. doi: 10.5465/amr.1999.1580438

Mehrabian, A., and Russell, J. A. (1974). *An Approach to Environmental Psychology*. Cambridge: the MIT Press.

Miner, J. B. (2000). Testing a psychological typology of entrepreneurship using business founders. *J. Appl. Behav. Sci.* 36, 43–69. doi: 10.1177/0021886300361003

Minniti, M., and Bygrave, W. (2001). A dynamic model of entrepreneurial learning. *Entrep. Theory Pract.* 25, 5–16. doi: 10.1177/104225870102500301

Minniti, M., and Nardone, C. (2007). Being in someone else's shoes: the role of gender in nascent entrepreneurship. *Small Bus. Econ.* 28, 223–238. doi: 10.1007/s11187-006-9017-y

Obschonka, M., Moeller, J., and Göthner, M. (2018). Entrepreneurial passion and personality: the case of academic entrepreneurship. *Front. Psychol.* 9:2697. doi: 10.3389/fpsyg.2018.02697

Oosterbeek, H., Van Praag, M., and Ijsselstein, A. (2010). The impact of entrepreneurship education on entrepreneurship skills and motivation. *Eur. Econ. Rev.* 54, 442–454. doi: 10.1186/s12909-015-0524-x

Organisation for Economic Co-operation and Development (2009). *OECD Economic Outlook*. Paris: Organisation for Economic Co-operation and Development.

Peterman, N. E., and Kennedy, J. (2003). Enterprise education: influencing students' perceptions of entrepreneurship. *Entrep. Theory Pract.* 28, 129–144. doi: 10.1046/j.1540-6520.2003.00035.x

Piperopoulos, P., and Dimov, D. (2015). Burst bubbles or build steam? Entrepreneurship education, entrepreneurial self-efficacy, and entrepreneurial intentions. *J. Small Bus. Manag.* 53, 970–985. doi: 10.1111/jsbm.12116

Pittaway, L., and Cope, J. (2007). Entrepreneurship education: a systematic review of the evidence. *Int. Small Bus. J.* 25, 479–510. doi: 10.1177/0266242607080656

Robinson, P. B., Stimpson, D. V., Huefner, J. C., and Hunt, H. K. (1991). An attitude approach to the prediction of entrepreneurship. *Entrep. Theory Pract.* 15, 13–32. doi: 10.1177/104225879101500405

Scheaf, D. J., Davis, B. C., Webb, J. W., Coombs, J. E., Borns, J., and Holloway, G. (2018). Signals' flexibility and interaction with visual cues: insights from crowdfunding. *J. Bus. Ventur.* 33, 720–741. doi: 10.1016/j.jbusvent.2018.04.007

Sequeira, J., Mueller, S. L., and Mcgee, J. E. (2007). The influence of social ties and self-efficacy in forming entrepreneurial intentions and motivating nascent behavior. *J. Dev. Entrep.* 12, 275–293. doi: 10.1142/S108494670700068X

Shane, S., and Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. *Acad. Manag. Rev.* 25, 217–226. doi: 10.5465/amr.2000.2791611

Shapero, A., and Sokol, L. (1982). "The social dimensions of entrepreneurship," in *The Encyclopedia of Entrepreneurship*, eds C. Kent, D. Sexton, and K. H. Vesper (Englewood Cliffs, NJ: Prentice-Hall), 72–90.

Shepherd, D. A., and Zacharakis, A. (1999). Conjoint analysis: a new methodological approach for researching the decision policies of venture capitalists. *Int. J. Entrep. Finan.* 1, 197–217. doi: 10.1080/136910699295866

Solomon, G. T., Duffy, S., and Tarabishy, A. (2002). The state of entrepreneurship education in the United States: a nationwide survey and analysis. *Int. J. Entrep. Educ.* 1, 65–86.

Stam, E., and Schutjens, V. (2004). *The Performance of Team Start-ups in the First Phases of the Life Course. ERIM Report Series Reference No. ERS-2004-097-ORG*. Available at: https://ssrn.com/abstract=636797

Stapel, D. A., and Koomen, W. (2001). I, we, and the effects of others on me: how self-construal level moderates social comparison effects. *J. Pers. Soc. Psychol.* 80, 766–781. doi: 10.1037/0022-3514.80.5.766

Syam, A., Akib, H., Yunus, M., and Hasbiah, S. (2018). Determinants of entrepreneurship motivation for students at educational institution and education personnel in indonesia. *J. Entrep. Educ.* 21, 1–12.

Taylor, S. E., Wayment, H. A., and Carrillo, M. (1996). "Social comparison, self-regulation, and motivation," in *Handbook of Motivation and Cognition. The Interpersonal Context*, eds R. M. Sorrentino and E. T. Higgins (New York, NY: The Guilford Press), 3–27.

Tkachev, A., and Kolvereid, L. (1999). Self-employment intentions among Russian students. *Entrep. Reg. Dev.* 11, 269–280. doi: 10.1080/089856299283209

Tounés, A. (2003). *L'intention Entrepreneuriale: Une Recherche Comparative Entre Des Étudiants Suivant Des Formations En Entrepreneuriat (bac+ 5) et des Étudiants en DESS CAAE*. Rouen: Université de Rouen.

Vallerand, R. J., and Houlfort, N. (2003). "Passion at Work: Toward a New Conceptualization," in *Emerging Perspective on Values in Organizations*, eds S. W. Gilliland, D. D. Steiner, and D. P. Skarlicki (Charlotte: Information Age Publishing), 175–204.

Van Auken, H., Fry, F. L., and Stephens, P. (2006). The influence of role models on entrepreneurial intentions. *J. Dev. Entrep.* 11, 157–167. doi: 10.1142/S1084946706000349

Wen, Z., Zhang, L., and Hou, J. (2004). Mediation effect test procedure and its application. *Psychol. J.* 36, 614–620.

Wilson, F., Kickul, J., and Marlino, D. (2007). Gender, entrepreneurial self-efficacy, and entrepreneurial career intentions: implications for entrepreneurship education 1. *Entrep. Theory Pract.* 31, 387–406. doi: 10.1111/j.1540-6520.2007.00179.x

Wu, W., Wang, H., Zheng, C., and Wu, Y. J. (2019). Effect of narcissism, psychopathy and Machiavellianism on entrepreneurial intention-the mediating of entrepreneurial self-efficacy. *Front. Psychol.* 10:360. doi: 10.3389/fpsyg.2019.00360

Yar Hamidi, D., Wennberg, K., and Berglund, H. (2008). Creativity in entrepreneurship education. *J. Small Bus. Enterpr. Dev.* 15, 304–320. doi: 10.1108/14626000810871691

Zellweger, T., Sieger, P., and Halter, F. (2011). Should I stay or should I go? Career choice intentions of students with family business background. *J. Bus. Ventur.* 26, 521–536. doi: 10.1016/j.jbusvent.2010.04.001

Zhao, H., Seibert, S. E., and Hills, G. E. (2005). The mediating role of self-efficacy in the development of entrepreneurial intentions. *J. Appl. Psychol.* 90:1265.

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APPENDIX

TABLE A1 | Experiment 1: Descriptive statistics and correlations.

Variables	Mean	*SD*	1	2	3	4	5	6	7
(1) Entrepreneurial role model stories	0.50	0.503							
(2) Gender	0.50	0.503	0.081						
(3) Self-efficacy (T1)	3.2534	0.72064	0.207	−0.002					
(4) Entrepreneurial intention (T1)	2.9196	0.87072	−0.029	0.023	0.066				
Successful stories EI (T1)	2.8946								
Failure stories EI (TI)	2.9447								
(5) Entrepreneurial intention (T2)	3.8678	0.70648	0.511**	0.335**	0.287*	−0.085			.
Successful stories EI (T2)	4.2265								
Failure stories EI (T2)	3.5091								
(6) Self-efficacy (T2)	3.9845	0.96640	0.218	0.154	0.01	−0.568	0.566		
(7) Entrepreneurial passion	4.4126	0.79782	0.527**	0.194	0.251*	−0.074	0.542**	0.425**	1
Successful stories EP	4.9183								
Failure stories EP	3.9069								

*$p < 0.05$, **$p < 0.01$.

TABLE A2 | Experiment 1: The regression results of hierarchical linear regression.

	Standardized coefficients		
	Model 1	**Model 2**	**Model 3**
Control variables			
Gender (1 = female)	0.338**	0.211**	0.132
Self-efficacy (T1)	0.296**	0.197*	0.126
Entrepreneurial intention (T1)	−0.112	0.249**	0.222*
Successful stories EI (T1)			
Failure stories EI (TI)			
Main effects			
Entrepreneurial role model stories		0.330**	0.191*
Self-efficacy (T2)		0.601**	0.406**
Interaction effect			
Entrepreneurial role model stories × self-efficacy			0.388**
R^2	0.174**	0.586**	0.651**

*$p < 0.05$, **$p < 0.01$. $N = 74$.

TABLE A3 | Experiment 1: The mediating effects of entrepreneurial passion.

	Independent variable	Dependent variable	Standardized Coefficients	Sig.
Model 1	ERMS	EI (T2)	0.511	0.000
Model 2	ERMS	EP	0.527	0.000
Model 3	EP	EI (T2)	0.542	0.000
Model 4	EP	EI (T2)	0.377	0.001
	ERMS		0.313	0.006

ERMS, entrepreneurial role model stories; EP, entrepreneurial passion; EI, entrepreneurial intention.

TABLE A4 | Experiment 2: The results of descriptive statistics and variance analysis.

	Description statistic		Variance analysis	
Variable	**Mean (T1EI)**	**Mean (T2EI)**	**F**	**Sig**
ERMS			13.145	0.001
ERMS (Successful)	3.2846	4.0497 (0.7651)		
ERMS (failure)	3.1648	3.6276 (0.4628)		
DRMA			9.277	0.003
Idol	3.2288	3.5875 (0.3587)		
Peer	3.2206	4.0899 (0.8693)		
ERMS × DRMA			4.029	0.048
Successful × idol	3.3288	3.6594 (0.3306)		
Successful × peer	3.3355	4.4400 (1.1045)		
Failure × idol	3.2239	3.5515 (0.3276)		
Failure × peer	3.1059	3.7398 (0.6339)		

DRMA, the distance between role model and audience; ERMS, entrepreneurial role model stories.

Variable Measurement

All variable was measured by asking respondents to rate themselves.

1 means "Totally disagree" and 7 means "Totally agree."

Entrepreneurial Intention

(1) How interested they were in setting up their own business.
(2) To what extent they had considered setting up their own business.
(3) To what extent they had been preparing to set up their own business.
(4) How likely it was that they were going to try hard to set up their own business.

Entrepreneurial Passion

(1) Establishing a new company excites me.
(2) Owning my own company energizes me.
(3) Nurturing a new business through its emerging success is enjoyable.

Self-Efficacy

I am:

(1) Being able to solve problems.
(2) Managing money.
(3) Being creative.
(4) Getting people to agree with you.
(5) Being a leader.
(6) Making decisions.

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Model of the Entrepreneurial Intention of University Students in the Pearl River Delta of China

Fei Hou[1], Yu Su[1], Minru Lu[1] and Mingde Qi[2]*

[1] School of Management, Beijing Normal University, Zhuhai, China, [2] School of Management, Guangdong University of Technology, Guangzhou, China

Although the entrepreneurial intention of university students has been studied from different perspectives, the results are still not convergent, and the mechanism and outcomes related to how entrepreneurial intention could be affected by different factors lacking integrated investigation and comparative research. Based on emotional theory, the theory of planned behavior (TPB), and entrepreneurial cognitive theory, as well as the perception of specific situations encountered by university students, this paper attempts to explore entrepreneurial intention from three perspectives, including individual, family and school; and constructs an integrated model that includes entrepreneurial passion, role models, entrepreneurial education, entrepreneurial self-efficacy, and entrepreneurial intention. Based on a survey of university students in the Pearl River Delta of China, this paper attempts to explore the intrinsic mechanism of the development of entrepreneurial intention from these three perspectives. The results show that entrepreneurial passion, role models, and entrepreneurial education could have different effects on entrepreneurial intention; additionally, entrepreneurial self-efficacy plays an important mediating role. The research findings contribute to the literatures regarding the factors influencing entrepreneurial intention, providing empirical evidence to formulate policies to encourage university students' entrepreneurship practices and help to enhance effectiveness of entrepreneurship education.

Keywords: entrepreneurial passion, role models, entrepreneurship education, entrepreneurship self-efficacy, entrepreneurial intention

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****Correspondence:***
Fei Hou
houfei@bnuz.edu.cn

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INTRODUCTION

In recent years, with the emergence of entrepreneurship activities and incubators, more and more people have focused on the study of entrepreneurship. While university students are often regarded as potential entrepreneurs, entrepreneurial intention is the core variable to predict the entrepreneurial behavior of university students (Krueger et al., 2000).

Regarding the study of entrepreneurial intention, scholars have begun to explore the key factors affecting entrepreneurial intention by using internal factors, such as psychological traits, personal characteristics, and the cognition of entrepreneurs, and have analyzed the development mechanism of entrepreneurial intention (Shapero and Sokol, 1982; Scott, 1991; Kickul and Krueger, 2004); however, these studies ignore the impact of external environmental factors on entrepreneurial intention. Later studies have explored environmental factors affecting entrepreneurs, taking into account both

internal and external factors when constructing their entrepreneurial intention model (Ajzen, 1991; Shook, 2003).

However, the current entrepreneurial intention model ignores the impact of specific situations, as entrepreneurs face specific situations that will inevitably affect their internal factors. That is, entrepreneurial intention is not only influenced by carrier factors (individual factors) but also by specific situational factors. Only when carrier factors and situational factors work together can entrepreneurial intention be stimulated (Elfving, 2008).

Therefore, the study of entrepreneurial intention began from a psychological perspective and then gradually combined with internal factors, such as trait theory, resource view and ability view. The study of entrepreneurial intention has now entered a new stage of research from a situational factor viewpoint. The focus of the present study highlights the role that specific situational factors play in the generation and development of entrepreneurial intention. Thus, different entrepreneurs will exhibit different performances in various specific situations; the entrepreneurs' internal factors and specific situational factors will jointly drive the emergence and development of entrepreneurial intention. However, questions remain: how do these internal and external factors drive entrepreneurial intention, and how do their effects differ? These questions must be explored and interpreted.

According to the relevant literature, the influencing factors of university students' entrepreneurial intention are divided into two levels: individual factors (micro level) and environmental factors (macro level). The micro-level factors mainly include individual characteristics, psychological characteristics, school experience, entrepreneurial knowledge, and ability, while the macro-level factors mainly include social cultures and norms, policy environment, economic level, personal social network, family background, and entrepreneurial education (Garavan and O' Cinneide, 1994).

This paper regards university students as potential entrepreneurs. At the level of personality traits, this paper mainly focuses on the emotional level of entrepreneurial passion; at the specific situation level, this paper is concerned with the impact of role models at the family level on university students, and at the school level, this paper chooses entrepreneurship education as the specific situational factor affecting entrepreneurial intention.

At present, entrepreneurial passion based on emotional theory is a research hot spot about the individual factors of entrepreneurial intention and is a key factor affecting entrepreneurial activities (Foo, 2011). Cardon et al. (2013) states that the entrepreneurship process is also the emotional experience process of entrepreneurs. The dimension of entrepreneurial passion includes intense positive feelings and identity centrality, which is the main driving force of entrepreneurial intention. The theory of planned behavior (TPB) is widely used in the field of entrepreneurship. One of the elements constituting the TPB is the subjective norms, which consists of the following two parts: one is the degree to which an individual complies with certain behaviors, and the other is the degree to which a person in an intimate relationship expects certain behaviors of another individual (Azjen, 1991). For university students, from the perspective of specific situations, the subjective normative level is mainly represented by role models. Scott and Twomey (1988) believe that parents have a great influence on an individual's entrepreneurial intention. Parents, as entrepreneurial models, and their experience will significantly affect entrepreneurial intention. However, current studies have performed limited research on the relationship between role models and entrepreneurial intention, and the results are quite different (Brenner et al., 1991; Gird and Bagraim, 2008; Geldhof et al., 2013). Therefore, based on the subjective normative level of TPB, this paper focuses on the impacts of family role models on entrepreneurial intention.

Moreover, in recent years, with research on entrepreneurial intention focusing on external factors, entrepreneurial education has gradually become a research hotspot. The university's entrepreneurship atmosphere and the support of entrepreneurship activities will affect the attitude of students toward entrepreneurship. Entrepreneurship education resources and the development of entrepreneurship courses could improve the perceived behavior control variables of university students, thus affecting their entrepreneurial intention.

The entrepreneurship atmosphere created by schools and the support of entrepreneurship activities will affect the attitude of university students toward entrepreneurship and entrepreneurship education resources; the development of entrepreneurship courses could improve entrepreneurial intention. Therefore, the mechanism of entrepreneurship education needs to be further explored; thus, based on the specific situation level, this paper also takes entrepreneurship education as the pre-variable of entrepreneurial intention.

In short, the exploration of influencing factors of entrepreneurial intention based on specific situations has both theoretical and practical implications. From the individual level, family level, and school level, this paper extracts three pre-variables: entrepreneurial passion, role models, and entrepreneurial education. Taking entrepreneurial self-efficacy as a mediating variable, this paper constructs a multi-perspective integration model of entrepreneurial intention. Based on the survey data of university students in the Pearl River Delta region, this paper explores the effects of factors at the individual level, family level, and school level on entrepreneurial intention.

LITERATURE REVIEW AND RESEARCH HYPOTHESIS

Entrepreneurial Passion and Entrepreneurial Intention

Passion was introduced into the field of entrepreneurship by scholars in the 21st century. In the process of entrepreneurship, the difficulties and obstacles entrepreneurs encounter are inevitable, but successful entrepreneurs will persist, which is inseparable from entrepreneurial passion (Zhu et al., 2011). Passion for entrepreneurship is the motivation for individuals to participate in entrepreneurial activities (Bierly et al., 2000) and is a strong and positive emotion that can stimulate individual potential (Baron and Ward, 2004). Passion for entrepreneurship is the source of courage for entrepreneurs to face risks and

challenges; this passion presents not only at the emotional level but also at the cognitive level (Cardon et al., 2009).

Entrepreneurial intention is the subjective thinking and mental state of entrepreneurs before they implement entrepreneurial behavior (Krueger et al., 2000). Baron (2008) proposed that a key factor in generating entrepreneurial motivation and entrepreneurial desire is entrepreneurial passion, which can stimulate people's internal motivation and individual entrepreneurship (Vallerand et al., 2010). Therefore, when entrepreneurial passion is stimulated, emotional expression strengthens. With a high interest in entrepreneurship, the individual's perception of entrepreneurship will be enhanced, as will the possibility of translating ideas into actions.

Cardon et al. (2013) divides entrepreneurial passion into two dimensions: intense positive feelings and identity centrality. Intense positive feelings are emotional expressions generated when individuals participate in entrepreneurial activities. The higher their interest in entrepreneurial activities is, the more confident they are about uncertainty and challenges, and this affects their entrepreneurial intention. Identity centrality is the identification of an individual to his own entrepreneur. When he accepts this identity, entrepreneurial ideas will also be generated.

Therefore, this study proposes:

H1: There is a positive relationship between entrepreneurial passion and entrepreneurial intention.

Role Models and Entrepreneurial Intention

Role essentially reflects a kind of social relationship, which is consistent with individual social status and which matches with identity. Roles are aggregates of characteristics of certain groups, which generally refer to the similar goals, attitudes or behaviors of groups.

The role models in the field of entrepreneurship are people with a supportive and encouraging attitude toward entrepreneurship and who also have a certain amount of successful experience. If people interested in learning about entrepreneurship maintain consistency with the goals of their role models, then they are vulnerable to their influence. These people also hope to learn from the experience of role models to achieve a goal. Therefore, role models are worth emulating (Basow and Howe, 1980).

According to the literature, role models are not well-known or authoritative people in the industry but, rather, are family members or friends we meet daily. Role models are closely related to individuals, including parents, relatives, friends, etc. This finding shows that the better and closer the relationships between individuals and their role models are, the more vulnerable the individuals are to their influence (Davidsson, 2004).

Busenitz and Barney (1997) argue that university students' entrepreneurial intention is influenced by role models. They point out that when parents' values are conservative and resistant of unstable and risky activities, they strongly discourage their children from participating in entrepreneurship projects. However, when parents are open-minded and take a positive attitude toward entrepreneurship, they will support their children to experience the process of entrepreneurship and participate in entrepreneurship projects. Therefore, individuals could complete entrepreneurship tasks stimulated by role models and thus make decisions. Since role models could positively affect entrepreneurial behavior, their existence is conducive to the formation of entrepreneurial intention in university students.

In addition, university students are vulnerable to the influence from friends who may have similar background resources. When a friend starts a new business and succeeds in it, university students will assume that if they enact the same behavior, then they will achieve the same level of performance, which would affect their entrepreneurial intention. Therefore, role models provide entrepreneurship experience for university students, who are also influenced by role models' attitudes toward entrepreneurship, so the entrepreneurial intention will improve.

Therefore, this study proposes:

H2: There is a positive relationship between role models and entrepreneurial intention.

Entrepreneurial Education and Entrepreneurial Intention

Entrepreneurship education could improve the ability of an individual to identify market opportunities and perceived risk (Peterman and Kennedy, 2003). When university students are regarded as potential entrepreneurs, entrepreneurship education is a means of providing entrepreneurship knowledge, cultivating entrepreneurship spirit, and improving entrepreneurship ability and psychological quality. Accordingly, entrepreneurial education has a positive impact on individual entrepreneurship attitude and ability.

Kolvereid and Moen (1997) pointed out that students in an entrepreneurship major have a higher entrepreneurial intention than those from non-entrepreneurship majors, and these students are likely to create new businesses after graduation. According to the literature, it is generally believed that entrepreneurship education has a positive impact on entrepreneurial intention (Rideout and Gray, 2013). In addition, the number of management courses is positively related to university students' entrepreneurial intention (Chen et al., 1998).

By gaining entrepreneurial knowledge, enhancing entrepreneurial awareness, developing the psychological qualities of entrepreneurship, and improving students' entrepreneurship ability and their understanding of the entrepreneurial spirit, entrepreneurial education can enhance the entrepreneurial intention of university students.

Therefore, this study proposes:

H3: There is a positive relationship between entrepreneurship education and entrepreneurial intention.

Entrepreneurial Passion and Entrepreneurial Self-Efficacy

Entrepreneurial self-efficacy is derived from the concept of "self-efficacy," which was first proposed by Bandura (1977). This involves the individual's control over the role of entrepreneurship and the strength of belief in accomplishing entrepreneurship

tasks (Scherer et al., 1989), as well as the belief that individuals can effectively complete entrepreneurship tasks and achieve the goals of entrepreneurial behavior (Chen et al., 1998).

In addition, entrepreneurial passion could promote individuals to positively evaluate the results of entrepreneurship and to believe that they can achieve success in entrepreneurship. Entrepreneurial passion can influence entrepreneurship cognition, that is, it plays a very positive role in entrepreneurial self-efficacy (Perttula, 2004). Passionate entrepreneurs are more confident in their evaluation of opportunities and in their entrepreneurial abilities. When entrepreneurs' enthusiasm for entrepreneurship is active, they will constantly seek new markets, more actively explore new products and learn new entrepreneurship knowledge and management knowledge (Cardon et al., 2013).

Cardon et al. (2009) added the concept of identity centrality to the study of entrepreneurial passion, and her research perspective gradually changed from an emotional viewpoint to a cognitive viewpoint. Intense positive feelings and identity centrality construct the dimensions of entrepreneurial passion. Her study showed that identity centrality is an individually perceived entrepreneurial identity from a psychological point of view (Cardon et al., 2013).

In addition, the individual's enthusiasm and interest in entrepreneurship activities is an intense positive feeling that can improve the individual's entrepreneurial confidence. Therefore, to stimulate university students' entrepreneurial passion, that is, to retain entrepreneurs' positive emotions about entrepreneurial activities and to make entrepreneurs clarify their identity as entrepreneurs, could result in enhancing entrepreneurial self-efficacy.

Therefore, this study proposes:

H4: There is a positive relationship between entrepreneurial passion and entrepreneurial self-efficacy.

Role Models and Entrepreneurial Self-Efficacy

One of the ways to influence self-efficacy is to set an example of self-efficacy behavior for others. Individuals can enhance their self-efficacy by learning from others' experience (Bandura and Wood, 1989). By observing the behavior of role models and learning the corresponding skills and methods, individuals can infer how much money, time, and energy they need to invest to achieve a performance similar to that of their role models (Gist and Mitchell, 1992).

Scott and Twomey (1988) found that parents' entrepreneurial experience can influence an individual's entrepreneurial cognition. Moreover, as the relationship between parents and university students is extremely close, it can help students to personally feel the process of parents' entrepreneurship, which will affect their own self-efficacy and confidence. Thus, role models are an important source of university students' confidence and self-efficacy in entrepreneurial activities.

Therefore, this study proposes:

H5: There is a positive relationship between role models and entrepreneurial self-efficacy.

Entrepreneurship Education and Entrepreneurial Self-Efficacy

The unstable personal characteristics of self-efficacy will change following tailored education (Hollenbeck and Hall, 2004). At the same time, entrepreneurship is periodic in nature, which also affects the self-efficacy of entrepreneurship. Specifically, when the individual experiences the entrepreneurial process and has a successful entrepreneurial experience, the entrepreneurial self-efficacy will improve; when suffering setbacks, the entrepreneurial self-efficacy will be reduced. Cox et al. (2002) found that students with entrepreneurship education have higher self-efficacy than those without entrepreneurship education.

The quality of entrepreneurs can be cultivated through acquired education. Individual entrepreneurs participating in entrepreneurship training or entrepreneurship courses and activities performed by schools can improve their psychological quality and entrepreneurship ability. That is, when an individual learns entrepreneurship knowledge through entrepreneurship education and experiences the entrepreneurship process through practice, their confidence in their ability to successfully accomplish tasks or surmount challenges will be enhanced, and the evaluation of their own ability will be correspondingly positive.

Therefore, this study proposes:

H6: There is a positive relationship between entrepreneurship education and entrepreneurship self-efficacy.

Entrepreneurial Self-Efficacy and Entrepreneurial Intention

With the development of cognitive theory, entrepreneurial self-efficacy plays an increasingly significant role in influencing entrepreneurial intention. Entrepreneurial self-efficacy can predict entrepreneurial intention (Franke, 2004) and will affect entrepreneurs' perception of potential self-confidence and entrepreneurship performance (Chen et al., 1998). Therefore, entrepreneurial self-efficacy is of great importance to entrepreneurial behavior and entrepreneurship activities.

Entrepreneurial self-efficacy is the key variable for an individual to become a real entrepreneur (Chen et al., 1998). It is the main factor affecting entrepreneurs and their behavior. Entrepreneurial self-efficacy is also an intrinsic cognitive trait of an individual. The more self-confident university students are about their own abilities, the stronger their entrepreneurial intention will be. University students participate in entrepreneurial activities and experience the entrepreneurial process; during this time, the sense of achievement they finally acquire will enhance their entrepreneurial self-efficacy. When they believe in successful entrepreneurship, the possibility that they will invest in entrepreneurial projects will be stronger. Thus, entrepreneurial self-efficacy can effectively predict entrepreneurial intention.

Therefore, this study proposes:

H7: There is a positive relationship between entrepreneurial self-efficacy and entrepreneurial intention.

The Mediating Role of Entrepreneurial Self-Efficacy

Entrepreneurial self-efficacy is a key precedent of individual entrepreneurial intention, and it is the internal factor that decides whether potential entrepreneurs invest in entrepreneurship activities.

Cardon et al. (2009) analyzed the individual's interest in entrepreneurship projects from an emotional perspective. When they assessed their abilities and market environment, they would transform ideas into practical actions. This shows that entrepreneurial self-efficacy has a mediating effect between entrepreneurial passion and entrepreneurial intention. Individuals with a high passion for entrepreneurship have a positive evaluation of their entrepreneurial ability. Accordingly, they believe in their success, which in turn affects their entrepreneurial intention (Vallerand et al., 2003). Thus, entrepreneurial passion can enhance an individual's confidence and willingness to start a business.

Therefore, this study proposes:

H8: Entrepreneurial self-efficacy plays a mediating role between entrepreneurial passion and entrepreneurial intention.

Bandura (1977) believed that individual self-efficacy would improve when a model with similar conditions succeeded through hard effort. When an individual observes the successful experience of others, he will infer the ability he needs to achieve the same level of achievement, which will have an impact on his ability evaluation. Accordingly, role models are helpful in improving an individual's entrepreneurial self-efficacy, promoting an individual's positive performance and increasing the possibility of entrepreneurship (Gibson, 2004). Thus, role models help to enhance individual entrepreneurial confidence and make individuals more willing to participate in entrepreneurship activities.

Therefore, this study proposes:

H9: Entrepreneurial self-efficacy plays a mediating role between role models and entrepreneurial intention.

Entrepreneurship education can enhance an individual's entrepreneurial confidence and influence their entrepreneurial intention (Chen et al., 1998). Individuals acquire entrepreneurial knowledge and skills through entrepreneurship education, which will increase their entrepreneurial awareness and their entrepreneurial understanding (Wilson et al., 2007). This knowledge will also enhance their entrepreneurial self-efficacy and affect their entrepreneurial intention. That is, entrepreneurship education can cultivate individual entrepreneurship ability and psychological quality and affect entrepreneurial intention by enhancing entrepreneurial self-efficacy.

Therefore, this study proposes:

H10: Entrepreneurial self-efficacy plays a mediating role between entrepreneurship education and entrepreneurial intention.

In short, specific situational factors affect entrepreneurial intention, but external factors cannot directly affect entrepreneurial intention but, rather, indirectly affect entrepreneurial intention through personal cognition (Krueger et al., 2000). Therefore, this paper proposes that entrepreneurial passion, role models and entrepreneurship education can stimulate entrepreneurship self-efficacy. According to entrepreneurial cognitive theory, entrepreneurial self-efficacy has been indicated to be the key factor in effectively predicting entrepreneurial intention (Boyd and Vozikis, 1997).

Based on the above analysis, the proposed concept framework constructed in this paper is shown in **Figure 1**.

MATERIALS AND METHODS

Procedure

Currently, universities in China may be seen as an intensive source of knowledge support and entrepreneurial opportunities. Universities in China try to provide several university policies and adequate environments where the university community can explore, evaluate and exploit knowledge that could be transformed into new ventures. Therefore, it is for this reason that it makes sense for intentions to be studied in this specific knowledge context (students at university).

This study uses a quantitative approach rather than a qualitative approach because it attempts to seek empirical support for hypotheses developed from previous literature. The data collected and the results from the study will predict the relationship between the variables hypothesized.

The data used in this study were collected using a primary source (questionnaire). The questionnaire used in this research was adapted from earlier studies. Questionnaires were distributed to university students in the Pearl River Delta of China, mainly in the cities of Guangzhou, Shenzhen, and Zhuhai. The university students answering the questionnaire must be those who have taken an entrepreneurship course.

The questionnaire consists of three parts. Part A seeks information on the respondent's socio-demographic data. Part B obtains information about the factors that influence the respondent's intention to be an entrepreneur. Part C solicits the respondent's intention to be an entrepreneur. The questionnaires were back-translated into the language of origin to assure no loss of meaning. The questionnaires were administered during class sessions, yielding a response rate of 100%. Using Likert scales and demographic variables, we measured students' entrepreneurial intentions as well as their perceived barriers to business start-up.

All surveys in our study were anonymous and did not include any individual identification elements and did not violate the privacy of the research participants. Moreover, respondents were assured of the anonymous nature of the data collection effort in advance. All respondents were informed that participation was voluntary, and that confidentiality was ensured.

The data were checked for reliability, validity, normality, and multicollinearity. Hierarchical multiple regression analysis and independent *t*-tests were used to analyze the data.

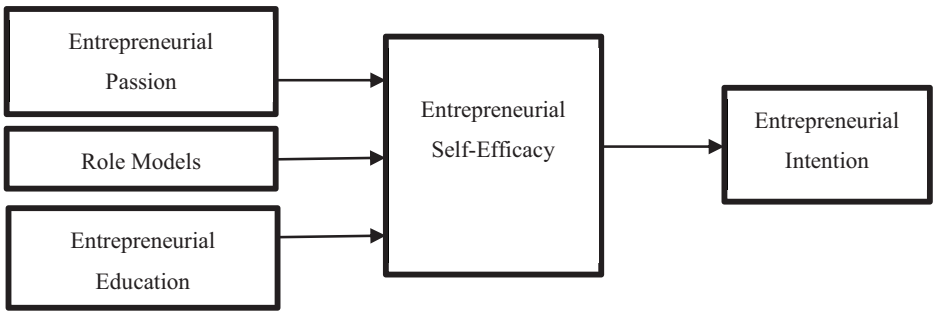

FIGURE 1 | Proposed theoretical model.

Sample Selection and Data Collection

The Pearl River Delta region of Guangdong province is one of the most developed regions in China and is a leading region in the process of China's reform and opening. During a period of more than 40 years spent contributing to this process, the Pearl River Delta region attracted a large number of entrepreneurs from all over the country and, even, all over the world who have started businesses. These entrepreneurs and their entrepreneurial activities, attracted by the reform and opening, have promoted the rapid economic and social development of the Pearl River Delta.

Therefore, the Pearl River Delta region has a strong entrepreneurial cultural atmosphere and a large number of entrepreneurial practices, which will directly or indirectly exert a subtle influence on university students in this region. At the same time, universities in the Pearl River Delta region pay more attention to entrepreneurship education. There are abundant entrepreneurship-related education courses and practical activities in universities, and students' entrepreneurial intention is relatively higher here than in other regions in China. Therefore, a study of the entrepreneurship education of university students in the Pearl River Delta has a good typicality and is an ideal sample area for entrepreneurship education and intention research.

For this reason, our research was conducted in universities in the southern cities of the Pearl River Delta of China. Through paper-based and online-based questionnaires, students mainly in Guangzhou, Shenzhen, and Zhuhai were surveyed.

Respondents were told to fill in the questionnaire anonymously and that the responses were only for academic research; these statements were made to prevent the influence of uncertainties on the questionnaire and to ensure the validity of the questionnaire. One hundred eighty-three paper-based questionnaires were distributed on the spot, and 160 were collected. Additionally, 617 questionnaires were collected from the network platform; finally, 800 questionnaires were sent out, and 727 valid questionnaires were collected.

The results of the sample composition are shown in **Table 1**. The data shows that Guangzhou, Shenzhen, and Zhuhai are the main locations and are typical representative areas of the Pearl River Delta that are active in entrepreneurship activities. Thus, university students in these three locations have more contact with entrepreneurship activities and are more vulnerable to the impact of relevant entrepreneurship information.

Measurement

All measures applied in this research were matured measurement scales which were deemed suitable as they seek to capture constructs that are defined. These measures were developed originally in English and were translated into Chinese and back-translated into English by bilingual experts. Aiming for equivalence and agreement, the back-translated English version was compared with the original English version (Brislin et al., 1973).

Entrepreneurial Passion

Entrepreneurial passion was measured using a 5-point Likert-type scale with 13-item, which were developed by Cardon et al. (2013) with intense positive feelings and identity centrality as dimensions. A sample measuring item for EP is, "It's exciting to find solutions to unmet market demands and commercialize them." (1 = strongly disagree, 5 = strongly agree).

TABLE 1 | Demographic characteristics.

		N	Percentage %
Gender	Male	226	31.1%
	Female	501	68.9%
Grade	Year 1	37	5.1%
	Year 2	134	18.4%
	Year 3	292	40.2%
	Year 4	243	33.4%
	Graduates	21	2.9%
Location	Guangzhou	347	47.7%
	Shenzhen	198	27.2%
	Zhuhai	182	25.1%
Major	Technology	111	15.3%
	Business	524	72.1%
	Art	79	10.9%
	Other	13	1.7%
Entrepreneurial experiences	Yes	131	18.0%
	No	596	82.0%

Role Models

The role models were measured by a scale developed by Obschonka et al. (2011). According to the scale, respondents were asked whether their parents, relatives, or close friends of the family were self-employed by using two items. The first item (targeting a parent's self-employed status) was recoded into 0 = no and 2 = yes and then summed with the second item (targeting number of self-employed relatives and close friends of the family on a three-point scale; 0 = nobody, 1 = some, 2 = many) so as to calculate the final variable. Consequently, this variable ranged from 0 to 4. Thus, the coding procedure focused on the proximity of parents as role models and the importance of a portfolio of role models simultaneously (Gibson, 2004).

TABLE 2 | Measurement items (reliability, convergent validity, discriminant validity).

Construct (source)	Items	Factor loading	SMC	Cronbach' alpha	CR	AVE
Entrepreneurial passion (Cardon et al., 2013)	EP1	0.842	0.709	0.943	0.959	0.644
	EP2	0.837	0.701			
	EP3	0.829	0.687			
	EP4	0.814	0.663			
	EP5	0.795	0.632			
	EP6	0.769	0.591			
	EP7	0.724	0.524			
	EP8	0.842	0.709			
	EP9	0.834	0.696			
	EP10	0.831	0.691			
	EP11	0.798	0.637			
	EP12	0.793	0.629			
	EP13	0.714	0.510			
Entrepreneurial education (Franke, 2004)	EE1	0.822	0.676	0.931	0.941	0.617
	EE2	0.808	0.653			
	EE3	0.800	0.640			
	EE4	0.797	0.635			
	EE5	0.794	0.630			
	EE6	0.784	0.615			
	EE7	0.771	0.594			
	EE8	0.770	0.593			
	EE9	0.765	0.585			
	EE10	0.739	0.546			
Entrepreneurial self-efficacy (Chen et al., 1998; DeNoble et al., 1999)	ESE1	0.852	0.726	0.912	0.933	0.700
	ESE2	0.850	0.723			
	ESE3	0.837	0.701			
	ESE4	0.834	0.696			
	ESE5	0.826	0.682			
	ESE6	0.819	0.671			
Entrepreneurial intention (Liñán and Chen, 2009; Kuckertz and Wagner, 2010)	EI1	0.889	0.790	0.876	0.917	0.734
	EI2	0.887	0.787			
	EI3	0.825	0.681			
	EI4	0.824	0.679			

SMC, Square multiple correlation, CR, Composite reliability, AVE, Average variance extracted.

Entrepreneurship Education

Entrepreneurial education was measured using a 5-point Likert-type scale with 10-item, which were developed by Franke (2004) to analyze the students' perceived entrepreneurship education environment. The scale encompasses three dimensions as followings: the atmosphere of entrepreneurship education, psychological quality education and curriculum and activity development. A sample measuring item for EE is, "The creative atmosphere in the university inspires us to develop ideas for new businesses." (1 = strongly disagree, 5 = strongly agree).

Entrepreneurial Self-Efficacy

Entrepreneurial self-efficacy was measured using a 5-point Likert-type scale with 6-items, which were developed by Chen et al. (1998) and DeNoble et al. (1999). The items on the self-assessment scale broadly represent the extent to which respondents believe in their competencies to cope with uncertainty, change and risk in related to business/entrepreneurial success (Forbes, 2005). A sample measuring item for ESE is, "I believe that I can constantly discover new markets and provide new products or services to meet customer needs." (1 = strongly disagree, 5 = strongly agree).

Entrepreneurial Intention

Entrepreneurial intention has been measured through a 5-point Likert-type scale with 5 items, to evaluate the degree to which the research participants have an intention to start a business in the future. The scale to capture EI constructs were adopted from Liñán and Chen (2009); Kuckertz and Wagner (2010). A sample measuring item for EI is, "I am determined to create a firm in the future." (1 = strongly disagree, 5 = strongly agree).

Control Variable

With respect to existing studies on the factors affecting EI, this study takes gender (GEN) and entrepreneurial experiences (EEX) as control variables. Individuals with masculine characteristics are associated with potential entrepreneurs and then entrepreneurship is considered as a masculine field according to the researches at the intersection of GEN and

TABLE 3 | Correlations and discriminant validity by Fornell–Larcker criterion.

Construct	Mean	*SD*	1	2	3	4	5
1. EP	3.872	0.678	(**0.802**)				
2. EE	3.587	0.671	0.421***	(**0.785**)			
3. RM	1.130	1.090	0.117***	0.036	–		
4. ESE	3.517	0.657	0.606***	0.523***	0.095*	(**0.837**)	
5. EI	3.139	0.814	0.535***	0.317***	0.124***	0.591***	(**0.857**)

****Significant at the 0.001 level; **significant at the 0.01 level; *significant at the 0.05 level. Diagonal elements (bold) in brackets are the square roots of AVEs. Below the diagonal elements are the correlations between the constructs. Variable definition: EP, Entrepreneurial passion; RM, Role models; EE, Entrepreneurial education; ESE, Entrepreneurial self-efficacy; EI, Entrepreneurial intention.*

entrepreneurship (Ahl, 2006; Gupta et al., 2009; Hu et al., 2018; Wu et al., 2019). Students with more entrepreneurial experience or work experience might be more inclined to consider starting a business (Kautonen et al., 2015).

RESULTS

Common Method Variance

According to Fuller et al. (2016), one of the methodological sources of measurement error is common method variance (CMV), which has the potential to harm the reliability and validity of underlying constructs and their postulated correlations in the research model.

With the aim of assessing CMV, both procedural and statistical techniques were applied to lessen its potential effects. For procedural techniques, this study designs an effective questionnaire in which the following techniques were used: (1) research participants were informed about the anonymity and confidentiality of the research survey; (2) honest answers are preferred for the research survey; (3) no right or wrong answer exists in the research survey; (4) ambiguous concepts were avoided; (5) question items were concise; and (6) some reverse-scored question items were designed. Method biases would be expected to lessen by using these procedural measures (Lindell and Whitney, 2001; Podsakoff et al., 2003).

In terms of statistical controls, according to Harman's one-factor test method, the test results indicate that when the variables in the model were simultaneously loaded into the exploratory factor analysis (EFA), all items of the variables were automatically aggregated into six factors whose eigenvalues are over one. The first emerging unrotated factor, with an eigenvalue of 13.48, cumulatively accounted for 38.52% of the overall variance, which is much lower than the 50% threshold recommended by Podsakoff et al. (2003).

In short, both the procedural and statistical controls above support the conclusion that CMV is not strong enough to bias this study.

Reliability and Validity

The adequacy of the measurement scales is evaluated based on scale reliability and validity by examining the criteria of reliability, convergent validity, and discriminant validity. Since the role models scale has only two items, the calculation method for the scale of role models differs from general scales, which measure the distance from the relatives around the entrepreneurial activities. The results of the reliability and validity tests are shown in **Table 2**. The test results show that all scales in the study have acceptable internal consistency and overall validity.

In terms of reliability, this study employed the criteria of Cronbach's alpha and composite reliability (CR). The values of Cronbach's alpha of the constructs in the models range from 0.876 to 0.943; the coefficients of CR range from 0.917 to 0.959. Based on this assessment, Cronbach's alpha and CR coefficients are all above the recommended cut-off of 0.7. Based on this assessment, the model's constructs exhibit a high internal consistency (Fornell and Larcker, 1981).

In terms of convergent validity, this study applied average variance extracted (AVE) criteria. The results show that the standardized factor loadings of measurement items of scales are significantly over the required minimum of 0.7. In addition, square multiple correlations (SMC) are over the required threshold level of 0.5, indicating the model's constructs have acceptable item reliability. Values of AVE of constructs in the model range from 0.617 to 0.734, which are all over the recommended threshold level of 0.5. Therefore, the amount of the construct's variance explained by measurement items of models' variables is greater than the amount of variance produced by measurement error (Fornell and Larcker, 1981). Based on this assessment, the model's constructs exhibit a high convergent validity.

In terms of discriminant validity, the square roots of the AVE compare with the inter-correlations of the model's constructs (Fornell and Larcker, 1981). The results show that the correlation coefficients of each pair of constructs are all lower than the square root of the AVE (see **Table 3**, shown on the diagonal with bold values in brackets), which indicates that the model's constructs have discriminant validity.

Correlation Analysis

The descriptive statistics and the pairwise correlation coefficient of all measured variables in the study are presented in **Table 3**. Observation indicates that there is little multicollinearity problem, as the intercorrelations among the model's constructs are below the threshold value of 0.8 (Gujarati, 2003). The results show that there are significant positive correlations among the model's variables.

To further interpret the correlation of variables in the proposed model, the scatter plot matrix is provided in **Figure 2**. The graph includes kernel density and rug plots in the principal diagonal and linear and loess fit lines of the model's constructs. The results show that all independent variables were positively correlated to the dependent variable (EI), and all independent variables were also closely related to the mediator variable (ESE).

On the basis of correlation analysis, hierarchical regression analysis is employed to examine the causal relationship of the model's constructs.

Hierarchical Regression Analysis

This section constructs 6 regression models to verify research hypotheses through multiple regression analysis, as shown in **Table 4**.

Models 1 and 3 only include the control variables as GEN and EEX. The control variables GEN and EEX both appear to be significantly related to ESE ($\beta = 0.166$, $p < 0.001$; $\beta = 0.156$, $p < 0.001$), which could explain 5.4% of the total variance in Model 1 ($R^2 = 0.054$, $p < 0.001$). In addition, the control variables GEN and EEX both appear to be significantly related to EI ($\beta = 0.252$, $p < 0.001$; $\beta = 0.202$, $p < 0.001$), which could explain 11.1% of the total variance in Model 3 ($R^2 = 0.111$, $p < 0.001$).

Model 5 is used to verify the main effect of the proposed model, the relationship among EP, RM, EE, and EI. The results

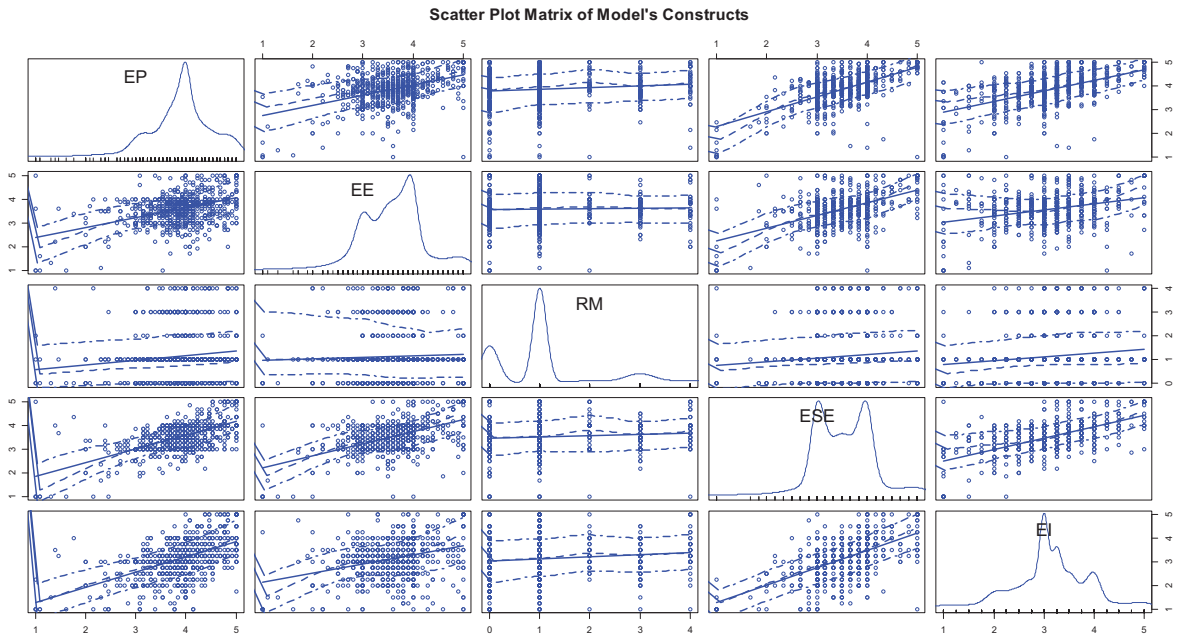

FIGURE 2 | Scatter plot matrix of the model's constructs. Variable definition: EP, Entrepreneurial passion; RM, Role models; EE, Entrepreneurial education; ESE, Entrepreneurial self-efficacy; EI, Entrepreneurial intention.

indicate that EP, RM, and EE all have a significantly positive relation with EI (β = 0.447, $p < 0.001$; β = 0.063, $p < 0.05$; β = 0.108, $p < 0.01$), which could explain 36.9% of the total variance ($R^2 = 0.369$, $p < 0.001$); thus, H1, H2, and H3 are confirmed. The implications of the regression results are that EP, RM, and EE could be effective predictors of EI after controlling for the effects of control variables. In addition, the results also show that EP has the greatest predictive effect on EI, followed by EE, and then RM.

Model 2 examines the relationship among EP, RM, EE, and ESE. The regression coefficients are 0.466 ($p < 0.001$), 0.028 and 0.326 ($p < 0.001$), respectively, which could explain 47.7% of the total variance in Model 1 ($R^2 = 0.477$, $p < 0.001$). The regression results show that EP, EE had a significant positive effect on ESE; thus, H4 and H6 are confirmed. As the regression coefficient of RM is not significant, H5 is not supported.

Model 4 examines the relationship between ESE and EI. The regression coefficients are 0.543 ($p < 0.001$), which could explain 39.0% of the total variance in Model 1 ($R^2 = 0.390$, $p < 0.001$). The regression results show that ESE had a significantly positive effect on EI; thus, H7 is confirmed.

The mediating effects of ESE on the relationship among EP, RM, EE, and EI have been tested through a second hierarchical regression model analysis; that is, Models 4, 5, and 6 jointly

TABLE 4 | Summary of hierarchical regression analysis.

	ESE		EI			
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
GEN	0.166***	0.112***	0.252***	0.162***	0.207***	0.165***
EEX	0.156***	0.098***	0.202***	0.117***	0.153***	0.117***
EP		0.466***			0.447***	0.279***
RM		0.028			0.063*	0.050
EE		0.326***			0.108**	−0.013
ESE				0.543***		0.376***
R^2	0.054	0.477	0.111	0.390	0.369	0.443
ΔR^2	0.054	0.423	0.111	0.279	0.258	0.074
F-statistics	13.810***	109.467***	30.151***	115.365***	70.099***	81.574***
Durbin–Watson statistic	1.900	1.986	1.932	1.914	1.880	1.874

*N = 727. *p < 0.05; **p < 0.01; ***p < 0.001. Variable definition: GEN, Gender; EEX, Entrepreneurial experience; EP, Entrepreneurial passion; RM, Role models; EE, Entrepreneurial education; ESE, Entrepreneurial self-efficacy; EI, Entrepreneurial intention.*

examine the indirect effects of ESE. According to Models 5 and 6, in terms of the EP-EI link, the results show that EP has a significantly positive effect but that the regression coefficient decreases from 0.447 ($p < 0.001$) to 0.279 ($p < 0.001$). In addition, the regression coefficient of ESE was 0.376 ($p < 0.001$), indicating that ESE has a partial mediating effect on the EP-EI link; thus, H8 is verified. For the RM-EI link, since RM has no significantly positive effect on the ESE, ESE has no mediating effect on the RM-EI link; thus, H9 is not supported. For the EE-EI link, the results show that EE has a significantly positive effect ($\beta = 0.108$, $p < 0.01$) in Model 5. However, when ESE is added to Model 6, the regression coefficient of EE is not significant, indicating that ESE has a complete mediating effect on the EE-EI link; thus, H10 is verified.

In sum, the first part of the hierarchy regression (Models 1 and 3) tested the effects of control variables. The second part of the hierarchy regression (Model 5) examined the main effect of the independent variables (EP, RM, and EE). The third part of the hierarchy regression (Models 4, 5, and 6) inspected the mediating effects of ESE. The results show that ESE has a partial mediating effect on EP and EI and has a complete mediating effect on EE and EI.

Indirect Effects Analysis

Traditionally, a four-step hierarchy regression approach is used to examine the mediation effects (Baron and Kenny, 1986). With the prerequisite that the direct path (c path) between the predictor and outcome variable is significant, then the hierarchy regression analysis is to only test whether the independent variable was significant related to mediating variable (a path) and whether the mediator was significant related to dependent variable (b path). In the final step of hierarchy regression, loss or decrease of the direct path between the independent variables and dependent variables was to demonstrate partial or full mediation. However, the requirement of a significant c path makes this hierarchy regression approach suboptimal, because the indirect effects of mediator can occur without the direct effect (Hayes, 2009).

To further test the mediating effects of ESE (Entrepreneurial Self-Efficacy), this study applies a mediating model (Preacher and Hayes, 2008) through the PROCESS SPSS computational tool (Hayes, 2012). One of the advantages of PROCESS is that it provides an actual test of the mediation including bootstrapping to quantify the stability of the indirect effect. With aim to boycott violation of normal distribution assumption, it is recommended to apply a non-parametric bootstrapping approach to evaluate the indirect effects, given the limited sample size (Preacher and Hayes, 2008). A confidence interval for the indirect effect is provided by the bootstrapping method. If the confidence interval (including lower limit and upper limit) of 95% CI (Confidence Interval) do not contain zero, indicating that indirect effects are significant (Preacher and Hayes, 2008).

As for the EP-EI and EE-EI links, according to the normal theory test for indirect effects, the Sobel Z-value is 8.943 ($p < 0.001$) and 7.695 ($p < 0.001$), respectively, thus supporting H8 and H10. In addition, bootstrapping results show that significance can be seen in that the 95% CI for the bootstrapping sample does not overlap the zero point (see **Table 5**, CI: 0.051 to 0.099, and 0.049 to 0.091), indicating that ESE does reliably mediate the relationship between EP and EI, and the relationship between EE and EI. Thus, H8 and H10 are further verified. For the RM-EI link, the Sobel Z-test is not significant, and the bootstrapping results show the 95% CI for the coefficient contain zero (see **Table 5**, CI: −0.038 to 0.121), revealing that ESE does not mediate the relationship between RM and EI; thus, H9 is not supported.

In addition, due to the significance of the direct effect of EP on EI, ESE (Entrepreneurial Self-Efficacy) partially mediates the relationship between EP (Entrepreneurial Passion) and EI (Entrepreneurial Intention). In addition, owing to the non-significance of the direct effect of EE on EI, ESE fully mediates the relationship between EE (Entrepreneurial Education) and EI (Entrepreneurial Intention).

Therefore, ESE has a partially mediating role between EP and EI and has a fully mediating role between EE and EI. It is of interest to explore whether there exist significant differences between two indirect effects. By conducting a pairwise contrast of two indirect effects, the bootstrapping results show that the 95% CI for the contrast overlapped the zero point (see **Table 5**, CI: −0.025 to 0.037), indicating that a magnitude of effects cannot be distinguished to compare with the two indirect effects.

Analysis of Regional Differences

To further explore the research variables in the proposed model, this paper applies ANOVA to investigate the differences among research variables in the survey regions, as presented in **Table 6**.

The results show that there are significant differences among Entrepreneurial Passion ($F = 6.261$, $p < 0.01$), Entrepreneurial Education ($F = 6.242$, $p < 0.01$), Role Models ($F = 17.688$, $p < 0.001$), entrepreneurial self-efficacy ($F = 7.614$, $p < 0.01$), and entrepreneurial intention ($F = 4.935$, $p < 0.01$). The results of the ANOVA test show that there are significant differences among the research variables among university students in Guangzhou, Shenzhen, and Zhuhai.

According to **Figure 3**, university students in Guangzhou, in comparison with those in Shenzhen and Zhuhai, have a high level of EI, a low level of RM, and a medium level of EE among three predictors of the proposed model. With regard to the mediator of the proposed model, they have a higher level of ESE and have the expected high level of EI.

Regarding university students in Zhuhai, among three predictors of the proposed model, they have a medium level of EP, a high level of RM, and a low level of EE. In addition, they have both medium levels of ESE and EI.

Regarding university students in Shenzhen, among three predictors of the proposed model, they have a low level of EP, a medium level of RM, and a high level of EE. However, they have both unexpected low levels of ESE and EI.

DISCUSSION

Based on emotional theory, planned behavior theory and cognitive theory, this paper constructs a model of entrepreneurial

TABLE 5 | Bootstrap coefficients, standard errors, and confidence intervals for mediation test.

Dependent variables	**Independent variables**						
Direct effect		**Effect**	**SE**	***t***	***p***	**LLCI**	**ULCI**
EI	EP	0.103	0.014	7.621	0.000	0.077	0.130
	RM	0.152	0.087	1.754	0.080	−0.018	0.322
	EE	−0.014	0.017	−0.815	0.415	−0.046	0.019
Indirect effect		**Effect**	**BootSE**	**Sobel *Z***	***p***	**95% CI for Bootstrap**	**95% CI for Bootstrap**
						Lower	**Upper**
EI	EP	0.074	0.012	8.943	0.000	0.051	0.099
	RM	0.037	0.040	1.019	0.308	−0.038	0.121
	EE	0.068	0.011	7.695	0.000	0.049	0.091
Contrasts							
Indirect effect comparison		**Estimate**	**SE**	***Z***	***p***	**95% CI for Bootstrap**	**95% CI for Bootstrap**
						Lower	**Upper**
IE (EP) vs. IE (EE)		0.006	0.016	0.377	0.706	−0.025	0.037

Five thousand bootstrap samples with 95% CI. Variable definition: EP, Entrepreneurial passion; RM, Role models; EE, Entrepreneurial education; ESE, Entrepreneurial self-efficacy; EI, Entrepreneurial intention; IE, Indirect effect.

TABLE 6 | ANOVA test.

		Sum of squares	**df**	**Mean square**	***F***	***p*-value**
EP	Between groups	958.165	2	479.082	6.261	0.002
	Within groups	55397.942	724	76.516		
	Total	56356.10729	726			
EE	Between groups	553.936	2	276.968	6.242	0.002
	Within groups	32122.650	724	44.368		
	Total	32676.586	726			
RM	Between groups	40.159	2	20.079	17.688	0.000
	Within groups	821.899	724	1.135		
	Total	862.058	726			
ESE	Between groups	232.119	2	116.060	7.614	0.001
	Within groups	11035.550	724	15.242		
	Total	11267.670	726			
EI	Between groups	103.390	2	51.695	4.935	0.007
	Within groups	7583.991	724	10.475		
	Total	7687.381	726			

*N = 727. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$. Variable definition: EP, Entrepreneurial passion; RM, Role models; EE, Entrepreneurial education; ESE, Entrepreneurial self-efficacy; EI, Entrepreneurial intention.*

intention from three perspectives: individual, family and school. Based on a survey of university students in the Pearl River Delta in China, the results show that entrepreneurial passion could both directly and indirectly affect entrepreneurial intention through entrepreneurial self-efficacy and that entrepreneurship education could indirectly affect entrepreneurial intention through entrepreneurial self-efficacy. However, role models have no significantly positive effect on the entrepreneurial self-efficacy, thus entrepreneurial self-efficacy has no mediating effect on the RM-EI link.

Findings from this study are as follows. There is a positive effect between entrepreneurial passion and entrepreneurial intention, which shows that entrepreneurial passion can effectively stimulate the entrepreneurial intention of students. Entrepreneurship education can positively affect entrepreneurial intention. When students receive more entrepreneurship education, their entrepreneurial intention is higher. This shows that entrepreneurship education in universities can cultivate students' entrepreneurial spirit, create a strong entrepreneurial atmosphere to stimulate students' entrepreneurial interest and enthusiasm, and positively affect their entrepreneurial behavior. Thus, to stimulate their intention in future entrepreneurial activities, it can be inferred that their individual characteristics (such as entrepreneurial passion)

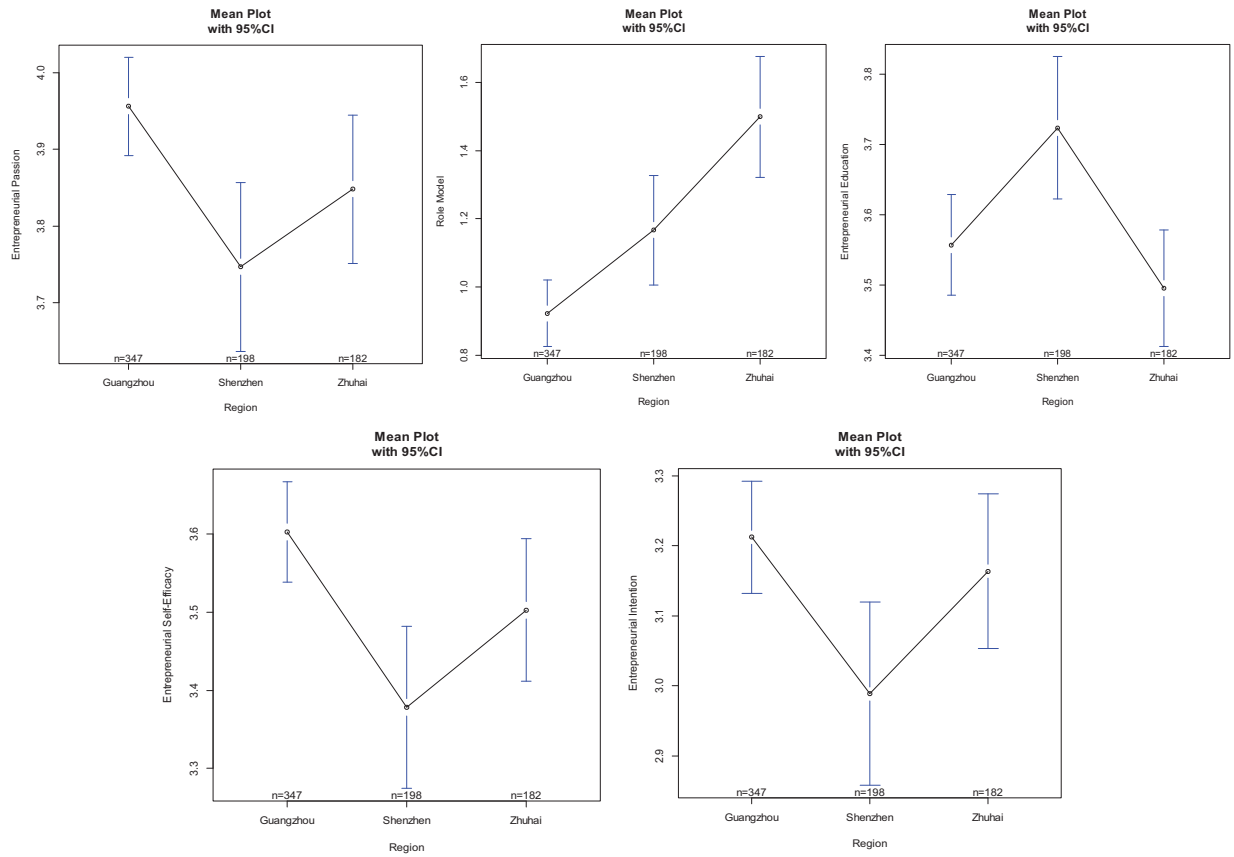

FIGURE 3 | Mean comparison of EP, RM, EE, ESE, EI in terms of regions (Guangzhou, Shenzhen, Zhuhai). Variable definition: EP, Entrepreneurial passion; RM, Role models; EE, Entrepreneurial education; ESE, Entrepreneurial self-efficacy; EI, Entrepreneurial intention.

and entrepreneurial education training and program could play a dominant role.

In addition, the findings of this study show that role models have a non-significant impact on entrepreneurial self-efficacy, which indicates that the entrepreneurial intentions of university students are not indirectly affected by family members with entrepreneurship experience through entrepreneurial self-efficacy. For university students, their parents and relatives who have successful experiences have a limited influence on their entrepreneurial intention development. These results may be explained in the following ways. First, role models may transmit negative experiences or signals to respondents, such as role models' long-time work experiences, discussing business at home, or business failure experiences, which would be expected to discourage the entrepreneurial self-efficacy and entrepreneurial intention of respondents. Second, role models may not offer respondents direct involvement in entrepreneurial activities, but the respondents could gain insights into the nature of entrepreneurship through such direct involvement. Third, direct involvement by the respondents could also provide an opportunity for role models and respondents to enjoy active interaction rather than passive interaction by observation. Thus, such active interaction could in turn help to influence the entrepreneurial self-efficacy and entrepreneurial intention of respondents (Auken, 2006).

Furthermore, the findings show that entrepreneurial self-efficacy has a mediating role between entrepreneurial passion and entrepreneurial intention. This result shows that when individuals are interested in entrepreneurship activities and maintain a stable mood, they will pay attention to entrepreneurship activities, believe in their ability to control resources and complete their entrepreneurship tasks. When faced with entrepreneurship information, they will accept their identity as entrepreneurs and decision makers, improve their sense of self-efficacy, and, thus, enhance their entrepreneurial intention.

Regarding the effects of entrepreneurial education on entrepreneurial intention, entrepreneurial self-efficacy plays a complete mediating role between them. Specifically, entrepreneurial education can indirectly improve students' entrepreneurial intention through entrepreneurial self-efficacy. Thus, students' intention to engage in entrepreneurial activities will be influenced by entrepreneurial education contingent on the effectiveness of entrepreneurial training and programs to enhance their entrepreneurial self-efficacy.

As for the regional analysis, universities in Shenzhen were included in the research survey. These institutions

attach great importance to entrepreneurship education. The entrepreneurship education system utilized in the universities in Shenzhen is more matured and sophisticated than those in Guangzhou and Zhuhai. Therefore, according to the ANOVA test, the average perceived level of entrepreneurship education of university students in Shenzhen is the highest, followed by Guangzhou and, lastly, Zhuhai. However, the entrepreneurial intention, passion and self-efficacy of university students in Shenzhen are lower. Thus, entrepreneurial education has not impacted entrepreneurial intention. The reasons for this difference could be explored from the aspects of regional entrepreneurship atmosphere and regional economic development, supporting policies, geographical location, and so on.

In this case, this phenomenon could be interpreted by using the proposed intention-based model. Based on the proposed model, we find that entrepreneurial education has significant indirect impacts on entrepreneurial intention. In particular, entrepreneurial self-efficacy plays a complete mediating role in the path of entrepreneurial education to intention. According to the ANOVA test, the mean of entrepreneurial self-efficacy of university students in Shenzhen is the lowest among the regions. That is, although the level of entrepreneurial education is highest in Shenzhen, it fails to have a direct effect on entrepreneurial intention.

Based on the proposed model, entrepreneurial education could indirectly affect entrepreneurial intention through the mediator of entrepreneurial self-efficacy. Therefore, it can be inferred that the entrepreneurship education system should not only provide a series of entrepreneurship courses and practical projects for improving students' perception of entrepreneurial activities but should also provide training for a variety of special skills and techniques to enhance student self-efficacy when undertaking entrepreneurial activities.

CONCLUSION

Research Implications

The purpose of the study is to explore the antecedents to predict entrepreneurial intention of university students mediated by entrepreneurial self-efficacy. The findings of this study have several theoretical implications for entrepreneurial research and education.

First, the development of the intention to be an entrepreneur is a complex process (Krueger and Kickul, 2006), which is both affected by internal and external factors. Most previous studies have focused on the impact of environmental dynamics on the relationship between antecedents and entrepreneurial intention (Baron, 2008). However, it is difficult to fully reveal the relationship only from external perspectives. In terms of internal perspectives, other studies on the antecedent variables of entrepreneurial intention mainly focus on motivation, subjective norms, and entrepreneurial attitudes (Ajzen, 1991; Sheldon et al., 2006). Therefore, this study further enriches the research on the antecedents of entrepreneurial intention of university students by constructing a research model from the combined internal and external perspectives. The findings of this study indicate that prediction of the entrepreneurial intention of university students is contingent on the specific contexts involved. Thus, in terms of specific contexts, this study proposes the intention-based path model in which university students' entrepreneurial intentions take shape, including the EP-EI (individual level), RM-EI (family level), EE-EI (school level) path links.

Second, from the cognitive and emotional perspectives, this study explores the relationship between entrepreneurial passion and entrepreneurial intention. In particular, entrepreneurial self-efficacy considered as important cognitive abilities is taken as a mediator in the research model. The findings reveal that entrepreneurial passion could directly enhance entrepreneurial intention and indirectly through entrepreneurial self-efficacy. University students are sensitive to entrepreneurial enthusiasm and emotions; however, existing studies rarely take university students as research samples to explore how entrepreneurial intention develops from the perspective of entrepreneurial passion. Thus, this study is one of the first to empirically investigate the mechanism of the EP-EI link by taking university students as potential entrepreneur samples. The findings of this study enrich the research on the antecedents of entrepreneurial intention and reveal the mediating mechanism of how entrepreneurial passion affects entrepreneurial intention.

Third, regarding the effect of entrepreneurial education on individual entrepreneurial intention, the existing studies show mixed results. Some empirical studies show that there is a significant difference between the level of entrepreneurial intention in accepting entrepreneurial education and the students who do not receive entrepreneurship education (Fayolle et al., 2006; Ali, 2013; Heuer and Kolvereid, 2014; Solesvik et al., 2014). However, other studies have found that entrepreneurship education has no or even a negative impact on entrepreneurial intention (Marques et al., 2012). This result indicates that the role of entrepreneurship education in the process of individual entrepreneurial intention must be further explored. The findings of this study enrich the research on effects of entrepreneurial education by exploring the mechanism as to how entrepreneurial education affects entrepreneurial intention. In particular, this study reveals that entrepreneurial self-efficacy plays a fully mediating role between entrepreneurial education and entrepreneurial intention. Thus, entrepreneurial education could enhance entrepreneurial self-efficacy by offering necessary entrepreneurial knowledge and techniques, which could further affect entrepreneurial intention (Ali, 2013).

Lastly, recent studies attach importance to role models in the intention to pursue entrepreneurial activities, however, very few studies have fully uncovered the mechanism of how role models affect entrepreneurial intention (Auken, 2006). In this respect, some extant studies show that role models affect entrepreneurial intention when combined with positive attitudes and entrepreneurial self-efficacy (Nowiński and Haddoud, 2019). Of note, this study has one important and novel finding: role models only have a slight direct impact on entrepreneurial intention but fail to have an indirect effect on entrepreneurial intention through entrepreneurial self-efficacy. The possible reasons could be the role models' negative signals, lack of

direct respondent involvement in entrepreneurial activities and active interaction between role models and respondents, which could contribute to understanding how role models affect entrepreneurial intention and enrich the research on the mechanism behind the RM-EI link.

Practice Implications

As far as the practical implications of this study are concerned, the findings of this study support a recommendation to enhance the entrepreneurial intention of university students; thus, the specific contexts involved should be considered, as the findings of this study indicate associations between EP-EI, EE-EI, and RM-EI. First, regarding the EP-EI link, the entrepreneurial passion of university students could be stimulated by providing entrepreneurial consulting and financial supporting services, continuously fostering an entrepreneurial atmosphere and culture in the university, and promoting governmental policies that support entrepreneurial activities, all of which could help translate the entrepreneurial passion of university students into entrepreneurial intention and action.

Second, as for the EE-EI link, the design of entrepreneurial education programs should consider the function of not only providing management skills but also enhancing entrepreneurial self-efficacy, as these are interconnected determinants. To enhance ESE, programs and training in entrepreneurial education should ensure university students' identity as potential entrepreneurs, the feasibility of achieving an entrepreneurial outcome, and the benefits of entrepreneurial activities. Recent research on entrepreneurial education indicates that to enhance and develop entrepreneurial intention, it is recommended that ESE be added to various entrepreneurial programs encompassing design-thinking workshops, pitch-meeting simulations, elevator talks, creativity workshops, and brain-storming (Detienne and Chandler, 2004; Huq and Gilbert, 2017).

Lastly, as for the RM-EI link, the results of this study show that negative interaction between role models and respondents would discourage respondents from developing interest in entrepreneurship. Thus, it is suggested that both respondents' involvement in entrepreneurial activities and the direct role model–respondent interaction would have a significant impact on respondents' entrepreneurial self-efficacy and entrepreneurial intention to undertake entrepreneurial action.

In sum, our findings enrich the research on the influencing factors of entrepreneurial intention, provide a theoretical basis for formulating policies to encourage university students' entrepreneurial intention and help to explore effective ways to enhance entrepreneurial intention and behavior. Future studies should investigate students' entrepreneurial intention along with their subsequent entrepreneurial behavior (Linan, 2004). This longitudinal research could be used to explore how entrepreneurial intention as shown in the results of this study would be materialized or realized and validate the proposed research model of this study. In-depth interviews regarding why students do or do not pursue entrepreneurial careers could also be conducted.

ETHICS STATEMENT

An ethics approval was not required as per applicable institutional and national guidelines and regulations. The informed consent of the participants was implied through survey completion.

AUTHOR CONTRIBUTIONS

FH performed the research design, methodology, literature review, statistical analysis and wrote the manuscript. YS conceived the literature review, research design, and practice implication. ML contributed to the literature review, research design, data collection and assisted in the data analysis. MQ conceived the literature review and practice implication.

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REFERENCES

Ahl, H. (2006). Why research on women entrepreneurs needs new directions. *Entrep. Theory Pract.* 30, 595–621. doi: 10.1111/j.1540-6520.2006.00138.x

Ajzen, I. (1991). The theory of planned behavior. *Organ. Behav. Hum. Decis. Process.* 50, 179–211.

Ali, D. F. (2013). The process of impact of entrepreneurship education and training on entrepreneurship perception and intention: study of educational system of Iran. *Educ. Train.* 55, 868–885. doi: 10.1108/et-04-2013-0053

Auken, H. V. (2006). The influence of role models on entrepreneurial intentions. *J. Dev. Entrep.* 11, 157–167. doi: 10.1142/s1084946706000349

Azjen, I. (1991). The theory decision processes of planned behavior. *Organ. Behav. Hum.* 50, 179–211. doi: 10.1016/0749-5978(91)90020-t

Bandura, A. (1977). Self-efficacy: toward a unifying theory of behavioral change. *Psychol. Rev.* 84, 191–215. doi: 10.1037/0033-295x.84.2.191

Bandura, A., and Wood, R. (1989). Social cognitive theory of organizational management. *Acad. Manag. Rev.* 14, 361–384. doi: 10.5465/amr.1989.4279067

Baron, R. A. (2008). The role of affect in the entrepreneurial process. *Acad. Manag. Rev.* 33, 328–340. doi: 10.5465/amr.2008.31193166

Baron, R. A., and Ward, T. B. (2004). Expanding entrepreneurial cognition's toolbox: potential contributions from the field of cognitive science. *Entrep. Theory Pract.* 28, 553–573. doi: 10.1111/j.1540-6520.2004.00064.x

Baron, R. M., and Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: conceptual, strategic and statistical considerations. *J. Pers. Soc. Psychol.* 51, 1173–1182. doi: 10.1037/0022-3514.51.6.1173

Basow, R. A., and Howe, K. G. (1980). Role model influence: effects of sex and sex role in college students. *Psychol. Women Q.* 4, 58–72.

Bierly, I. I. I. P. E., Kessler, E. H., and Christensen, E. W. (2000). Organizational learning, knowledge and wisdom. *J. Organ. Change Manag.* 13, 595–618. doi: 10.1108/09534810010378605

Boyd, N. G., and Vozikis, G. S. (1997). The Influence of self-efficacy on the development of entrepreneurial intentions and actions. *Entrep. Theory Pract.* 18, 63–77. doi: 10.1177/104225879401800404

Brenner, O., Pringle, C. D., and Greenhaus, G. H. (1991). Perceived fulfillment of organizational employment versus entrepreneurship: work values and career intentions of business college graduates. *J. Small Bus. Manag.* 29, 62–74.

Brislin, R., Lonner, W. J., and Thorndike, R. (1973). *Cross-Cultural Research Methods*. New York, NY: Wiley.

Busenitz, L. W., and Barney, J. (1997). Differences between entrepreneurs and managers in large organization: biases and heuristics in strategic decision-making. *J. Bus. Ventur.* 12, 9–30. doi: 10.1016/s0883-9026(96)00003-1

Cardon, M. S., Gregoire, D. A., and Stevens, C. E. (2013). Measuring entrepreneurial passion: Conceptual foundations and scale validation. *J. Bus. Ventur.* 28, 373–396. doi: 10.1016/j.jbusvent.2012.03.003

Cardon, M. S., Wincent, J., and Singh, J. (2009). The nature and experience of entrepreneurial passion. *Acad. Manag. Rev.* 34, 511–532. doi: 10.5465/amr.2009.40633190

Chen, C., Greene, P., and Crick, A. (1998). Does entrepreneurial self-efficacy distinguish entrepreneurs from managers? *J. Bus. Ventur.* 13, 295–316. doi: 10.1016/s0883-9026(97)00029-3

Cox, L., Mueller, S. L., and Moss, S. E. (2002). The impact of entrepreneurship education on entrepreneurial self-efficacy. *Int. J. Entrep. Educ.* 1, 229–247.

Davidsson, P. (2004). *International Studies in Entrepreneurship*, New York, NY: Springer. doi: 10.1007/978-3-319-26692-3

DeNoble, A., Jung, D., and Ehrlich, S. (1999). "Entrepreneurial self-efficacy: the development of a measure and its relationship to entrepreneurship," in *Frontiers of Entrepreneurship Research*, eds P. D. Reynolds, W. D. Bygrave, S. Manigart, C. M. Mason, G. D. Meyer, H. J. Sapienza, et al. (Wellesley, MA: Babson College), 73–87.

Detienne, D. R., and Chandler, G. N. (2004). Opportunity identification and its role in the entrepreneurial classroom: a pedagogical approach and empirical test. *Acad. Manag. Learn. Educ.* 3, 242–257. doi: 10.5465/amle.2004.14242103

Elfving, J. (2008). *Contextualizing Entrepreneurial Intentions: A Multiple Case Study on Entrepreneurial Cognition and Perception*. Åbo: Åbo Akademi University Press, Diss.: Åbo Akademi University.

Fayolle, A., Gailly, B., and Lassas-Clerc, N. (2006). Assessing the impact of entrepreneurship education programmes: a new methodology. *J. Eur. Ind. Train.* 30, 701–720. doi: 10.1108/03090590610715022

Foo, M. D. (2011). Emotions and entrepreneurial opportunity evaluation. *Entrep. Theory Pract.* 35, 375–393. doi: 10.1111/j.1540-6520.2009.00357.x

Forbes, D. (2005). The effects of strategic decision making on entrepreneurial self-efficacy. *Entrep. Theory Pract.* 29, 599–626 doi: 10.1111/j.1540-6520.2005.00100.x

Fornell, C., and Larcker, D. F. (1981). Structural equation models with unobservable variables and measurement error: algebra and statistics. *J. Mark. Res.* 18, 382–388. doi: 10.1177/002224378101800313

Franke, N., and Lüthje, C. (2004). Entrepreneurial intentions of business students benchmarking study. *Int. J. Innov. Technol. Manag.* 1, 269–288. doi: 10.1142/s0219877004000209

Fuller, C. M., Simmering, M. J., Atinc, G., Atinc, Y., and Babin, B. J. (2016). Common methods variance detection in business research. *J. Bus. Res.* 69, 3192–3198. doi: 10.1016/j.jbusres.2015.12.008

Garavan, T. N., and O' Cinneide, B. (1994). Entrepreneurship education and training programmes: a review and evaluation-part. *J. Eur. Ind. Train.* 18, 3–12. doi: 10.1108/03090599410068024

Geldhof, G., Weiner, J. M., and Agans, J. P. (2013). Understanding entrepreneurial intent in late adolescence: the role of intentional self-regulation and innovation. *J. Youth Adolesc.* 43, 81–91. doi: 10.1007/s10964-013-9930-8

Gibson, D. E. (2004). Role models in career development: new directions from theory and research. *J. Vocat. Behav.* 65, 134–156. doi: 10.1016/s0001-8791(03)00051-4

Gird, A., and Bagraim, J. J. (2008). The theory of planned behavior as predictor of entrepreneurial intent amongst final year university students. *South Afr. J. Psychol.* 38, 711–724. doi: 10.1177/008124630803800410

Gist, M. E., and Mitchell, T. R. (1992). Self-efficacy: a theoretical analysis of its determinants and malleability. *Acad. Manag. Rev.* 17, 183–211. doi: 10.5465/amr.1992.4279530

Gujarati, D. (2003). "Multicollinearity: what happens if the regressors are correlated," in *Basic Econometrics* (New York, NY: McGraw-Hill), 341–385.

Gupta, V. K., Daniel, B. T., Arzu, S. W., and Arijit, S. (2009). The role of gender stereotypes in perceptions of entrepreneurs and intentions to become an entrepreneur. *Entrep. Theory Pract.* 33, 397–417. doi: 10.1111/j.1540-6520.2009.00296.x

Hayes, A. F. (2009). Beyond Baron and Kenny: statistical mediation analysis in the new millennium. *Commun. Monogr.* 76, 408–420. doi: 10.1080/03637750903310360

Hayes, A. F. (2012). *PROCESS: A Versatile Computational Tool for Observed Variable Mediation, Moderation, and Conditional Process Modeling [White Paper]*.

Heuer, A., and Kolvereid, L. (2014). Education in entrepreneurship and the theory of planned behavior. *Eur. J. Train. Dev.* 38, 506–523.

Hollenbeck, G., and Hall, D. T. (2004). Self-confidence and leader performance. *Organ. Dyn.* 33, 254–269. doi: 10.1016/j.orgdyn.2004.06.003

Hu, R., Wang, L., Zhang, W., and Bin, P. (2018). Creativity, proactive personality, and entrepreneurial intention: the role of entrepreneurial alertness. *Front. Psychol.* 9:951. doi: 10.3389/fpsyg.2018.00951

Huq, A., and Gilbert, D. (2017). All the world's a stage: transforming entrepreneurship education through design thinking. *Educ. Train.* 59, 155–170. doi: 10.1108/et-12-2015-0111

Kautonen, T., Gelderen, M. V., and Fink, M. (2015). Robustness of the theory of planned behavior in predicting entrepreneurial intentions and actions. *Entrep. Theory Pract.* 39, 655–674. doi: 10.1111/etap.12056

Kickul, J., and Krueger, N. F. (2004). "A cognitive processing model of entrepreneurial self-efficacy and intentionality," in *Frontiers of Entrepreneurship Research*, eds P. D. Reynolds, W. D. Bygrave, S. Manigart, C. M. Mason, G. D. Meyer, H. J. Sapienza, et al. (Wellesley, MA: Babson College), 607–619.

Kolvereid, L., and Moen, O. (1997). Entrepreneurship among business graduates: does a major in entrepreneurship make a difference. *J. Eur. Ind. Train.* 21, 154–157.

Krueger, N. F., and Kickul, J. (2006). "So you thought the intentions model was simple? Navigating the complexities and interactions of cognitive style, culture, gender, social norms, and intensity on the pathways to entrepreneurship," in *Paper Presented at the USASBE Conference*, (Tuscon, AZ).

Krueger, N. F., Reilly, M. D., and Carsrud, A. L. (2000). Competing models of entrepreneurial intentions. *J. Bus. Ventur.* 15, 411–432. doi: 10.1016/s0883-9026(98)00033-0

Kuckertz, A., and Wagner, M. (2010). The influence of sustainability orientation on entrepreneurial intentions – investigating the role of business experience. *J. Bus. Ventur.* 25, 524–539. doi: 10.1016/j.jbusvent.2009.09.001

Linan, F. (2004). Intention-based models of entrepreneurial education. *Small Bus.* 3, 11–13.

Liñán, F., and Chen, Y. W. (2009). Development and cross-cultural application of a specific instrument to measure entrepreneurial intentions. *Entrep. Theory Pract.* 33, 593–617. doi: 10.1111/j.1540-6520.2009.00318.x

Lindell, M. K., and Whitney, D. J. (2001). Accounting for common method variance in cross-sectional research designs. *J. Appl. Psychol.* 86, 114–121. doi: 10.1037/0021-9010.86.1.114

Marques, C. S., Ferreira, J. J., and Gomes, D. N. (2012). Entrepreneurship education: how psychological, demographic and behavioral factors predict the entrepreneurial intention. *Educ. Train.* 54, 657–672. doi: 10.1108/00400911211274819

Nowiński, W., and Haddoud, M. Y. (2019). The role of inspiring role models in enhancing entrepreneurial intention. *J. Bus. Res.* 96, 183–193. doi: 10.1016/j.jbusres.2018.11.005

Obschonka, M., Silbereisen, R. K., and Schmitt-Rodermund, E. (2011). Successful entrepreneurship as developmental outcome a path model from a lifespan perspective of human development. *Eur. Psychol.* 1, 10–11. doi: 10.1027/1016-9040/a000075

Perttula, K. (2004). *The POW Factor: Understanding and Igniting Passion for One's Work*, Los Angeles, CA: University of Southern California.

Peterman, N. E., and Kennedy, J. (2003). Enterprise education: influencing students' perceptions of entrepreneurship. *Entrep. Theory Pract.* 28, 129–144. doi: 10.1046/j.1540-6520.2003.00035.x

Podsakoff, P. M., MacKenzie, S. B., Lee, J.-Y., and Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *J. Appl. Psychol.* 88:879. doi: 10.1037/0021-9010.88.5.879

Preacher, K. J., and Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behav. Res. Methods* 40, 879–891. doi: 10.3758/brm.40.3.879

Rideout, E. C., and Gray, D. (2013). Does entrepreneurship education really work? A review and methodological critique of the empirical literature on the effects of university-based entrepreneurship education. *J. Small Bus. Manag.* 3, 329–351. doi: 10.1111/jsbm.12021

Scherer, R. F., Adams, J. S., and Carley, S. (1989). Role model performance effects on development of entrepreneurial career preference. *Entrep. Theory Pract.* 13, 53–71.

Scott, J. W. (1991). The evidence of experience. *Critical Inquiry* 17, 773–797.

Scott, M. G., and Twomey, D. F. (1988). The long-term supply of entrepreneurs: students' career aspirations in relation to entrepreneurship. *J. Small Bus. Manag.* 26, 26–37.

Shapero, A., and Sokol, L. (1982). "The social dimension of entrepreneurship," in *Encyclopedia of Entrepreneurship*, eds C. A. Kent, D. L. Sexton, and K. H. Vesper (Englewood, NJ: Prentice Hall).

Sheldon, K. M., Houser-Marko, L., and Kasser, T. (2006). Does autonomy increase with age? Comparing the goal motivations of college students and their parents. *J. Res. Pers.* 2006, 168–178. doi: 10.1016/j.jrp.2004.10.004

Shook, C. L. (2003). Venture creation and the enterprising individual: a review and synthesis. *J. Manag.* 29, 379–399. doi: 10.1016/s0149-2063(03)00016-3

Solesvik, M., Westhead, P., and Matlay, H. (2014). Cultural factors and entrepreneurial intention: the role of entrepreneurship education. *Educ. Train.* 56, 680–696. doi: 10.1108/et-07-2014-0075

Vallerand, R. J., Blanchard, C., and Mageau, G. A. (2003). Les passions defame: on obsessive and harmonious passion. *J. Pers. Soc. Psychol.* 85, 756–767. doi: 10.1037/0022-3514.85.4.756

Vallerand, R. J., Paquet, Y., and Philippe, F. L. (2010). On the role of passion for work in burnout: a process model. *J. Pers.* 78, 289–312. doi: 10.1111/j.1467-6494.2009.00616.x

Wilson, F., Kickul, J., and Marlino, D. (2007). Gender, entrepreneurial self-efficacy and entrepreneurial career intentions: implications for entrepreneurship education. *Entrep. Theory. Pract.* 5, 387–406. doi: 10.1111/j.1540-6520.2007.00179.x

Wu, W., Wang, H., Zheng, C., and Wu, Y. J. (2019). Effect of narcissism, psychopathy, and machiavellianism on entrepreneurial intention—the mediating of entrepreneurial self-efficacy. *Front. Psychol.* 10:360. doi: 10.3389/fpsyg.2019.00360

Zhu, F., Chen, R., and Li, M. (2011). The divergent effects of autonomy and passion on persistence in new venture creation. *Acad. Manag.* 1, 1–6. doi: 10.5465/ambpp.2011.65870627

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Exploring the Mode of Entrepreneurship Education Based on the Legal-Business Compound Competency in China

*Ting Wang**

School of Business, China University of Political Science and Law, Beijing, China

A perfect legal guarantee can ensure China's high-quality socio-economic development. At present, in terms of China's entrepreneurship education (EE), it is necessary to strengthen entrepreneurs' legal consciousness and respect for rules. The research establishes a model for legal-business compound competency (LBCC). It is a pioneering EE mode adapted to characteristics of China's market transition to cultivate interdisciplinary talents who excel at management and administration but also have a command of laws and regulations in EE. By utilizing behavioral event interview (BEI) and Delphi methods, factors affecting LBCC were summarized. Moreover, a questionnaire-based inquiry was conducted using graduates who received law–business interdisciplinary entrepreneurship education (LBIEE) as subjects to collecting data to evaluate the cultivation effect of the EE mode. In the study, a model for LBCC was established from the three perspectives including knowledge, skill, and attitude. Additionally, cultivating competency of law–business interdisciplinary talents (LBITs) shows a significantly positive influence on compensation level and job satisfaction among graduates who have received the EE. The core task of LBIEE is to improve compound competency of students in legal-business to enable students to show entrepreneurial spirit with legal-business intelligence. It is considered an innovation in a mode of education adapted to the transition and development of China's market economy.

Keywords: entrepreneurship education, legal-business compound competency, law–business interdisciplinary talents, competency model, behavioral event interview

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***Correspondence:**
Ting Wang
wangting@cupl.edu.cn

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INTRODUCTION

Entrepreneurship education (EE) pursues the development of student competency to grasp commercial opportunity (Daniela et al., 2016) and adapt to complex business environments (Ho et al., 2014; Rauch and Hulsink, 2015). Whether and how competency is cultivated through EE is proposed by Gorman et al. (1997). It is suggested that competency can be favorably cultivated via EE (Kuratko, 2005) while related meta-analysis also shows that EE is, on the whole, effective (Martin et al., 2013; Bae et al., 2014); however, super-fine multidisciplinary settings in educational contexts leads students passively receiving separate disciplinary cultures (Gu, 2011). As a result,

it is hard for students to develop a comprehensive competency in solving realistic problems in society (Gu, 2011). In the new era, with rapidly changing technologies and an ever-changing market environment, entrepreneurs need to face significant uncertainty. Therefore, they have to retain multidisciplinary knowledge and skills and show strong adaptability. In contrast, the essence of interdisciplinary talents lies in combination of knowledge, skill, and quality and therefore interdisciplinary talents are essential in the new era (Su and Ma, 2011). Cultivating interdisciplinary talents is an important direction for development research and practice in EE (Gary, 2005; Daniela et al., 2016; Virginia and Carlos, 2018).

The cultivation of interdisciplinary entrepreneurial talents will meet the demand of a society for comprehensive, application-oriented, and innovative talents to promote the development of society, the economy, and scientific technology (Wang and An, 2015; Karen and Dawn, 2016). The mode of innovation of inter-disciplinary talent cultivation in EE is constantly acknowledged and strengthened. Many colleges start to integrate business education with other disciplines, expecting to cultivate inter-disciplinary entrepreneurial talents. In the United States, there is no doubt that JD (Juris Doctor) or MBA (Master of Business Administration) are the most characteristic and attractive co-training projects (Chen and Qiu, 1996). Law–business interdisciplinary entrepreneurship education (LBIEE) underwent its first 5-year test period at the University of Virginia: this proved that inter-disciplinary education in law and management was feasible (John, 1982). Afterward, Harvard Business School and Northwestern University (United States) also expanded similar EE projects to cultivate LBITs (Lynn and Justin, 2005). Through JD/MBA education project, Harvard University aims to train students to master rigorous and centralized classroom knowledge, acquire practical expertise in law and management, and deepen their understanding of legal and business principles in their future career (Wang, 2017). However, Northwestern University's JD/MBA project pays more attention to practice, thus providing students with many practical learning opportunities to help them deal with many legal and business cross-cutting incidents (Wang, 2017).

A series of research achievements show that the cultivation characteristics of EE are influenced by their environment (Walter and Dohse, 2012; De Clercq et al., 2013), institution (Sascha and Jörn, 2016), and national background (Shepherd, 2011; Panagiotis, 2012). With the further development of legalization processes in China's economy, entrepreneurs will inflict a destructive blow to a start-up if they make a decision violating laws and business ethics (Baron et al., 2015). China's economic development during the transition period requires a great number of interdisciplinary talents who not only have a command of management but also show legal awareness (Wang, 2017). Therefore, in China's EE, it is necessary to strengthen the learning of law-based knowledge and cultivation of rule consciousness (Chai and Sun, 2012; Qu, 2015). In particular, with the internationalization of Chinese Enterprises, mastering the legal operating norms of overseas markets have been one of necessary attributes of entrepreneurial talents (Sun, 2018).

In 2010, Business School of China University of Political Science and Law (CUPL) started to explore the innovation of the law–business EE mode based on the construction of a pilot site for cultivating LBITs in quality engineering by the Ministry of Education of the People's Republic of China (Sun et al., 2012). China's LBIEE has been a new field which is under development in many universities (Huang et al., 2012; Zhao, 2015). A market economy means an economy ruled by law, so law is naturally integrated with business, which is an innate demand of entrepreneurial management (Wu, 2012). The inclusion of the legal and ethical components in business education programs can provide the tools and processes necessary for executive decision making (Ostapski et al., 1996). The LBIEE mode emphasizes the integration of law and business elements (Li, 2012) to remove boundaries between disciplines (Andrew et al., 1996). In particular, it effectively solves problems arising during the transition of China's market economy (Xie, 2017; Wang, 2018) and improves the law–business interdisciplinary application ability of students in commercial activities by applying interdisciplinary education methods (Wang, 2017). Students that have a better understanding of the legal issues involved with invention and entrepreneurship can have more successful careers and better contribute to society (Borns, 2002).

According to the psychologically educational theory, the competency is the integration of knowledge, skill and attitude (KSA) which affect performance and hence the success of the individual (McClelland, 1973; Baartman and Bruijn, 2011). This research explores a model for legal-business compound competency (LBCC) established from these three perspectives including knowledge, skill, and attitude through behavioral event interview (BEI) which is the general method in the research of competency exploration. Then, we evaluate the influence of the LBIEE on the graduates' compensation level and job satisfaction by the survey data from CUPL. The purpose of this research is to improve the LBIEE mode by exploring characteristics of LBCC.

MATERIALS AND METHODS

For exploring the model of LBCC, the method of BEI is firstly executed to extract the competency factors of LBCC. Then, through the Delphi method, the experts involved to the LBIEE project are invited to score the importance degree of these factors for making the extracted factors more complete and effective. According to the process of BEI and Delphi methods, some of the most important characteristics of competency of LBITs can be ranked in qualitative analysis. Moreover, the scales for competency were formed in the survey questionnaire to collect the data for establishing a LBCC model in three perspectives of knowledge, skill, and attitude by extraction method of principal component analysis and quantitatively evaluating the influence of LBIEE project on the graduates.

Behavioral Event Interview

The method of BEI is an open exploration technology based on behavior review (McClelland, 1973; Spencer and Spencer, 1993; Larson, 2001). It is implemented according to the following

process: interviewees narrate two or three successful and failed typical cases in their working lives and explain the whole process (including situation, participants, actions, thinking, and result) of events in detail. In the interview process, it is necessary to conduct effective guidance, and record the process. Finally, professionals make a summary, analysis, and code their findings to reveal core qualities in the staff interviewed (Adrian et al., 2014).

Through expert recommendation, 54 people with outstanding managerial ability in legal-business were interviewed. By utilizing BEI, 190 legal–business management cases were extracted in which there were 94 successful and 96 failed cases, respectively. On this basis, competency factors were extracted and coded from the cases to form a competency dictionary relating to LBCC. Moreover, frequencies of various competency factors in cases were calculated (**Table 1**).

TABLE 1 | Dictionary of competency factors in legal-business and statistical results (frequencies).

Factor of competency	Sub-dimension	Name and frequency
Knowledge	Knowledge in management	Knowledge concerning managerial economics (11), strategic management (36), leadership (7), financial management (13), marketing (3), contract management (12), human resource management (HRM) (45), organizational behavior (6), quality management (3), supply chain management (3), international operation (4)
	Knowledge in law	Knowledge concerning contract law (100), labor law (34), intellectual property law (12), trademark law (5), competition law (4), overseas legal risk of enterprises (4), commercial law (24), securities law (5), tax law (3), procedural law (2)
Skill	Basic skill	Negotiation ability (32), ability of interpersonal skill (3), communication ability (52), ability of analysis and identification (29), executive capacity (23), flexible application ability (18), learning ability (8), innovation capacity (6), self-discipline ability (12), position competency (14), stress resistance (3), ability to understand policy (15)
	Managerial skill	Team-based organization ability (11), strategic decision-making ability (13), risk management capacity (117), resource integration capability (15), ability of crisis management (37), cross-cultural management ability (5)
Attitude		Legal consciousness (135), rule consciousness (37), consciousness of rights safeguarding (50), sense of responsibility (17), overall viewpoint (33), rationality and calmness (43), carefulness (44), dialectical thinking (9), aggressiveness (8), objectivity and fairness (4), win-win cooperation (11), caution (42), honesty and trustworthiness (9), tenacity and determination (1)

Notes: Figure in the parentheses refers to the frequency of the competency factor in cases based on BEI.

Delphi Method

The Delphi method, also called the expert inquiry investigation method, is, in essence, an anonymous feedback inquiry method. The method can predict investigated problems through comprehensive analysis, which is implemented based on the following process: according to a rule-based procedure, anonymous experts are consulted for opinions or judgment of some predicted problems; According to the results of several investigations, and by virtue of knowledge and experience of experts, arrangement, statistics, and calculations are undertaken, and conclusions reached (Jon et al., 2017).

In the study, 27 teachers involved in this LBIEE project were invited to take part in the expert inquiry. The result obtained through the BEI was sent to various experts by e-mail. In this way, the experts can score the degree of importance of various factors concerning LBCC in **Table 1** and also compensate for the dictionary of competency factors. After being subjected to two rounds of feedback, and supplemented by use of the Delphi method, the variance, standard deviation, etc., of competency factors in the second round were lower than those first obtained, and the dot pitch of upper and lower quartiles also slightly reduced. It indicated that experts' feedback was more concentrated after two rounds of feedback and supplementation through the Delphi method: the mean of scores, deduced by experts for various factors of competency of LBITs in the dictionary, have high reliability (Petra, 2016; Stefan et al., 2017). Moreover, according to expert opinions obtained based on the Delphi method, three competency factors (including knowledge of business ethics, accountancy knowledge, and knowledge of corporate governance) are added into "knowledge in management." Moreover, a competency factor (comprehensive thinking ability) is supplemented for "basic skill." The "attitude" also contains team awareness and achievement motivation; therefore, the dictionary of factors of competency of LBITs is rendered more complete.

According to statistical data pertaining to scores by experts, the top 12 ranked competency factors in terms of scores are listed in **Table 2**, and mainly concentrate on attitude and skill factors. This implies that the skill factors in an iceberg competency model (McClelland, 1973) and attitude factors under ice surface are of great importance to EE. The factor "honesty and trustworthiness" returned the highest score, which is the most important characteristic of competency of LBITs and the factor which most needs cultivating during LBIEE.

Data Collection Based on Questionnaire Survey

To reflect the quality of cultivation of LBITs through this EE project, some questionnaires were issued to graduates

TABLE 2 | Factors of LBCC ranked in terms of scores by experts based on the Delphi method.

Rank	Name of competency factors	Mean	Standard deviation	Variance	Dimension of competency
1	Honesty and trustworthiness	4.67	0.483	0.233	Attitude
2	Communication ability	4.57	0.598	0.357	Skill
3	Learning ability	4.57	0.507	0.257	Skill
4	Team-based organization capacity	4.57	0.598	0.357	Skill
5	Strategic decision-making capacity	4.57	0.598	0.357	Skill
6	Legal consciousness	4.52	0.68	0.462	Attitude
7	Rule consciousness	4.52	0.68	0.462	Attitude
8	Sense of responsibility	4.52	0.68	0.462	Attitude
9	Overall viewpoint	4.52	0.602	0.362	Attitude
10	Innovation capacity	4.48	0.75	0.562	Skill
11	Knowledge of strategic management	4.48	0.68	0.462	Knowledge
12	Knowledge of contract law	4.43	0.87	0.757	Knowledge

who received LBIEE. The contents of questionnaires involved basic information including the evaluation of research objects on LBIEE and working conditions after they received EE. Additionally, based on factors affecting LBCC formed by using BEI and the Delphi method, a 5-point Likert scale for competency including 24 knowledge factors, 19 skill factors, and 16 attitude factors was established and used to evaluate ability levels of research objects.

During questionnaire design, to avoid common method bias, the following methods were used: (1) interviewees anonymously fill in questionnaires; (2) interviewers promise confidentiality and require interviewees to answer questions as honestly as possible; (3) interviewers define and explain any ambiguous or specialized professional questions (Nederhof, 1985; Podsakoff et al., 2003).

The Business School of China University of Political Science and Law first proposed LBIEE in China and has attracted a diversified elite cadre of students for enterprise management. It can represent the cultivation of demand and characteristics of competency of a majority of LBITs to some extent. On the premise of it being both voluntary and anonymous, interviewers issued paper and electronic questionnaires to law–business interdisciplinary graduates in the university who received LBIEE. All of the 145 questionnaires were returned (an effective return rate of 100%). The numbers of male and female samples were 89 and 56, which accounted for 61.4 and 38.6% of the whole sample, respectively. It approximated to the overall male–female ratio of graduates in the university who participate in LBIEE. The research objects are mainly aged from 30 to 40 years old and they are engaged in diversified careers. Therefore, the structure of investigated samples was deemed reasonable.

Test of Reliability and Validity of Questionnaires

Statistical analysis was conducted on the collected data. The values of Cronbach's alpha of various factors of LBCC in a Likert scale are all larger than 0.9 and the total α value in the scale reaches 0.964 (**Table 3**). This indicated that the scale for competency applied in the study shows a high reliability (James, 1993). Moreover, the Kaiser-Meyer-Olkin (KMO) values of various variables are all larger than 0.8. According to the reference standard of KMO value, it can be seen that there is a strong correlation between variables. Therefore, KMO is favorably suitable for factor analysis. The corresponding probability (p) of observed values of statistical values obtained based on Bartlett's test of sphericity is less than 0.0001, suggesting a significant difference, therefore, Bartlett's test of sphericity is also suited to factor analysis (**Table 4**). Based on the aforementioned data, it can be seen that the scale for competency exhibits favorable validity (James, 1993).

TABLE 3 | Test index for reliability of questionnaires.

Variable	Variable factor	Measured item	α value of various factors	Total α of the scale
LBCC	Knowledge	24	0.945	0.964
	Skill	19	0.934	
	Attitude	16	0.945	

TABLE 4 | Indices for KMO and Bartlett's test of sphericity of questionnaires.

Variable	Verified value for sample sufficiency based on KMO	Approximate chi-square value verified by using Bartlett's test of sphericity	Degree of freedom	Sig.
LBCC	0.863	7282.257	1711	<0.0001

RESULTS

Benefits From LBIEE Project

Data obtained through this investigation revealed that graduates think that they mainly benefit from the following aspects: systematically learning managerial knowledge, enhancing the consciousness of legal risk prevention, enriching interpersonal

TABLE 5 | Benefits from LBIEE project.

Benefits from learning	Number of samples	Proportion of total sample
Systematically learning managerial knowledge	107	73.8%
Strengthening consciousness of legal risk prevention	103	71.0%
Enriching interpersonal network	93	64.1%
Expanding business opportunity	88	60.7%
Broadening the horizon and renewing ideas	58	40.0%
Improving practical ability	29	20.0%
Others	5	3.5%

networks, expanding commercial opportunities, etc., through participation in this LBIEE project. The proportions of benefits in these four aspects are 73.8, 71.0, 64.1, and 60.7%, respectively (**Table 5**), showing that the EE project realizes the training objective of gaining improvements in legal-business contexts. With the progressive improvement of China's market economy and the increase of the degree of internationalization therein, entrepreneurs need to be good at management but also proficient in mastering its rules. That is, they are required to have business intelligence and also be able to grasp and apply rules (Sun, 2018). Facing such a context, strengthening learning in law courses in EE is conducive to contributing to the success of graduates in innovation and when starting a business (Wang, 2018). The LBIEE project proposed by China University of Political Science and Law strengthens the competitiveness of graduates in complex business environments and also provides high-quality LBITs for China's market economy in the transition period.

Establishing a Model for LBCC

Competency was first proposed in research by an American psychologist McClelland (1973): by establishing an iceberg competency model, he suggested that personal qualities influencing work performance can be divided into knowledge, skill, self-cognition, quality, and motivation. Competency is the potential characteristics of a person, which enable them to attain excellent performance in their posts (Boyatzis and Royatzis, 1982), and it is the technology, ability, and personal characteristics required by an efficient or competent manager (Page et al., 1994). Overall, competency is defined as the requirement of a specific work for a person in knowledge, skill, and attitude (Spencer and Spencer, 1993). The LBCC model will be established based on these three aspects.

Establishment of the Model for LBCC Based on Knowledge Factors

In terms of knowledge, according to the characteristics of LBIEE, 24 items from two major categories (knowledge in management and law) are extracted from the scale used for LBCC, as shown in **Table 1**. Through the SPSS software-based tests, the KMO value reflecting the overall validity of knowledge factors in the questionnaires was 0.888. This indicated that various knowledge factors in the questionnaires show many common factors and therefore the validity obtained through factor analysis is feasible. Factor analysis was conducted by applying principal component analysis (PCA) and varimax rotation was used to perform orthogonal rotation on the factor load matrix: four factors were thus acquired. The interpretation rate of the factors on the total variance was 67.174% and the result of factor analysis is shown in **Table 6**.

TABLE 6 | Result of factor analysis on knowledge factors.

	Component			
	1	2	3	4
Labor law	0.846	0.102	0.163	−0.043
Contract law	0.759	0.264	0.203	0.091
Human resource management	0.686	−0.087	0.509	0.021
Procedural law	0.679	0.413	−0.150	0.199
Contract management	0.651	0.234	0.374	0.234
Intellectual property law	0.643	0.276	0.047	0.424
Trademark law	0.641	0.324	0.039	0.509
Competition law	0.549	0.469	0.140	0.505
Corporate governance	0.483	0.373	0.403	0.134
Business ethics	0.462	0.097	0.288	0.419
Accountancy	0.105	0.808	0.184	0.035
Securities law	0.261	0.774	0.075	0.201
Financial management	−0.024	0.720	0.445	0.078
Tax law	0.356	0.659	0.257	0.173
Business law	0.486	0.599	0.134	0.264
Overseas legal risk	0.343	0.562	0.165	0.442
Strategic management	0.140	0.195	0.747	0.269
Leadership	0.210	0.124	0.737	0.133
Marketing	0.076	0.412	0.659	0.227
Managerial economics	0.159	0.301	0.655	0.241
Organizational behavior	0.581	−0.039	0.590	0.147
Supply chain management	0.030	0.154	0.245	0.787
Quality management	0.214	0.063	0.244	0.701
International operation	0.068	0.325	0.441	0.522

Extraction method, principal component analysis.

According to the aforementioned factor analysis, four factors can be extracted from 24 knowledge factors. Among them, knowledge of labor law, contract law, HRM, procedural law, contract management, intellectual property law, trademark law, competition law, corporate governance, and business ethics show a high load in the first factor, which can be called knowledge of Enterprise Compliance Governance; knowledge of accountant, securities law, financial management, tax law, business law, and overseas legal risk of enterprises exhibit a high load in the second factor, which can be named knowledge of Enterprise Asset Management; knowledge of strategic management, leadership, marketing, managerial economics, and organizational behavior have a high load in the third factor, which is called knowledge of Enterprise Management Strategy; knowledge of supply chain management, quality management, and international operation show a high load on the fourth factor, which is called knowledge of Enterprise Production and Operation. Therefore, the structure of the model for LBCC based on knowledge factors can be described by **Figure 1**.

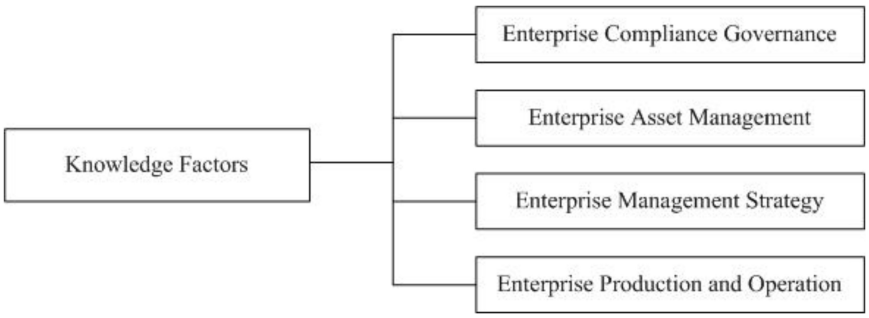

FIGURE 1 | LBCC model based on knowledge factors.

Establishment of the Model for LBCC Based on Skill Factors

In terms of skill, 19 items in two major categories (basic and managerial skills) were extracted from the scale of LBCC, as shown in **Table 1**. The KMO value reflecting the overall validity of skill factors in the questionnaires was 0.907, which implied that items related to various skill factors in the questionnaires contain many common factors. As a result, the validity through factor analysis is feasible. PCA was applied to conduct factor analysis and varimax rotation was used to implement orthogonal rotation on factor load matrix to thus obtain three factors. The interpretation rate of the factors for the total variance reached 63.274% and the result obtained through factor analysis is displayed in **Table 7**.

According to the aforementioned factor analysis, three factors can be extracted from 19 skill factors. Therein, position competency, self-discipline ability, executive capacity, learning ability, team-based organization ability, stress resistance, ability to understand policy, comprehensive thinking ability, and flexible application ability show a high load on the first factor, which are called Work and Occupation Competency; resource integration capacity, cross-cultural management ability, ability of crisis management, risk management capacity, strategic decision-making ability, and innovation capacity exhibit a high load on the second factor, which are called Management and Control Capacity; communication ability, ability of interpersonal skill, negotiation ability, and ability of analysis and identification have a high load on the third factor, which are called Communication and Negotiation Ability. Therefore, the structure of the model for LBCC based on skill factors can be displayed in **Figure 2**.

TABLE 7 | Result of factor analysis on skill factors.

	Component		
	1	**2**	**3**
Position competency	0.751	0.073	0.153
Self-discipline ability	0.744	0.124	0.009
Executive capacity	0.724	0.168	0.334
Learning ability	0.640	0.295	0.325
Team-based organization ability	0.638	0.356	0.173
Stress resistance	0.598	0.319	0.274
Ability to understand policy	0.597	0.503	0.108
Comprehensive thinking ability	0.567	0.452	0.301
Flexible application ability	0.488	0.362	0.478
Resource integration capacity	0.157	0.780	0.183
Cross-cultural management ability	0.131	0.758	0.116
Ability of crisis management	0.200	0.755	0.246
Risk management capacity	0.342	0.731	0.081
Strategic decision-making ability	0.258	0.657	0.363
Innovation capacity	0.217	0.598	0.232
Communication ability	0.291	0.176	0.840
Ability of interpersonal skill	0.249	0.151	0.820
Negotiation ability	−0.016	0.359	0.777
Ability of analysis and identification	0.456	0.200	0.643

Extraction method, principal component analysis.

Establishment of the Model for LBCC Based on Attitude Factors

In terms of attitudes, 16 items were extracted from the scale for LBCC, as shown in **Table 1**. The KMO value reflecting the overall validity of attitude factors in the questionnaires was 0.917. This indicated that various attitude factors in the questionnaires have many common factors and therefore the validity through factor analysis is feasible. Factor analysis was carried out using PCA and the factor load matrix was subjected to orthogonal rotation by using varimax rotation to thus attain two factors. The interpretation rate of the factors for the total variance was 63.642% and the result obtained based on factor analysis is shown in **Table 8**.

According to the aforementioned factor analysis, two factors can be extracted from 16 attitude factors. Among them, team awareness, win-win cooperation, tenacity and determination, objectivity and fairness, achievement motive, aggressiveness, honesty and trustworthiness, dialectical thinking, rationality, calmness, and caution show a high load on the first factor, which can be called Personality Characteristics; legal consciousness, rule consciousness, sense of responsibility, carefulness, consciousness of rights safeguarding, and overall viewpoint exhibit a high load on the second factor, which can be called Risk Consciousness. Thus, the structure of the model for LBCC based on attitude factors can be described in **Figure 3**.

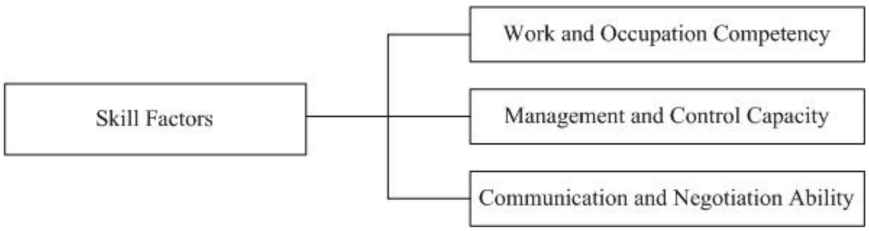

FIGURE 2 | LBCC model based on skill factors.

TABLE 8 | Result of factor analysis on attitude factors.

	Component	
	1	2
Team awareness	0.789	0.260
Win-win cooperation	0.773	0.264
Tenacity and determination	0.772	0.355
Objectivity and fairness	0.735	0.365
Achievement motive	0.725	0.074
Aggressiveness	0.713	0.400
Honesty and trustworthiness	0.708	0.398
Dialectical thinking	0.590	0.459
Rationality and calmness	0.569	0.529
Caution	0.497	0.473
Legal consciousness	0.208	0.867
Rule consciousness	0.245	0.827
Sense of responsibility	0.458	0.696
Carefulness	0.480	0.637
Consciousness of rights safeguarding	0.152	0.606
Overall viewpoint	0.568	0.599

Extraction method, principal component analysis.

The Influence of Various Factors on LBCC

Through factor analysis, it can be seen that LBCC can be well explained by using nine factors, involving knowledge of standard of enterprise operation, knowledge of enterprise asset management, knowledge of enterprise management strategy, knowledge of enterprise production and management, work competency, management and control capacity, communication and negotiation ability, personality characteristics, and risk consciousness. The nine factors are used to conduct multiple regressions on LBCC to analyze the influence of various factors on the LBCC. Assuming that Y refers to LBCC and the aforementioned nine factors are separately represented by applying FAC1 to FAC9. The model is as follows:

$$Y_i = b0 + b1FAC1 + b2FAC2 + b3FAC3 + b4FAC4 + b5\,FAC5 + b6FAC6 + b7FAC7 + b8FAC8 + b9FAC9 + \xi i$$

By using SPSS, multiple regressions are carried out on the model and the result of data analysis is shown in **Table 9**. It can be seen from the regression coefficient of the model that, when regression equation contains the above nine variables, the significance probability of the equation is lower than 0.001, rejecting the null hypothesis that the population regression coefficients are all equal to zero, therefore, the model should contain the nine variables. It can be seen from the analysis of regression coefficients that the significance level of regression coefficients is lower than 0.05, which is verified by t-test. That is, the standardized multiple regression model is as follows:

$$Y = 3.635 + 0.302FAC1 + 0.266FAC2 + 0.246FAC3 + 0.213FAC4 + 0.227FAC5 + 0.228FAC6 + 0.18FAC7 + 0.233FAC8 + 0.21FAC9$$

All factors are positively proportional to LBCC, implying that the improvement of abilities in the nine aspects can increase the LBCC to differing extents.

The Influence of LBIEE on Graduates

The purpose of EE is to improve students' comprehensive ability to adapt to complex environments in business activities (Rauch and Hulsink, 2015; Daniela et al., 2016). It is feasible to measure the training effect of EE based on two dimensions: objective compensation level and subjective job satisfaction of graduates in business activities.

Business education can bring long-term economic value for students, which significantly increases graduates' compensation

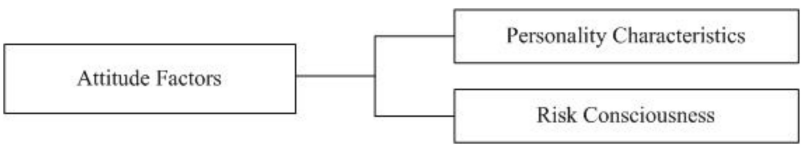

FIGURE 3 | LBCC model based on attitude factors.

TABLE 9 | Coefficients of regression equation for LBCC.

		Non-standardized coefficient		Standardized coefficient	t	Sig.
		B	Standard error	Beta		
	(Constant)	3.635	0.001		4576.263	0.000
Knowledge factors	FAC1: knowledge of standard of enterprise operation	0.124	0.001	0.302	134.878	0.000
	FAC2: knowledge of enterprise asset management	0.110	0.001	0.266	129.291	0.000
	FAC3: knowledge of enterprise management strategy	0.101	0.001	0.246	102.931	0.000
	FAC4: knowledge of enterprise production and management	0.087	0.001	0.213	102.602	0.000
Skill factors	FAC5: work competency	0.094	0.001	0.227	76.027	0.000
	FAC6: management and control capacity	0.094	0.001	0.228	91.029	0.000
	FAC7: communication and negotiation ability	0.074	0.001	0.180	77.859	0.000
Attitude factors	FAC8: personality characteristics	0.096	0.001	0.233	83.166	0.000
	FAC9: risk consciousness	0.086	0.001	0.210	80.285	0.000

TABLE 10 | Data on the influence of LBIEE on compensation level of graduates.

Model		Non-standardized coefficient		Standardized coefficient	*t*	Sig.
		B	Standard error	Beta		
1	(Constant)	0.457	0.818		0.559	0.577
	LBCC	0.713	0.224	0.258	3.188	0.002

TABLE 11 | The influence of LBIEE on graduate job satisfaction.

		Non-standardized coefficient		Standardized coefficient	*t*	Sig.
		B	Standard error	Beta		
1	(Constant)	48.727	9.134		5.335	0.000
	LBCC	6.759	2.497	0.221	2.707	0.008

level (Jonathan et al., 2010). To observe the influence of LBIEE on the compensation level of graduates, the competency level of graduates in legal-business after receiving LBIEE was taken as the independent variable. Moreover, the annual salary of graduates was considered as a dependent variable. Through regression analysis, it can be seen, from **Table 10**, that the competency level in legal-business shows a significantly positive correlation with graduate salary. This indicates that LBIEE can improve the compensation level of graduates and the LBCC strengthens the comprehensive quality of graduates in career development. Graduates make a high-quality human capital investment in LBIEE.

The level of job satisfaction of graduates is an overall view after comprehensively considering various factors and it is a key factor for measuring education quality (Yue, 2013). Education can indirectly influence job satisfaction of graduates through various factors including salary and physical conditions (Eugenia and Luis, 2007). Entrepreneurial activity not only can bring material welfare but enhance job satisfaction and well-being (Wim et al., 2014). To explore the influence of LBIEE on job satisfaction of graduates, the competency of graduates in legal-business contexts after receiving LBIEE was regarded as the independent variable. Moreover, the job satisfaction of graduates in business activities was considered as a dependent variable. Through regression analysis (**Table 11**), it can be seen that the competency level in legal-business contexts is positively proportional to graduate job satisfaction. This implied that LBIEE can improve graduate job satisfaction. The LBCC is not only conducive to improving the ability of graduates in commercial management context but can also strengthen their adaptability to complex external business competition during the transition of China's economy. Establishing the concept of rule of law and rule consciousness is conducive to commercial development.

CONCLUSION AND DISCUSSION

The China University of Political Science and Law proposed the cultivation of LBITs characterized by possessing business and law intelligence, quick thinking, and strong actions. The university first launched the LBIEE project in 2010 and started an upsurge in innovative LBIEE modal development. LBIEE complies with the

direction of innovating talent cultivation through EE in China's universities and also satisfies the practical needs of standardized, legalized development of the market economy for cultivating interdisciplinary talents (Chai and Sun, 2012). The core task of LBIEE is to improve students' LBCC and enable students to show entrepreneurial spirit with legal-business intelligence (Sun, 2012). For LBIEE, it needs to pay attention to cultivate legal-business intelligence in the following ways:

Integrating Legal Thinking Into Business Logics

As an independent discipline, business EE has its complete course system, including core curriculum and specialized curriculum. The purpose of the design logic of courses is to cultivate leaders in commercial circles who exhibit relatively comprehensive knowledge systems in management and also show entrepreneurial spirit. Such an education program is likely to lead to homogenization (Stewart and Anne, 2003; Datar et al., 2013). LBIEE incorporates legal thinking into the system of business. In terms of curriculum provision, law courses related to business need to be set, for example, contract law, economic law, tax law, and WTO legal regulation (Wang, 2018). This can equip graduates with entrepreneurship-related laws and regulations and a knowledge bank of policy rules and a grasp of various skills (planning, marketing, decision-making, and risk assessment) required in entrepreneurship. The LBCC can effectively improve students' entrepreneurial ability and urge them to take delight, and dare to participate, in entrepreneurship (Lu, 2015).

Building Legal Awareness in Commercial Spirit

Traditional EE tends to emphasize innovation, breakthrough, and entrepreneurial spirit that dare to face failure. Many people think that it contradicts legal consciousness, and especially in the initial development period of China's market economy, many excellent entrepreneurs have failed due to a lack of legal consciousness (Qu, 2015). LBIEE pays much attention to building correct values in business for students. By holding a series of courses, lectures, and case discussions related to legal-business, students' commercial spirit is endowed with more connotative meaning. In this way, legal consciousness and business ethics imperceptibly influence students' decision-making behaviors. The case-based course of most characteristic influence is law–business management, which realizes the integration of law and business knowledge in teaching research of management cases (Mu, 2012). On this basis, it is expected to train students to have an awareness of accepting laws and rules as a necessary constraint when facing practical problems in business.

Legal Risk Prevention in Business Competition

Significant business competition implies significant risk: at present, during the transition of China's economy, legal regulations have not yet been fully embedded and there are many uncertainties in market environment. Therefore, many enterprises frequently consider business risk during competition while ignoring legal risk. As a result, legal risk has been an important factor leading to entrepreneurship failure (Xie, 2017), which brings many unnecessary hidden dangers in business management for enterprise development (Baron et al., 2015). Additionally, Chinese enterprises are frequently subject to foreign law while implementing the "Going global" internationalization strategy. Transnational management cases evincing significant loss caused by China's enterprises failing to evaluate legal risk have become common in recent years (Wang, 2012). LBIEE neither means cultivating entrepreneurs into professional legal talents nor requires students to learn legal provisions by rote in this training program: it lets students know of the legal issues and pitfalls in business management through law–business interdisciplinary course teaching and case discussion. Furthermore, entrepreneurs can achieve success in business by taking effective strategies to prevent legal risk.

Strengthening the Application of Legal Personnel in Commercial Activities

Various management activities of an enterprise are always related to legal affairs. A majority of students who received law–business EE are professional managers in various domains at different positions. Besides, a batch of advanced professional layers in major law firms in China also participates in LBIEE and they bring their rich experience in legal affairs from their client portfolios. LBIEE leads to an interpersonal network satisfaction for sharing legal-business experience (Sun, 2012). Through interaction between students, practical problems of students in enterprises are discussed as law–business cases (Ge and Mu, 2010), which provide systematic solutions to business activities by using law–business conjoined thinking while also reflecting the importance of participating in LBIEE.

Limitations and Suggestions

This research is an exploratory factor analysis for establishing the model of LBCC by the process and methods of competency research. However, due to the limited purpose of this study, the training effect of the LBIEE project is only examined by the influence on objective compensation level and subjective job satisfaction of the graduates. Empirical studies relating to the effects of LBIEE projects on other aspects of graduates (e.g., entrepreneurial intention) need to be added and strengthened in the future researches for better improving this pioneering EE mode. In addition, the survey of this research only focus on Business School of China University of Political Science and Law (CUPL) started to explore the innovation of the LBIEE mode, which limits the generalizability of the results. Future researches ought to expand the samples to study individuals in different LBIEE projects. Moreover, this research is primarily based on the Chinese context because the LBIEE mode adapted to characteristics of China's market transition which requires a great number of LBITs who not only have a command of management but also show legal awareness. Whether the LBIEE mode is suitable for the development environment of foreign

countries has not been discussed. The wider applicability of this LBIEE mode can be further explored in future researches.

AUTHOR CONTRIBUTIONS

TW provided substantial contributions to the research design and data analysis. TW wrote and revised the manuscript. TW approved of this version of the manuscript to be published.

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REFERENCES

Adrian, B., Paloma, C., and Charlotte, C. (2014). Storytelling in the selection interview? How applicants respond to past behavior. *J. Bus. Psychol.* 29, 593–604.

Andrew, S. O., John, O., and Gaston, T. G. (1996). The legal and ethical components of executive decision-making: a course for business managers. *J. Bus. Ethics*. 15, 571–579. doi: 10.1007/BF00381932

Baartman, L. K. J., and Bruijn, E. D. (2011). Integrating knowledge, skills and attitudes: conceptualising learning processes towards vocational competence. *Edu. Res. Rev*. 6, 125–134. doi: 10.1016/j.edurev.2011.03.001

Bae, T. J., Qian, S., Miao, C., and Fiet, J. O. (2014). The relationship between entrepreneurship education and entrepreneurial intentions: a meta-analytic review. *Enterp. Theory Pract.* 38, 217–254. doi: 10.1111/etap.12095

Baron, R. A., Zhao, H., and Miao, Q. (2015). Personal motives, moral disengagement, and unethical decisions by entrepreneurs: cognitive mechanisms on the slippery slope. *J. Bus. Ethics* 128, 107–118.

Borns, R. J. (2002). "The legal aspects of engineering education, entrepreneurship, and invention," in *Proceedings of the 32nd Annual Frontiers in Education*, (Piscataway, NJ: IEEE).

Boyatzis, R. E., and Royatzis, R. (1982). *The Competent Manager: A Model for Effective Performance*. New York, NY: Wiley.

Chai, X. Q., and Sun, X. Z. (2012). *On Setting Up the Management School of Law and Business, Legal-business Management Review*. China: Economy & Management Publishing House, 19–26.

Chen, B. F., and Qiu, Q. (1996). The reform of harvard management education and its enlightenment. *Nankai J.* 3, 57–60.

Daniela, M., Rainer, H., Norbert, K., and Birgit, W. (2016). The impact of entrepreneurship education on the entrepreneurial intention of students in science and engineering versus business studies university programs. *Technol. Forecast. Soc.* 104, 172–179. doi: 10.1016/j.techfore.2015.11.006

Datar, M. S., Garvin, A. D., and Cullen, G. P. (2013). *Rethinking the MBA Business Education at a Crossroads*. Brighton, MA: Harvard Business Press, 17–42.

De Clercq, D., Lim, D. S. K., and Oh, C. H. (2013). Individual-level resources and new business activity: the contingent role of institutional context. *Entrepreneurship: Theor. Pract.* 37, 303–330. doi: 10.1111/j.1540-6520.2011.00470.x

Eugenia, F. F., and Luis, E. V. L. (2007). Evaluation of the effects of education on job satisfaction: independent single-equation vs. structural equation models. *J. Int. Adv. Econ. Res.* 13, 157–170. doi: 10.1007/s11294-007-9081-3

Gary, B. (2005). The entrepreneurship curriculum for music students: thoughts towards a consensus. *Coll. Music Sym.* 45, 13–24.

Ge, J. H., and Mu, F. L. (2010). Exploration of "law – business" in case teaching practice. *J. Chin. Univ. Edu.* 7, 67–70.

Gorman, G., Hanlon, D., and King, W. (1997). Some research perspectives on entrepreneurship education, enterprise education, and education for small business management: a ten-year literature review. *Int. Small Bus. J.* 15, 56–77. doi: 10.1177/0266242697153004

Gu, H. L. (2011). "Snow's proposition" and interdisciplinary research in the humanities and social sciences. *Soc. Sci. Chin.* 32, 14–22. doi: 10.1080/02529203.2011.598290

Ho, Y.-P., Low, P.-C., and Wong, P.-K. (2014). Do university entrepreneurship programs influence students' entrepreneurial behavior? An empirical analysis of university students in Singapore. *Adv. Stud. Entrepreneurship Innov. Econ. Growth* 24, 65–87.

Huang, Z. X., Huang, L. J., and Song, Z. H. (2012). Entrepreneurial law education of college students: the necessity and recommendations. *Chin. High. Educ. Res.* 12, 76–78. doi: 10.16298/j.cnki.1004-3667.2012.11.018

James, O. B. (1993). *Statistical Decision Theory and Bayesian Analysis (Springer Series in Statistics)*. Berlin: Springer.

John, W. K. (1982). An analysis of legal education and business education within the context of a J.D./MBA program. *J. Legal Educ.* 31, 512–530.

Jon, S., Richard, T. C., Stale, N., Ariel, O., and Jeffrey, R. (2017). Vincent, using the Delphi method to value protection of the Amazon rainforest. *J. Ecol. Econom.* 131, 475–484. doi: 10.1016/j.ecolecon.2016.09.028

Jonathan, P. O., Paul, L. D., Crook, T. R., and Craig, E. A. (2010). Does business school research add economic value for students? *Acad. Manage. Learn. Educ.* 9, 638–651. doi: 10.1007/s00268-017-4370-3

Karen, L. R., and Dawn, S. (2016). Entrepreneurial literacy and the second language curriculum. *J. Hispania* 99, 423–435.

Kuratko, D. F. (2005). The emergence of entrepreneurship education: development, trends, and challenges. *Enterp. Theory Pract.* 29, 577–597. doi: 10.1111/j.1540-6520.2005.00099.x

Larson, W. W. (2001). *Ten-Minute Guide to Conducting a Job Interview*. Indianapolis, IN: Macmill.

Li, J. H. (2012). *Law and Business Administration and Its Basic Methods in Legal-Business Management Review*. China: Economy & Management Publishing House, 40–51.

Lu, Q. P. (2015). On the correlation between college entrepreneurship education and college students' entrepreneurial ability. *J. Educ. Rev.* 6, 21–24.

Lynn, W., and Justin, O. (2005). Crossing the charles: the experiences, networks, and career paths of Harvard JD/MBA Alumni. *SSRN Electron. J.* 8, 1–64. doi: 10.2139/ssrn.812425

Martin, B. C., McNally, J. J., and Kay, M. J. (2013). Examining the formation of human capital in entrepreneurship: a meta-analysis of entrepreneurship education outcomes. *J. Bus. Ventur.* 28, 211–224. doi: 10.1016/j.jbusvent.2012.03.002

McClelland, D. C. (1973). Testing for competence rather than for "intelligence". *Am. Psychol.* 28:1.

Mu, F. L. (2012). *Exploration and Study on Legal-Business Management Cases, in Legal-Business Management Review*. China: Economy & Management Publishing House, 194–202.

Nederhof, A. J. (1985). Methods of coping with social desirability bias: a review. *Eur. J. Soc. Psychol.* 15, 263–280. doi: 10.1002/ejsp.2420150303

Ostapski, S. A., Oliver, J., and Gonzalez, G. T. (1996). The legal and ethical components of executive decision-making: a course for business managers. *J. Bus. Ethics* 15, 571–579. doi: 10.1007/BF00381932

Page, C., Wilson, M., and Kolb, D. (1994). *Managerial Competencies: On the Inside, Looking in?*. Wellington: Ministry of Commerce.

Panagiotis, G. (2012). Innovation embedded in entrepreneurs' networks and national educational systems. *Small Bus. Econ.* 39, 495–515. doi: 10.1007/sl1187-014-9546-8

Petra, R. K. (2016). Integrating factor analysis and the Delphi method in scenario development: a case study of Dalmatia. *Croatia. J. Appl. Geogr.* 71, 56–68. doi: 10.1016/j.apgeog.2016.04.007

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., and Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. *J. Appl. Psychol.* 88, 879–903.

Qu, Z. H. (2015). Research on the development of legal education in the teaching of "entrepreneurship foundation" course in universities. *J. Innov. Entrepreneurship Educ.* 6, 128–130.

Rauch, A. J., and Hulsink, W. (2015). Putting entrepreneurship education where the intention to act lies. An investigation into the impact of entrepreneurship education on entrepreneurial behaviour. *Acad. Manage. Learn. Educ.* 14, 187–204. doi: 10.5465/amle.2012.0293

Sascha, G. W., and Jörn, H. B. (2016). Outcomes of entrepreneurship education: An institutional perspective. *J. Bus. Venturing* 31, 216–233. doi: 10.1016/j.jbusvent.2015.10.003

Shepherd, D. A. (2011). Multilevel entrepreneurship research: opportunities for studying entrepreneurial decision making. *J. Manage.* 37, 412–420. doi: 10.1177/0149206310369940

Spencer, L. M., and Spencer, S. G. (1993). *Competence at Work: Models for Superior Performance*. New York, NY: Wiley.

Stefan, A., Kerstin, C., Lars, G., Maria, H., Jana, H., and Monika, M. (2017). Real-time delphi in practice—a comparative analysis of existing software-based tools. *J. Technol. Forecast. Soc.* 118, 15–27. doi: 10.1016/j.techfore.2017.01.023

Stewart, R. C., and Anne, R.-S. (2003). Revising the boundaries: management education and learning in a postpositivist world. *Acad. Manage. Learn. Educ.* 2, 85–98.

Su, X. Y., and Ma, Y. Q. (2011). Research on the cultivation to the compound talents in high school. *Modern Edu. Forum.* 11, 73–74. doi: 10.13694/j.cnki.ddjylt.2011.10.037

Sun, X. Z. (2012). *To Open up a New Era of Legal-Business Management: Reflections and Explorations on Legal-Business Management Issues in Legal-Business Management Review*. China: Economy &Management Publishing House, 3–18.

Sun, X. Z. (2018). *The wisdom of Law-Business Management Leading the Internationalization of Chinese Enterprises in Legal-Business Management Interpretation*. China: Economy &Management Publishing House, 159–165.

Sun, X. Z., Wang, L., and Wang, T. (2012). *Explorations and Practices of Cultivating Legal-Business Interdisciplinary Talents in Legal-Business Management Review*. China: Economy &Management Publishing House, 183–193.

Virginia, B. S., and Carlos, A. S. (2018). Entrepreneurial intention among engineering students: the role of Entrepreneurship education. *Eur. Res. Manage. Bus. Econ.* 24, 53–61. doi: 10.1016/j.iedeen.2017.04.001

Walter, S. G., and Dohse, D. (2012). Why mode and regional context matter for entrepreneurship education. *Entrepreneurship Reg. Dev.* 24, 807–835. doi: 10.1080/08985626.2012.721009

Wang, B. Q., and An, J. (2015). On the ways of cultivating compound talents in science and engineering colleges. *Educ. Vocat.* 7, 2–3. doi: 10.13615/j.cnki.1004-3985.2015.07.044

Wang, L. (2012). *Legal-business management model and its TDCA optimization tool in Legal-Business Management Review*. China: Economy & Management Publishing House, 27–39.

Wang, N. (2018). The setting of education law course on innovation and entrepreneurship in universities–a case study. *J. Innov. Enterprise Educ.* 9, 3–6.

Wang, T. (2017). American JD/MBA Law-business compound talents' training model and its enlightenment. *High. Educ. Explor.* 2, 94–97.

Wim, N., José, E. A., and Oscar, C. (2014). Surfeiting,the appetite may sicken: entrepreneurship and happiness. *J. Small Busi. Econ.* 42, 523–540. doi: 10.1007/s11187-013-9492-x

Wu, Y. X. (2012). *Perspective on the Concept and Connotation About Legal-Business Management From the View of Management in Legal-Business Management Review*. China: Economy & Management Publishing House, 52–73.

Xie, R. H. (2017). A study on the legal safeguard mechanism of college students' entrepreneurship from the perspective of risk theory. *J. Univ. Educ. Manage.* 11, 53–59. doi: 10.13316/j.cnki.jhem.20171027.007

Yue, C. Q. (2013). Analysis on the influencing factors of Chinese college graduates' employment satisfaction. *J. Educ. Comment. Peking Univ.* 11, 2–12. doi: 10.19355/j.cnki.1671-9468.2013.02.007

Zhao, Y. X. (2015). The theoretical context and practical problems of the "law-business vocational education". *J. Hubei Univ. Econ.* 12, 138–139.

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Can Group Intelligence Help Entrepreneurs Find Better Opportunities?

*Yan Zichu**

Department of Leadership and Organization Management, Tsinghua University, Beijing, China

Entrepreneurial activities are becoming more and more prevalence in our social life. One of the important questions in entrepreneurship is how to find good quality entrepreneurial opportunities. Previous researches suggested that characteristics of entrepreneurs such as their prior experiences, social capitals, and professional skills may influence the consequence of entrepreneurial opportunities finding. This research will introduce a more dynamic perspective to explain the influencing factor of the entrepreneurial opportunities finding. During the decision making process, some behaviors of team members such as joint decision making and constructive controversy may help decision makers understand key issues more comprehensive and decrease the risk come from uncertainties. Besides, this research also takes the different industries' environmental dynamism into consideration. Thus, we can observe the internal and external effect at the same time.

Keywords: entrepreneurial opportunity, joint decision making, constructive controversy, industry environmental dynamism, entrepreneurship, group intelligence

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Università degli Studi di Catania, Italy

***Correspondence:**
Yan Zichu
yzc517@126.com

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INTRODUCTION

With the economy developing these years, entrepreneurship activities have been paid more and more attentions to by researchers and managers. People want to reveal the myth of entrepreneurship and find the way to be successful. In most cases, entrepreneurs are the critical part of the entrepreneurship activities. Since 1980s, most entrepreneurship activities not only involve one entrepreneur but also teams doing the work. As Gartner et al. (1994) mentioned that "entrepreneur in entrepreneurship" is typically plural, not singular. Besides, according to the statistics of Panel Study of Entrepreneurship Dynamics (PSED), over half of the nascent entrepreneurs started their business with two or more partners (Reynolds et al., 2004). And PSED in China (2012) suggests that over sixty percent entrepreneurs realize the importance of establishing entrepreneurial teams when starting their business. Kamm, Shuman, Seeger and Nurick in 1990 firstly gave a strict definition for the entrepreneurial team. According to their words, entrepreneurial team should consist of at least two individuals and these individuals can get financial benefits from the new firm respectively. The entrepreneurial team phenomenon is significant because it is not only a prevalence phenomenon nowadays but also a critical factor to influence the consequence of entrepreneurship (Kamm et al., 1990). Compared with singular entrepreneur, entrepreneurial teams have the advantage of skills and background diversity. It is much easier for entrepreneurial teams to integrate the resources they have (Davidsson and Honig, 2003). Furthermore, entrepreneurial activities are always full of uncertainties and entrepreneurial

team can cope better with these uncertainties (Niu et al., 2011). The better adaption ability brought by the entrepreneurial team can benefit entrepreneurial performance (Lechler, 2001). In practice, venture capitals also consider the entrepreneurial team as a critical factor to determine whether to invest a firm or not (Maschke and zu Knyphausen-Aufseβ, 2012).

Previous researches have suggested that successful new venture management cannot be reduced to a set of simple rules or techniques (Forbes et al., 2006). Entrepreneurial teams become successful because they not only have several people but also have a reasonable process to make each team member's knowledge and resources function most effectively. Preceding studies about entrepreneurial teams most focus on the diversity in the team. These studies clarify that diversity especially in skills can make entrepreneurial team perform better. Some researchers find that team members' entrepreneurial related experiences will influence entrepreneurial activities positively (Shrader and Siegel, 2007). Shu et al. (2018) points out that making full use of entrepreneurial team members can expand the social network resources of entrepreneurial teams, which is beneficial to entrepreneurial performance. Other studies major in dynamic team formation process also suggested that teams absorb new team members who own different skills, knowledge or background during the entrepreneurial activities (Ucbasaran et al., 2003). In contrast, some other studies mentioned that diversity in teams may impede the communications in teams because different people have different background knowledge would focus differently on the same thing, and that thus this may hinder team work efficiently.

Diversity can just provide some important resources for a new firm, but more important is how to use these resources. Rather than explaining whether diversity in entrepreneurial teams will influence the consequence of entrepreneurship as most of preceding researches have done, this study will try to reveal how entrepreneurial teams can take advantage of these diversities. In the setup stage of entrepreneurial activities, entrepreneurs should make two-thirds more decisions than managers in mature companies in average and decisions in entrepreneurial firms will more directly influence the future development of the firm. Thus, this research will focus on the perspective of constructive controversy and joint decision making in decision making process in entrepreneurial teams, and will explain how the process may affect entrepreneurial consequences. Meanwhile, in order to make the result more persuasive, we also take the opportunity differentiation in different industries when we evaluate entrepreneurship opportunities.

Theoretical Background

Entrepreneurial opportunities are always core topic in the field of entrepreneurship researches. Plenty of scholars and practitioners regard entrepreneurial opportunities as one of the most important consequences in the entrepreneurial activities. Hansen et al. (2011) concluded the definitions of entrepreneurial opportunities in papers published in six most reputed journal in entrepreneurship field in the past nearly 20 years, and found that there are 49 conceptual definitions and 32 operational definitions about entrepreneurial opportunities. The most prevalence definition is given by Shane and Venkataraman (2000) as "situations in which new goods, services, raw materials, markets and organizing methods can be introduced through the formation of new means, ends or ends–means relationships... In addition, unlike optimizing or satisfying decisions, in which the ends that the decision maker is trying to achieve and the means that the decision maker will employ are given, entrepreneurial decisions are creative decisions. That is the entrepreneur constructs the means, the ends or both."

Entrepreneurial opportunities make entrepreneurial teams clear about the direction of new firm development; thus, team members can devote their own advantages to solve certain problems. A great entrepreneurial opportunity not only means new, but also should be achievable and locate in an existing or potential big market. Most researchers agree that entrepreneurial opportunity is one of the key factors for a successful entrepreneurship. Previous studies about entrepreneurial opportunity most focus on the following question.

First is the classification of the entrepreneurial opportunity. Ardichvili et al. (2003) used two dimensions, value sought and value creation capability to classify entrepreneurial opportunity into four categories including "Dreams" "Problem Solving" "Technology Transfer" and "Business Formation." This classification suggests that different kinds of entrepreneurial opportunities should have different risks and different potential benefits.

Second are the resources of entrepreneurial opportunities. There is a debate in the field of entrepreneurship that whether the entrepreneurial opportunities are recovery by entrepreneurs in the objective environment or created by the subjective recognition of entrepreneurs. Renko et al. (2012) integrated these two perspectives and proposed that entrepreneurial opportunity is objectively existing but should be explored by subjective recognition and behaviors of entrepreneurs.

Another critical issue is entrepreneurial opportunity recognition. Entrepreneurial opportunity recognition consists of two parts: the first part is the quantity of entrepreneurial opportunity entrepreneurs find and the second part is the quality of entrepreneurial opportunity. Most previous studies about entrepreneurial opportunity recognition focus on the quantity of opportunities. They operationalize entrepreneurial opportunity as the amount of opportunities entrepreneurs find in recent two or five years (e.g., Hills et al., 1997). But it is obviously not reasonable to judge entrepreneurial opportunity recognition solely from the perspective of quantity. Hansen et al. (2011) also criticized these kinds of operationalization. Timmons and Spinelli (1999) listed eight standards to evaluate quality of opportunities. Samuelsson (2004) in his doctoral dissertation gave out four criterions for innovation of opportunities. But entrepreneurial opportunity does not equal to innovation, and new ideas or methods do not always mean good. When we talk about entrepreneurial opportunities, we should also pay attention to the feasibility or operationalization of the opportunities and potential benefits the opportunities can bring. Rather than the opportunities self, the social environment

and industry requirement also influence the evaluation of entrepreneurial opportunity.

As for the antecedents of entrepreneurial opportunity, most of preceding studies explain from the perspective of entrepreneurs' characteristics or teams' characteristics, such as entrepreneurs' cognitive abilities (Corbett, 2007), human capital (Ucbasaran et al., 2009), social capital (Zhang et al., 2008) and confidence of entrepreneurs (Krueger and Dickson, 1994). But these factors are static and cannot reflect the dynamic influence on the quality entrepreneurial opportunity. Few studies pay attention to team process factors. Kollmann et al. (2018) investigate the relationship between task conflict and entrepreneurial capability in teams planning a business. In this study, scholars find task conflict is beneficial to business planning performance. However, they did not give a sufficient explanation to the team interaction process. George et al. (2016) did a systematic review of entrepreneurial opportunity recognition during past three decades. They suggest knowledge integration in teams is one of the important mechanisms to opportunity recognition, high quality knowledge integration is crucial to opportunity improving. Thus, following researches should more focus on the team process that can integrate knowledge from different team members. In order to cover shortages of opportunity quality evaluation and lack of dynamic process in previous study, this study will evaluate the quality of entrepreneurial opportunity according to the comprehensive suggestions of western scholars and some Chinese scholars and focus on the decision-making process which is critical for utilizing static resources. At the same time, we will also take external environment into consideration.

Hypotheses Development

Entrepreneurial teams usually consist of individuals owning different backgrounds, experiences and skills. Some team members cannot clearly know the roles of themselves in the team or cannot understand well about the missions of the new firm. Thus, collaboration between the team members may encounter many problems (Foss et al., 2008). Entrepreneurships are activities full of uncertainty, and the quality of coordination among team members make this uncertainty become more serious to some extent. Blatt (2009) find that team members who are different in age, education and experience will be more likely to behave differently. More importantly, the different behaviors and understandings among team members may do harm to the normal function of the new firm if team members cannot communication well with others (Foss et al., 2008). Thus, cooperation among team members especially when in decision making becomes really important for an entrepreneurial team.

Joint decision-making means that team members participate into the process of decision making and that the final decision is not made by any one solely. Following the definition given by Subramani and Venkatraman (2003), we define the joint decision making as the degree to which team members jointly make decisions about key issues in the new firm. Joint decision making is not only a mechanism of cooperation but also a mechanism of mutual monitoring. Team members can take their own advantages to help the new firm prevent from risk actions or to reduce the cost of team learning. They can solve the problems in the entrepreneurial process together and avoid the loss brought by bias recognition of any certain individuals. As for mutual monitoring, joint decision making can prevent team members making decisions which are beneficial to individuals rather than the firm. More importantly, the process of joint decision making let core team members know well about the development of the firm, and it will make communication among team members more efficient and make team members more confident about the project they undertake. Novara et al. (2018) also suggests that the specific mode of problem solving should be made by the person face the problem directly, who may also find the opportunities behind the problems. In entrepreneurial teams, different team members usually responsible for different areas but these areas are highly interdependent, so joint decision-making process can help the team make more informed decisions.

Furthermore, joint decision making can also make team members feel that the process of decision making is fair (Kim and Mauborgne, 1993). The fairness feeling can make team members have higher potential to believe that the final decision is reasonable (Sapienza and Korsgaard, 1996) and have greater motivation to cooperate with other team members. Besides, fairness decision making process ensure that each team member can get the profit they should own. Team members getting the profit they deserved is a critical guarantee for their further devotions. Wang (1992) also mentioned that better joint decision making is beneficial to promote team performance. Thus, we propose that:

> H1: Joint decision making is positively related to entrepreneurial opportunity evaluation, and the higher degree of joint decision making in team usually leads to better quality of entrepreneurial opportunity finding.

Another important factor that may influence the final decision-making is controversy in the decision-making process. Controversy is a special kind of conflicts. Team members discuss the different views, ideas and perspectives on the same question in public, and try to get consensus recognition and decision making. Tjosvold (1982) found that some kinds of controversy are beneficial to decision making, and he named those kinds of controversy as constructive controversy. Tjosvold (1982, 1984) also gave a definition of constructive controversy that constructive controversy refers to the open discussion on the different views for firm's common interests. This discussion should be advantageous to team members' explore thinking, finding new information and integrating different opinions among team members. Moreover, Gullo et al. (2015) emphasizes the important effect of positive working relationship in the team process. Constructive controversy on the one hand simulate cognitive conflict among team members, which can help team members consider issues comprehensively. On the other hand, constructive controversy aims at the problems rather than specific persons, thus constructive controversy

can avoid emotional conflict that may harm to the positive working relationship.

Entrepreneurial activities are activities full of uncertain, and it is normal that there are different opinions existing in the team when team members understand this kind of uncertainty from different perspectives. Ou et al. (2018) discuss the relationship between constructive controversy and creative process engagement. They find constructive controversy can cultivate the positive conflict value and promote the creative engagement in the team. Entrepreneurial teams usually explore new fields or new mode of productions, thus team members engage in creative process is crucial to the success of the startups. Chen and Ning (2010) pointed out that constructive controversy can help team overcome the communication gap which caused by diversity of team members. Besides, Levinthal and March (1981) also suggested that none of individuals has unlimited cognitive and analysis ability, thus it is impossible to avoid systematic bias when team members make decisions depending on sole individual's prior experiences. Constructive controversy can avoid individual's cognitive bias in team's critical decision making. Public discussion of different opinions can also prevent the team falling into aimless groupthink (Tjosvold and Johnson, 1983) and ensure the efficiency and quality of decision making. We therefore propose:

H2: Constructive controversy in the entrepreneurial team can help the team make better decisions, thus entrepreneurs can find entrepreneurial opportunities of higher quality.

Industry environmental dynamism is one of the most important external factors may influence the entrepreneurial opportunity evaluation. Dess and Beard (1984) defined environmental dynamism as the rate of unpredicted change within the industry that the startup operates. Existing research has proved that environmental dynamism can moderate the relationship between leadership style and entrepreneurial performance (Waldman et al., 2001). Yan and Liu (2018) use simulation experiment to explore the how environmental dynamics influence entrepreneurs' opportunities recognition. The results suggest that in the case of more dynamic environment, information processing plays a stronger role in identifying better opportunities for entrepreneurs. Ensley et al. (2006) also pointed out that transformational leadership was most effective in dynamic environment.

Joint decision making and constructive controversy make entrepreneurial team have the ability to face uncertainty better. Compared with industry in stable environment, the new industry or industry in dynamic environment will let entrepreneurial firms face higher level and higher frequency of uncertainties. Thus, for entrepreneurial firms in high dynamic environment industry, the ability to response to uncertainties becomes more important. Therefore, we propose following two hypotheses (integrative model, see **Figure 1**):

H3a: Industry environmental dynamism can moderate the relationship between joint decision making and entrepreneurial opportunity evaluation. Higher level of industry environmental dynamism will magnify the effect of joint decision making on entrepreneurial opportunity evaluation.

H3b: Industry environmental dynamism can moderate the relationship between constructive controversy and entrepreneurial opportunity evaluation. Higher level of industry environmental dynamism will magnify the effect of constructive controversy on entrepreneurial opportunity evaluation.

MATERIALS AND METHODS

Sample

We collected data from 259 individuals come from 82 entrepreneurial teams which participated in an entrepreneurial competition in Tsinghua University. We handed out our questionnaires before they started displaying their programs and took back the questionnaires when they completed the program displaying. Participation was voluntary, respondents were assured of the confidentiality of their responses, and the informed consent of the participants was implied through survey completion. All of participants have been informed that this survey is independent from the competition. The results of the survey would only keep for academic research rather than influencing the competition results. In order to avoid common method bias, we also get evaluations of programs from judges of the competition and evaluations of industry environmental dynamism from three doctoral students who are familiar with this field.

Of the 380 surveys were distributed, 259 complete surveys were returned, giving a response rate of 68.1%. We delete the teams which are less than three participants. Thus, the final valid data come from 207 individuals of 53 entrepreneurial teams. Of the participants, 22.2% were female, the average age of was 28.5 years (SD = 5.8), and the average team tenure was 9.7 months (SD = 3.2).

As for judges, there are five groups of judges in the competition. Each group consists of three judges. All judges are senior VC investors or professors major in entrepreneurial field. All of them have the experience of been judges in different kind of entrepreneurial competition for several times. Thus, their evaluation should be reasonable and professional.

One of the three doctoral students who evaluated Industry environmental dynamism is the author self and another two are the students major in entrepreneurial field and are familiar with entrepreneurial practice. Before they evaluated, they were asked to do preparation works for industry background again and be explained clearly about the mean of industry environmental dynamism.

Measures

Part of survey items this study selected which were originally in English have been translated by some Chinese scholars before, thus we use the translated items directly. Others English items

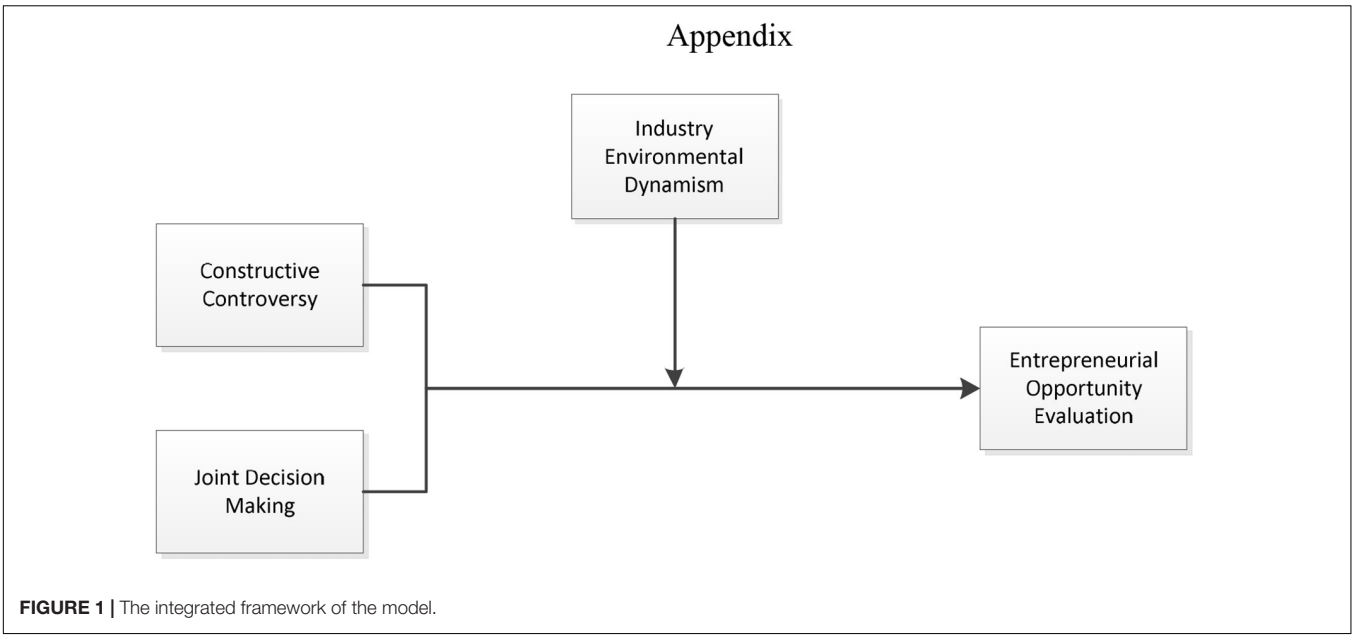

FIGURE 1 | The integrated framework of the model.

were translated into Chinese by two students following the commonly used back-translation procedure (Brislin, 1986).

Team Constructive Controversy

To measure constructive controversy, we adapted the six items scale developed by Chen et al. (2006) and translated into Chinese by Chen and Ning (2010). This is also one of the most common used scales to measure constructive controversy. Sample item is like "Team members can display their own opinions to others directly." Participants rated each item on a scale from 1, "strongly disagree," to 7, "strongly agree" ($\alpha = 0.86$).

Because these items we directly measure on individuals we should aggregate to team level. We conducted ANOVA and calculated the value of ICC1. The ICC1 estimates for team constructive controversy was 0.29 ($p < 0.05$). Thus, we use average scores among team members to represent the score of team constructive controversy for an entrepreneurial team.

Joint Decision Making

To measure joint decision making, we used the three items scale developed by Subramani and Venkatraman (2003). Sample item is like "All team members can influence firm's decision making." Participants rated each item on a scale from 1, "strongly disagree," to 7, "strongly agree" ($\alpha = 0.73$).

Be same as team constructive controversy, we also need to aggregate this item into team level. ICC1 estimates for joint was 0.23 ($p < 0.05$). Thus, it is reasonable to use average scores of team members' joint decision-making scores to represent the joint decision-making score of the team.

Entrepreneurial Opportunity Evaluation

The entrepreneurial opportunity evaluation is scored by judges of the competition. According to Timmons' (1999) suggestion 11 standards of entrepreneurial opportunity evaluation and Wu and Wu (2011) suggestions for entrepreneurial opportunity evaluation standards in China, we choose seven standards to evaluate entrepreneurial opportunity in this study. These standards respectively are technology innovation, business model innovation, product or service innovation, product or service feasibility, potential market capacity, potential development of the program, team member construct. Each program has been evaluated by three judges. In order to avoid bias in the evaluation, we used average scores of three judges to represent final scores for entrepreneurial opportunity evaluation of the team.

Industry Environmental Dynamism

Industry environmental dynamism is evaluated by three doctoral students. According to the common industry classification of entrepreneurial competition nowadays, we classified programs into eight industries based on their application forms. These industries include: education, TMT, medical care, modern service industry, precision manufacturing, materials, environment and energy source and Industrial and architectural design. Following, Dess and Beard (1984) suggestion and Yang (2014) implication, we evaluate industry environmental dynamism majorly two perspectives: the amount of unpredicted issues happened in the industry recent years and the technical/business model changing recent years. Doctoral students rated each industry on a scale from 1, "most stable," to 9, "most dynamic" ($\alpha = 0.76$).

Control Variables

We put several control variables in our studies. Following previous researches, we controlled for team members' average age, firm tenure (months), team size, average education level (1: below bachelor, 2: bachelor, 3: master,4: PhD), whether have any full time program participants (1: yes, 2: no), does any team member has entrepreneurial experience before (1: yes, 0: no). Besides, according to plenty of research about entrepreneurial activities suggestion, we also controlled the patents own condition of the teams (1: yes, 0: no).

TABLE 1 | Means, standard deviations, and correlations among variables.[a]

Variable	Means	*SD*	1	2	3	4	5	6	7	8	9	10	11
Level 1													
1. Age	28.75	5.60	1.00										
2. Education	2.88	0.59	0.37**	1.00									
3. Experience	1.14	0.33	−0.19	−0.19	1.00								
4. Fulltime	1.28	0.45	−0.41**	−0.14	−0.03	1.00							
5. Patent	0.70	0.49	0.07	0.22	0.03	−0.08	1.00						
6. Controversy	5.30	1.23	0.10	0.11	0.32*	−0.09	0.38**	1.00					
7. Joint decision	5.28	0.92	0.10	0.11	−0.03	0.18	0.31*	0.40**	1.00				
8. Team Size	5.32	2.23	−0.11	0.11	0.07	0.04	0.14	−0.11	−0.19	1.00			
9. Duration	9.60	5.17	0.19	−0.11	0.11	−0.08	0.33*	0.26	0.22	0.26	1.00		
10. Evaluation	75.07	8.65	0.18	0.24	0.10	0.01	0.52**	0.66**	0.62**	0.00	0.26	1.00	
Level 2													
11. Environmental Dynamism	5.62	1.18	0.25	0.32*	−0.02	−0.09	0.28*	0.45**	0.32*	0.01	0.14	0.41**	1.00

[a] *n = 53. *p ≤ 0.05; **p ≤ 0.01.*

Analytic Strategies

Because of the multilevel nature of the data, we conducted hierarchical linear modeling (HLM) using HLM 6.08 to test our hypotheses (Raudenbush et al., 2004). Since the programs were from different industry, we included that an ordinary regression based may possible confounding effects of industry level factors on the relationship. Thus, we use two level models in our analysis with teams at level 1 and industries at level 2.

RESULTS

Table 1 shows the descriptive statistics among the study variables at the team level and industry level. In this table, we do not find surprising relationships among variables. Before we conducted HLM, we also tested the multi-collinearity of the data, and find no problems.

Hypothesis Tests

Hypothesis 1 suggested that teams' joint decision making should positively relate to entrepreneurial opportunities evaluation. We put all control variables and level 1 predictors in the model 1. All predictors in the level 1 have been group mean centered. The results of model 1 in **Table 2** shows that the team joint decision making was significantly related to entrepreneurial opportunities evaluation ($r = 6.59$, $p < 0.01$). Thus, Hypothesis 1 has been strongly supported.

Another main effect was also tested in model 1. Hypothesis 2 proposed that constructive controversy in the team can promote teams' entrepreneurial opportunities evaluation. As **Table 2** shown, the relationship between constructive controversy and entrepreneurial opportunities evaluation is significant ($r = 6.24$, $p < 0.05$). Therefore, the test supported Hypothesis 2.

To examine moderation effect, we conducted HLM in model 2 and model 3. In both models, we used group mean centered environmental dynamism scores (level 2 predictor). Hypothesis 3a predicted that in more dynamic industry environment, joint decision making will relate to entrepreneurial opportunity evaluation stronger. Model 3 suggests the coefficient of the cross term was not significant ($r = 1.76$, $p > 0.05$). Hypothesis 3b predicted the moderation effect on another main effect. But as shown in **Table 2** (model 2), the coefficient is also not significant ($r = -1.90$, $p > 0.05$). Therefore, both Hypothesis 3a and Hypothesis 3b have not been supported.

DISCUSSION

In our study we find that joint decision making and constructive controversy are positive related to entrepreneurial opportunity evaluation. Two main effects both have been supported. But we can find that joint decision making has more significant effect on entrepreneurial opportunity evaluation than constructive controversy. This may because joint decision-making effect on final decision of firms more directly. Constructive controversy only refers to team members can display their own different opinions but it does not restrict when to display these opinions. The suggestions merge rightly during the decision-making process are more likely to influence decision makers' ideas. Joint decision making may not only involve making suggestion, but also make suggestions at the right time. Thus, joint decision making has stronger effect on entrepreneurial opportunity evaluation seems reasonable.

None of our moderation prediction has been supported by this study. We consider there are following possible reasons can cause these failures. First is our sample size is not big enough and the amounts of teams in different industry are not balance. In this dataset, some industries include nearly 15 teams and some only include four teams. Because of the small sample size, each special case can have big influence on the final statistical result. Thus, the result may be not robust enough. The second possible reason is the real influential factor for entrepreneurial opportunity evaluation is not the objective industry environment dynamism, but the industry environment dynamism perceived by judges. Entrepreneurial opportunity evaluation is provided

TABLE 2 | Hierarchical linear modeling results for entrepreneurial opportunity evaluation.

Variables	Model 1	Model 2	Model 3
Intercept	76.27**	76.27**	76.27**
Age	0.14	0.11	0.15
Education	0.10	0.06	0.16
Experience	3.03	3.21	2.44
Fulltime	0.80	0.59	0.49
Patent	3.73	3.70	3.60
Controversy	6.24*	4.93	6.76*
Joint decision	6.59**	6.83**	6.78**
Team Size	0.39	0.36	0.44
Duration	−0.01	0.00	−0.03
Interaction effect			
Controversy × Environmental Dynamism		−1.90	
Joint decision × Environmental Dynamism			1.76
Deviance	320.04	317.68	317.74

*n = 53. *p ≤ 0.05; **p ≤ 0.01. Two-tailed tests.*

by judges based on their subjective perception. Although judges are professional investors and professors in this field, it is normal they are more familiar with some certain industries. This may lead to bias evaluations when judges observing programs. For the same reason, three doctoral students who scored the industry environment dynamism may also suffer this kind of bias. Therefore, we failed to prove the two moderation effect.

Theoretical Implications

This research introduced more dynamic influencing mechanism on entrepreneurial opportunity evaluation than previous study. Most preceding studies solely focus on entrepreneurs' or entrepreneurial teams' statistical characteristics cannot explain well about why similar entrepreneurs will make different decisions. Combined with previous studies, this research suggested a resource integration mechanism which has highly influence on entrepreneurial consequence. Besides, most of previous researches on entrepreneurial team focus on the function of team leaders, few cares about other team members. This research emphasized the importance of team members.

Although our test failed support the moderation effect. The selection of industry environment dynamism also should be a good implication for academic researches. There are a lot of researchers in the entrepreneurial field mentioned that different industries may have different effect, but few of them pointed out why the effect should be different. This research suggested the reason why different industries are different is because their environment dynamisms are not the same. Only when we pointed out what cause the differences, can we know why it should be different.

Practical Implications

This research suggested that make good use of team members' intelligence can help entrepreneurial teams find better opportunity. For entrepreneurial teams, they usually have few resources and should face high level of uncertainties. Compared with mature firms the entrepreneurial firms are much more fragile, any tiny decision error may lead to the firm bankrupt. In order to consider more comprehensively before decision making, team leader should listen to the opinions of team members carefully and take these suggestions into consideration when making decisions.

Besides, let team members join in the decision-making process directly is also a good way for entrepreneurial teams. Joint decision making is one of the most efficiency methods to absorb team members' intelligence. It can also make team members understand firms' decisions more comprehensively so they can execute better. More important, invite team members to participate into decision making progress can also make them feel fairness atmosphere in the companies and they would have higher motivation to devote.

Limitations and Future Researches

Although we make a lot effort to conduct this study, there are also a lot of limitations existing in the research. First, as we mentioned in the preceding part, the sample size may not big enough, this may influence our data analysis results. Second, the data is collected during the competition, team members may likely evaluate their teams better than they really like. Third, it is obviously that no matter joint decision making or constructive controversy will have certain cost, but we did not consider the dark side of joint decision making and constructive controversy. Fourth, although we want to reveal a dynamic mechanism, the observations of this study came from a point of time. It may make us ignore some important factors during the process.

In the future researches, we should try to find more complete mechanisms which influence entrepreneurial opportunity evaluation. For example, after decision maker receiving suggestions from team members, decision maker should have a process to deal with the suggestions. How decision maker evaluates the suggestions or whether there exists a process to polish these suggestions through repeated interaction with team members will all influence the final consequence. Furthermore, we suppose constructive controversy and joint decision making can promote entrepreneurial opportunity quality because they can reduce the uncertainties teams facing. But we did not test the whole path. Future researches can try to confirm whether the effect work really through the uncertainties reducing.

Besides, we also should do further studies about the content of industries' differences. Many scholars and practitioners have realized that it may not reasonable to compare two entrepreneurial opportunities in different fields. But the problem is when can we compare two entrepreneurial opportunities? Do the entrepreneurial opportunities in the same industry is the only condition to conduct the comparison?

Or can we compare opportunities in different industries if they meet some requirements? Future in-depth researches may help us solve these problems.

CONCLUSION

Entrepreneurial opportunity quality is a critical factor that influences the entrepreneurial consequences and all the people participate into entrepreneurial activities should notice how can find a better opportunity. This research suggests that joint decision making and constructive controversy among team members can help entrepreneurial teams find better entrepreneurial opportunities. Furthermore, this study also explains why joint decision making has stronger effect than constructive controversy.

ETHICS STATEMENT

The data I used in this study all collect by my own and there is no relevant third party (A specific ethics approval was not required as per applicable institutional and national guidelines). During the data collection process, all the respondents are anonymous and they were informed all the data we collect is just for academic research purpose and be kept confidential (the respondents are clear that if they are willing to answer the questionnaire, it indicates that they agree with the purpose of the questionnaire). Furthermore, these data not involve biological information or other sensitive information, we confirm the data collection process and data analysis process would not cause any potential detriments to respondents or other parties.

AUTHOR CONTRIBUTIONS

YZ independently completed the survey design, data analysis and manuscript writing.

REFERENCES

Ardichvili, A., Cardozo, R., and Ray, S. (2003). A theory of entrepreneurial opportunity identification and development. *J. Bus. Ventur.* 18, 105–123. doi: 10.1016/s0883-9026(01)00068-4

Blatt, R. (2009). Tough love: how communal schemas and contracting practices build relational capital in entrepreneurial teams. *Acad. Manag. Rev.* 34, 533–551. doi: 10.5465/amr.2009.40633298

Brislin, R. W. (1986). "Field methods in cross-cultural psychology," in *The Wording and Translation of Research Instruments*, eds W. J. Lonner and J. W. Berry (Newbury Park, CA: Sage Publications).

Chen, G., Tjosvold, D., and Liu, C. (2006). Cooperative goals, leader people and productivity values: their contribution to top management teams in china. *J. Manag. Stud.* 43, 1177–1200. doi: 10.1111/j.1467-6486.2006.00633.x

Chen, G.-Q., and Ning, N. (2010). Study on relationship among team constructive controversy, learning from experience and performance. *J. Manag. Sci. China* 13, 65–77.

Corbett, A. C. (2007). Learning asymmetries and the discovery of entreprene urial opportunities. *J. Bus. Ventur.* 22, 97–118. doi: 10.1016/j.jbusvent.2005.10.001

Davidsson, P., and Honig, B. (2003). The role of social and human capital among nascent entrepreneurs. *J. Bus. Ventur.* 18, 301–331. doi: 10.1016/s0883-9026(02)00097-6

Dess, G. G., and Beard, D. W. (1984). Dimensions of organizational task environments. *Adm. Sci. Q.* 29, 52–73. doi: 10.2307/2393080

Ensley, M. D., Pearce, C. L., and Hmieleski, K. M. (2006). The moderating effect of environmental dynamism on the relationship between entrepreneur leadership behavior and new venture performance. *J. Bus. Ventur.* 21, 243–263. doi: 10.1016/j.jbusvent.2005.04.006

Forbes, D. P., Borchert, P. S., Zellmer-Bruhn, M. E., and Sapienza, H. J. (2006). Entrepreneurial team formation: an exploration of new member addition. *Entrep. Theory Pract.* 30, 225–248. doi: 10.1111/j.1540-6520.2006.00119.x

Foss, N. J., Klein, P. G., Kor, Y. Y., and Mahoney, J. T. (2008). Entrepreneurship, subjectivism, and the resource-based view: toward a new synthesis. *Strateg. Entrep. J.* 2, 73–94. doi: 10.1002/sej.41

Gartner, W. B., Shaver, K. G., Gatewood, E., and Katz, J. A. (1994). Finding the entrepreneur in entrepreneurship. *Entrep. Theory Pract.* 18, 5–10.

George, M. N., Parida, V., Lahti, T., and Wincent, J. (2016). A systematic literature review of entrepreneurial opportunity recognition: insights on influencing factors. *Int. Entrep. Manag. J.* 12, 309–350. doi: 10.1007/s11365-014-0347-y

Gullo, S., Lo Coco, G., Di Fratello, C., Giannone, F., Mannino, G., and Burlingame, G. (2015). Group climate, cohesion, and curative climate: a study on the common factors in the group process and their relation with members' attachment dimensions. *Res. Psychother.* 18, 10–20.

Hansen, D. J., Shrader, R., and Monllor, J. (2011). Defragmenting definitions of entrepreneurial opportunity. *J. Small Bus. Manag.* 49, 283–304. doi: 10.1111/j.1540-627x.2011.00325.x

Hills, G. E., Lumpkin, G. T., and Singh, R. P. (1997). *Opportunity Recognition: Perceptions and Behaviors of Entrepreneurs, Frontiers of Entrepreneurship Research.*, Wellesley, MA: Babson College, 203-218.

Kamm, J. B., Shuman, J. C., Seeger, J. A., and Nurick, A. J. (1990). Entrepreneurial teams in new venture creation: a research agenda. *Entrep. Theory Pract.* 14, 7–17. doi: 10.1177/104225879001400403

Kim, W. C., and Mauborgne, R. A. (1993). Procedural justice, attitudes, and subsidiary top management compliance with multinationals' corporate strategic decisions. *Acad. Manag. J.* 36, 502–526. doi: 10.2307/256590

Kollmann, T., Stöckmann, C., and Linstaedt, J. W. (2018). Task conflict, narcissism and entrepreneurial capability in teams planning a business: a moderated moderation approach to explaining business planning performance. *J. Small Bus. Manag.* doi: 10.1111/jsbm.12418

Krueger, N., and Dickson, P. R. (1994). How believing in ourselves increases risk taking: perceived self-efficacy and opportunity recognition. *Decis. Sci.* 25, 385–400. doi: 10.1111/j.1540-5915.1994.tb01849.x

Lechler, T. (2001). Social interaction: a determinant of entrepreneurial team venture success. *Small Bus. Econ.* 16, 263–278.

Levinthal, D., and March, J. G. (1981). A model of adaptive organizational search. *J. Econ. Behav. Organ.* 2, 307–333. doi: 10.1016/0167-2681(81)90012-3

Maschke, K., and zu Knyphausen-Aufseβ, D. (2012). How the entrepreneurial top management team setup influences firm performance and the ability to raise capital: A literature review. *Bus. Res.* 5, 83–123. doi: 10.1007/bf03342733

Niu, F., Zhang, Y., and Yang, J. (2011). Heterogeneity of entrepreneurial team and new ventures'performance: the moderating role of team leaders'optimism. *Manag. Rev.* 23, 110–119.

Novara, C., Lavanco, G., Mannino, G., and Serio, C. (2018). Management and human factors: exploratory research with focus groups. *World Futures* 74, 343–354. doi: 10.1080/02604027.2018.1492294

Ou, Z., Chen, T., Li, F., and Tang, P. (2018). Constructive controversy and creative process engagement: the roles of positive conflict value, cognitive flexibility, and psychological safety. *J. Appl. Soc. Psychol.* 48, 101–103.

Raudenbush, S. W., Bryk, A. S., Cheong, Y. F., and Congdon, R. T. (2004). *HLM 6: Hierarchical Linear and Nonlinear Modeling.* Chicago: Scientific Software International.

Renko, M., Shrader, R. C., and Simon, M. (2012). Perception of entrepreneurial opportunity: a general framework. *Manag. Decis.* 50, 1233–1251. doi: 10.1108/00251741211246987

Reynolds, P. D., Carter, N. M., Gartner, W. B., and Greene, P. G. (2004). The prevalence of nascent entrepreneurs in the United States: evidence from the panel study of entrepreneurial dynamics. *Small Bus. Econ.* 23, 263–284. doi: 10.1023/b%3Asbej.0000032046.59790.45

Samuelsson, M. (2004). *Creating New Ventures: A Longitudinal Investigation of the Nascent Venturing Process*. Jönköping: Internationella Handelshögskolan.

Sapienza, H. J., and Korsgaard, M. A. (1996). Procedural justice in entrepreneur-investor relations. *Acad. Manag. J.* 39, 544–574. doi: 10.5465/256655

Shane, S., and Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. *Acad. Manag. Rev.* 25, 217–226. doi: 10.5465/amr.2000.2791611

Shrader, R., and Siegel, D. S. (2007). Assessing the relationship between human capital and firm performance: evidence from technology-based new ventures. *Entrep. Theory Pract.* 31, 893–908. doi: 10.1111/j.1540-6520.2007.00206.x

Shu, R., Ren, S., and Zheng, Y. (2018). Building networks into discovery: the link between entrepreneur network capability and entrepreneurial opportunity discovery. *J. Bus. Res.* 85, 197–208. doi: 10.1016/j.jbusres.2017.12.048

Subramani, M. R., and Venkatraman, N. (2003). Safeguarding investments in asymmetric interorganizational relationships: theory and evidence. *Acad. Manag. J.* 46, 46–62. doi: 10.2307/30040675

Timmons, J. A., and Spinelli, S. (1999). *New Venture Creation: Entrepreneurship for the 21st Century*. New York, NY: McGraw-Hill Education.

Tjosvold, D. (1982). Effects of approach to controversy on superiors' incorporation of subordinates' information in decision making. *J. Appl. Psychol.* 67, 189–193. doi: 10.1037/0021-9010.67.2.189

Tjosvold, D. (1984). Effects of crisis orientation on managers' approach to controversy in decision making. *Acad. Manag. J.* 27, 130–138. doi: 10.5465/255961

Tjosvold, D., and Johnson, D. W. (1983). *Productive Conflict Management: Perspectives for Organizations*. Irvington, NY: Team Media.

Ucbasaran, D., Lockett, A., Wright, M., and Westhead, P. (2003). Entrepreneurial founder teams: factors associated with member entry and exit. *Entrep. Theory Pract.* 28, 107–128. doi: 10.1046/j.1540-6520.2003.00034.x

Ucbasaran, D., Westhead, P., and Wright, M. (2009). The extent and nature of opportunity identification by experienced entrepreneurs. *J. Bus. Ventur.* 24, 99–115. doi: 10.1016/j.jbusvent.2008.01.008

Waldman, D. A., Ramirez, G. G., House, R. J., and Puranam, P. (2001). Does leadership matter? CEO leadership attributes and profitability under conditions of perceived environmental uncertainty. *Acad. Manag. J.* 44, 134–143.

Wang, Z. M. (1992). Managerial psychological strategies for Sino-foreign joint ventures. *J. Manag. Psychol.* 7, 10–16. doi: 10.1108/eum0000000001737

Wu, K., and Wu, J. (2011). Studies on the evaluation of venture opportunities based on the fuzzy and comprehensive evaluation method. *Sci. Technol. Manag. Res.* 31, 61–66.

Yan, J., and Liu, R. (2018). Environmental dynamics, entrepreneurial learning, and entrepreneurial opportunity recognition: an agent-based simulation approach. *Sci. Technol. Prog. Policy* 35, 9–15.

Yang, L. (2014). Entrepreneurial firms' TMT influence on diversity and entrepreneurial strategy: the moderate effect of industry environment and ownership style. *Nankai Bus. Rev.* 17, 134–144.

Zhang, Y., Yang, J., and Ren, B. (2008). Social capital, prior experiences and entrepreneurial opportunity: an interaction model and enlightenment. *Manag. World* 7, 91–102.

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Development and Evaluation of Affective Domain Using Student's Feedback in Entrepreneurial Massive Open Online Courses

*Wen-Hsiung Wu[1,2], Hao-Yun Kao[1,2], Sheng-Hsiu Wu[1] and Chun-Wang Wei[1,2]**

[1]Department of Healthcare Administration and Medical Informatics, Kaohsiung Medical University, Kaohsiung, Taiwan, [2]Department of Medical Research, Kaohsiung Medical University Hospital, Kaohsiung, Taiwan

Entrepreneurship education is a very important issue in the digital age. It aims to enable learners and society to respond to emergent economic and employment challenges. When entrepreneurs struggle to launch and sustain a new venture, the key question usually is not a lack of relevant knowledge, but the necessary fortitude and attitude to face down difficulties and challenges. Thus, entrepreneurs require development in the affective domain. However, most of courses emphasize the cognition and psychomotor functions, but neglect the affective domain. This study attempts to combine entrepreneurial Massive Open Online Courses (MOOCs) and blended curriculum design for affective learning. A total of 32 students participated in a 9-week social entrepreneurship program. Content analysis was used for comparison of the learning performance. The findings suggest that social entrepreneurship courses can be effectively used to help learners achieve learning objectives of different affective levels, but this is a time-intensive process, particularly for higher levels. The affective development of the final level takes longer to achieve; therefore, course designers should adopt a spiral structure which frequently revisits concepts in the last three levels. Moreover, MOOCs are designed for mass usage, and treat all learners uniformly. MOOCs' course content should be supplemented and adjusted according to specific course goals and student needs.

Keywords: entrepreneurship education, social entrepreneurship, affective development, MOOCs, content analysis

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University College Fairview, Malaysia

***Correspondence:**
Chun-Wang Wei
cwwei@kmu.edu.tw

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INTRODUCTION

The digital era is a rapidly changing environment driven by Information and Communication Technologies (ICTs). It not only increases the speed and extent of knowledge throughput in the economy and society, but also creates new opportunities to generate new knowledge more frequently for adaptation to the changing surrounding environment. However, knowledge turnover makes it hard for human beings to control the development and spread of knowledge (Nambisan, 2018). Therefore, how to make good use of the benefits of ICTs in a controlled situation is a very important issue in the digital era.

The European Commission defines entrepreneurship as the ability of individuals to translate ideas into action, including creativity, innovation and risk taking, and the ability to plan and manage projects to achieve goals (Karimi et al., 2016; Palazzeschi et al., 2018). Employees with good entrepreneurship should be able to use emerging technologies to carry out effective activities for value creation. The cultivation of entrepreneurship can help employees better understand their work environment while providing entrepreneurs with the foundation to build new social or business activities to better capture new opportunities (Austin et al., 2006). Thus, entrepreneurship education is an important issue in the digital era.

Entrepreneurship education aims to enable learners and society as a whole to cope with emerging economic and employment challenges through creating an entrepreneurial mind-set and assuming the direct relationship between entrepreneurial intentions, motivation, and attitude (Hytti and O'Gorman, 2004; Haase and Lautenschläger, 2011; Kirby and Ibrahim, 2011; Nabi et al., 2017). Matlay (2008) pointed out that entrepreneurship education will affect attitudes toward entrepreneurship. For example, Walt Disney's greatest creations are not animated films, not even Disneyland, but their extraordinary ability to delight the audience. If employees lack entrepreneurship, they cannot support the company's development missions. Entrepreneurship education provides the essential knowledge and skills to increase the number of well-educated entrepreneurs (Matlay, 2008; O'Connor, 2013). Established firms have also reported benefiting indirectly from entrepreneurship education through recruiting better prepared employees (Kuckertz, 2013; Daniel, 2016).

Today, entrepreneurship courses have to cover a wide range of needs for learners of various backgrounds and interests. Bloom's taxonomy suggests a well-designed course should include the learning objectives in the cognitive, affective, and psychomotor domains (Bloom et al., 1956). However, Sitzmann et al. (2010) pointed out that course design still mostly focuses on knowledge transfer, which emphasizes the cognitive and psychomotor functions, but neglects the affective domain. Moreover, it is difficult to measure achievement of affective goals through traditional evaluation methods. Taber (1989) argued that focusing on cognitive development may leave students unable to adapt to real-world challenges. When entrepreneurs struggle to launch and sustain a new venture, the key challenge usually is not a lack of relevant knowledge, but the necessary fortitude and attitude to face down difficulties and challenges. Thus, entrepreneurs and business managers require development in the affective domain.

Affection and cognition are complementary and cannot be developed independently during the learning process. Kraiger et al. (1993) pointed out that cognitive ability is foundational to affective learning, which is critical to behavioral performance and practical skills. Therefore, affective teaching strategies play an important role in entrepreneurship education (Fodor and Pintea, 2017). Effective teaching in the affective domain can help learners review their value choices, reflect on their value beliefs, revise their value systems, and then create their own approaches for innovation and creativity. However, few studies emphasize the affective domain for entrepreneurship education.

In the digital era, Massive Open Online Courses (MOOCs) offer learning opportunities for updating people's knowledge of various subjects across the globe (Viswanathan, 2012). Intelligence solutions enabled by new technologies can help learners improve their quality of life and learning performance in the university environment (Coccoli et al., 2014). With the rise of MOOCs, outstanding scholars in individual fields can deliver their knowledge online, thus extending their influence and providing access to students living in peripheral areas. However, different political, economic, social, and educational conditions impact the development of innovation and entrepreneurship in different countries and regions, and the MOOC one-size-fits-all approach presents difficulties in customizing course content (Muñoz-Merino et al., 2015). Previous studies did not provide solutions to design an ideal blended curriculum for improving students' affective abilities. Thus, this study explores how to balance a non-differentiated curriculum design with regionally specific objectives.

Bloom et al. (1984) argued that affective development is a process of exploring and adapting human interests, attitudes, values, and appreciation. Affective learning outcomes cannot easily be quantified by traditional testing and rather relies on qualitative self-reflection. This study analyzed learning experience reports collected after each class to evaluate whether pre-established teaching objectives had been met. Most previous studies focus exclusively on the assessment of cognitive development; however, this study combines entrepreneurial MOOCs, specific curriculum design, and content analysis for the development and evaluation of the affective domain. Written student feedback and follow-up interviews were the basis for analysis and comparison. The purpose of this study is to investigate how the curriculum design influences the students' affective development based on Bloom's taxonomy. The research question is whether the students' feedback on Bloom's affective level is different at each stage of the course. The findings may provide useful insight into the development and use of MOOC support for entrepreneurship courses in the digital era.

LITERATURE REVIEW

Entrepreneurship Education

Rigg and O'Dwyer (2012) argue there are very different meanings as a curriculum concept between enterprise and entrepreneurship education: enterprise education methods can be "advancing teaching methods" or "including challenging concepts in teaching practice to support and increase problem solving skills" or "improving key employment skills awareness beyond university education." Even though entrepreneurship education is similar in terms of development and skills development, in many cases, the clear intentions of entrepreneurship and the factors should be considered when choosing employment pathways (Rigg and O'Dwyer, 2012; Gimmon, 2014; Sanchez-Garcia et al., 2018).

The objectives of entrepreneurship education include increasing learner knowledge (i.e., understanding entrepreneurship), improving entrepreneurial abilities and behavior in real-life contexts (i.e., developing an entrepreneurial outlook), and providing a

relevant set of skills and competences for establishing new start-ups or managing existing firms (i.e., learning to become an entrepreneur) (Hytti and O'Gorman, 2004; Fretschner and Weber, 2013; O'Connor, 2013). These objectives overlap to some extent, as an increased understanding on the phenomenon of entrepreneurship is likely to influence that learner's mastery of start-up-related skills or other entrepreneurial competencies (Middleton and Donnellon, 2014; Scott et al., 2016; Thrane et al., 2016).

Jones and Iredale (2010) also argued the key points of entrepreneurship education from the perspectives of different roles, such as policymakers, teachers, lecturers, students, and pupils, focus on start-ups; new enterprise risk planning; initiate, develop, and manage business; develop and operate businesses, advance skills, behaviors, and knowledge needed for self-employment (Jones and Iredale, 2010; Ruskovaara and Pihkala, 2013). On the other hand, entrepreneurship education focuses on developing personal skills, behaviors, attributes, and knowledge needed in a broader range of contexts, with the learner functioning as an employee, consumer, and citizen, with a particular focus on how small businesses work (Thrane et al., 2016). While both domains take similar approaches to developing and improving skills, entrepreneurship education frequently features a clear emphasis on business start-ups and success factors for professional business innovators.

These acknowledgments imply that entrepreneurship education contributes to the development of cognitive, intellectual, and reasoning skills. Participating in entrepreneurship classes, seminar, and internships can positively impact learner affection. Such activity not only develops learner knowledge, attitudes, values, emotions, and skills which contribute to effective self-employment but also teaches them about potential problems which they can avoid (Said, 2014).

Massive Open Online Course (MOOC)

Self-directed learning can now take place on open online networks which combine communication technologies and extensive resources to create effective online learning environments (Kop, 2011). A massive open online course is an online course which aims to provide unlimited participation and open access *via* the Web. MOOCs represent an innovative, Web-based business model for financing, designing, and delivering educational services (Wulf et al., 2014). Since 2008, MOOCs have been run by a variety of public and private universities, especially in North America. Many academic researchers and practitioners have shown interest in the potential for MOOCs to deliver instruction around the globe on an unprecedented scale, and considerable research attention has focused on developing best practices for the use of these platforms (Liyanagunawardena et al., 2013; Lerís et al., 2017).

MOOCs provide a variety of educational content for those who are willing to learn. Academically, the value of MOOCs to a large number of participants depends on whether MOOCs provide appropriate assistance approaches (Zhuhadar et al., 2015). In addition to traditional course materials such as film lectures, reading and problem sets, many MOOCs offer interactive discussion forums to support community interactions between students, professors, and teaching assistants. MOOC, a recent study extensively in the field of distance education, was first introduced in 2008 and became a popular learning model in 2012 (Saadatdoost et al., 2015). When employees already have entrepreneurial skills, they can overcome the challenges of specific tasks to support the company's development. Established companies try to recruit more prepared entrepreneurial employees to benefit business operations. Many entrepreneurship courses are offered in MOOC platforms, including Coursera, Udemy, edX, FutureLearn, and Udacity (Spyropoulou et al., 2014). These courses explore entrepreneurship-related issues from diverse perspectives, such as innovation and creativity, design thinking, product design, entrepreneurial mind-set, business strategies, financial planning, social enterprise, and so on. These online courses provide good guidance to help those who attend classes succeed in entrepreneurship.

Affective Domain Objectives

Bloom's et al. (1956) taxonomy divides educational objectives into three overlapping "domains": cognitive (knowledge), affective (attitude), and psychomotor (skills). The model supports effective student learning by helping teachers determine the appropriate teaching strategies to be used (Bloom et al., 1956, 1984; Savickienë, 2010; Testa et al., 2018). The Taxonomy of the Affective Domain contains five levels, from lowest to highest: receiving, responding, valuing, organization, and characterization (Krathwohl et al., 1964; Anderson et al., 2001). This taxonomy was applied to written self-evaluations to assess changes in affective learning. Each level is described as follows (Krathwohl et al., 1964; Anderson et al., 2001):

Receiving: Awareness of the need and willingness to hear selected attention, e.g., listening respectfully to others, listening for and remembering names of newly introduced people. Keywords for content analysis include acknowledge, ask, attentive, courteous, dutiful, follows, gives, listens, and understands. When students present these keywords in their written feedback and the meaning of the sentence conforms to the concept of this level, it will be encoded as belonging to this level.

Responding: Actively participate in learning, including responding to various appearances. Learning outcomes may emphasize compliance in response, willingness to respond, or satisfaction (motivation) in response. Examples include participation in class discussions, presentations, questions to improve understanding, and compliance with safety rules. Keywords at this level include answers, assistants, assists, compliance, compliance, discussions, greetings, help, tags, shows, gifts, and narration.

Valuing: It is defined as the ability to judge the worth or value of something, including specific objects, phenomena, behaviors or information, and to express it clearly from simple acceptance to a more complex state of commitment. When a learner internalizes a particular set of values, these value beliefs can usually be expressed by explicit and identifiable behaviors. Examples include expressing convictions about the democratic process, being sensitive to individual and cultural differences (i.e., focusing on diversity), addressing value conflicts, proposing social improvement plans and fulfilling commitments, and

informing management of concerns. Keywords of this level include appreciates, cherish, treasure, demonstrates, initiates, invites, joins, justifies, proposes, respect, and shares.

Organization: It is defined as comparing and classifying values, resolving conflicts between them, and creating a unique value system with a primary focus on comparison, relevance, and integrated values. Case in point includes recognizing the need for an equilibrium between freedom and responsibility, explaining the importance of system planning in solving problems, accepting ethical standards, creating life plans that suit their abilities, interests, and beliefs, effectively prioritizing time to meet organizations, family, and self-needs. Keywords of this level include compares, relates, and synthesizes.

Characterization: It is defined as the establishment of a value system that controls learner behavior, which is universal, consistent, predictable, and the most important feature of learners. Teaching objectives involve individual, social, and emotional patterns that learners adjust. For example, being able to work independently, collaborate in group activities, use objective methods to solve problems, practice professional ethics, modify beliefs and change behavior based on new evidence, and value people beyond superficial features. Keywords of this level include acts, discriminates, displays, influences, modifies, performs, qualifies, questions, revises, serves, solves, and verifies.

Entrepreneurship courses differ from general management courses in that the former aim to not only provide knowledge, but also to prepare students to launch a business. Entrepreneurship education is also more action oriented than general education, which seeks to cultivate professionalism. One of the main goals of the social studies curriculum is to promote the emotional development of students, including improving their interest in learning, positive attitudes, and local cultural identity. However, it is difficult to construct or change the attitudes of students. Affection-related teaching objectives are not as clearly defined as those for cognitive or action-related skills (Hwang and Chang, 2016). To effectively achieve learning objectives, entrepreneurship courses must properly manage student interest in learning over time, while promoting good ethics. To help students develop positive value systems and attitudes, entrepreneurship courses not only focus on cognitive and psychomotor development, but consider the influences of affective domain (Jagger, 2013).

MATERIALS AND METHODS

Course Design

Recently, an emphasis of entrepreneurship activity has emerged to generate social benefits. So-called social entrepreneurship uses innovative approaches to address problems in the domains of education, environmental protection, fair trade, health and human rights, and is widely regarded as an important building block for sustainable national development (Mair and Marti, 2006). Peter Ferdinand Drucker has suggested that social entrepreneurship may eventually become more important than for-profit entrepreneurship (Mair and Noboa, 2006; Ruskin et al., 2016). Therefore, a social entrepreneurship course from Coursera was selected for this study.

A 9-week blended course was designed to integrate affective learning into an international MOOC curriculum. The course title was Introduction to Social Innovation and Entrepreneurship, a third-grade course in the Department of Healthcare Administration and Medical Informatics at a medical university in Taiwan. This introductory course provides students with an understanding of the areas of social innovation and social entrepreneurship and introduces students to several useful "frameworks" to understand the field and apply it to follow-up courses in social innovation and social entrepreneurship. The blended approach is that after each week's MOOC session, the instructor conducted affective domain learning activities (primarily through case studies and group discussions) in local classrooms to achieve affective targets for entrepreneurial education. Canaleta et al. (2014) mentioned that active learning methodologies enhance the development of the competences of students and provide a better evaluation of outcomes. The learning activities of this study encouraged students to participate directly and actively in the learning process. The instructional design is summarized in **Table 1**. A total of 32 students (12 male and 20 female, ranging in age from 21 to 24 years) participated in the course. Oral informed consent was obtained from all participants. Each week, the learners provided written feedback on slips of paper after each class and these comments served as the basis for further content analysis. These open-ended questions include: What did you learn in this course? What difficulties have you encountered? Evaluate the strengths and weaknesses of the course content? What is your our own opinion on this issue and other ideas.

TABLE 1 | Entrepreneurship course objectives.

Week	Affective level	Course objectives
1	Receiving and responding	Introduction to "social entrepreneurship"
2	Receiving and responding	Defines social entrepreneurship through a case study of Bangladesh's Grameen Bank. Students are assigned to develop a proposal within the CBS Entrepreneurship Platform to attract external funding
3	Receiving and responding	Discuss the characteristics needed for successful social entrepreneurship
4	Valuing and organization	Identifying and developing opportunities: identifying hidden ones, creating new ones, eliminating the need for one and creating demand for antagonistic assets
5	Valuing and organization	Distinguishing business models for specific businesses in terms of scale model, role model, organism, recipes
6	Valuing and organization	Applying the "business model canvas" concept to the real businesses
7	Characterization	Discussing and developing business proposals
8	Characterization	Optimizing organizational structures using examples from CIC and L3C. Identifying the pros and cons of different organization types
9	Characterization	Attracting external funding. Students share their experience of developing effective business plans for raising funds

Content Analysis

In order to understand the real impact of the blended teaching strategy on learners, the field research method was applied in this study. Field research is a non-experimental scientific inquiry to explore the relationship and interaction between educational, psychological, and social variables in real situations (Burgess, 2002). The research method does not have any experimental manipulation or random sampling of research subjects or distribution groups. Everything was done in a natural situation. After collecting student feedback, content analysis was conducted using individual sentences as the unit of analysis to identify consistent units of meaning (e.g., themes or ideas) in a message. Berelson (1952) defined content analysis as "a research technique for the objective, systematic and quantitative description of the manifest content of communication." We followed Berrellson's (1952) opinion to analyze students' feedback into quantitative charts systematically and then explained the findings. To ensure inter-rater reliability, we created two coding teams, each consisting of a researcher and a research assistant with backgrounds in entrepreneurship education and educational technology. Bloom's classification guide was used as a standard for content analysis. A coding manual detailing coding instructions and standardized coding worksheets was prepared and distributed to both teams. The coders read the student's weekly written feedback. If the text is related to the affective domain, it is classified at a certain affective level. Their coding tasks were processed based on the levels of affective domain, such as receiving, responding, valuing, organization, and characterization as proposed by Bloom et al. (1956).

Krathwohl et al. (1964) defined action verbs appropriate for each level of Bloom's taxonomy. The action verbs can be used to indicate a clearly observable and measurable action. We only counted sentences with the action verbs in the affective domain. Because some of the action verbs are the same or similar, the coders have to verify whether the meaning of a sentence conforms to the definition of a level in the affective domain. The action verbs for each level of affective domain are accept, attend, develop, recognize for Receiving; complete, comply, cooperate, discuss, examine, obey for Responding; accept, defend, devote, pursue, seek for Valuing; codify, discriminate, display, order, organize, systematize, weigh for Organization; and internalize, verify for Characterization (Krathwohl et al., 1964).

The actual coding process was preceded by training sessions and discussion of the coding instructions. Text coding is inherently subjective, too often leaving the results open to the coder's personal preferences or biases. This potential for bias makes it essential to check results between individuals and teams. Individual discrepancies were discussed to reach a group consensus. To improve scoring consistency, the coders conferred and compared results openly at the end of the first unit, and constant communication between individuals and teams was encouraged to ensure solutions and conclusions were shared throughout all groups. The actual coding process commenced after the second discussion to ensure each coder clearly understood the requirements.

Thirty-two students produced 288 course feedbacks in 9 weeks. These feedbacks were split into 2,938 sentences analyzed. Each person contributed about 10 sentences per week. There were 714 sentences related to the affective domain, accounting for 24.3% of the total sentences. Once coding was completed, coders exchanged their results with each other to perform a pair inter-rater reliability check and reliability indexing. Inter-rater reliability testing found agreement of 84.76% with a Kappa of 0.76.

Follow-Up Interviews

To understand the retention rate of students in the affective domain, follow-up interviews were conducted to gain an understanding of participant feedback about the affective domain 2 weeks after the end of the course. Interviews were conducted with eight students (three male and five female) who participated in the course. The interviews consisted of open-ended questions designed to evaluate the impact of course, content, and platform design on affective development. Later, follow-up individual interviews lasting 40 min each were conducted to validate participant response to these questions. More importantly, the results of interviews were applied to corroborate the previous analysis of other data sources (i.e., content analysis), to link and compare with the results of content analysis. A total of 201 sentences from eight students were analyzed. Each person contributed about 25 sentences to the interview. There were 71 sentences related to the affective domain, accounting for 30.3% of the total sentences.

Two researchers independently analyzed the data and established the inter-rater agreement from the interview results, producing an agreement rate of 92%. Each participant was treated as a separate case. Data from each interview were used to generate a summary of the participant's views on and conceptions of the entrepreneurship course. These summaries were then reviewed and discussed by the researchers to reach a consensus on the affective domain about the entrepreneurship course assisted with MOOCs. These results were then compared against those generated from content analysis.

RESULTS

Affective development is time-consuming and requires specially designed teaching methods. In addition, its learning outcomes are difficult to evaluate (Pascarella, 1985). As a result, most courses emphasize cognitive and psychomotor development, and generally neglect the affective domain. In the digital era, the development of affective abilities can help people adapt to the rapidly changing environment. MOOC-based courses allow for nearly universal access to instructional content delivered over the Internet. However, the content may not fit the needs of regional courses. The entrepreneurship course of this study is supplemented with instructional content intended to emphasize affective development and achieve a balance with cognitive development.

Table 1 shows the affective teaching objectives for the 9-week course. The first 3 weeks focused on receiving and responding, while helping students develop a better understanding of social issues and social entrepreneurship operations. Weeks 4–6 emphasized valuing and organization,

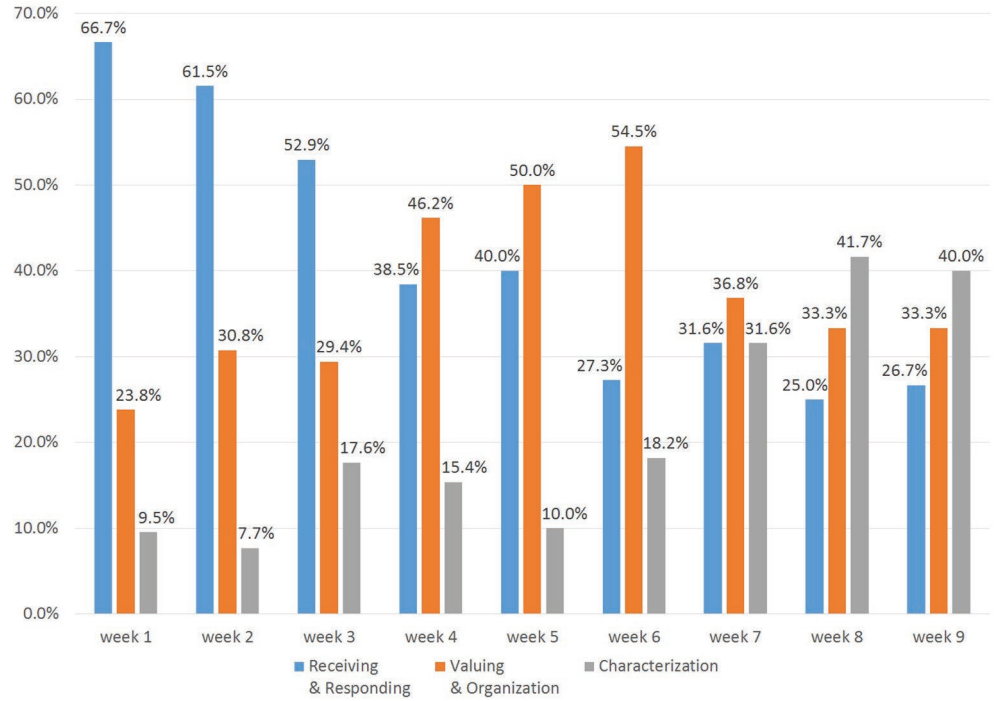

FIGURE 1 | Variation of affective goals.

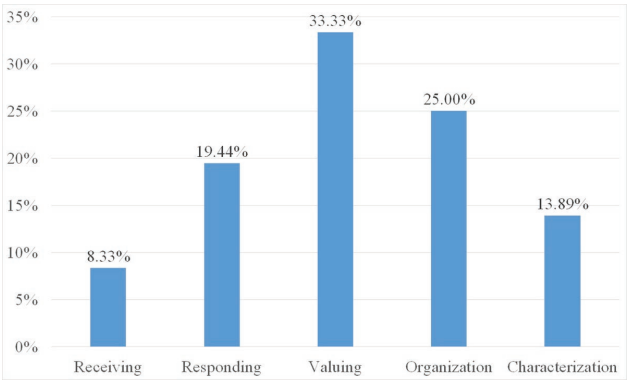

FIGURE 2 | The retention status after the end of the course.

encouraging students to develop their own definitions of social enterprises and to distinguish social enterprise characteristics in different national contexts. The last 3 weeks of the course gradually shifted the focus to characterization, encouraging students to make ethical judgments and to evaluate feasible solutions for different social problems. As the course progressed, learners engaged in activities designed to provide exposure to successive affective domain levels, with considerable overlapping between stages. At the conclusion of the course, students were expected to be able to sum up their acquired knowledge for establishing social enterprises and contributing to the solution of social issues.

After each class session, students were asked to provide written feedback, and these comments were used as data for affective development analysis. This study only focuses on the feedback content in the affective domain. To avoid bias introduced by the small amount of feedback at each level, the five levels of the affective domain were simplified into three categories: low (receiving and responding), middle (valuing and organization) and high (characterization). **Figure 1** shows the variation between categories and a timeline of affective goals. It was found that course design can significantly influence affective domain development.

Two weeks after the end of the course, the students were invited to reflect on the whole course to assess the retention of affective learning, as shown in **Figure 2**. The results show that the frequency related to middle level of affective domain in students' written feedback was higher than the frequency related to low and high levels.

DISCUSSION

In the first stage, low-level affective concepts are considerably more developed than the middle and high levels. This early stage emphasizes receiving and responding skills, with the instructor guiding students in understanding the basic concepts, opportunities, challenges, and resources of the social entrepreneurship, which helped students understand and pay attention to relevant issues, and then improve their entrepreneurial motivation. Before the student's motivation is aroused, they

may begin with passive attitudes toward the contents and the teacher's concepts. Further guidance should encourage students to take the initiative rather than just participate passively.

The second stage shifted the focus to mid-level affective skills; therefore, the middle level feedback is higher than that of low level, prompting students to consider the importance and usefulness of entrepreneurial values and adopt them. Different entrepreneurial values found different degrees of acceptance in terms of cognition and affection. The course design encourages students to evaluate and select entrepreneurial values on their own, and to gradually accept and internalize various aspects of entrepreneurial knowledge. After the establishment of the value assessment process, students will consider different values and address conflicts from the viewpoint of social enterprise to establish an internally consistent value system. The value organization emphasizes the comparison, relation, and integration of various values.

Later stage development enhances high-level skills, which contribute to the development of characterization, and these positive changes in personal value systems are internalized in learners' thoughts and characters.

The follow-up interview implies that the students' affective development was still in the valuing and organization levels, having progressed beyond the receiving and responding levels, but they had not yet internalized the characterization level. The affective development of the final level takes longer to achieve, thus course designers should adopt a spiral structure which frequently revisits concepts in the last three levels. Moreover, the high affective level may be retained for a long duration if classroom-based instruction can be supplemented by hands-on experience or field practice opportunities. The arrangement of programs and teaching methods, which followed the principle of learning by doing, can not only enable students to balance theory and practice, but also support students in creating social enterprises (Wu et al., 2013; Antonaci et al., 2015).

CONCLUSION

The achievement of affective teaching goals is an important task for entrepreneurship education in the digital era. Guiding students to reflect on and revise their values and social beliefs is a time- and labor-intensive endeavor, requiring considerable effort for effective evaluation. Weekly feedback and interaction between teachers and students can enhance student enthusiasm for entrepreneurship.

Our findings suggest that social entrepreneurship courses with blended approach can be effectively used to help learners achieve different levels of affective domain teaching objectives, but this is a time-intensive process, particularly for higher levels. Affective development at the receiving and responding levels can be reached in 3 weeks, while 5 weeks should be allocated for valuing and organization, and at least 7 weeks for the characterization level. Higher levels of development take longer to achieve; therefore, course designers should adopt a spiral structure which frequently revisits concepts in the last three levels. Moreover, MOOCs are designed for mass usage and treat all learners uniformly. MOOCs' course content should be supplemented and adjusted according to specific course goals and student needs.

The main limitation of this study is the use of field research. Since the participants of this study are students of a course, researchers can invite various types of subjects and use experimental methods to explore the impact of various teaching strategies on the students' affective development. In addition, this study presents the learners' affective feedback in a quantitative manner. In the future, researchers can develop a causal model to explore the factors that influence the affective development of learners.

ETHICS STATEMENT

Oral informed consent was obtained from all participants. For the reported study, no ethics approval was required according to the guidelines of Kaohsiung Medical University or Ministry of Health and Welfare of Taiwan.

AUTHOR CONTRIBUTIONS

W-HW, H-YK, and C-WW contributed to the supervision of the project, design of the research, organization of experiment conduction, data analysis and interpretation, writing and revision of the article. S-HW contributed to the organization of experiment conduction, data analysis and interpretation, and writing of the article.

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REFERENCES

Anderson, L. W., Krathwohl, D. R., Airasian, P., Cruikshank, K., Mayer, R., Pintrich, P., et al. (2001). *A taxonomy for learning, teaching and assessing: A revision of Bloom's taxonomy*. (New York: Longman Publishing).

Antonaci, A., Dagnino, F. M., Ott, M., Bellotti, F., Berta, R., De Gloria, A., et al. (2015). A gamified collaborative course in entrepreneurship: focus on objectives and tools. *Comput. Hum. Behav.* 51, 1276–1283. doi: 10.1016/j.chb.2014.11.082

Austin, J., Stevenson, H., and Wei-Skillern, J. (2006). Social and commercial entrepreneurship: same, different, or both? *Entrep. Theory Pract.* 30, 1–22. doi: 10.1111/j.1540-6520.2006.00107.x

Berelson, B. (1952). *Content analysis in communication research*. (New York, NY, US: Free Press).

Bloom, B. S., Engelhart, M. D., Furst, E. J., Hill, W. H., and Krathwohl, D. R. (1956). *Taxonomy of educational objectives, Handbook I: The cognitive domain*. (New York: David McKay Co Inc.).

Bloom, B. S., Krathwohl, D. R., and Masia, B. B. (1984). *Taxonomy of educational objectives: The classification of educational goals*. (New York: Longman).

Burgess, R. G. (2002). *In the field: An introduction to field research*. (London: Routledge).

Canaleta, X., Vernet, D., Vicent, L., and Montero, J. A. (2014). Master in teacher training: a real implementation of active learning. *Comput. Hum. Behav.* 31, 651–658. doi: 10.1016/j.chb.2013.09.020

Coccoli, M., Guercio, A., Maresca, P., and Stanganelli, L. (2014). Smarter universities: a vision for the fast changing digital era. *J. Vis. Lang. Comput.* 25, 1003–1011. doi: 10.1016/j.jvlc.2014.09.007

Daniel, A. D. (2016). Fostering an entrepreneurial mindset by using a design thinking approach in entrepreneurship education. *Ind. High. Educ.* 30, 215–223. doi: 10.1177/0950422216653195

Fodor, O. C., and Pintea, S. (2017). The "emotional side" of entrepreneurship: a meta-analysis of the relation between positive and negative affect and entrepreneurial performance. *Front. Psychol.* 8:310. doi: 10.3389/fpsyg.2017.00310

Fretschner, M., and Weber, S. (2013). Measuring and understanding the effects of entrepreneurial awareness education. *J. Small Bus. Manag.* 51, 410–428. doi: 10.1111/jsbm.12019

Gimmon, E. (2014). Mentoring as a practical training in higher education of entrepreneurship. *Educ. Train.* 56, 814–825. doi: 10.1108/ET-02-2014-0006

Haase, H., and Lautenschläger, A. (2011). The 'teachability dilemma' of entrepreneurship. *Int. Entrep. Manag. J.* 7, 145–162. doi: 10.1007/s11365-010-0150-3

Hwang, G. J., and Chang, S. C. (2016). Effects of a peer competition-based mobile learning approach on students' affective domain exhibition in social studies courses. *Br. J. Educ. Technol.* 47, 1217–1231. doi: 10.1111/bjet.12303

Hytti, U., and O'Gorman, C. (2004). What is "enterprise education"? An analysis of the objectives and methods of enterprise education programmes in four European countries. *Educ. Train.* 46, 11–23. doi: 10.1108/00400910410518188

Jagger, S. (2013). Affective learning and the classroom debate. *Innov. Educ. Teach. Int.* 50, 38–50. doi: 10.1080/14703297.2012.746515

Jones, B., and Iredale, N. (2010). Enterprise education as pedagogy. *Educ. Train.* 52, 7–19. doi: 10.1108/00400911011017654

Karimi, S., Biemans, H. J., Lans, T., Chizari, M., and Mulder, M. (2016). The impact of entrepreneurship education: a study of Iranian students' entrepreneurial intentions and opportunity identification. *J. Small Bus. Manag.* 54, 187–209. doi: 10.1111/jsbm.12137

Kirby, D. A., and Ibrahim, N. (2011). Entrepreneurship education and the creation of an enterprise culture: provisional results from an experiment in Egypt. *Int. Entrep. Manag. J.* 7, 181–193. doi: 10.1007/s11365-010-0153-0

Kop, R. (2011). The challenges to connectivist learning on open online networks: learning experiences during a massive open online course. *Int. Rev. Res. Open Dist. Learn.* 12, 19–38. doi: 10.19173/irrodl.v12i3.882

Kraiger, K., Ford, J. K., and Salas, E. (1993). Application of cognitive, skill-based, and affective theories of learning outcomes to new methods of training evaluation. *J. Appl. Psychol.* 78, 311–328. doi: 10.1037/0021-9010.78.2.311

Krathwohl, D. R., Bloom, B. S., and Masia, B. B. (1964). *Taxonomy of educational objectives, Book II. Affective domain*. (New York, NY: David McKay Company, Inc.).

Kuckertz, A. (2013). Entrepreneurship education – status quo and prospective developments. *J. Entrep. Educ.* 16, 59–71. doi: 10.2139/ssrn.1862295

Lerís, D., Sein-Echaluce, M. L., Hernández, M., and Bueno, C. (2017). Validation of indicators for implementing an adaptive platform for MOOCs. *Comput. Hum. Behav.* 72, 783–795. doi: 10.1016/j.chb.2016.07.054

Liyanagunawardena, T. R., Adams, A. A., and Williams, S. A. (2013). MOOCs: a systematic study of the published literature 2008–2012. *Int. Rev. Res. Open Dist. Learn.* 14, 202–227. doi: 10.19173/irrodl.v14i3.1455

Mair, J., and Marti, I. (2006). Social entrepreneurship research: a source of explanation, prediction, and delight. *J. World Bus.* 41, 36–44. doi: 10.1016/j.jwb.2005.09.002

Mair, J., and Noboa, E. (2006). "Social entrepreneurship: how intentions to create a social venture are formed" in *Social entrepreneurship*. eds. J. Mair, J. Robinson, and K. Hockerts (New York: Palgrave Macmillan), 121–135.

Matlay, H. (2008). The impact of entrepreneurship education on entrepreneurial outcomes. *J. Small Bus. Enterp. Dev.* 15, 382–396. doi: 10.1108/14626000810871745

Middleton, K. W., and Donnellon, A. (2014). Personalizing entrepreneurial learning: a pedagogy for facilitating the know why. *Entrep. Res. J.* 4, 167–204. doi: 10.1515/erj-2013-0040

Muñoz-Merino, P. J., Ruipérez-Valiente, J. A., Alario-Hoyos, C., Pérez-Sanagustín, M., and Kloos, C. D. (2015). Precise effectiveness strategy for analyzing the effectiveness of students with educational resources and activities in MOOCs. *Comput. Hum. Behav.* 47, 108–118. doi: 10.1016/j.chb.2014.10.003

Nabi, G., Liñán, F., Fayolle, A., Krueger, N., and Walmsley, A. (2017). The impact of entrepreneurship education in higher education: a systematic review and research agenda. *Acad. Manag. Learn. Educ.* 16, 277–299. doi: 10.5465/amle.2015.0026

Nambisan, S. (2018). Digital entrepreneurship: toward a digital technology perspective of entrepreneurship. *Entrep. Theory Pract.* 41, 1029–1055. doi: 10.1111/etap.12254

O'Connor, A. (2013). A conceptual framework for entrepreneurship education policy: meeting government and economic purposes. *J. Bus. Ventur.* 28, 546–563. doi: 10.1016/j.jbusvent.2012.07.003

Palazzeschi, L., Bucci, O., and Di Fabio, A. (2018). High entrepreneurship, leadership, and professionalism (HELP): a new resource for workers in the 21st century. *Front. Psychol.* 9:1480. doi: 10.3389/fpsyg.2018.01480

Pascarella, E. T. (1985). Students' affective development within the college environment. *J. High. Educ.* 56, 640–663. doi: 10.2307/1981072

Rigg, C., and O'Dwyer, B. (2012). Becoming an entrepreneur: researching the role of mentors in identity construction. *Educ. Train.* 54, 319–329. doi: 10.1108/00400911211236181

Ruskin, J., Seymour, R. G., and Webster, C. M. (2016). Why create value for others? An exploration of social entrepreneurial motives. *J. Small Bus. Manag.* 54, 1015–1037. doi: 10.1111/jsbm.12229

Ruskovaara, E., and Pihkala, T. (2013). Teachers implementing entrepreneurship education: classroom practices. *Educ. Train.* 55, 204–216. doi: 10.1108/00400911311304832

Saadatdoost, R., Sim, A. T. H., Jafarkarimi, H., and Mei Hee, J. (2015). Exploring MOOC from education and information systems perspectives: a short literature review. *Educ. Rev.* 67, 505–518. doi: 10.1080/00131911.2015.1058748

Said, M. M. (2014). Entrepreneurial education, spirit of entrepreneurship and the expectation of students. *Int. J. Dev. Sustain.* 3, 1569–1582. https://www.academia.edu/8263058/Entrepreneurial_education

Sanchez-Garcia, J. C., Vargas-Morua, G., and Hernandez-Sanchez, B. R. (2018). Entrepreneurs' well-being: a bibliometric review. *Front. Psychol.* 9:1696. doi: 10.3389/fpsyg.2018.01696

Savickienë, I. (2010). Conception of learning outcomes in the Bloom's taxonomy affective domain. *Qual. High. Educ.* 7, 37–59. https://files.eric.ed.gov/fulltext/EJ900258.pdf

Scott, J. M., Penaluna, A., and Thompson, J. L. (2016). A critical perspective on learning outcomes and the effectiveness of experiential approaches in entrepreneurship education: do we innovate or implement? *Educ. Train.* 58, 82–93. doi: 10.1108/ET-06-2014-0063

Sitzmann, T., Ely, K., Brown, K. G., and Bauer, K. N. (2010). Self-assessment of knowledge: a cognitive learning or affective measure? *Acad. Manag. Learn. Educ.* 9, 169–191. doi: 10.5465/amle.9.2.zqr169

Spyropoulou, N., Pierrakeas, C., and Kameas, A. (2014). "Creating MOOC guidelines based on best practices" in *Edulearn14 Proceedings*. eds. L. Gómez Chova, A. López Martínez, and I. Candel Torres (Barcelona, Spain: IATED Academy). 6981–6990. https://mafiadoc.com/edulearn16-proceedings-isbn-978-84-608-8860-4_59c29ae81723ddc865e7af79.html

Taber, G. D. (1989). "Affective education and a nation at risk" in *Affective education: Methods and techniques*. ed. I. L. Sonnier (Englewood Cliffs, NJ: Educational Technology Publications).

Testa, S., Toscano, A., and Rosato, R. (2018). Distractor efficiency in an item pool for a statistics classroom exam: assessing its relation with item cognitive level classified according to Bloom's taxonomy. *Front. Psychol.* 9:1585. doi: 10.3389/fpsyg.2018.01585

Thrane, C., Blenker, P., Korsgaard, S., and Neergaard, H. (2016). The promise of entrepreneurship education: reconceptualizing the individual–opportunity nexus as a conceptual framework for entrepreneurship education. *Int. Small Bus. J.* 34, 905–924. doi: 10.1177/0266242616638422

Viswanathan, R. (2012). Teaching and learning through MOOC. *Front. Lang. Teach.* 3, 32–40. https://s3.amazonaws.com/academia.edu.documents/30401977/4-_Viswanathan__2012.pdf?AWSAccessKeyId=AKIAIWOWYYGZ2Y53UL3A&Expires=1557332049&Signature=%2BZXg%2FgNaJB90NW9Y95MUooeRaX0%3D&

response-content-disposition=inline%3B%20filename%3DTeaching_and_Learning_through_MOOC.pdf

Wu, Y. C. J., Kuo, T., and Shen, J. P. (2013). Exploring social entrepreneurship education from a Web-based pedagogical perspective. *Comput. Hum. Behav.* 29, 329–334. doi: 10.1016/j.chb.2012.08.012

Wulf, J., Blohm, I., Leimeister, J. M., and Brenner, W. (2014). Massive open online courses. *Bus. Inform. Syst. Eng.* 6, 111–114. doi: 10.1007/s12599-014-0313-9

Zhuhadar, L., Kruk, S. R., and Daday, J. (2015). Semantically enriched massive open online courses (MOOCs) platform. *Comput. Hum. Behav.* 51, 578–593. doi: 10.1016/j.chb.2015.02.067

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Gratifications for Social Media Use in Entrepreneurship Courses: Learners' Perspective

*Yenchun Wu and Dafong Song**

Graduate Institute of Global Business and Strategy, National Taiwan Normal University, Taipei, Taiwan

The purpose of this study is to explore uses and gratifications on social media in entrepreneurship courses from the learners' perspective. The respondents must have participated in government or private entrepreneurship courses and joined the online group of those courses. Respondents are not college students, but more entrepreneurs, and their multi-attribute makes the research results and explanatory more abundant. A total of 458 valid data was collected. The results of the survey revealed four gratification factors namely trust, profit, learning, and social in online entrepreneurial groups. It is also found that the structures and of the four gratification factors vary in three social media (Line, Facebook, and WeChat) and "trust" outranks other factors. Most of the entrepreneurs' business is "networking business," and the business unit is mostly "micro." In terms of the trust factor, there are significant differences among the three social media. In short, the two gratification factors of trust and profit can be seen as specific gratifications for online entrepreneurial groups, especially the trust factor, which deserves more attention in the further research of online entrepreneurial courses on social media.

Keywords: entrepreneurship education (EE), entrepreneurship (new firms, start-ups), social media, uses and gratifications theory, Line, Facebook (FB), Wechat, entrepreneurship

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***Correspondence:**
Dafong Song
songdafong@gmail.com

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INTRODUCTION

"Entrepreneurs are not afraid of more brothers." This proverb refers to the spirit of entrepreneurs and the reason that they prefer joining groups and are particularly inclined to form a community. In recent years, social media has become a popular tool for entrepreneurs to cluster around. Numerous entrepreneurship courses have begun to use social media as a teaching aid (Menkhoff and Bengtsson, 2012; Lapolla, 2014). It can help entrepreneurial teachers improve their teaching practices to increase learner engagement and support learners' success in individual courses, learning experiences, and teaching goals. In addition, from the perspective of the development of entrepreneurship education differs from that of general subjects. Entrepreneurship is fascinating but challenging. Because it involves uncertainty and risk, most entrepreneurship courses replace traditional teaching with mentoring, coaching and inheriting experience are more popular among learners than are the theories in books. In this context, the diverse and unique functions of social media are highly conducive to the development of entrepreneurship courses. Social media use can promote the development of learners and of the teacher-learner relationships. Emerging digital teaching technologies can facilitate interaction between learners and course content, increase learners' motivation, enhance their entrepreneurial skills, and increase learner engagement in

entrepreneurial knowledge acquisition (Wu et al., 2017). However, many entrepreneurs do not become unsuccessful in the first attempt, and thus, entrepreneurship courses can invite successful learners back to class to share their success stories. In this case, social media provides an effective learning platform; learners can find help in their entrepreneurial activities through access to numerous online resources. Based on the abovementioned points, we regarded social media as a teaching tool, particularly beneficial for entrepreneurial learning, and selected the online groups of entrepreneurial courses as the object of observation.

Encouraging teachers to use social media as a teaching strategy is worthwhile (Gruzd et al., 2018). However, for a learner-centered position, the following questions are raised: what are the reasons for learners to continue the use social media in the curriculum design? Can social media genuinely enhance the absorption and application of learners' knowledge in the classroom? What are the factors that help, interfere with, and cause doubt when learners use this knowledge? In general, social media must be sustained, actively invested in, and used by team members to achieve its value. However, research and commentary on applying social media to entrepreneurship courses are rare. Therefore, how to effectively use the particularities of social media to attract learners to use it voluntarily and continually is worthy of further discussion.

Course groups can use social media platforms, such as Line, Facebook, and WeChat. Some groups are a course requirement for teachers and some are composed of learners themselves; some groups can be joined for free and some require a fee. We found that in terms of groups' growth and decline, in addition to the characteristics of the social media platform, the active participation of team members is the most critical factor. Therefore, this study focused on the online groups of entrepreneurship courses to explore the experiences of learners in their curriculum and motivation to continue to use social media.

The uses and gratifications (U&G) theory emphasizes that an audience will actively select and use a particular form of media according to their own needs and then use their behaviors to meet its demands (Katz et al., 1973, 1974). Social media is highly suitable for being discussed from the perspective of the U&G theory because it is a medium that people use to attract other users, who they then use to improve and expand their own media. Furthermore, the idea that learners use social media in a targeted manner is quite consistent with the U&G theory, which considers users to be active decision-makers who seek, use, and apply media for their own purposes (Katz et al., 1973, 1974; Shao, 2009). To answer the research questions, this study explored the characteristics of social media and the motivation and gratification of learners in social media through the U&G theory.

Many studies conducted on the relationship between social media and learning have been set in schools. The research targets have mostly been teachers (Gruzd et al., 2018) and students (Menkhoff and Bengtsson, 2012; Dahlstrom et al., 2013; Lapolla, 2014; Lupton, 2014; Wohn and LaRose, 2014; Barhoumi, 2015; Gan and Wang, 2015; Imlawi et al., 2015; Hajibayova, 2017; Gan, 2018; Klobas et al., 2018). However, as far as entrepreneurship courses are concerned, apart from schools, the government and the private sector have vigorously promoted the courses in quantity and terms of types even beyond school education. The current study used government and private entrepreneurship course learners as research objects for two reasons: first, the diversity of personal attributes (e.g., age and education level) can enrich the interpretation of the research results, and second, such learners may have relatively stronger entrepreneurial motivations as well as experiences of entrepreneurship success or failure. Therefore, we attempted to answer the following research questions: how do these learners use social media in their courses? What are the purposes and gratification factors of using social media? What are the challenges and difficulties of using social media?

If teachers understand the needs of entrepreneurship learners, they can use social media correctly and more effectively to help achieve their teaching goals. Most of the relevant studies have focused on the use of one or two social media platform (Wohn and LaRose, 2014; Gan and Wang, 2015; Gan, 2018; Klobas et al., 2018), but the comparative analyses of the use of three social media platforms have been limited. Therefore, this study compared the similarities and differences of gratification factors across three social media. Thus, this study's objectives are as follows: (1) To explore the current situation of learners using social media in entrepreneurship courses. (2) To investigate the learners' perspective the gratification factors of using social media in entrepreneurship courses. (3) To compare the similarities and differences among the gratification factors of three social media entrepreneurship courses.

Literature Review

Social Media and Learning

The contribution of social media in the classroom has generated increasing interest in such tools for assisted learning. Six reasons for teachers to use social media in their curriculum are that it (1) promotes student participation, (2) makes teachers more organized, (3) combines external resources; (4) makes students more focused on the topic being learned, (5) establishes a group for practical applications, and (6) enables resource development (Gruzd et al., 2018). Some studies from students' perspective also exist. For example, Dahlstrom et al. (2013) surveyed 113,035 college students from 14 countries on technology perception and use in higher education. Although the students understood the value of learning on social media, they wanted to know how to apply social media more effectively in the courses they study themselves. Similarly, in a study on six courses, each course used a different type of social media differently; it found that students struggled to use social media because they felt that they did not learn enough about how to use teaching support for social media (Bennett et al., 2012). Wohn and LaRose (2014) found that the compulsive use of YouTube aided students in studying their courses; however, the negative feelings were similar to the consequences of being forced to use Facebook. This discovery may alert teachers of the risk of forced use when applying social media. However, studies on social media and learning from these

perspectives are limited, particularly those related to learning; they are usually related to learning how to use social media rather than applying it to the curriculum to enhance the learning effects of the course.

Other classroom applications include those reported: Wang et al. (2012) who used Facebook as a two-course learning management system; Barhoumi (2015) and Sulisworo and Toifur (2016), who incorporated WhatsApp; and Menkhoff and Bengtsson (2012) who applied mobile phones and social media to entrepreneurship courses at a university in Singapore. These studies have shown that students were willing to use and satisfied with social media as a teaching tool and that the learning results were good.

Lapolla (2014) evaluated the use of the social media platform Pinterest in fashion design courses and found that students believed they benefited from communicating with customers through the community. This indicated that extended learning was considered an intention of using social media. In a survey conducted by Lupton (2014) the reasons respondents gave for using social media were working with other people in the class and for outside learning and extending classroom contact time. Therefore, expanding the classroom contact environment is a reason for using social media. This validates the use of social media and expands the scope of the learning environment to access resources. However, in the aforementioned literature, the research targets were still mostly teachers and students.

The use of social media in courses allows learners to experience active participation, sharing, openness, and collaboration, and simultaneously attracting them to actively engage in and even start their career (Senges et al., 2008). Furthermore, the use of social media helps promote participants' development. This matches Vygotsky's (1978) view, who advocated that learners' ability to solve problems with the help of a teacher or cooperation with a more capable companion goes beyond the problem-solving ability that emerges when they are alone, he believed that the group provides an interactive situation wherein teachers provide guidance and support through the dialog to enhance the ability to expand learners' knowledge and demonstrate different learning outcomes. Because the development of individuals is influenced by social interactions, the process of group interaction learning can also promote individual development, which makes participation and reflection another reason for using social media in the curriculum. Learners must interact with others and learn and practice new norms to actively form their own learning style.

Teachers are also crucial players in the group. The personality traits and interactions of teachers may be a reason that learners continue to participate. Imlawi et al. (2015) explored the use of social media in a study on teacher credibility and found that when teachers posted information about themselves and expressed a sense of humor, students' learning outcomes were stimulated, which could be considered a method of teachers and students using social media to build trust and cooperation. When we interviewed respondents about the entrepreneurship curriculum, nearly everybody mentioned that trust is a crucial reason affecting their motivation to join or leave the group.

In summary, there are several reasons for learners using social media in their courses: (1) it aids learners in actually experiencing what they have learned; (2) it expands the scope of the learning environment; (3) it promotes interaction, cooperation, and learning; and (4) it highlights the personality traits of teacher and encourages their participation.

Uses and Gratifications Theory and Social Media

U&G theory identifies the social and psychological needs that drive individuals to use specific media, and it also explains why individuals actively choose particular media to gratify a variety of needs (Katz et al., 1974). U&G theory pays great attention to the initiative of the audience, emphasizing the voluntary and selective nature between the audience and the media, which is highly suitable for the theme of this study. In this era of continual introductions of new forms of media, when the initiative of the audience becomes a key factor in the behavior of the media, the U&G are more suitable for the overall picture of the audience's use of media behavior. Social media may not be able to replace traditional media but it may help researchers explore the motivations, needs, and gratifications of more audiences.

Some of the studies using U&G perspective are as follows: Gan (2018) analyzed 368 Chinese college students who used the social media platforms. Sina Weibo and WeChat and confirmed that four types of gratification exist across different social media platforms: hedonic, emotional, message, and social gratification. Furthermore, the author found that the intensity of each gratification varied to various degrees in terms of the use of different social media platforms. Klobas et al. (2018) studied 807 Malaysian university students and found that entertainment motivation is more attractive to students than messages motivation.

The U&G framework fits our research because it does not assume a set of predefined gratifications factors, but rather, causes factors to be generated from the data; this led us to ask how and why such media is used as well as how each type of media serves each user. Thus, corroborating to our research objectives, we selected respondents who used entrepreneurial course groups on Line, WeChat, or Facebook.

MATERIALS AND METHODS

Questionnaire Design and Identification

Our questionnaire was aimed at understanding the current situation of learners who use social media in entrepreneurship courses as well as at exploring the gratifications factors of using social media in entrepreneurship courses from the learners' perspective. First, we interviewed five well-known entrepreneurship teachers and 12 active members of entrepreneurship course groups and held two focus group discussions. We developed questions relevant to our research objectives, and then, according to the interview content and literature review, we incorporated them into the initial questionnaire. This questionnaire was evaluated for expert validity by six senior entrepreneurship teachers, and corrections were made to form the pretest questionnaire.

Initially, the questionnaire was based on the four directions in the literature: (1) the learner actually experiencing what he or she has learned, (2) expanding the scope of the learning environment, (3) promoting learning through group interaction and cooperation, and (4) encouraging the teacher's traits and the participation levels. However, after the expert interviews and focus group discussions, the traits of the teacher were removed because groups formed by learners did not necessarily have a teacher and some entrepreneurship courses online are comprised of only learners. The pretest questionnaire consisted of two parts. The first part concerned the feeling of participating in the group, and the content included the five aspects of trust, profit, learning, happiness, and interaction. In total, the first part comprised 21 questions, all of which were measured using a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). The second part concerned personal use and basic information. To obtain the degree of discrimination for the pretest questionnaire, we conducted item analysis. As presented in **Table 1**, the composite reliability (CR) of 21 items reached significance, indicating that each item had a good degree of discrimination. Furthermore, the total correlation coefficient (CC) was > 0.4, which also reached significance; thus, all 21 items were retained.

Subsequently, factor analysis was performed, followed by Kaiser-Meyer-Olkin (KMO) verification and Bartlett's test to determine whether the data was suitable for factor analysis. Next, principal component analysis was conducted to extract common factors, and through Varimax rotation the selected

TABLE 1 | After item analysis and factor analysis the removed questions, the new facets, and the new question number.

Original facets and questions		CC	CR	Removed	New facet	New no.
Trust	(1) I believe that most of the information provided by this group is reliable.	0.66***	9.92***		**Trust**	1
	(2) I think the teacher in the courses can be trusted.	0.69***	10.09***		**Trust**	2
	(3) I think most of the members of this group are trustworthy.	0.67***	9.61***		**Trust**	3
	(4) Even if the exchange of information in a group is risky, I will still participate in the group.	0.47***	5.27***	X		
Profit	(5) Joining the group gives me a chance to make money.	0.70***	11.51***		**Profit**	4
	(6) The participation of the group expanded my network and helped me start a career.	0.78***	12.96***		**Profit**	5
	(7) The main purpose of participating in the group is to make money in order to start a business.	0.71***	10.89***		**Profit**	6
	(8) I think we can take advantage of starting a business through the community.	0.70***	9.87***	X		
	(9) Joining the group can help me think of a new idea to start a career.	0.71***	10.00***	X		
Learning	(10) Participate in the group to help me better understand the meaning of entrepreneurship or heterogeneous alliance and other concepts.	0.66***	9.38***		**Learning**	7
	(11) Joining the group can help me review what I have learned after going home.	0.75***	12.65***		**Learning**	8
	(12) Sharing or discussing in the group helps me with my studies.	0.78***	11.12***		**Learning**	9
	(13) The information published by the group members in the cluster is more relevant to the subject matter of the course.	0.72***	13.50***		**Learning**	10
Happiness	(14) When I interact with other team members, it makes me feel very happy.	0.30***	2.82***	X		
	(15) Someone in the group answered my question and made me feel warm.	0.69***	10.07***	X		
	(16) It makes me feel comfortable to express my opinions or ask questions in the group.	0.74***	12.61***		**Social**	12
	(17) When I send a message in a group, someone gives me a sense of laud when he likes it.	0.71***	10.23***		**Social**	13
Interaction	(18) Teachers or members of the team often respond to questions brought up in the group.	0.79***	14.36***		**Learning**	11
	(19) The interaction between the team members is consistent.	0.70***	9.45***		**Social**	14
	(20) I often interact with other team members.	0.70***	11.03***		**Social**	15
	(21) Groups often organize gatherings and invite team members to participate.	0.66***	9.80***		**Social**	16

****p < 0.000.*

factors were rotated. The factor loadings of each item are required to be > 0.5.

After five rounds of factor analysis, five items were removed individually: question 4 of the trust facet, questions 8 and 9 of the profit facet, and questions 14 and 15 of the happiness facet. According to **Table 2**, the remaining 16 items have KMO = 0.94 > 0.9, Bartlett's test = 2746.60, and Sig. = 0.000, which indicated that they were suitable for factor analysis, and reduced the original five facets to four. Question 18 had originally belonged to the interaction facet before, belonging to the learning facet, and questions 16 and 17 had originally belonged to the happiness facet before, belonging to the interaction facet. The happiness and interaction facets were combined to form one facet, which was called "social" (see **Table 1**). According to **Table 2**, the eigenvalues of all four facets greater than 1: trust (2.60), profit (2.42), learning (3.11), and social (3.72). The variance explained was 16.26% for trust, 15.13% for profit, 23.22% for social, and 19.46% for learning, and the highest explanatory power was for social. The total variance explained was 74.07 > 50.0%, indicating that the first part of the questionnaire had good validity and explanatory power. The first part of the new questionnaire concerned the feeling of participating in the group. It was divided into four facets and 16 items as follows: trust comprised three items, profit comprised three items, learning comprised five items, and social comprised five items. Next, reliability analysis was performed, the overall questionnaire Cronbach's α = 0.94, and the Cronbach's α of each facet: trust (0.84), profit (0.84), learning (0.89), and social (0.88), all of which were > 0.7 (see **Table 2**), indicating that the overall questionnaire and each facet had stable internal consistency. Therefore, the questionnaire was valid as a tool for follow-up research. We continued to use this questionnaire to investigate and analyze entrepreneurship course groups on the following three social media platforms: Line, Facebook, and WeChat.

TABLE 2 | Factors extracted for pre-test questionnaire.

	Pre-test (=173)			
I think/I feel use Line/Facebook/WeChat	**F1**	**F2**	**F3**	**F4**
F1: Trust				
Message is reliable	0.839			
Teacher can be trusted	0.763			
Members are trustworthy	0.699			
F2: Profit				
Have a chance to make money		0.784		
Expanded my network		0.594		
In order to start a business		0.755		
F3: Learning				
Understand the meaning of entrepreneurship			0.596	
Can review what I have learned			0.757	
Help me with my studies			0.715	
Relevant to the subject matter of the course			0.701	
It often respond to questions brought up			0.664	
F4: Social				
It makes me feel comfortable				0.678
Someone gives me a sense when he likes it				0.709
Interaction between the members is consistent				0.770
I often interact with members				0.761
It often organize physical gatherings				0.736
Eigenvalue	2.60	2.42	3.11	3.72
Variance explained (%)	16.26	15.13	19.46	23.22
Total variance explained (%)	74.01			
Cronbach's α	0.84	0.84	0.89	0.88
Total Cronbach's α	0.94			
KMO	0.94			
Bartlett's test	1852.18 Sig. = 0.000			

Data Collection

The respondents were required to have taken an entrepreneurship course and participated in its online group on Line, Facebook, or WeChat. The target audience was entrepreneurship groups that we had participated in and were familiar with or entrepreneurial groups recommended by senior entrepreneurial teachers. Some online groups are designed by teachers for their curriculum, whereas some are comprised of the learners themselves. Using a group message notification, we sent a message to respondents containing a link to the questionnaire on an online survey website. In addition to the online survey system, we participated in the physical group of the entrepreneurship courses to interview learners and collect questionnaires. We not only employed group messaging but also one-to-one messaging for anonymous answers. Two online questionnaire systems were employed: Google Questionnaire (in Traditional Chinese), and Tencent Questionnaire (in Simplified Chinese), which were posted on the entrepreneurship groups on Line, Facebook, and WeChat. In total, 42 entrepreneurship course groups were interviewed (Line = 21, Facebook = 16, and WeChat = 5) and the number of members in each group was between 23 and 463. In addition, a questionnaire setting mechanism was applied to avoid missed items and repeated responses by the respondents.

RESULTS

Respondent Demographics

The respondents' demographics are shown in **Table 3**. In total, 173 questionnaires were collected from the pretest subjects, and 458 questionnaires were collected from the formal test subjects (Line = 189, Facebook = 142, and WeChat = 127). The ratio of men to women is roughly equal. Regarding age, the majority of WeChat users were aged 21–30 years, whereas the users of the other groups were mostly aged 31–50 years. Most respondents had a university-level education. The proportion of respondents who used the group because it was a part of their teacher's curriculum design was 42.8–51.2%; that of respondents who were required to pay for the group was 33.3–51.2%; and that of respondents who used the group several times a day was 34.4–66.9%. Furthermore, more than half of the respondents had already started their own business (62.5–91.0%). As shown in

TABLE 3 | Respondent demographics.

	Pre-test (*n* = 173)	Line (*n* = 189)	Facebook (*n* = 142)	WeChat (*n* = 127)
Measure and items	**Frequency (%)**	**Frequency (%)**	**Frequency (%)**	**Frequency (%)**
Gender				
Male	88 (50.9)	101 (53.4)	62 (43.7)	61 (48.0)
Female	85 (49.1)	88 (46.6)	80 (56.3)	66 (52.0)
Age				
21–30	34 (19.6)	21 (11.1)	21 (14.8)	62 (48.8)
31–40	51 (29.5)	58 (30.7)	47 (33.1)	25 (19.7)
41–50	53 (30.6)	64 (33.9)	47 (33.1)	23 (18.1)
51–60	26 (15.0)	40 (21.2)	21 (14.8)	12 (9.5)
Over 61	9 (5.2)	6 (3.1)	6 (4.2)	5 (3.9)
Education				
Under high school	11 (6.4)	5 (2.6)	6 (4.2)	9 (7.1)
High school	32 (18.5)	19 (10.1)	18 (12.7)	21 (16.5)
University	90 (52.0)	98 (51.9)	78 (54.9)	76 (59.8)
Graduate school	40 (23.1)	67 (35.4)	40 (28.2)	21 (16.5)
Type				
Teacher's design	74 (42.8)	85 (45.0)	65 (45.8)	65 (51.2)
Learners' self-contained	99 (57.2)	104 (55.0)	77 (54.2)	62 (48.8)
Need to pay				
Yes	67 (38.7)	63 (33.3)	56 (39.4)	65 (51.2)
No	106 (61.3)	126 (66.7)	86 (60.6)	62 (48.8)
How long of use				
Less than 6 months	49 (28.3)	69 (36.5)	29 (20.4)	52 (40.9)
6–12 months	51 (29.5)	82 (43.4)	44 (31.0)	49 (38.6)
1–2 years	33 (19.1)	31 (16.4)	36 (25.4)	9 (7.1)
More than 2 years	40 (23.1)	7 (3.7)	33 (23.2)	17 (13.4)
How often				
Once a week or longer	20 (11.6)	9 (4.8)	6 (4.2)	1 (0.8)
Several times a week	27 (15.6)	52 (27.5)	18 (12.7)	14 (11.0)
Once a day	26 (15.0)	60 (31.7)	14 (9.9)	38 (29.9)
Several times a day	76 (43.9)	65 (34.4)	95 (66.9)	65 (51.25)
All the day	24 (13.9)	3 (1.6)	9 (6.3)	9 (7.1)
Place of residence				
Taiwan	149 (86.1)	187 (98.9)	131 (92.3)	6 (4.7)
China	22 (12.7)	2 (1.1)	5 (3.5)	118 (92.9)
Others	2 (1.2)		6 (4.2)	3 (2.4)

Table 4, the business units are mostly "micro" (employing fewer than five people) and most of the businesses are "networking business." Other business types included dining, cram schools, investment, and beauty and etc. As for the other items, many types existed, indicating that the categories of entrepreneurship are quite diverse.

Gratifications for the Use of Three Social Media

As shown in **Table 5**, the factors extracted from Line have KMO = 0.91 > 0.9, Bartlett's test = 2025.72, Sig. = 0.000, which indicated that they were suitable for factor analysis. The eigenvalues of all four facets were greater than 1: trust = 2.48, profit = 2.57, learning = 3.19, social = 3.58. The total variance explained is 73.81%, the interpretation of social is the highest (22.36%). Regarding the reliability analysis, the overall questionnaire Cronbach's $\alpha = 0.93$, trust Cronbach's $\alpha = 0.80$, profit Cronbach's $\alpha = 0.82$, learning Cronbach's $\alpha = 0.89$, social Cronbach's $\alpha = 0.90$, all of which were > 0.7, indicating that the overall questionnaire and each facet have stable internal consistency and the gratification factors have good validity and explanatory power.

The factors extracted from Facebook have KMO = 0.93 > 0.9, Bartlett's test = 1561.79, Sig. = 0.000, which indicated that they were suitable for factor analysis. The eigenvalues of all four facets are greater than 1: trust = 2.89, profit = 2.32, learning = 2.86, social = 3.76, the total variance explaining 73.90%, the interpretation of social is the highest (23.49%). Reliability analysis, the overall questionnaire Cronbach's $\alpha = 0.94$, trust Cronbach's $\alpha = 0.85$, profit Cronbach's $\alpha = 0.84$, learning Cronbach's $\alpha = 0.89$, social Cronbach's $\alpha = 0.88$, all of which

TABLE 4 | Industry information of entrepreneurs.

	Pre-test (*n* = 134)	Line (*n* = 172)	Facebook (*n* = 113)	WeChat (*n* = 79)
Measure	**Frequency (%)**	**Frequency (%)**	**Frequency (%)**	**Frequency (%)**
Have you started your business				
Yes	134 (77.5)	172 (91.0)	113 (79.6)	79 (62.5)
No	39 (22.5)	17 (9.0)	29 (20.4)	48 (37.8)
Size of the business				
Micro	111 (82.8)	135 (78.5)	100 (88.5)	71 (89.9)
Small	20 (14.9)	37 (21.5)	12 (10.6)	8 (10.1)
Medium	3 (2.2)	0	1 (0.9)	0
What business do you run				
Networking	41 (30.6)	33 (19.2)	44 (38.9)	30 (38.0)
Dining/baking	20 (14.9)	12 (7.0)	15 (13.3)	11 (13.9)
Investment	16 (11.9)	10 (5.8)	7 (6.2)	6 (7.6)
Cram classes	14 (10.5)	16 (9.3)	13 (11.5)	10 (12.7)
Beauty	8 (6.0)	13 (7.6)	12 (10.6)	8 (10.1)
Others	35 (26.1)	88 (51.2)	22 (19.5)	14 (17.7)

TABLE 5 | Factors extracted and reliability for three social media.

	Line (*n* = 189)				Facebook (*n* = 142)				WeChat (*n* = 127)			
I think/I feel	**F1**	**F2**	**F3**	**F4**	**F1**	**F2**	**F3**	**F4**	**F1**	**F2**	**F3**	**F4**
F1: Trust												
Message is reliable	0.825				0.861				0.782			
Teacher can be trusted	0.742				0.714				0.769			
Members are trustworthy	0.721				0.788				0.741			
F2: Profit												
Have a chance to make money		0.735				0.733				0.797		
Expanded my network		0.773				0.606				0.596		
In order to start a business		0.838				0.798				0.753		
F3: Learning												
Understand the meaning of entrepreneurship			0.635				0.754				0.500	
Can review what I have learned			0.687				0.619				0.721	
Help me with my studies			0.763				0.656				0.703	
Relevant to the subject matter of the course			0.733				0.624				0.780	
Often respond to questions brought up			0.648				0.552				0.692	
F4: Social												
It makes me feel comfortable				0.621				0.668				0.652
Someone gives me a sense when he likes it				0.609				0.772				0.530
Interaction between the members is consistent				0.775				0.757				0.716
I often interact with members				0.854				0.673				0.787
Often organize physical gatherings				0.755				0.771				0.781
Eigenvalue	2.48	2.57	3.19	3.58	2.89	2.32	2.86	3.76	3.06	2.20	2.90	3.04
Variance explained (%)	15.47	16.07	19.91	22.36	18.07	14.5	17.84	23.49	19.11	13.76	18.11	19.03
Total variance explained (%)	73.81				73.9				70.01			
Cronbach's α	0.80	0.82	0.89	0.89	0.85	0.84	0.89	0.88	0.83	0.85	0.85	0.83
Total Cronbach's α	0.93				0.94				0.93			
KMO	0.91				0.93				0.92			
Bartlett's test	2025.72 Sig. = 0.000				1561.80 Sig. = 0.000				1126.88 Sig. = 0.000			

were > 0.7, indicating that the overall questionnaire and each facet have stable internal consistency and the gratification factors have good validity and explanatory power.

The factors extracted from WeChat have KMO = 0.92 > 0.9, Bartlett's test = 1126.88, Sig. = 0.000, which indicated that they were suitable for factor analysis. The eigenvalues of all

TABLE 6 | Mean and ranking of o four factors for three social media.

	Line (n = 189)			Facebook (n = 142)			WeChat (n = 127)		
Factor	**Mean**	***SD***	**Ranking**	**Mean**	***SD***	**Ranking**	**Mean**	***SD***	**Ranking**
Trust	3.67	0.82	1	3.90	0.85	1	4.14	0.76	1
Profit	3.26	1.03	3	3.77	0.97	3	3.74	0.94	3
Learning	3.52	0.96	2	3.83	0.86	2	3.91	0.76	2
Social	3.07	1.02	4	3.67	0.86	4	3.73	0.81	4

four facets are greater than 1: trust = 3.06, profit = 2.20, learning = 2.90, social = 3.04, the total variance explaining 70.01%, the interpretation of trust is the highest (19.11%). Reliability analysis, the overall questionnaire Cronbach's α = 0.93, trust Cronbach's α = 0.83, profit Cronbach's α = 0.85, learning Cronbach's α = 0.85, social Cronbach's α = 0.83, all of which were > 0.7, indicating that the overall questionnaire and each facet have stable internal consistency and the gratification factors have good validity and explanatory power. This outcome has the similar result as the study by Gan and Wang (2015) and Gan (2018), the structure of the gratification factor is different in different social media. It shows that although users can get the same gratification from different social media, how get the gratification may vary.

Comparative Analysis of the Gratifications on Three Social Media

Table 6 presents the means and rankings of the four factors across the three social media platforms. The gratification ranking was as follows: trust, learning, profit, and social. Trust ranked first across all social media platforms. Subsequently, we conducted an analysis of the variance. The results of Levene's test indicated that two facets exhibited inhomogeneity of variance (see **Table 7**); therefore, we referred to the Brown-Forsythe and Welch statistics to determine the average (robust tests of equality of means). Both types of statistics followed an F distribution, and thus the homogeneity assumption was not required. The verification results were significant (see **Table 8**), and therefore, *post hoc* analysis was continued. Because the number of groups exceeded 50, we used Games–Howell tests for *post hoc* comparisons. The results are shown in **Table 9**. Regarding the trust factor, the difference between on three social media is significant (WeChat > Facebook > Line). Regarding the profit factor, the difference between WeChat and Line is significant (WeChat > Line) and that between Facebook and Line was significant (Facebook > Line); however, the difference between WeChat and Facebook is not significant. Regarding the learning factor, the difference between WeChat and Line is significant (WeChat > Line) and that between Facebook and Line is significant (Facebook > Line); however, the difference between WeChat and Facebook is not significant. Finally, regarding the social factor, the difference between WeChat and Line is significant (WeChat > Line) and that between Facebook and Line is significant (Facebook > Line); however, the difference between WeChat and Facebook is not significant.

TABLE 7 | Test of homogeneity of variances.

Factor	**Levene statistic**	**df1**	**df2**	**Sig.**
Trust	1.90	2	455	0.151
Profit	0.54	2	455	0.581
Learning	5.27	2	455	0.005
Social	4.18	2	455	0.016

Confirmatory Factor Analysis

As shown in **Figure 1**, confirmatory factor analysis (CFA) of the 458 formal respondents revealed the following results: $\chi^2(98, N = 458) = 400.375$, $P = 0.001$, $\chi^2/df = 4.058 < 5$, GFI = 0.90 > 0.9, AGFI = 0.86 > 0.8, CFI = 0.94 > 0.9, NNFI = 0.92 > 0.9, IFI = 0.94 > 0.9, RMSEA = 0.08 < 0.1, indicating that the model's fit could be accepted (Bagozzi and Yi, 1988). As shown in **Table 10**, the factor loading of 16 items are all > 0.7, indicating good convergent validity. The CR of the four factors is as follows: trust = 0.84, profit = 0.87, learning = 0.88, and social = 0.90. All are > 0.6, indicating that the measurement is stable and have good reliability. Average variance extracted (AVE) is as follows: trust = 0.63, profit = 0.68, learning = 0.60, and social = 0.64. All are > 0.5, indicating that the convergent validity of the potential variable is ideal and have good operationalization. IF the AVE of each construct is greater than the square of the correlation coefficient (CC) associated with other constructs, which verified the discriminant validity of the constructs (Fornell and Larcker, 1981). The results as shown in **Table 11**: between trust and profit, $r = 0.52$, $r^2 = 0.27$. trust AVE = 0.63 > 0.27, profit AVE = 0.68 > 0.27, all of which indicate good discriminant validity between trust and profit. By analogy, good distinction validity existed between trust and learning, trust and social, profit and learning, and profit and social. Only between learning and social was the AVE not greater than the r^2 of the CC associated with other constructs, as shown in **Table 11**. Thus, the CFA of the measurement model could be accepted and both the convergent and discriminant validity are appropriate and feasible.

DISCUSSION AND CONCLUSION

Discussion and Implications

To save space, the results of the in-depth interviews are discussed together. This study found learners asked questions about the course on social media in order to get a response from the teacher

TABLE 8 | Robust tests of equality of means.

Factor		Statistic[a]	df1	df2	Sig.
Trust	Welch	13.62	2	287.1	0.000
	Brown-Forsythe	12.93	2	431.5	0.000
Profit	Welch	13.24	2	289.6	0.000
	Brown-Forsythe	13.86	2	439.6	0.000
Learning	Welch	8.75	2	295.3	0.000
	Brown-Forsythe	9.33	2	450.3	0.000
Social	Welch	24.49	2	295.8	0.000
	Brown-Forsythe	27.42	2	452.8	0.000

[a]*Asymptotically F distributed.*

TABLE 9 | Mean comparison among three social media.

Factor			Mean difference	Sig.	*Post hoc* tests (Games–Howell)
Trust	Line	WeChat	0.47*	0.000	WeChat > Facebook > Line
		Facebook	−0.23*	0.038	
	WeChat	Line	0.47*	0.000	
		Facebook	0.24*	0.038	
	Facebook	Line	0.23*	0.038	
		WeChat	−0.24*	0.038	
Profit	Line	WeChat	−0.48*	0.000	WeChat > Line Facebook > Line WeChat = Facebook
		Facebook	−0.50*	0.000	
	WeChat	Line	0.48*	0.000	
		Facebook	−0.03	0.975	
	Facebook	Line	0.50*	0.000	
		WeChat	0.03	0.975	
Learning	Line	WeChat	−0.39*	0.000	WeChat > Line Facebook > Line WeChat = Facebook
		Facebook	−0.31*	0.006	
	WeChat	Line	0.39*	0.000	
		Facebook	0.08	0.704	
	Facebook	Line	0.31*	0.006	
		WeChat	−0.08	0.704	
Social	Line	WeChat	−0.66*	0.000	WeChat > Line Facebook > Line WeChat = Facebook
		Facebook	−0.60*	0.000	
	WeChat	Line	0.66*	0.000	
		Facebook	0.06	0.841	
	Facebook	Line	0.60*	0.000	
		WeChat	−0.06	0.841	

*$p < 0.05$, $N = 458$.

or classmate. In addition, because most of the learners were entrepreneurs, the groups usually provide them with advertising time for marketing their products or ideas to the group. Since the learners are classmates, trust between them is high and the chances of the transactions are relatively great. If learners continue to participate in an advanced course, they can join the associated advanced group without interrupting their learning and continuing to use the group.

We also found that trust, profit, learning, and social are the four gratification factors for learners participating in online groups. These four factors are in line with the U&G theory's active users in a framework. Trust and profit can be regarded as specific gratification factors, and learning and social are general gratification factors. The participants in the in-depth interviews also agreed that participating in course groups could enhance the absorption and application of classroom knowledge; for example, by reviewing what was learned, group discussions and sharing can assist them in learning. The reasons for learners being willing to continue to use the groups were strengthened learning, the ability to receive information, social and emotional gratifications, and the opportunities to make money and profit. For entrepreneurship course group members, making money is the greatest reward. If learners are allowed more opportunities to make money through their group, this will increase their gratification with the group and they will continue to participate.

As for the challenges and difficulties that learners encounter in the group, the general disturbances and doubts about using course groups were as follows: members' questions are often

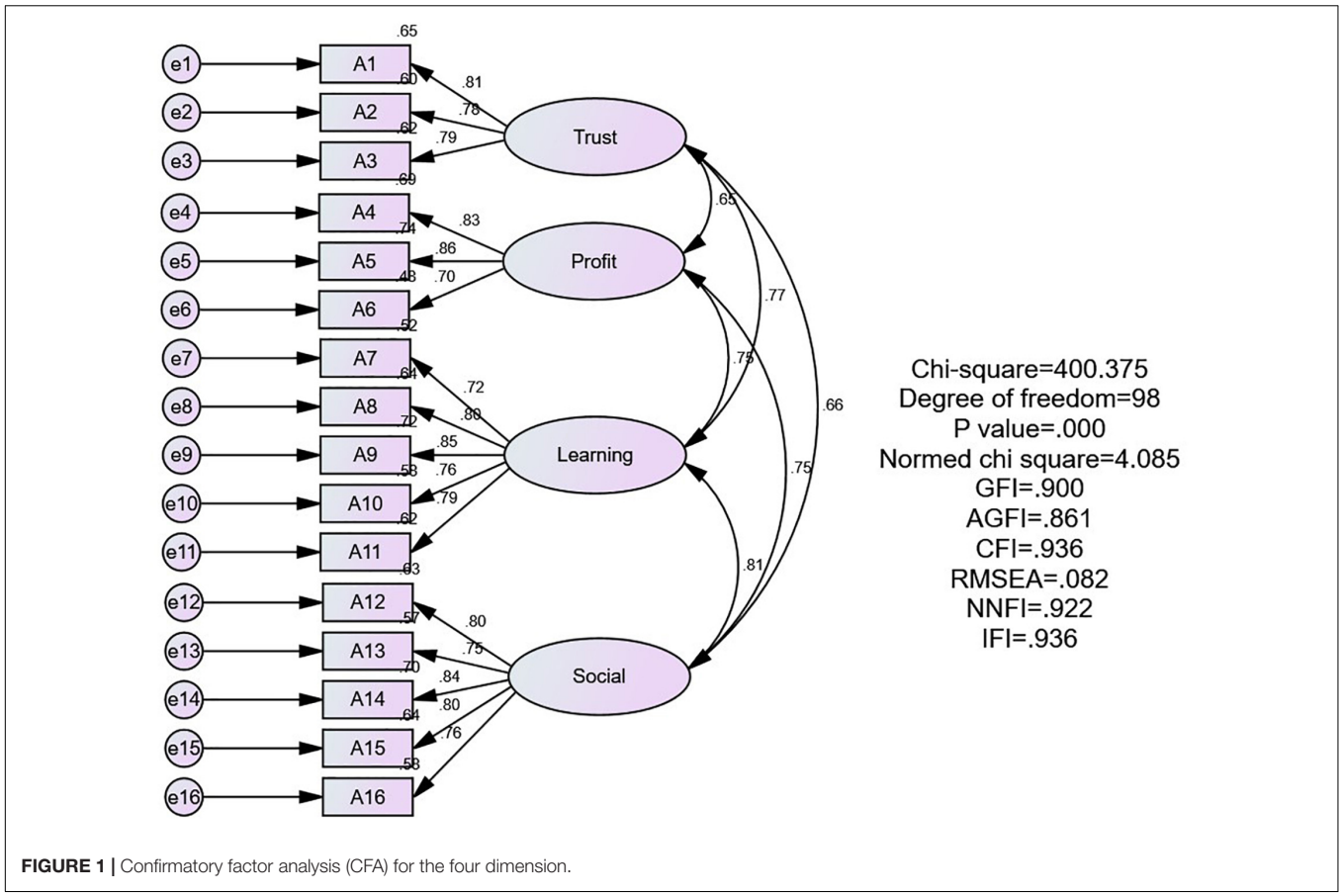

FIGURE 1 | Confirmatory factor analysis (CFA) for the four dimension.

TABLE 10 | Factor loading of items, composite reliability, and average variance extracted.

Factor	Factor loading of items					CR	AVE	Cronbach's α
Trust	0.81	0.78	0.79			0.84	0.63	0.83
Profit	0.83	0.86	0.70			0.87	0.68	0.84
Learning	0.72	0.80	0.85	0.76	0.79	0.88	0.60	0.89
Social	0.80	0.75	0.84	0.80	0.76	0.90	0.64	0.89

Total Cronbach's α = 0.94.

TABLE 11 | Correlation coefficient and average variance extraction between factors.

Factor	Trust	Profit	Learning	Social
Trust	0.63 (AVE)	0.43 (r^2)	0.59 (r^2)	0.63 (r^2)
Profit	0.65	0.68 (AVE)	0.43 (r^2)	0.56 (r^2)
Learning	0.77	0.75	0.60 (AVE)	0.65 (r^2)
Social	0.66	0.75	0.81	0.64 (AVE)

repeated or too simple, and the answers may not be relevant or posted unconfirmed messages.

Besides that, we found that the entrepreneurs across the three social media platforms mostly operated networking businesses. In addition to acquiring the knowledge and skills of entrepreneurship, the reasons for their participation in entrepreneurship courses and groups were to promote their products, particularly through the power of social media, to increase their performance. Almost all operators were small storefronts or individual studios with fewer than five people. This coincides with the survey findings, and the entrepreneurs' businesses were mostly micro business. Devanatha and Saha (2018) used case studies to learn about the success of two female entrepreneurs by using social media as an entrepreneurial tool. Their study considered social media not only low-cost and low-risk but also accessible to a wide range of target consumers, and thus, an effective entrepreneurial tool.

From the in-depth interviews in the first phase of this study, we knew that some learners started their own business because of unemployment, especially young learners. This is due to the fact that the occupation is a social identity, and young people need such recognition (Formica et al., 2017), coupled with their willingness to accept the challenge of starting a business, they participate in entrepreneurship courses and through learning, to

realize the dream of entrepreneurship. However, modern social and economic environments increase occupational mobility and work transitions are more frequent (Santisi et al., 2018), so the learners may experience the less linear career pathways (Formica et al., 2017; Santisi et al., 2018). Therefore, the design of entrepreneurship courses needs to consider this point of view.

On the other hand, throughout life, knowledge, and experience, the individual's uniqueness and subjectivity are ultimately involved (Mannino and Caronia, 2017; Mannino et al., 2017), so a flexible learning model is important, for learners to get what they need, and learn to adjust and adapt for the living environment, therefor, teaching and training should consider individual differences and special educational needs (Mannino and Faraci, 2017). Entrepreneurship courses are no exception, whether it's a physical course or on social media.

Contributions

The major contribution of our study is to identify four gratification factors, which are key incentives for applying social media in entrepreneurship courses. In addition, the influence of these factors is fluctuation of which depends on the variety of social media. Other contributions are as follows: first, this study extended the perspective of the entrepreneurship curriculum from universities to the government and private sector. The respondents are no longer college students, but more entrepreneurs (more than 60% of the respondents of the questionnaire survey are already business owners). The multiple attributes of the respondents enriched the research results. Our findings included the current state of social media use by learners of entrepreneurship courses, the four gratification factors of social media use in the entrepreneurship curriculum, especially the two factors of trust and profit, which has been less considered in prior studies. And a comparison of the gratification factors across the three social media platforms, the U&G theory was adopted to reveal the commonalities and differences among gratifications to use different social media. These valuable findings as above deepen our understanding of user behavior in social media. Second, the rich results and collected data can be used as materials for follow-up research. For example, the four extracted gratification factors (trust, profit, learning, and social) have good validity, reliability, and explanatory power in terms of measurement application, and the revised overall questionnaire and each facet have stable internal consistency, thus, the questionnaire could be used as a tool for subsequent research. Moreover, we can establish a structural equation model, investigate the relationship between the gratification factors and the continual use of the course group. In summary, our study can supplement the lack of information in the relevant literature.

In practice, the findings will not only help teachers to correctly and effectively use social media to achieve their teaching goals but also provide a reference and examples of applications to research and development designers in social media. For instance, social media platforms should not only be designed according to users' general gratification factors but also unique features should be designed to meet users' specific gratification factors, such as trust and profit, and there should be more cooperation with the entrepreneurship course group in terms of content creation. In summary, our study can supplement the lack of information in the relevant literature.

Limitations and Suggestions for Future Research

This study possesses several limitations as follows: first, our method of the study used static data to explain dynamic process; such as the main gratification factor trust is a dynamic process (Dai et al., 2018), and from the perspective of dynamic psychology, subjective perception of time has a major impact on human behavior and choice (Mannino and Caronia, 2017; Mannino et al., 2017), therefore, longitudinal research is inevitable in the future. Second, we inferred the results with small sample size, in the future, we must increase the number of respondents, particularly in the area of Mainland China. Third, the impact of social expectations and cultural biases (Granieri et al., 2017) was ignored in the questionnaire for this study and can be included in the future. Fourth, we used the U&G framework to find different gratification factors, which also suggested that while traditional dimensions in the framework have been widely used to study the use of various media, they may not be sufficient to explain the use of new social media (Liu et al., 2016), future research can integrate other theories. Fifth, this research employed quantitative research after a pre-quality study, however, we did not conduct further in-depth interviews, follow-up studies can employ further in-depth interviews after quantification to answer the questions more clearly, even found other gratification factors and motivations.

And we can conduct surveys and analyses on a certain type of entrepreneurial groups, such as beauty enterprise groups or dining groups, and compare them with each other. Subsequent research can include a more in-depth discussion and analysis based on a certain factor, such as trust which is the foundation of all communication, but how can we psychologically understand trust behaviors in social media? In the future, we can analyze and discuss the trust factor in more detail. In addition, we can increase the comparison to other platforms such as YouTube. Furthermore, future studies can be designed to allow respondents who use two social media platforms simultaneously to compare gratification factors between groups. We can also view from other perspectives, such as self-regulation, personality differences, maladaptive personality traits, health and well-being, cognition and behavior, entrepreneurial leadership, and career perspective (Gorgievski and Stephan, 2016; Gervasi et al., 2017; Granieri et al., 2017; Mannino and Faraci, 2017) to investigate the learner' activities and actions of entrepreneurship course on social media, Future research can dive into a deeper understanding of entrepreneurs' learning behavior and their gratifications on social media.

ETHICS STATEMENT

Ethics approval for this research was not required as per institutional and national guidelines. 636 Consent from all research participants was obtained by virtue of survey completion.

AUTHOR CONTRIBUTIONS

YW took charge in developing the concept, assisting in data collection. DS designed the research, performed data analysis, and wrote this manuscript.

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REFERENCES

Bagozzi, R. P., and Yi, Y. (1988). On the evaluation of structural equation models. *J. Acad. Mark. Sci.* 1, 74–94.

Barhoumi, C. (2015). The effectiveness of whatsapp mobile learning activities guided by activity theory on students' knowledge management. *Contemp. Educ. Technol.* 6, 221–238.

Bennett, S., Bishop, A., Dalgarno, B., Waycott, J., and Kennedy, G. (2012). Implementing Web 2.0 technologies in higher education: a collective case study. *Comput. Educ.* 59, 524–534. doi: 10.1016/j.compedu.2011.12.022

Dahlstrom, E., Walker, J. D., and Dziuban, C. (2013). *Educause Centre for Analytics and Research (ECAR) Study of Undergraduate Students and Information Technology*. Available at: http://www.educause.edu/library/resources/ecar-study-undergraduatestudents-and-information-technology-2013 (accessed September 16, 2013).

Dai, H., Yin, J., Wang, K., Tsai, S.-B., Zhou, B., and Lin, W.-P. (2018). Trust building in dynamic process of internet entrepreneurial social network. *IEEE Access.* 6, 79138–79150. doi: 10.1109/access.2018.2883755

Devanatha, P. P., and Saha, S. (2018). Role of social media in boosting women entrepreneurship-the indian scenario. *J. Manage. Technol.* 8, 38–41.

Formica, I., Pellerone, M., Morabito, C., Barberis, N., Ramaci, T., Di Giorgio, A., et al. (2017). The existential suspension of the young-adult in times of liquid modernity. a differential analysis of identity uneasiness in precarious times. *Mediterr. J. Clin. Psychol.* 5, 1–28. doi: 10.6092/2282-1619/2017.5.1665

Fornell, C., and Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *J. Mark. Res.* 18, 39–50. doi: 10.1177/002224378101800104

Gan, C. (2018). Gratifications for using social media: a comparative analysis of Sina Weibo and WeChat in China. *Inform. Dev.* 34, 139–147. doi: 10.1177/0266666916679717

Gan, C., and Wang, W. (2015). Uses and gratifications of social media: a comparison of microblog and WeChat. *J. Syst. Inf. Tech.* 17, 351–363. doi: 10.1108/jsit-06-2015-0052

Gervasi, A. M., La Marca, L., Lombardo, E., Mannino, G., Iacolino, C., and Schimmenti, A. (2017). Maladaptive personality traits and internet addiction symptoms among young adults: a study based on the alternative DSM-5 model for personality disorders. *Clin. Neuropsychiatry* 14, 20–28.

Gorgievski, M., and Stephan, U. (2016). Advancing the psychology of entrepreneurship: a review of psychological literature and an introduction. *Appl. Psychol. Int. Rev.* 65, 437–468. doi: 10.1111/apps.12073

Granieri, A., La Marca, L., Mannino, G., Giunta, S., Guglielmucci, F., and Schimmenti, A. (2017). The relationship between defense patterns and DSM5 maladaptive personality domains. *Front. Psychol* 8:1926. doi: 10.3389/fpsyg.2017.01926

Gruzd, A., Haythornthwaite, C., Paulin, D., Gilbert, S., and Del Valle, M. E. (2018). Uses and gratifications factors for social media use in teaching: instructors' perspectives. *New Media. Soc.* 20, 475–494. doi: 10.1177/1461444816662933

Hajibayova, L. (2017). Students' viewpoint: what constitutes presence in an online classroom? *Catalog. Class. Quart.* 55, 12–25. doi: 10.1080/01639374.2016.1241972

Imlawi, J., Gregg, D., and Karimi, J. (2015). Student engagement in course-based social networks: the impact of instructor credibility and use of communication. *Comput. Educ.* 88, 84–96. doi: 10.1016/j.compedu.2015.04.015

Katz, E., Blumler, J. G., and Gurevitch, M. (1973). Uses and gratifications research. *Public Opin. Q.* 37, 509–523.

Katz, E., Blumler, J. G., and Gurevitch, M. (1974). "Utilization of mass communication by the individual," in *The Uses of Mass Communications: Current Perspectives on Gratifications Research*, eds J. G. Blumler and E. Katz (Thousand Oaks, CA: SAGE Publications), 19–32.

Klobas, J. E., McGill, T. J., Moghavvemi, S., and Paramanathan, T. (2018). Compulsive youTube usage: a comparison of use motivation and personality effects. *Comput. Hum. Behav.* 87, 129–139. doi: 10.1016/j.chb.2018.05.038

Lapolla, K. (2014). The pinterest project: using social media in an undergraduate second year fashion design course at a United States University. *Art Des. Comm. High Educ.* 13, 175–187. doi: 10.1386/adch.13.2.175_1

Liu, I. L., Cheung, C. M., and Lee, M. K. (2016). User satisfaction with microblogging: information dissemination versus social networking. *J. Assoc. Inf. Sci. Technol.* 67, 56–70. doi: 10.1002/asi.23371

Lupton, D. (2014). *"Feeling Better Connected": Academics' Use of Social Media*. Available at: http://www.canberra.edu.au/aboutuc/faculties/arts-design/attachments2/pdf/n-and-mrc/Feeling-Better-Connected-report-final.pdf (accessed June 10, 2014).

Mannino, G., and Caronia, V. (2017). Time, well-being, and happiness: a preliminary explorative study. *World Futures* 73, 318–333. doi: 10.1080/02604027.2017.1333849

Mannino, G., and Faraci, E. (2017). Morphogenesis of work. application to the psychological well-being and psychosocial health. *Riv. Int. Sci. Soc.* 3, 315–334.

Mannino, G., Montefiori, V., Faraci, E., Pillitteri, R., Iacolino, C., Pellerone, M., et al. (2017). Subjective perception of time: research applied on dynamic psychology. *World Futures* 73, 285–302. doi: 10.1080/02604027.2017.1333850

Menkhoff, T., and Bengtsson, M. L. (2012). Engaging students in higher education through mobile learning: lessons learnt in a Chinese entrepreneurship course. *Educ. Res. Policy Pract.* 11, 225–242. doi: 10.1007/s10671-011-9123-8

Santisi, G., Magnano, P., Platania, S., and Ramaci, T. (2018). Psychological resources, satisfaction, and career identity in the work transition: an outlook on Sicilian college students. *Psychol. Res. Behav. Manag.* 11, 187–195. doi: 10.2147/PRBM.S164745

Senges, M., Brown, J. S., and Rheingold, H. (2008). Entrepreneurial learning in the networked age. how new learning environments foster entrepreneurship and innovation. *Paradigms* 1, 125–140.

Shao, G. (2009). Understanding the appeal of user-generated media: a uses and gratification perspective. *Internet Res.* 19, 7–25. doi: 10.1108/10662240910927795

Sulisworo, D., and Toifur, M. (2016). The role of mobile learning on the learning environment shifting at high school in Indonesia. *Int. J. Mob. Learn. Organ.* 10, 159–170.

Vygotsky, L. S. (1978). *Mind in Society: The Development of Higher Psychological Processes*. Cambridge: Harvard University.

Wang, Q., Woo, H. L., Quek, C. L., Yang, Y., and Liu, M. (2012). Using the facebook group as a learning management system: an exploratory study. *Br. J. Educ. Technol.* 43, 428–438. doi: 10.1111/j.1467-8535.2011.01195.x

Wohn, D. Y., and LaRose, R. (2014). Effects of loneliness and differential usage of facebook on college adjustment of first-year students. *Comput. Educ.* 76, 158–167. doi: 10.1016/j.compedu.2014.03.018

Wu, Y.-C. J., Wu, T., and Li, Y. (2017). Impact of using classroom response systems on students' entrepreneurship learning experience. *Comput. Hum. Behav* 92, 634–645. doi: 10.1016/j.chb.2017.08.013

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Course Design for College Entrepreneurship Education – From Personal Trait Analysis to Operation in Practice

Hsin-Te Wu[1] *and Mu-Yen Chen*[2]*

[1] *Department of Computer Science Information Engineering, National Penghu University of Science and Technology, Magong, Taiwan,* [2] *Department of Information Management, National Taichung University of Science and Technology, Taichung, Taiwan*

Nowadays, many countries are promoting entrepreneurial education or the "innovation, entrepreneurship, and creativity" education. Entrepreneurial education can enhance a nation's economic competitiveness and give rise to new business. At the moment, entrepreneurial courses are mostly designed by school teachers; however, while school teachers may possess business experience, they lack in entrepreneurial experience. Hence, entrepreneurial education courses call for experts with entrepreneurial experience to contribute to course designs and assist with course teachings. Entrepreneurial education not only improves a student's entrepreneurial skills, but also enables each student to explore their personal characteristics in order to advance the collaboration efficacy of the team as a whole. This study asked six experts with entrepreneurial experience in the information industry to work with school teachers in course design as well as teaching collaboration. The course design starts with three talk sessions given by professionals who share with students their thoughts and experiences in entrepreneurial products, team organization, fund raising, and profit calculation. Following that, each student is asked to share their own thoughts on entrepreneurial products and start searching for team members and planning their project. During the course, each team receives six individual advising sessions from the professionals, with topics ranging from product modeling, feasibility, product market estimation, fundraising methods, and profit calculation. The experts also provide each team member with personal trait analysis. Last but not least, the course invites five management-level industry professionals to play the role of venture capital investor, and evaluate each team's product modeling based on their presentation. This study reviews the grades given by the experts as well as the evaluations given by the three industry managers to assess whether the entrepreneurial education course's student entrepreneur teams satisfy the industry's expectations.

Keywords: entrepreneurial education, entrepreneurial development, entrepreneurship and innovation management, innovation, personal trait analysis

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Marinella Coco,
Università degli Studi di Catania, Italy
Adamantios Koumpis,
University of Passau, Germany

***Correspondence:**
Mu-Yen Chen
mychen@nutc.edu.tw;
mychen.academy@gmail.com

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INTRODUCTION

The modern technology industry is in rapid development and often demands sizable financial input toward product development; among them, many successful stories started in campuses with students forming teams and taking up entrepreneurial activities (Jones and Liu, 2017), notably Microsoft and Google. Information technology (IT) products require great amount of funding for the development and marketing processes; however, students can hardly meet such financial demand, which is why they often rely on venture capital from private firms or crowdfunding. Pebble Watch is among one of such examples. In the past, school education focused on fostering students' professional skills or academic capabilities (Medina et al., 2018), and students had no access to entrepreneurial training. As the world grows more competitive, firms that in the past constituted mainly of field-specific professionals are nowadays in need of employees that not only have professional skills but also possess entrepreneurial talent (Troudt et al., 2017). Meanwhile, given the Information Age's rapid growth, schools should help students develop teamwork and communication skills so as to satisfy the needs of their future career positions.

Entrepreneurial education was the main topic of concern in the European Commission's, 2012 developmental policies (European Commission, 2012). Application of entrepreneurial concepts can help resolve issues of resource allocation in certain underprivileged areas as well as improve unemployment rates. Moreover, applying entrepreneurial concepts can help make aspects of our daily lives or the city we live in more innovative, such as art, automobile, and quality of life. After being trained through the entrepreneurial education program, workers will be able to come up with more innovative ideas at their jobs, and this will bring room for change for our society – which is also one of the "renaissance of entrepreneurship" goals set by the European Commission (Council of the European Union, 2014). Currently, many colleges across different nations have included entrepreneurial education in their curriculum. The design and teaching of such courses call for joint participation from experienced entrepreneurs. On one hand, the businessmen can fulfill their societal responsibilities (Elena and Timo, 2015; Lindner, 2018). On the other hand, while school teachers may have professional skills and industry experiences, they lack in entrepreneurial experience; hence, they need the joint effort of businessmen with entrepreneurial experience to help them with teaching. Incorporating entrepreneurial education into courses can motivate the students' entrepreneurial spirits and cultivate a spirit of societal responsibility (Mehta et al., 2018). In an startup team, each member has a role to play. The entrepreneurial course not only teaches students entrepreneurial capabilities but also explores their potentials and personal traits and then trains them accordingly (Neumeyer and McKenna, 2018). Students can learn about the roles they play in the team as well as their own potentials and strong suits, and the course's training enhances their ability to deal with challenges in their future careers.

This study aims at investigating how the proposed entrepreneurial course is received within the industry and whether it is helpful toward students in helping them explore their personal traits. Additionally, the study conducts a course design satisfaction analysis using questionnaires. The proposed course was designed by school teachers and experts with entrepreneurial experiences. Experts share their entrepreneurial journey during three talk sessions, during which students can start to entertain their own startup ideas and analyze traits they want to look for in team members. Following that, the school teachers will ask the students to prepare presentations and assemble a team. The experienced experts are invited to serve as co-advisors for the students by taking turns in teaching each team all the steps along the way. Finally, the experts are asked to grade each team's project. The effect of the proposed course design is verified by taking a look at the students' project results: the study compares the grades given by the experienced experts during each advising session with the overall grades at the end of the term to assess whether each team's startup success rate is believable. The tools used for verification is statistical product and service solutions (SPSS). SPSS is used to analyze the composite reliability aspect while course evaluation forms can help assess the students' reception toward the overall course arrangement. Analysis results suggest that by working with experts in the industry, students receive better training in the entrepreneurial course and gain recognition from business enterprises.

Problems of Research

After unemployment rates skyrocketed following the global financial crisis, many youngsters began dreaming of starting their own business. According to Hsiao (2016), the success rate of youngsters starting their own business is 10%, and the biggest obstacle in their entrepreneurial attempt lies in financial funding – something that can crush their dreams altogether. Even with the most ambitious entrepreneurial intentions, the youth may not success, and the biggest reason is their lack of training in entrepreneurship-related courses (Li and Yang, 2011). Therefore, many universities have started offering entrepreneurial courses to educate their students in entrepreneurial knowledge. It is most fitting for universities to incorporate entrepreneurial education into their curriculum because since the goal of universities is to cultivate professional skills and academic capabilities, adding entrepreneurial professionalism would go a long way in helping students create new career opportunities. When incorporating entrepreneurial education into the curriculum, universities must take note of their teaching approach and course design (Strachan, 2018). The practices of entrepreneurial education must fall in line with the Education for Sustainable Development (UNESCO, 2016) in order to adhere to the educational goal set by the United Nations. College courses should move from the classroom teaching approach of the past toward diversified approaches. In the past, college education focused on fostering professional skills; nowadays, it must incorporate entrepreneurial education. Nevertheless, problems may arise in four aspects: (1) unreasonable course design; (2) lack of entrepreneurial experience in teachers; (3) entrepreneurial education teaching approach; and (4) inadequate structural planning in the entrepreneurial education system (Weiming et al., 2016).

Aside from teaching students how to start a business, entrepreneurial education also explores the students' intentions for entrepreneurship. In Hamidi et al. (2008), industry experts share entrepreneurial experiences with students, and their experiment results suggest that entrepreneurial training can enhance entrepreneurial intention in students. Johansen (2014) examined the relationship between the student's academic performance and entrepreneurship and concluded that the two factors were irrelevant to each other. Meanwhile, Neumeyer and McKenna (2018) utilized entrepreneurial education to teach students about the importance of division of labor in teamwork so as to elevate their personal skills and abilities in the role the play in the team. Edokpolor and Somorin (2017) illustrated that entrepreneurial education needs to cultivate talents that demonstrate competence in entrepreneurship, productivity, ability to innovate, analytical skills, proactivity, and interpersonal relationship abilities. Given the above, entrepreneurial education requires a series of courses to develop the student's personal traits.

Seikkula-Leino et al. (2015) mentions 30 partners in a school that worked together toward providing entrepreneurial environment and courses for their entrepreneurial education, and their teaching strategies were widely praised. In Lahn (2016), students were sent to work as interns at business firms and learn about entrepreneurship through the experience while in Nielsen and Stovang (2015), entrepreneurial education took the form of "about," "for," "through," and "embedded" so as to enable students to gain entrepreneurial skills. On the other hand Karimi et al. (2016), discusses entrepreneurship and entrepreneurial opportunities. It talks about how to train students not only in entrepreneurship but also in creating entrepreneurial opportunities for themselves. Moreover, it instructs students on how to go from brainstorming to conceptualizing their startup ideas, increasing their chances of realizing such ideas. By contrast, Baschiera et al. (2018) discuss how today's educators lack entrepreneurial capabilities and thus need input and collaboration from industry businessmen to help better the students' entrepreneurial skills. On this note, Belitski (2016) argues that students' entrepreneurial skills can only be nurtured through the collaborative work between the university, the industry, and the government. Duval-Couetil et al. (2014) collected demographic characteristics to analyze the students' entrepreneurial intentions. Riese (2013) sent students to small-sized companies to intern and start their own business, gaining actual, hands-on experience in entrepreneurship. Rossano et al. (2016) incorporated problem-based learning (PBL) with entrepreneurial education – teachers who used to play the part of simply passing on knowledge must now take on the role of guiding students in team learning. Duval-Couetil et al. (2016) notes that, in an era of swift technological development, engineering majors may find entrepreneurial opportunities more easily if they also partake in entrepreneurial courses. The entrepreneurial courses are conducted in an experiential manner and elevates the students' entrepreneurial skills.

Research Focus

This study incorporated entrepreneurial education into the course; however, it ran into the following problems: (1) While many college professors have experience working in the industry, they seldom have entrepreneurial experience. (2) College professors are dedicated toward teaching academic or professional subjects, and they lack in teaching entrepreneurial courses. (3) College professors do not have access to entrepreneurial resources and, as a result, cannot provide students with the funds or funding approaches in their entrepreneurship. (4) Entrepreneurial courses should not only teach entrepreneurial skills but also allow students to learn about their personal traits in teamwork. The proposed course design has the following purposes: (1) Having industry experts with entrepreneurial experience join in planning the coursework makes the course more comprehensive. (2) Allowing expert instructors to focus on entrepreneurial teaching while college professors focus on academic and professional subjects allows students to enjoy all-around learning about entrepreneurship and realize product development. (3) Introducing industry experts to the classroom gives the students a chance to learn all about fund raising; meanwhile, the expert instructors are invited to grade the startup teams' projects at the end of the term, increasing chances of collaboration between the students and the businesses. (4) Instructors will offer reviews to each team during each stage of the course, allowing individual students to understand their own traits better.

MATERIALS AND METHODS

The proposed method invites experts in the professional field to cohost the courses. This not only offers students a chance to improve their hands-on entrepreneurial skills but also allows them to make further contact with the business industry and perhaps gain access to business resources. Likewise, college professors can benefit by gaining entrepreneurial experience. This section provides an elaboration of the overall course design, collaboration approach with industry experts, the student teams' grading method, and the business firms' grading method.

The Overall Course Design

The proposed entrepreneurial course's course planning procedure is shown in **Figure 1**. The course invites industry experts with entrepreneurial experience to join in planning the course. Most students who take this course are computer science majors; the industry experts mostly have some background in computer science. There will be three entrepreneurship talk sessions that hope to help students understand the entrepreneurial process and cultivate the necessary skills needed during the process of starting a business. After the talk session, students will begin to look for their teammates and start conceptualizing their product as well as prepare PowerPoint presentations. Next, the industry experts will offer adjustment advice to each team based on their division of labor and product presentation. The expert instructors will regularly provide guidance and grade reviews; meanwhile, the role of the college professors is to advise on the technical aspect. Moreover, during the time of the industry experts' participation, college professors can listen, and learn about entrepreneurial experiences to

FIGURE 1 | Execution procedure of the entrepreneurial course.

facilitate their future promotion of related courses. Each time the industry expert advises on the teams, they will give concrete advice and scores to the team's labor of division, which the college professors may then utilize to have the teams make adjustment. Additionally, the received advice can make college professors aware of each student's strengths and weaknesses so as to offer further guidance to fortify each student's specialty in the team. After the students devise the product modeling, the experts will give each team a grade based on the model and offer subsequent funding or resource information. The industry expert grading mechanism gives the business enterprises a chance to know each startup team and even match them up.

Industry Expert Collaboration Approach

For the course design of the proposed entrepreneurial course, college professors invite industry experts with entrepreneurial experience to jointly plan and design the coursework. In this study, six industry experts took part in the course design following this procedure:

(1) Three entrepreneurship talk sessions were offered. The first talk session focused on entrepreneurial concepts, the second focused on entrepreneurial skills, and the third one discussed startup funding.
(2) The industry experts conducted six individual advising sessions for each team. Each expert advised teams separately so that the students could learn about actual entrepreneurial process from their team's presentation and product modeling. On the other hand, the experts could correct the students' mistakes during the process and improve their entrepreneurial process.
(3) The college professors learned about entrepreneurial skills and concepts during the course, which compensated their ability to teach entrepreneurial courses. In the future, when they offer related courses, they will be able to design, and teach a course by themselves.

Each talk session lasted for 3 h. The first session, a talk on entrepreneurial concepts, focused on discussing entrepreneurial risks and entrepreneurial concepts to teach students that entrepreneurship requires more than technical skills – it involves innovation, creativity, and feasibility. While the first talk offered students entrepreneurial concepts, the second talk advised them on product positioning. It taught them how to analyze the product's target market, the product's advantages, demands, and profit calculation. The third talk involved startup funding, which mostly concerned presentation, funding, and venture capital concepts, teaching students how to obtain startup funds through fundraising or venture capital investments.

Each industry expert took turn in counseling the student teams, advising them on aspects such as the product itself, market positioning, and product advantage. They also offered comments on each team members role in the team to teach students about hands-on entrepreneurial skills and abilities. The college professors, who lack in entrepreneurial experience, could utilize their participation in the course to absorb entrepreneurial experience, and which would become helpful toward when they offer related courses in the future. Ideally, the college professors will be able to work alone in setting up course design and teaching the course.

Student Grading Mechanism

During the proposed entrepreneurial course, the industry experts take turns in giving each student team counseling sessions and grading reports, as shown in **Table 1**. The experts will give grades during each of the advising sessions; the grading criteria was decided by the six industry experts after some discussion. The first parameter is target market planning, which assesses the startup team's product market share. This parameter helps investors understand the product's future developments. The second parameter is product feasibility, which concerns the product's realization. It prevents the product from being too unrealistic or impractical and assesses whether the conceptualization is

TABLE 1 | Grade report form for industry experts.

Parameter / team	Target market planning (20%)	Product feasibility (25%)	Product profit calculation (20%)	Team performance (20%)	Financial planning (15%)	Total score
Comments						

TABLE 2 | Grade report form for management-level industry professionals.

Parameter / team	Target market planning and competitiveness (25%)	Product feasibility and marketing strategies (25%)	Business model and financial planning (25%)	Team performance (25%)	Total score
Comments					

reasonable. The third parameter is profit calculation. The team is asked to analyze the expected return on investment (ROI) of the product after its launch into the market. The fourth parameter is team performance. This is an evaluation of each team member's role in their teamwork, including each member's execution progress. Last but not least, the fifth parameter concerns financial planning. It evaluates the funds needed for the team's product as well as how reasonable the team is with its use of funds during business operation. Finally, in the "comment" section, the industry experts offer variegated opinions. They will also point out any mistakes during the team's presentation to allow students to improve their entrepreneurial and personal abilities from hands-on operations. The college professors can take the report from each expert counseling session and ask students to make adjustments accordingly. Each report is also passed on to the next expert advisor; in this way, the industry expert can not only have a grasp of each team's issues from the previous time, but they can also follow up on the progress. The proposed entrepreneurial course also established industry expert chat groups on social media websites to help them closely monitor and discuss the student teams' progress.

Business Firm Grading Mechanism

This course invited three management-level industry professionals to grade the team's venture capital projects with the grading report shown in **Table 2**. The business firm grading mechanism focuses on reviews from business investors. For instance, for the first parameter of target market planning and competitiveness, the firm will take into consideration the product's feasibility, and competitiveness in a real market. The second parameter concerns product feasibility and marketing strategies. This takes into consideration the product's viability and its future marketing strategies for the market. Even if a product is feasible, the marketing of the product may be even more labor- and fund-consuming, which is why the startup team must address their marketing strategies. The third parameter is business model and financial planning, which mainly serves to help investors understand the startup team's future business model as well as their financial planning. The team must also address their product's expected ROI, and the business professionals will evaluate whether the startup team's financial plans are reasonable and how they fare in the product's ROI. The fourth parameter is team performance, in which the business professionals evaluate each team's professionalism, and their performance across different aspects. Team performance is also the highlight of the whole startup project. Lastly, the business professionals offer advice after listening to each team's presentation and Q&A session. They also include their comments in the grade reports.

RESULTS

This section includes two subsections: grade report results and discussion.

Grading Result Analysis

This study utilized the statistical analysis software – statistical package for social science (SPSS) – to run analysis of variance on the grades given to the students by the industry experts

TABLE 3 | *Z*-score statistics of the grades given by the industry experts.

Student team	Mean	Standard deviation	*Z*-Score
1	63.28	7.56	−1.89
2	76.38	5.62	0.16
3	70.73	4.68	−0.78
4	83.83	5.24	−0.71
5	86.23	4.98	−0.35
6	53.54	11.29	−0.49
7	87.86	3.10	−0.28
8	59.75	8.70	−1.37
9	84.38	5.00	−0.87
10	62.69	5.20	−1.08
11	64.33	7.88	−0.52
12	52.42	17.79	−0.67

TABLE 4 | *Z*-score statistics of the grades given by each industry expert.

Industry expert	Mean	*Z*-Score
1	64.89	−1.03
2	70.96	0.09
3	63.15	−1.36
4	72.46	0.37
5	76.83	1.18
6	74.43	0.74

TABLE 5 | *Z*-score statistics of the grades given by the business professionals.

Student team	Mean	Standard deviation	*Z*-score
1	65.50	4.38	−0.97
2	71.92	2.70	−0.43
3	73.67	4.37	−0.27
4	86.00	3.88	−0.97
5	88.08	2.01	−1.04
6	67.42	6.52	−1.14
7	88.33	2.89	0.58
8	61.08	10.17	−1.09
9	87.92	1.84	−0.77
10	67.58	6.71	−1.13
11	70.58	1.46	−0.74
12	64.92	5.00	−0.98

TABLE 6 | *Z*-score statistics of the grades given by each business professional.

Business professional	Mean	*Z*-score
1	70.73	−1.15
2	76.67	0.70
3	75.85	0.45

and business professionals. The course given in this study was titled "Internet of Things Design Course;" a total of 38 students enrolled in the course and were subsequently divided into 12 teams to undergo entrepreneurial training. The study employed the distribution-free statistical method in determining the reliability of grades. The *z*-score was used to assess whether the industry experts and business professionals agree on the grades to each team. **Table 3** is a *z*-score analysis of the six industry experts' grades toward the twelve student teams while **Table 4** is a calculation of whether there is significant variance between grades offered by different industry experts. Both the *z*-score of **Tables 3**, **4** fall in the confidence interval between −2 and +2, indicating that the industry experts gave consistent grades to each team. Meanwhile, **Table 5** is a *z*-score analysis of the three business professionals' grades toward the twelve student teams while **Table 6** is a calculation of whether there is significant variance between grades offered by different business professionals. It is seen from **Tables 5**, **6** that both of their *z*-score fall in the confidence interval between −2 and +2, indicating that the business professionals offered consistent grades to each team. It can be concluded from **Tables 3**–**6** that all the industry experts and business professionals offered consistent grades to the students' startup products. If multiple industry experts and instructors offer positive feedback, then this means that the product proposed by the entrepreneurial team is feasible and applicable in the real-world industry. This study's proposed method allows entrepreneurial education to be realized in a college curriculum; the course approach can effectively integrate professional skills with entrepreneurship. Entrepreneurial education can enhance students' motivation toward learning the courses; as shown in **Table 7**, students showed a satisfaction rate of 4.39. By having business experts and college professors to jointly offer the course helps students as well as the professors to improve their professional abilities and entrepreneurial experiences; moreover, it achieves the goal of encouraging/realizing industry-academy cooperation as well as bridging the gap between theory and practice.

DISCUSSION

The proposed entrepreneurial course employed the approach of inviting industry experts to join in course design and teaching. This helps students understand current entrepreneurial skills and industry resources. The proposed scheme aims at enriching

TABLE 7 | Teaching evaluation of the entrepreneurial education course.

Question number	Question	Average
The instructor's teaching techniques (0–5, 5 being the highest score)		4.43
01	The instructor was able to provide a comprehensive syllabus (including teaching goals, progress, and grading criteria)	4.41
02	The instructor's teaching contents were organized and focused	4.44
03	The instructor demonstrated professional knowledge in the subject taught	4.44
04	The instructor was well prepared	4.46
05	The instructor was enthusiastic and dedicated toward teaching	4.44
06	The instructor was never late or absent to class or modified class schedule with no good reason	4.41
07	The instructor was able to motivate the student's learning interests	4.44
08	The instructor's lectures were clear and cohesive in a way that was easy to understand	4.41
09	The instructor gave tests that evaluated the students in an effective manner	4.39
10	The instructor graded students in an objective and fair manner	4.41
The student's self-evaluation (0–5, 5 being the highest score)		4.37
11	I believe that the course was offered with great teaching quality	4.39
12	I am satisfied at the instructor's teaching during the course	4.34
13	I feel like I learned a lot from taking the course	4.37
14	I would recommend this course to my junior classmates	4.37
Overall average score		4.4

the professors' experiences in entrepreneurial courses while also cultivating the students' entrepreneurial abilities. Entrepreneurial education has become an educational goal in many different countries. The purpose of inviting industry experts to join in course design and teaching is to elevate the course's practicality; meanwhile, having multiple industry experts jointly offer a course broadens the students' scope of learning experience. Having different instructors assess and grade the products of the entrepreneurial teams also raises the reliability of such gradings. Finally, the study invited several management-level business professionals to give the entrepreneurial teams an overall grading, the goal of which was to utilize the perspective of these management-level professionals to assess the success rate of such entrepreneurial products. Last but not least, the experiment results served to verify whether the course design did indeed meet the demands of management-level professionals in the industry. The purpose of bringing industry professionals into the project is to create collaboration between business experts and entrepreneurial teams so that the entrepreneurial teams in the course may genuinely create a product and truly realize the process of entrepreneurship.

CONCLUSION

The proposed entrepreneurial course was jointly designed by college professors and industry experts. The course devised three entrepreneurship talk session to teach share with students experiences in entrepreneurial skills and resources. The industry experts were in charge of teaching entrepreneurial skills while the college professors were in charge of cultivating technically professional skills; finally, the business professionals took upon the task of grading each team's product, allowing students to learn about the entrepreneurial process as well as their product's strengths, and weaknesses while also elevating their entrepreneurial capabilities and professional competitiveness. The proposed entrepreneurial education course can achieve the following goals: (1) enrich college professors' experiences with entrepreneurial education; (2) incorporate industry resources and bridge the gap between theory and practice; (3) jointly design the course with the industry to ensure cultivation of talents needed in the real-world industry; (4) raise the entrepreneurial teams' success rate by having both the instructors and management-level business professionals offer their assessment; and (5) encourage and facilitate industry-academy cooperation opportunities by inviting industry professionals to jointly offer the course. The proposed procedure offers a break-through from past traditional teaching approaches by having both business experts and management-level professionals teach and grade the students, all the while offering entrepreneurial experiences and resources that can help improve the chances of success for the entrepreneurial teams.

ETHICS STATEMENT

An ethics approval was not required as per applicable institutional and national guidelines and regulations. The informed consent of the participants was implied through participation.

AUTHOR CONTRIBUTIONS

H-TW presented the research topic and concept, and designed and implemented the experiments. M-YC surveyed the literatures and research methodologies, finished the experimental process, and discussed the experimental results.

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REFERENCES

Baschiera, B., Santini, S., and Socci, M. (2018). Intergenerational entrepreneurship education: older entrepreneurs reducing youngsters' social and work disengagement. *Probl. Educ. 21st Century* 76, 7–20.

Belitski, M. (2016). *Expanding Entrepreneurship Education Ecosystems*, Vol. 36. Bingley: Emerald Publishing Limited, 163–177.

Council of the European Union (2014). *Education, Youth, Culture and Sport Council Meeting, "Council Conclusions on Entrepreneurship in Education and Training"*. Romania: Council of the European Union.

Duval-Couetil, N., Gotch, C. M., and Yi, S. (2014). The characteristics and motivations of contemporary entrepreneurship students. *J. Educ. Bus.* 89, 441–449. doi: 10.1080/08832323.2014.933156

Duval-Couetil, N., Shartrand, A., and Reed, T. (2016). The role of entrepreneurship program models and experiential activities on engineering student outcomes. *Adv. Eng. Educ.* 5:27.

Edokpolor, J., and Somorin, K. (2017). Entrepreneurship education programme and its influence in developing entrepreneurship key competencies among undergraduate students. *Probl. Educ. 21st Century* 75, 144–156.

Elena, R., and Timo, P. (2015). Entrepreneurship education in schools: empirical evidence on the teacher's role. *J. Educ. Res.* 108, 236–249. doi: 10.1080/00220671.2013.878301

European Commission (2012). *Education, and Training, "Rethinking Education: Investing in Skills for Better Socio-Economic Outcomes"*. Brussels: European Commission.

Hamidi, Y. D., Wennberg, K., and Berglund, H. (2008). Creativity in entrepreneurship education. *J. Small Bus. Enterp. Dev.* 15, 304–320.

Hsiao, H.-L. (2016). "A study of seccess factors for youth micro-enterprise," in *Proceedings of the International Conference on Leisure, Hospitality, and Tourism Education, 2016* (Tagbilaran).

Johansen, V. (2014). Entrepreneurship education and academic performance. *Scand. J. Educ. Res.* 58, 300–314. doi: 10.1080/00313831.2012.726642

Jones, C. G., and Liu, D. (2017). Approaches to incorporating it entrepreneurship into the information systems curriculum. *J. Inform. Syst. Educ.* 28, 43–57.

Karimi, S., Biemans, H. J. A., Lans, T., Aazami, M., and Mulder, M. (2016). Fostering students' competence in identifying business opportunities in entrepreneurship education. *Innov. Educ. Teach. Int.* 53, 215–229. doi: 10.1080/14703297.2014.993419

Lahn, L. C. (2016). *Entrepreneurship Education by Design*, Vol. 58. Bingley: Emerald Group Publishing Limited, 684–699.

Li, T., and Yang, M.-L. (2011). *The Effects of Government Policy, Entrepreneurship Education and Social Capital on Entrepreneurial Intention – Entrepreneurial Attitude as a Mediator*. Master's thesis. Kaohsiung: National Kaohsiung University of Science and Technology.

Lindner, J. (2018). Entrepreneurship education for a sustainable future. *Discourse Commun. Sustain. Educ.* 9, 115–127. doi: 10.2478/dcse-2018-0009

Medina, O. L., Fernandez-Ahumada, E., Lara-Velez, P., Garrido-Varo, A., Perez-Marin, D., and Guerrero-Ginel, J. E. (2018). Assessing an entrepreneurship education project in engineering studies by means of participatory techniques. *Adv. Eng. Educ.* 6:n2.

Mehta, K., Zappe, S., Brannon, M. L., and Zhao, Y. (2018). An educational and entrepreneurial ecosystem to actualize technology-based social ventures. *Adv. Eng. Educ.* 5:38.

Neumeyer, X., and McKenna, A. (2018). Entrepreneurial thinking in interdisciplinary student teams. *Adv. Eng. Educ.* 5:20.

Nielsen, S. L., and Stovang, P. (2015). *DesUni: University Entrepreneurship Education Through Design Thinking*, Vol. 57. Bingley: Emerald Group Publishing Limited, 977–991.

Riese, H. (2013). Enacting entrepreneurship education: the interaction of personal and professional interests in mini-enterprises. *J. Educ. Work* 26, 453–471.

Rossano, S., Meerman, A., Kesting, T., and Baaken, T. (2016). The relevance of problem-based learning for policy development in university-business cooperation. *Eur. J. Educ.* 51, 40–55. doi: 10.1111/ejed.12165

Seikkula-Leino, J., Satuvuori, T., Ruskovaara, E., and Hannula, H. (2015). *How Do Finnish Teacher Educators Implement Entrepreneurship Education?* Vol. 57. Bingley: Emerald Group Publishing Limited, 392–404.

Strachan, G. (2018). Can education for sustainable development change entrepreneurship education to deliver a sustainable future? *Discourse Commun. Sustain. Educ.* 9, 36–49. doi: 10.2478/dcse-2018-0003

Troudt, E. E., Schulman, S. A., and Winkler, C. (2017). "An evolving entrepreneurship simulation as a vehicle for career and technical education," *Preparing a STEM Workforce through Career-Technical Education*, eds D. J. Smith and S. Starobin (San Francisco, CA: Jossey-Bass), 35–44. doi: 10.1002/cc.20251

UNESCO (2016). *Office in Brasilia, "Education 2030: Incheon Declaration and Framework for Action in Portuguese*. Paris: United Nations Educational, Scientific and Cultural Organization.

Weiming, L., Chunyan, L., and Xiaohua, D. (2016). Ten years of entrepreneurship education at chinese universities: evolution, problems, and system building. *Chin. Educ. Soc.* 49, 198–216. doi: 10.1080/10611932.2016.1218250

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What Entrepreneurial Followers at the Start-Up Stage Need From Entrepreneurship Cultivation: Evidence From Western China

Xuefan Dong[1†], Chengxiang Tang[2†], Ying Lian[1] and Daisheng Tang[1]*

[1] School of Economics and Management, Beijing Jiaotong University, Beijing, China, [2] School of Public Administration, Guangzhou University, Guangzhou, China

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***Correspondence:**
Daisheng Tang
dstang@bjtu.edu.cn

[†] These authors have contributed equally to this work

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Entrepreneurial followers are defined as the crucial members of a specific entrepreneurial team and do not include the leader or normal employees in the present paper. This population can be viewed as indispensable factors in the success of entrepreneurship, especially in the start-up stage. In addition, according to the following time, they can be divided into two groups, namely long-term entrepreneurial followers and short-term entrepreneurial followers. However, studies focusing on entrepreneurship cultivation for entrepreneurial followers are relatively few. The main purpose of this paper is to determine the needs of Chinese entrepreneurial followers in entrepreneurship cultivation from the early stage of entrepreneurship. In this paper, a sample of 200 long-term entrepreneurial followers from Tianfu New Area in China was investigated. To enable the researchers to explore the unique opinions of entrepreneurial followers, a mixed data collection approach that combined interviews and questionnaires was chosen in this study. The results revealed following findings: (a) high levels of social capital, good entrepreneurial opportunities and projects, and highly cooperative teams were viewed as the most important factors for entrepreneurship by entrepreneurial followers in China; (b) most entrepreneurial followers believed that the primary difficulty in the cultivation process was the inefficiency in talent training mechanism; and (c) nearly 40% of samples suggested that the cultivation and enhancement of local talents should be firstly carried out by the Chinese government, indicating a gap between the supporting force for local and returned talents in China. In addition, various types of incentive policies and good environments for talent growth were also considered as important suggestions by entrepreneurial followers. We found that unlike entrepreneurial leaders, entrepreneurial followers focus more on income expectation, and personal development rather than supporting the development of companies in China. These findings should be viewed as priorities when enhancing current entrepreneurship cultivation in China.

Keywords: entrepreneurship, entrepreneurial follower, entrepreneurship cultivation, start-up stage, Western China

INTRODUCTION

Entrepreneurship has attracted the attention of policymakers, economists, and scholars around the world. In general, entrepreneurship can be defined as an employment opportunity enabling individuals to be self-employed (Matlay, 2013). During the whole process of entrepreneurship, the problem in the start-up stage is the biggest obstacle facing entrepreneurs (Raposo and Do, 2011), because start-up companies have only two options: either it fails, and it dies (Villéger, 2018). Previous studies have confirmed the important role played by entrepreneurs in entrepreneurship (Shane and Venkataraman, 2000). This increased interest has led to a growing body of research that has attempted to identify the factors of entrepreneurs that can be promoted by its cultivation. It is generally accepted by policymakers and scholars that high levels of entrepreneurship can be achieved through cultivation. This assumption proves that entrepreneurs' abilities can be cultivated and are not fixed personal features (Oosterbeek et al., 2010). However, as far as our knowledge goes, studies regarding the cultivation of entrepreneurs only considered the financial (Elston and Audretsch, 2010; Román et al., 2013) and political (Peng et al., 2014) aspects. Thus, they could not provide a comprehensive investigation that focused on the real situations of entrepreneurs during start-up stage, the most difficult and momentous period. Additionally, as Pittaway and Cope (2016) pointed out, the empirical evidence does not often offer conclusive support in this field.

Moreover, existing studies also suggested that, despite the important role played by the entrepreneurial leader as a lone hero, their followers also hold influence in promoting the development of entrepreneurship, especially in the early stages (Ensley et al., 2006; Patterson et al., 2008). However, the entrepreneurial follower is not clearly defined yet. In most previous studies related to the leadership area where leader-follower relationship is frequently discussed, the followers are simply regarded as normal employees and only little recent attention has been paid to followership (Ilies et al., 2005; Jensen and Luthans, 2006; Uhl-Bien et al., 2014). As Uhl-Bien et al. (2014) stated that, the main cause for this shortcoming refers to the confusion and misunderstanding about the definition of followership or followers. This problem is even more serious in entrepreneurship research. Although many scholars have implemented empirical studies on various related issues and provided some evidence indirectly supporting the importance of entrepreneurial followers (Beckman and Burton, 2008; Klotz et al., 2014; Jin et al., 2016; Forsström-Tuominen et al., 2017), how to accurately define this special group is still not considered.

Thus, in order to fill this theoretical gap that currently exists in the literature, the present paper aims to propose the definition of entrepreneurial followers. We argued that entrepreneurial followers could be defined as the crucial members (or crucial employees) of a specific entrepreneurial team and do not include the leader or normal employees. They have highly consistent interests or beliefs with leaders and are generally responsible for different important components of entrepreneurial activities. Instead of being simply viewed as the people being led, entrepreneurial followers are precious human resources for entrepreneurship with characteristics of initiative, activeness, enthusiasm, and creativity.

In addition, only a little evidence has been proposed to support the view that there are considerable differences in personal characteristics and expectations between entrepreneurial leaders and followers. As an example, Ensley et al. (2006) stated that compared to the leaders, followers are more likely to lack confidence in their innovation achievements in uncertain environments. Therefore, by regarding 1 of 19 new state-level areas in China that were established upon approval of the State Council—namely, the Tianfu New Area, located in Sichuan Province, this investigation focuses on answering the following question: What do entrepreneurial followers really need in entrepreneurship cultivation at the start-up stage? In total, 3 aspects will be considered in relation to this question: (a) The factors that influence entrepreneurial followers in participating in entrepreneurship activities; (b) the difficulties faced by entrepreneurial followers in early stage entrepreneurship; and (c) suggestions for the improvement of the system of entrepreneurship cultivation at the start-up stage. By taking these three aspects into considerations from entrepreneurial followers' own perspectives, a more comprehensive and precise investigation regarding the cultivation of them at the start-up stage could be provided. Thus, this paper has the potential to address the existing gap in entrepreneurship cultivation, which has been neglected by previous studies.

The present paper is organized as follows. The next section provides a literature review about the topic. The section "Materials and Methods" demonstrates the applied method of this paper. The section "Results" presents the empirical results. The section "Conclusion and Discussion" draw on the main conclusion and implications extracted from the results.

RELATED WORKS

Previous studies indicated that the entrepreneurship is important for social, national, and industrial development (Shane and Venkataraman, 2000; Raposo and Do, 2011; Zhang et al., 2014). For instance, Zhang et al. (2014) stated that entrepreneurship contributes to the incubation of technological innovation, increases economic efficiency, and creates new jobs. Raposo and Do (2011) argued that the improvement of innovation performance and the well-being of citizens are also considerable factors that contributed to a high level of entrepreneurial activity. Shane and Venkataraman (2000) suggested that entrepreneurship is a good way of showing new technical information that is embodied in products and services. In addition, various aspects such as age (Bohlmann et al., 2017), gender (Zampetakis et al., 2017), personality (Vries, 2010; Hu et al., 2018), cognitive style (Kickul et al., 2010), decision-making abilities of entrepreneurs (Liu, 2018), and the optimization of the allocation of entrepreneurial resources (Dunkelberg et al., 2013) are recent research topics found in the literature.

Much evidence to support that entrepreneurship capabilities can be cultivated and are not fixed personal features has

been published in existing research. For instance, Karimi et al. (2016) stated that effective cultivation can foster entrepreneurial competences. In addition, as Sánchez (2011), Chia (2010), and Piperopoulos and Dimov (2014) suggested, despite the knowledge and skills necessary to begin and run a business, the improvement of certain beliefs, values, and attitudes is the main achievement of entrepreneurial cultivation. With respect to these improvements from a cultivation perspective, the governmental influence is frequently considered, especially in relation to educational and industrial policies (Verheul et al., 2002; Sánchez, 2011). Raposo and Do (2011) claimed that policy can affect entrepreneurship in two ways: directly, through special measures, and indirectly, through generic measures. Pittaway and Cope (2016) cited political issues as the first macro level of entrepreneurship cultivation, and they believed that the second macro level should refer to general enterprise infrastructure. To be more specific, these themes can be viewed as the input and output of the domain of entrepreneurship cultivation, respectively.

From a framework perspective, Jamieson (1984) divided entrepreneurship cultivation into 3 categories by considering different types of cultivation—namely, cultivation for enterprise, which aims to educate students on awareness creation from a theoretical perspective; cultivation in enterprise, which focuses on encouraging participants to begin their own business; and the cultivation in enterprise that includes but is not limited to training management and business expansion. The first category refers to the level of universities or higher-learning institutions that have attracted the attention of the majority of researchers who focus on entrepreneurship cultivation (e.g., Saboe et al., 2002; Rindova et al., 2012; Galloway and Brown, 2013; Küttim et al., 2014; Din et al., 2016). Such a high level of research interest is mainly due to the general consensus that youths are the most important participants in entrepreneurship; there is a significantly positive relationship between the effectiveness of education programs in universities and learning institutions and youths' intentions of entrepreneurship. Din et al. (2016) stated that many graduates prefer to find positions in public and private sectors with high levels of competitiveness and income rather than becoming entrepreneurs due to their lack of knowledge, awareness, and skills. This is primarily owing to the deficiency of entrepreneurship educational programs in universities. Moreover, some scholars even recommend that entrepreneurship education should be implemented earlier (Sexton and Landström, 2000). In addition, with respect to the third category, the educated population are often small-business owners who have achieved some success. In other words, the point of concern in this category is not whether the entrepreneurs could start a business, but how to run the business more successfully. Therefore, exiting studies related to this aspect could be classified into the area of small-business management (Gorman et al., 1997; Neck and Greene, 2011). However, despite the inspiration that was cultivated in universities and learning institutions and the management capabilities gained in enterprise-training activities, how to carry out the practice in reality is a considerably important point to be discussed, especially at the start-up stage. According to Raposo and Do (2011), this is a typical example of the second category, which refers to the hardest time in the entrepreneurship. In general, start-up companies simply refer to young innovative companies (Zaech and Baldegger, 2017). In this view, the age of companies has been proved to be a widely accepted assessment criterion to judge whether a company is going through the start-up stage (Pellegrino et al., 2012). According to Villéger (2018), the maximum age to define start-up companies varies from 5 to 12 years. Additionally, growth, organizational flexibility, and limited human and finical resources are also typical characteristics of start-up companies that have been identified by existing research (Liao and Welsch, 2003; Peterson et al., 2009).

In addition to the temporal perspective, many scholars have researched entrepreneurship cultivation from a spatial point of view, in which the United States (Worsham and Dees, 2012; Elert et al., 2015; Guo et al., 2016) and the United Kingdom (Matlay, 2009; Henry and Treanor, 2010; Dabic et al., 2016) are frequently discussed. In addition, other developed European countries, such as France (Klapper, 2004; Kövesi, 2017), Germany (Klandt, 2004), and Sweden (Dahlstedt and Fejes, 2017) have also been targeted by existing studies. However, a focus on developing countries, such as China, is relatively low in English-language literature, and if developing countries were discussed, it was mostly in consideration of university students only. For instance, Wu and Wu (2008) investigated the relationship between Chinese university students' higher educational backgrounds and their entrepreneurial intentions. Zhou and Xu (2012) evaluated the state of entrepreneurship education from a student level in China and compared it to the United States. Li et al. (2013) discussed the critical factors in Chinese higher-educational institutions that may shape the directions of entrepreneurship education. Tian et al. (2016) conducted a knowledge map for studies related to entrepreneurship education in China from 2004 to 2013. Xu et al. (2016) reviewed entrepreneurship education in Chinese secondary schools. It is interesting to note that China did not begin any entrepreneurship education programs until 2002, when the Ministry of Education published a pilot project for entrepreneurship education, and the effectiveness of this project is considerable. According to a global entrepreneurship survey, China jumped from eleventh place in 2002 to second place in 2012 in the entrepreneurship composite index rankings of more than 60 countries and regions (Li et al., 2013). Therefore, more in-depth research that targets the development process and current state of Chinese entrepreneurship cultivation is of great significance from a global perspective. Furthermore, as mentioned above, a comprehensive investigation should be implemented, with empirical evidence used to identify useful educational factors that ensure success for entrepreneurs at the start-up stage.

In the view of entrepreneurial followers, some scholars have implemented empirical studies that focus on various related issues (Beckman and Burton, 2008; Jin et al., 2016; Forsström-Tuominen et al., 2017). For instance, Jin et al. (2016) conducted a meta-analysis to investigate the relationship between the composition features of entrepreneurial teams and new venture performance. New venture performance can generally be defined

as the development and growth of companies at the start-up stage (Klotz et al., 2014). Jin et al. (2016) suggested that the individual ability of entrepreneurial followers could contribute to a higher level of new venture performance. Additionally, Forsström-Tuominen et al. (2017) applied a qualitative multiple-case study to analyze the initiation and formation of entrepreneurial teams in the start-up stage, based on individual- and group-interview data from 4 high-tech teams. They found that in addition to economic and technical issues, the various social and psychological aspects, such as collective encouragement, could be viewed as another important impetus to initiate an entrepreneurial team. It seems that to a large extent, there would be no entrepreneurship without a team. This argument emphasizes the significant value of entrepreneurial members in early stage entrepreneurship. However, the definition of entrepreneurial followers still remains unclear. Instead, most existing studies mixed entrepreneurial leaders and followers, especially for those focused on the entrepreneurship cultivation (Dabic et al., 2016; Din et al., 2016). It seems that such a practice is overly broad and inevitably leads to a reduction in pertinence. Therefore, the present paper provided the definition of entrepreneurial follower (see the section "Introduction") in order to identify the main differences between entrepreneurial leaders and followers, and accordingly find the needs of entrepreneurial followers in entrepreneurship cultivation during the start-up stage.

Moreover, according to the following time, we argued that the entrepreneurial followers can be divided into two categories: long-term entrepreneurial followers and short-term entrepreneurial followers. In comparison, the former shows greater loyalty and autonomy, and has more interest or belief foundation with the leaders. In addition, the behaviors of leader are also more likely to be shaped and altered by the former because the long-term closely personal, social and working relationships between them. Many historical examples have proved the importance of long-term entrepreneurial followers for the success of entrepreneurship. As Cooney (2005) stated that, when one considers the success of Apple, Steve Jobs may immediately spring to mind for most people. However, such great success could not be achieved without Steve Wozniak, who invented the model for the first personal computer, or Mike Markkula, who provided access to venture capital. In addition, with respect to the Alibaba Group, a world-famous Chinese company, apart from the personal capacity of Ma Yun, who is the founder and executive chairman, the success at the start-up stage of venturing cannot be separated from the role of his followers, including but not limited to Jianhang Jin, who was responsible for marketing, and Yongming Wu, who provided technical support.

MATERIALS AND METHODS

Study Design

Since the goal of this study is to both "explore" and "measure" the needs of entrepreneurial followers in entrepreneurship cultivation, it not only demands a more qualitative design (Marshall et al., 2015), but also requires a quantitative consideration. Thus, a mixed data collection approach that combined interviews and questionnaires was employed in the present paper to obtain a thorough exploration of the samples' opinions. According to previous studies, through more than one method to collecting data on the same topic can minimize the weaknesses of quantitative and qualitative methodologies in single research investigations and across investigations (Alaiad and Zhou, 2017). It can also give a greater perspective and understanding for interpreting the quantitative results by containing more supplementary qualitative techniques (Pope and Mays, 1995; Venkatesh et al., 2013). In addition, validity or credibility of evaluation findings can be enhanced and the representativeness of the study can be strengthened by using a mixed data collection approach (Ferreira et al., 2019). For example, by using a mixed method that combined an interview and survey, Alaiad and Zhou (2017) comprehensively identified some important concerns of several healthcare patients and medical professionals regarding the adoption of the WSN-Based Smart Home Healthcare Systems (WSN-SHHS). With respect to our study, the application of this mixed data collection approach by considering both qualitative interviews and quantitative questionnaires could help us obtain rich insights into the phenomena of interest, thus providing a more comprehensive and deeper understanding entrepreneurial followers' needs in the entrepreneurship cultivation. In specific, employing qualitative interviews can yield broader and more detailed accounts from samples' own views and beliefs toward the entrepreneurship cultivation that are potentially important to them and allow us to gain access to acquire various underlying mechanisms and reasons behind their perceptions, and the use of quantitative questionnaires was to develop additional more targeted and hierarchical opinions concerning the entrepreneurship cultivation.

Sampling

Our data source is the Tianfu New Area, Chengdu city, Sichuan province, China. Since ancient times, Chengdu was an important center where entrepreneurs gathered. For example, Bing Li, who was a world-famous hydraulic engineer in the Warring States Period, designed the Dujiangyan Irrigation System. The *jiaozi* (a kind of Chinese ancient currency) was also firstly invented in Chengdu during the time of the Northern Song Dynasty, which created the paper currency system that is still in use today. In addition, the receptive and inclusive culture that is rooted in Sichuan province is currently a fundamental characteristic of the Tianfu New Area. Based on recent developments, officials have planned for the construction of the Luxi Chile Valley Technology Innovation and High-Tech Service Function Area in the Tianfu New Area, and the construction of several new parks, such as the Tianfu Haichuang Park and the Tianfu Science and Technology Park, has already begun. Additionally, it has seen the introduction of key national laboratories such as the Industrial Big Data National Engineering Laboratory, which has welcomed many renowned scientific-research universities and institutions, including but not limited to Tsinghua University, Peking University, Beihang University, and the Chengdu Science Research Center of Chinese Academy of Sciences. Moreover,

the Tianfu New Area is the location of many well-known enterprises such as the Chengdu Mengsheng Electronics Limited Company and the China Aerospace Science and Industry Corporation. In recent years, several intellectual property service agencies (represented by Liushen Law Firm) and science and technology financial service agencies (represented by Granite Global Ventures Capital) have successfully settled in the area.

The reason for choosing this area as our data source is because it is 1 of 19 state-level "new" areas in China that was established upon approval of the State Council in October 2014. In 2017, the Tianfu New Area introduced the "Policy Proposals for Accelerating Technological Innovation and Developing High-Tech Services" and the "Implementing Measures for the "Tianfu Elite Program" of the Chengdu Zone of Tianfu New Area." A special fund has also been established, with 1 billion RMB allocated for talent development. Since its launch in 2014, the Tianfu New Area has attracted more than 1,400 innovative enterprises and 14,600 entrepreneurs, including 12 national experts, 21 provincial experts, 2 expert teams, 24 experts chosen by the Chengdu Talent Planning Program, and 9 foreign experts. In addition, entrepreneurship has developed in these areas in a considerably active way. In addition, there is a large number of entrepreneurial teams at different stages of the entrepreneurship process, thus providing a dedicated support for our investigation. We applied the typical probability sampling method to include companies across various industries in this area. The industries included but were not limited to the technology service industry, the information service industry, the business service industry, the cultural and creative industry, and the high-tech manufacturing industry.

Companies from all seven districts (Chengdu Straight Zone, Chengdu High Tech Zone, Shuangliu, Longquanyi, Xinjin, Jianyang, and Meishan) were considered to ensure that the participants included in this study allowed for optimal generalization. By following this rule, based on the typical probability sampling method, 10 companies were selected. According to the sample, the following six points can be noticed: (a) The registered place of all surveyed companies is in Sichuan province; (b) 73.3% of selected companies are in the creation or seed stages; (c) the registration time of 63.3% of companies is 2015, and the others were registered in 2014; (d) the registered capital of 30% of surveyed companies is below 500,000 RMB, 56.7% is between 1 million RMB (including) and 5 million RMB, and 13.3% is more than 10 million RMB; (e) the number of followers in 53.4% of companies is under 10, and it is between 12 and 45 in 40% of the companies; and (f) the asset value of 40% companies is below 1 million RMB, and 26.7% of companies have an asset value of between 1 and 5 million RMB.

As previously mentioned, entrepreneurial followers refer to the crucial members of an entrepreneurial team, aside from the leader and normal employees. In addition, because the long-term entrepreneurial followers generally play a more important role for the development of companies compared to short-terms ones, they have greater significance to be researched, to a large extent. Thus, in the present paper, only the first-generation entrepreneurial followers of these 10 companies who have followed the leaders for a long period of time (long-term entrepreneurial followers) and made significant contributions to the selected companies were considered.

Data Collection

By following Alaiad and Zhou (2017), we began with semi-structured interviews to collect entrepreneurial followers' own perceptions about the entrepreneurial cultivation, and then asked them to select the most appropriate one from the options contained in a structured questionnaire survey (some questions contained in the survey were shown in **Table A1** in the **Appendix**). During the interviewing process, we firstly explained the informed consent at the beginning to make sure that the samples were ensured confidentiality and protection of their privacy. Then, the objective of this study and scenarios to the samples were introduced. In addition, in order to encourage the interviewees to develop contacts and dialogues, a relatively free interview atmosphere was built by beginning with open-ended questions in each interview. A topic guide (see **Table A2** in the **Appendix**) was applied to help interviewers to cover the main points in each interview, and to remain flexible to allow interviewees to introduce different issues of interest to them.

By applying this mixed data collection method, we surveyed and interviewed all of the long-term entrepreneurial followers separately and considered 2 rules for implementing the filtration process of surveys: (a) Ensuring the completeness and validity of the surveys; (b) ensuring industry diversity of the investigated companies. After the data-cleaning procedure, we obtained 200 samples. All of the data obtained from the participants were encrypted to ensure data security.

Data Analyze

Qualitative

Within the process of qualitative data analysis, two researchers (XD and YL) of this paper transformed pronouns and other indexical terms into nominal meanings in order to provide clearer surrounding concepts. Further, these concepts or comments were integrated and categorized based on their central themes by all the researchers of this paper.

Quantitative

The collected quantitative data were analyzed using Stata version 14.0. Firstly, the crossover analyses between the entrepreneurship industry and education levels, and between the number of entrepreneurial followers and the annual revenues of the researched companies were carried out. Subsequently, differences in samples' responses on each question contained in the survey were compared descriptively based on the calculated percentages. The analysis was conducted by XD and YL with review by CT and DT.

Reliability and Validity Test

The reliability test cannot be carried out in our study because the designed survey does not contain scales. In this view, Gikandi et al. (2011) suggested that a mixed approach combing quantitative and qualitative techniques is useful to assess the degree of reliability in questionnaires. Therefore, we implemented the semi-structured interviews to collect qualitative

TABLE 1 | Validity test results of the survey.

KMO and Bartlett test		
KMO measure of sampling adequacy		0.635
Sphericity test of Bartlett	Approximate chi square	4618.551
	df.	105
	Sig.	0.000

data, which could ensure the reliability degree of our survey, to a large extent. Additionally, we also carried out a validity test. The results are shown in **Table 1**. It can be seen that the Kaiser-Meyer-Olkin (KMO) value is larger than 0.5, and the *P* value of Bartlett's sphericity test is less than 0.05. Thus, the validity of the survey can be guaranteed.

RESULTS

Entrepreneurial Followers

The investigated personal characteristics of the entrepreneurial followers include three aspects—namely, age, education level, and the entrepreneurship industry they work in. The descriptive graphs are shown in **Figure 1**. It can be seen that the number of entrepreneurial followers between the age of 30 and 45 years occupy 60.9 percent of the total entrepreneurial followers studied. It can also be seen that there is an inverse U-shape relationship between educational background and entrepreneurship. In addition, we found that new technology industries are more attractive for entrepreneurial followers. A crossover analysis between the entrepreneurship industry and education levels was also implemented. The results are displayed in **Table 2**.

According to **Table 2**, entrepreneurial followers with a doctoral degree in the electronic information technology industry have the maximum frequency, which is 22. In addition, entrepreneurial followers with college degrees have the minimum frequency. Despite other industries, the electronic information technology, biology and new medicine technology, and new material technology industries have high frequencies, which is mainly due to the regional and national policies of recent years. Moreover, according to the investigation results of entrepreneurial industries chosen by entrepreneurial followers, entrepreneurial activities are concentrated in basic research and applied research, while activities such as technology product marketing and technology work management are not universally popular, despite impacting on the development of entrepreneurial followers.

In addition, some indirectly evidence proving the contribution of entrepreneurial followers on the development of entrepreneurial companies has been provide by some existing papers (Ensley et al., 2006; Patterson et al., 2008). In order to further verify this conclusion through real data in China, a crossover analysis between the number of entrepreneurial followers and the annual revenues of the researched companies was implemented, shown in **Table 3** and **Figure 2**. It can be seen that there is a piece-wise increasing function between these two elements; this is particularly noticeable when the number of entrepreneurial followers reached 10 and the marginal revenue of the company then began to accelerate.

The Need for Entrepreneurial Followers at the Start-Up Stage

Factors That Influence Entrepreneurship

In the interview, 11 potential factors that influence entrepreneurship were considered, and we asked the entrepreneurial followers to choose the most important ones. The responding results are shown in **Table 4**.

It can be seen from **Table 4** that only 2.56% of entrepreneurial followers suggested that scientific and technological achievements or patents should be considered as important factors for entrepreneurship. This is due to the fact that, compared to entrepreneurial leaders, followers always have less of a future-focused vision. This finding is in accordance with some previous studies (Hellmann, 2007; McCarthy et al., 2010).

In addition, about 15.38% of followers viewed high levels of social capital, good entrepreneurial opportunities and projects, and highly cooperative teams as vital foundations of entrepreneurship. It seems that entrepreneurial followers believe social capital to be more important than sufficient funds. According to Kim and Aldrich (2005), social capital could be defined as the resources available to people through their social connections. They suggested that social capital is a natural characteristic that plays a preconditioned role in financial support for entrepreneurs. This phenomenon is common in the Chinese *guanxi* (social relationship) network, especially for start-up ventures (Batjargal, 2007). With respect to the high-quality entrepreneurial opportunities and projects, McCarthy et al. (2010) provided some evidence to support the consistency of top-down decision-making techniques through the strict hierarchy of entrepreneurial teams. This results in little room for followers to engage. In other words, it seems that instead of thinking about future plans, entrepreneurial followers are more concerned with how to effectively fulfill the tasks assigned to them by their leaders.

Additionally, our results showed that only 2.56% of followers considered the business operation model an important factor for entrepreneurship; this confirms the proposition suggested by Cooney (2005): That the core idea of entrepreneurship has often been created before the formation of the team. Finally, entrepreneurial followers believe that an effective team can achieve more than one person working alone. As Forsström-Tuominen et al. (2017) stated, teams have greater power in encouraging individuals to exchange ideas and create a much stronger impetus for entrepreneurship that is related to both social and psychological aspects. This could be viewed as central to triggering and initiating entrepreneurship.

Difficulties Faced by Entrepreneurial Followers in the Start-Up Stage

In the interview, we surveyed the potential difficulties faced by entrepreneurial followers in the start-up stage of entrepreneurship. The results are displayed in **Table 5**.

It can be noticed from **Table 5** that 44% of entrepreneurial followers believe that the difficulty in transforming research

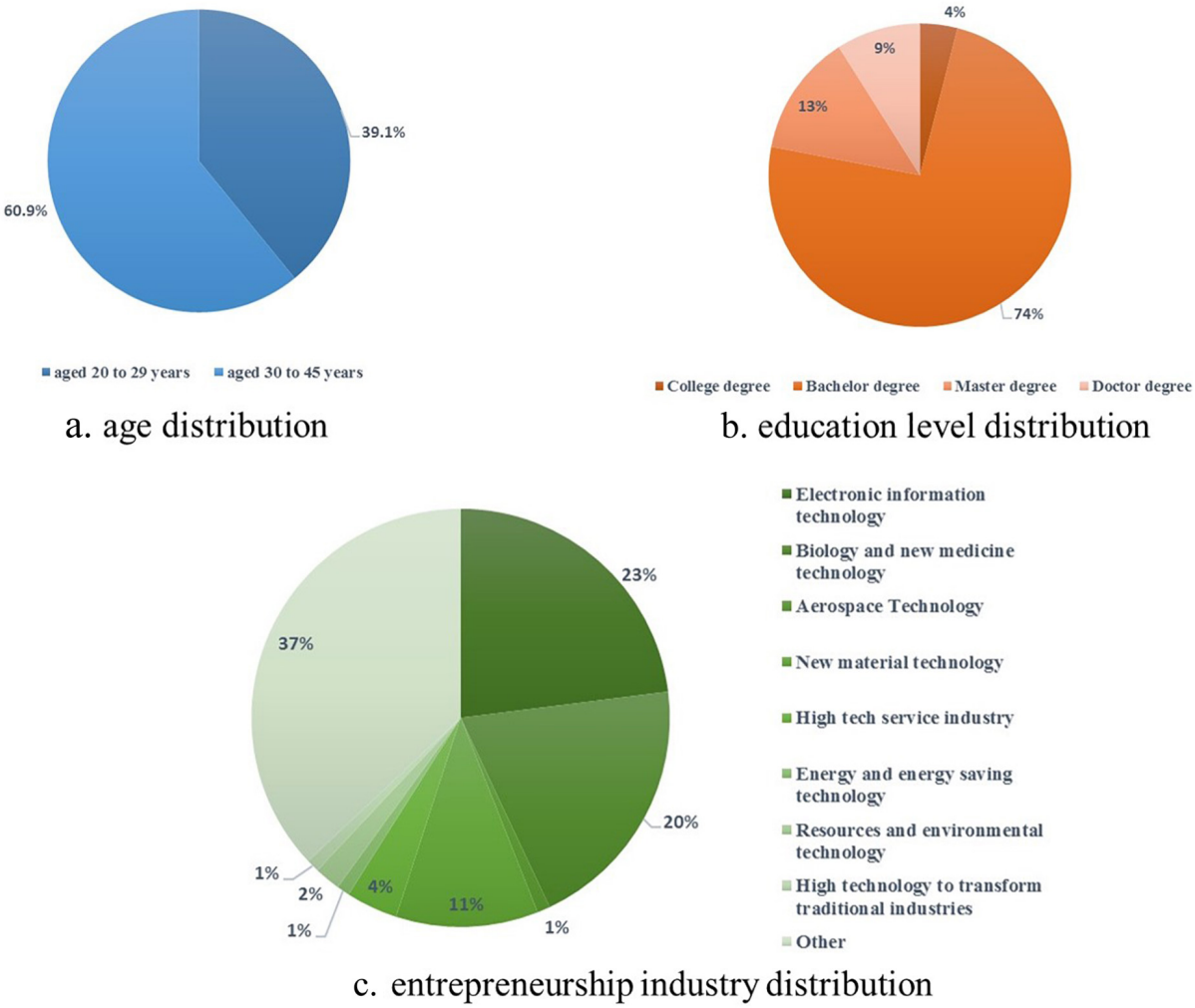

FIGURE 1 | Personal characteristics of samples.

results are urgent problems in entrepreneurship, and 26% suggested that low salaries also present considerable difficulties. These findings indicate that, unlike foreign (Patterson et al., 2008; McCarthy et al., 2010) and Chinese (Wang et al., 2013; Sochett and Daneman, 2014) entrepreneurial leaders, who focus more on entrepreneurial success and enterprise development, entrepreneurial followers focus more on income expectation and personal development. This finding may also directly reflect the main weaknesses in the current Chinese cultivation system for entrepreneurial followers.

In general, the construction of an effective and comprehensive entrepreneurship cultivation system could be viewed as an important factor in attracting more entrepreneurship teams and fostering more successful entrepreneurial firms. Thus, it is necessary to accurately understand the existing problems, which should be solved in a targeted manner. Despite the valuable findings that focus on the improvement of entrepreneurship cultivation for entrepreneurial leaders (e.g., Okudan and Rzasa, 2006; Mckonesweet et al., 2011) and entrepreneurs as a whole (e.g., Rasmussen and Sørheim, 2006; Henry and Treanor, 2010; Graevenitz et al., 2010; Li et al., 2013; Tian et al., 2016), the number of studies related to entrepreneurial followers seems to be much fewer. However, the abilities of followers and the introduction of more followers with high abilities are also indispensable elements that determine the success of entrepreneurship. Therefore, we surveyed the interviewees regarding the difficulties of the cultivation mechanism system during the early stages of entrepreneurship. The responding results are shown in **Table 6**.

It can be seen from the data in **Table 6** that 45% of respondents ranked the talent training mechanism as the primary difficulty in the cultivation process, and 20 and 35% ranked the difficulty in distribution incentive mechanism in first and second place, respectively. In addition, the talent evaluation mechanism was, respectively ranked in first and second place by 15 and 10% of interviewees. These findings further developed and enriched our previous discoveries. It seems that entrepreneurial followers place more importance on their personal development than income

TABLE 2 | Results of the crossover analysis between the entrepreneurship industry and education levels.

			Education level				Total
			College	Bachelor	Master	Doctor	
Industry	Electronic information technology	Frequency	0	8	16	22	46
		Percentage of industry	0.0%	17.4%	34.8%	47.8%	100%
		Percentage of education level	0.0%	12.9%	32.0%	25.6%	23%
		Percentage of total	0.0%	4.0%	8.0%	11.0%	23%
	Biology and new medicine technology	Frequency	2	16	2	20	40
		Percentage of industry	5.0%	40.0%	5.0%	50.0%	100%
		Percentage of education level	100%	25.8%	4.0%	23.3%	20%
		Percentage of total	1.0%	8.0%	1.0%	10.0%	20%
	Aerospace technology	Frequency	0	2	0	0	2
		Percentage of industry	0.0%	100%	0.0%	0.0%	100%
		Percentage of education level	0.0%	3.2%	0.0%	0.0%	1%
		Percentage of total	0.0%	1.0%	0.0%	0.0%	1%
	New material technology	Frequency	0	8	2	12	22
		Percentage of industry	0.0%	36.4%	9.1%	54.5%	100%
		Percentage of education level	0.0%	12.9%	4.0%	14.0%	11%
		Percentage of total	0.0%	4.0%	1.0%	6.0%	11%
	High-tech service	Frequency	0	4	2	2	8
		Percentage of industry	0.0%	50.0%	25.0%	25.0%	100%
		Percentage of education level	0.0%	6.5%	4.0%	2.3%	4%
		Percentage of total	0.0%	2.0%	1.0%	1.0%	4%
	Energy and energy saving technology	Frequency	0	0	0	2	2
		Percentage of industry	0.0%	0.0%	0.0%	100%	100%
		Percentage of education level	0.0%	0.0%	0.0%	2.3%	1%
		Percentage of total	0.0%	0.0%	0.0%	1.0%	1%
	Resources and environmental technology	Frequency	0	0	2	2	4
		Percentage of industry	0.0%	0.0%	50.0%	50.0%	100%
		Percentage of education level	0.0%	0.0%	4.0%	2.3%	2%
		Percentage of total	0.0%	0.0%	1.0%	1.0%	2%
	High technology to transform traditional industries	Frequency	0	0	0	2	2
		Percentage of industry	0.0%	0.0%	0.0%	100%	100%
		Percentage of education level	0.0%	0.0%	0.0%	2.3%	1%
		Percentage of total	0.0%	0.0%	0.0%	1.0%	1%
	Other	Frequency	0	24	26	24	74
		Percentage of industry	0.0%	32.4%	35.1%	32.4%	100%
		Percentage of education level	0.0%	38.7%	52.0%	27.9%	37%
		Percentage of total	0.0%	12.0%	13.0%	12.0%	37%
Total		Frequency	2	62	50	86	200
		Percentage of industry	1.0%	31.0%	25.0%	43.0%	100%
		Percentage of education level	100%	100.0%	100%	100%	100%
		Percentage of total	1.0%	31.0%	25.0%	43.0%	100%

expectation. Moreover, this finding indicates that the current Chinese entrepreneurship cultivation system has overlooked the training of entrepreneurial followers to a large extent.

Improvements for Entrepreneurship Cultivation at the Start-Up Stage

Based on the surveyed results of **Table 6**, we also asked the entrepreneurial followers to propose some improvements to the entrepreneurship cultivation system, shown in **Table 7**.

According to **Table 7**, 39.13% of entrepreneurial followers believed that the government should first cultivate and enhance local talents. This interesting finding reflects the traditional Chinese belief in hometown identity, and this is especially common in Chengdu, where the culture is both receptive and inclusive. From a policy perspective, a more important concern is that there is a huge gap between the supporting force of the government for local versus returned talents in China. The latter always receives better salary and cultivation opportunities when compared to the former. This phenomenon is also common in Chinese universities and scientific institutions. As seen in Normile (2018), the only reason for a United States ecologist's move from the University of Hong Kong (HKU) to

TABLE 3 | Results of the crossover analysis between the number of entrepreneurial followers and the annual revenues of the researched companies.

			Annual revenue (unit: RMB million)				Total
			1 to 2	2 to 4	4 to 10	Over 10	
Number of entrepreneurial followers	Less than 5	Count	3	1	0	0	4
		% of Total	15.0%	5.0%	0.0%	0.0%	20.0%
	5 to 10	Count	4	6	4	0	14
		% of Total	20.0%	30.0%	20.0%	0.0%	70.0%
	Over 10	Count	0	0	1	1	2
		% of Total	0.0%	0.0%	5.0%	5.0%	10.0%
Total		Count	7	7	5	1	20
		% of Total	35.0%	35.0%	25.0%	5.0%	100.0%

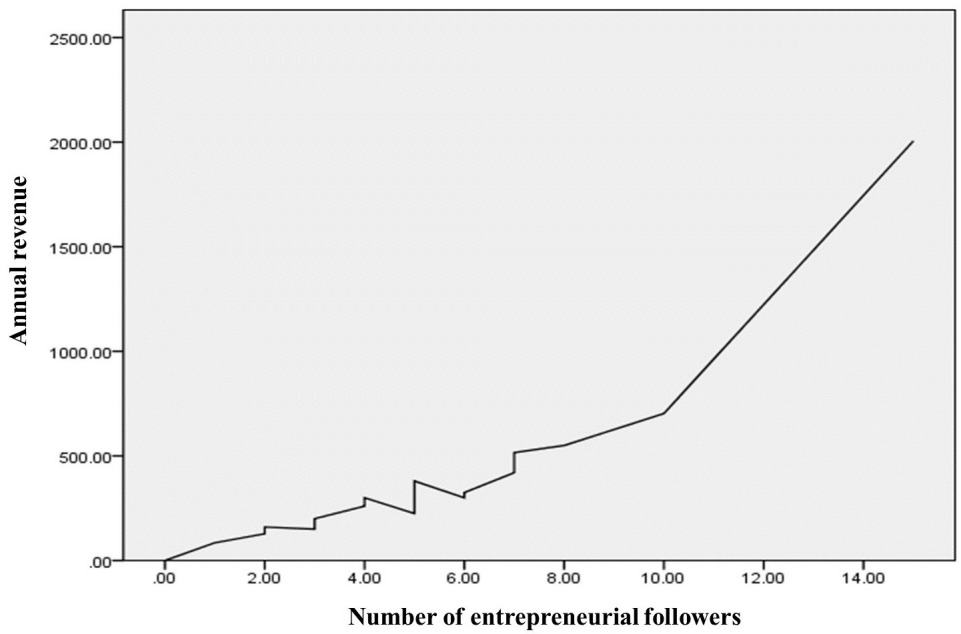

FIGURE 2 | Linear correlation graph showing the number of entrepreneurial followers and the annual revenues of the sampled companies.

the Southern University of Science and Technology is because he can earn 40 times more than what he is currently receiving in research support at HKU. This kind of priority is due to the lack of high-level innovative people in China. However, with the sustainable development of the Chinese economy and the growth of national power, the international status of Chinese cultural and technological forces has increased. As a result, a considerable decrease has emerged in this gap between local and returned talents, which could be viewed as highly important for potential entrepreneurial leaders or followers in the future (e.g., Jack Ma and Jun Lei are world-famous entrepreneurs who are both local talents). Thus, we claim that although significant achievements have been reached, keeping these relatively unfair and inappropriate investment and policy guidelines may harm the entrepreneurial enthusiasm of local entrepreneurs.

In addition, this high interest in the cultivation of local talents and the finding that 34.78% of entrepreneurial followers ranked a good environment for talent growth in second place are findings that are consistent with our previous argument: Entrepreneurial followers are more concerned with their personal development than treatment conditions. Moreover, 34.78% of interviewees ranked the introduction of various types of incentive policies in first place, which indicates an urgent need to raise incentives for entrepreneurial followers in the cultivation process during the start-up stage. This finding is in accordance with McCarthy et al. (2010), who proposed that incentives played a dominant role in motivating entrepreneurial employees to carry out more entrepreneurial activities. However, as the primary agent of cultivation and investment in entrepreneurship, the Chinese government is often profit- and achievement-oriented. This leads to a considerable ignorance of early entrepreneurship projects with lower profits and entrepreneurial followers with fewer accomplishments. This weakness may inevitably lead to a reduction in the possibility of creating potentially outstanding entrepreneurs and start-ups.

TABLE 4 | Responding results of potential factors that influence entrepreneurship.

Factors	Responses		Percent of cases
	N	Percent	Percent
Scientific and technological achievements or patents	2	10.00%	2.56%
Work experience and interpersonal relationships	9	45.00%	11.54%
Regional entrepreneurship service systems	5	25.00%	6.41%
Superior geographical resources	0	0.00%	0.00%
High levels of social capital	12	60.00%	15.38%
Sufficient funds	11	55.00%	14.10%
Business operation model	2	10.00%	2.56%
High-quality entrepreneurial opportunities and projects	12	60.00%	15.38%
Highly cooperative teams	12	60.00%	15.38%
Suitable market opportunities	8	40.00%	10.26%
Marketing	5	25.00%	6.41%
Total	78	390.00%	100.00%

TABLE 5 | Results of difficulties in the start-up stage of entrepreneurship.

Factors	Responses		Percent of cases
	N	Percent	Percent
Low wages	26	23.01%	26.0%
Poor housing	1	0.88%	1.0%
Difficulty in children's education and employment	5	4.42%	5.0%
Difficulty in spouse's transfer and employment	2	1.77%	2.0%
Difficulty in furthering personal development	2	1.77%	2.0%
Difficulty in researching results transformation	44	38.94%	44.0%
Difficulty in title appraisal	5	4.42%	5.0%
Difficulty in mobility	1	0.88%	1.0%
Difficulty in academic communication	11	9.73%	11.0%
Others	16	14.16%	16.0%

TABLE 6 | Results of the difficulties in the entrepreneurship cultivation system at the start-up stage.

Factor	First	Second	Third
Difficulty in training mechanisms	45.00%	5.00%	15.79%
Difficulty in distribution incentive mechanisms	20.00%	35.00%	10.53%
Difficulty in selection and appointment mechanisms	10.00%	20.00%	10.53%
Difficulty in talent flow mechanisms	5.00%	15.00%	5.26%
Difficulty in talent evaluation mechanisms	15.00%	10.00%	21.05%
Difficulty in guarantee mechanisms	5.00%	15.00%	36.84%
Others	0.00%	0.00%	0.00%

TABLE 7 | Results for the suggested improvement of the entrepreneurship cultivation system at the start-up stage.

Factor	First	Second	Third
Cultivate and enhance local talents	39.13%	4.35%	0.00%
Introduce foreign and overseas students	4.35%	4.35%	14.29%
Improve and implement the government talent work system	8.70%	8.70%	14.29%
Introduce incentive policies for all types of talents at all levels	34.78%	17.39%	9.52%
Optimize talent employment mechanisms	0.00%	26.09%	14.29%
Develop intermediary talent service agencies	0.00%	4.35%	4.76%
Create a good environment for growth of talent	8.70%	34.78%	19.05%
Encourage talents to undertake government, science, and technology projects	4.35%	0.00%	23.81%
Others	0.00%	0.00%	0.00%

DISCUSSION

Previous studies have provided some indirectly evidence to prove the important role played by entrepreneurial followers in the development of entrepreneurial companies (Ensley et al., 2006; Patterson et al., 2008). In view of this, on one hand, Ilies et al. (2005) suggested that a high-quality leader-follower relationship could provide more open communication and strong value congruence. On the other hand, existing studies also stated that the followers' pursuing behavior of self-interest is conducive to the development of entrepreneurship at the start-up stage (Ensley et al., 2006). In order to obtain higher profits, they would contribute their biggest strength to the growth of companies. Moreover, this behavior indirectly reflects the speculative psychology commonly existing in Chinese entrepreneurial followers, which is mainly caused by their poor conditions and survival pressures.

In addition, seen from a long-term perspective, different to leaders, followers are always faced with the risk of being dismissed, especially when companies are in financing difficulties (Zhang et al., 2018). In addition, due to the extensive financial pressure of entrepreneurship and their high levels of education, followers' entrepreneurial activities are often profit-oriented and research-oriented. However, the Chinese government and investment institutions often have high risk-aversion characteristics. In most cases, only the entrepreneurial projects that have been successful are financially supported. Finally, they may become victims in the development process of companies. To some extent, this argument is consistent with our findings that entrepreneurial followers focus more on income expectation and personal development. However, in addition to the short-term gains brought by them, there are also some long-term risks. According to Zhang et al. (2018), 50.4% of registered firms failed within 5 to 10 years from 2008 to 2012 in China, and this failure rate is continuing to grow. They also suggested that the inclination to pursue short-term interests should be considered as one of main reasons for the failure of entrepreneurship. Although there are various factors contributed to this high failure rate and short survival time of Chinese entrepreneurial companies, the weaknesses in the current Chinese cultivation system for entrepreneurial followers to a large extent plays a vital role (Tian et al., 2016). Thus, it is of great significance to improve the cultivation of entrepreneurial followers by finding out what it is that they really need.

In order to realize this purpose, three main areas were studied in this paper—namely, influencing factors for entrepreneurship, difficulties faced by entrepreneurial followers at the start-up stage, and suggestions for the improvement of entrepreneurship cultivation systems at the start-up stage. The results show that high levels of social capital, good entrepreneurial opportunities and projects, and highly cooperative teams were viewed as vital foundations of entrepreneurship by samples. This finding indicates that Chinese entrepreneurial followers pay more attention to income expectation and personal development rather than supports that contribute to the development of companies. In addition, they are also concerned about the *guanxi* (social relationship) network in entrepreneurship activities, which is a unique phenomenon in China.

Moreover, nearly half of the studied entrepreneurial followers held that the difficulty in transforming research results was the most serious problem in entrepreneurship in China, and more than a fifth of those believed that low salaries present considerable difficulties as well. With respect to the difficulties faced by Chinese entrepreneurial followers in the cultivation process, talent training mechanism was considered as the primary one. It seems that rather than income expectation, Chinese entrepreneurial followers place more importance on their personal development; in most cases, higher capability often equates to higher income. Furthermore, as nearly 40% of entrepreneurial followers suggested that the Chinese government should pay more attention to the cultivation of local talents, an unbalance and unfair distribution of supports between local and returned talents seems to be proved. Additionally, we also found that the lack of incentive mechanism is also an existing problem. These points reflect some dominant problems of the current entrepreneurship cultivation system in China.

Theoretical Implications

Our analysis makes some important contributions to current knowledge. First, given the importance of entrepreneurial followers for the success of entrepreneurship (Ensley et al., 2006; Patterson et al., 2008), our research firstly defined this special group as the crucial members (or crucial employees) of a specific entrepreneurial team and do not include the leader or normal employees. Entrepreneurial followers have highly consistent interests or beliefs with leaders and are generally characterized initiative, activeness, enthusiasm, and creativity. On the basis of following time, Entrepreneurial followers can be categorized into two groups: long-term and short-term, in which the former shows greater loyalty and autonomy, has more interest or belief foundation with the leaders, and has more influence on the shape of leaders' behaviors. In addition, we also extended the existing related literature by proposing that entrepreneurial followers pay more attention to the benefits that can be gained through participating in entrepreneurial activities at the start-up stage. In a more specific sense, the income expectation and personal development opportunities could be viewed as the two main concerns of entrepreneurial followers, thus providing a more comprehensive and detailed understanding of this special group who have been commonly ignored by previous studies. In addition, we also found that these factors lead to a healthy, mutual, and complementary relationship that contributes to the development of entrepreneurship.

Second, unlike existing research, which only focused on entrepreneurship cultivation for entrepreneurial leaders or entrepreneurs as a whole (Dabic et al., 2016; Din et al., 2016), the present study investigated the needs of entrepreneurial followers in the cultivation process. Based on the results of this empirical study, we suggested that the Chinese government should pay more attention to the cultivation of entrepreneurial followers, especially local ones, by publishing more rational and comprehensive policies that target entrepreneurial companies at the start-up stage. This study thus fills a gap in the literature of entrepreneurship cultivation for entrepreneurial followers.

Third, through multiple investigation angles and various experimental methods, we tested the needs of entrepreneurial followers in entrepreneurship cultivation from the start-up stage. Our findings focused on the factors that influence entrepreneurship, the current difficulties faced by followers, and improvement suggestions for entrepreneurial cultivation, thus making our conclusion more credible and forming a reasonable, logical relationship to enable related researchers to comprehensively understand this point. Thus, this study contributes to the literature of entrepreneurship cultivation and entrepreneurial followers.

Practical Implications

The present paper has some practical implications, as it can help policymakers, institutional investors, entrepreneurial leaders design and carry out related measures to improve the current entrepreneurship cultivation system in China and abroad. First, material incentives for the basic conditions of entrepreneurial followers should be established in order to provide them with better living and service environments. Second, the time and space advantages for cooperation between industry and university research as well as fair investment and financing systems should be built though institutional incentives. This would strengthen the technological beliefs and innovative pursuits of entrepreneurial followers. Third, traditional culture should be pertinently integrated into the entrepreneurship education system in order to enhance entrepreneurship awareness and the capacity of entrepreneurial followers.

Limitations and Future Research Suggestions

However, there are still some limitations to the present paper:

I. This study only focused on the entrepreneurial followers in the Tianfu New Area, which limited the generality of our findings. Future studies should consider a larger sample size of multiple organizations and countries. This will make the results more representative and specific.
II. This paper only studied entrepreneurial companies at the start-up stage due to their relatively significant representativeness. However, the cultivation process is also extremely important for entrepreneurial companies in various other stages. Thus, for a more comprehensive

perspective, future studies should pay attention to entrepreneurial enterprises at different growth stages.

CONCLUSION

The main purpose of this paper was to answer the question that what do entrepreneurial followers really need in entrepreneurship cultivation at the start-up stage. Based on the results, following conclusions could be gained. First, high levels of social capital, good entrepreneurial opportunities and projects, and highly cooperative teams were viewed as the most important factors for entrepreneurship by entrepreneurial followers in China. Second, entrepreneurial followers considered the difficulty in transforming research results, shortage in talent training mechanism, and low salaries as main difficulties in the entrepreneurship cultivation at the start-up stage. Third, most samples believed that the government should first cultivate and enhance local talents.

These findings indicate that entrepreneurial followers in China pay more attention to their personal development than income expectation, and the social relationship in entrepreneurship activities is also an important concern. In addition, it should be noted that there is a gap between the supporting force of the government for local versus returned talents, and a lack of incentive mechanism in China.

Therefore, we claimed that the Chinese government should delivery more rational policies focusing on the cultivation of entrepreneurial followers, especially for local ones. Moreover, various types of incentive policies and good environments for talent growth were also considered as the aspects to be improved in future policies.

ETHICS STATEMENT

This study was carried out in accordance with the recommendations of ethic guidelines, Ethic Committee of Beijing Jiaotong University with written informed consent from all subjects. All subjects gave written informed consent in accordance with the Declaration of Helsinki. The protocol was approved by the Ethic Committee of Beijing Jiaotong University.

AUTHOR CONTRIBUTIONS

XD, CT, and DT provided substantial contributions to the research conception and design. XD and YL analyzed and interpreted the data. XD, CT, and DT wrote the manuscript and provided critical revisions of the manuscript.

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REFERENCES

Alaiad, A., and Zhou, L. (2017). Patients' adoption of WSN-based smart home healthcare systems: an integrated model of facilitators and barriers. *IEEE Trans. Prof. Commun.* 60, 4–23. doi: 10.1109/TPC.2016.2632822

Batjargal, B. (2007). Internet entrepreneurship: social capital, human capital, and performance of internet ventures in China. *Res. Policy* 36, 605–618. doi: 10.1016/j.respol.2006.09.029

Beckman, C. M., and Burton, M. D. (2008). Founding the future: path dependence in the evolution of top management teams from founding to IPO. *Organ. Sci.* 19, 3–24. doi: 10.1287/orsc.1070.0311

Bohlmann, C., Rauch, A., and Zacher, H. (2017). A lifespan perspective on entrepreneurship: perceived opportunities and skills explain the negative association between age and entrepreneurial activity. *Front. Psychol.* 8:2015. doi: 10.3389/fpsyg.2017.02015

Chia, R. (2010). Teaching paradigm shifting in management education: university business schools and the entrepreneurial imagination. *J. Manag. Stud.* 33, 409–428. doi: 10.1111/j.1467-6486.1996.tb00162.x

Cooney, T. M. (2005). Editorial: what is an entrepreneurial team? *Int. Small Bus. J.* 23, 226–235. doi: 10.1177/0266242605052131

Dabic, M., Vlajcic, D., and Novak, I. (2016). Entrepreneurial management education needs in the republic of Croatia, Poland and the United Kingdom. *Int. J. Educ. Manag.* 30, 738–755. doi: 10.1108/IJEM-08-2014-0111

Dahlstedt, M., and Fejes, A. (2017). Shaping entrepreneurial citizens: a genealogy of entrepreneurship education in Sweden. *Crit. Stud. Educ.* 1, 1–15. doi: 10.1080/17508487.2017.1303525

Din, B. H., Anuar, A. R., and Usman, M. (2016). The effectiveness of the entrepreneurship education program in upgrading entrepreneurial skills among public university students. *Proc. Soc. Behav. Sci.* 224, 117–123. doi: 10.1016/j.sbspro.2016.05.413

Dunkelberg, W., Moore, C., Scott, J., and Stull, W. (2013). Do entrepreneurial goals matter? Resource allocation in new owner-managed firms. *J. Bus. Ventur.* 28, 225–240. doi: 10.1016/j.jbusvent.2012.07.004

Elert, N., Andersson, F. W., and Wennberg, K. (2015). The impact of entrepreneurship education in high school on long-term entrepreneurial performance. *J. Econ. Behav. Organ.* 111, 209–223. doi: 10.1016/j.jebo.2014.12.020

Elston, J. A., and Audretsch, D. B. (2010). Risk attitudes, wealth and sources of entrepreneurial start-up capital. *J. Econ. Behav. Organ.* 76, 82–89. doi: 10.1016/j.jebo.2010.02.014

Ensley, M. D., Pearce, C. L., and Hmieleski, K. M. (2006). The moderating effect of environmental dynamism on the relationship between entrepreneur leadership behavior and new venture performance. *J. Bus. Ventur.* 21, 243–263. doi: 10.1016/j.jbusvent.2005.04.006

Ferreira, P., Lima, F., Ribeiro, F., and Vieira, F. (2019). A mixed-method approach for the assessment of local community perception towards wind farms. *Sustain. Energy Technol. Assess.* 33, 44–52. doi: 10.1016/j.seta.2019.02.004

Forsström-Tuominen, H., Jussila, I., and Goel, S. (2017). The start of team start-ups: collective dynamics of initiation and formation of entrepreneurial teams. *J. Enterp. Cult.* 25, 31–66. doi: 10.1142/S0218495817500029

Galloway, L., and Brown, W. (2013). Entrepreneurship education at university: a driver in the creation of high growth firms? *Educ. Train.* 44, 398–405. doi: 10.1108/00400910210449231

Gikandi, J. W., Morrow, D., and Davisa, N. E. (2011). Online formative assessment in higher education: a review of the literature. *Comput. Educ.* 57, 2333–2351. doi: 10.1016/j.compedu.2011.06.004

Gorman, G., Hanlon, D., and King, W. (1997). Some research perspectives on entrepreneurship education, enterprise education and education for small business management: a ten-year literature review. *Int. Small Bus. J.* 15, 56–77. doi: 10.1108/00400910210449231

Graevenitz, G. V., Harhoff, D., and Weber, R. (2010). The effects of entrepreneurship education. *J. Econ. Behav. Organ.* 76, 90–112. doi: 10.1016/j.jebo.2010.02.015

Guo, X., Chen, W., and Yu, A. (2016). Is college education worth it? Evidence from its impacts on entrepreneurship in the United States. *J. Small Bus. Entrep.* 28, 1–26. doi: 10.1080/08276331.2015.1104452

Hellmann, T. (2007). When do employees become entrepreneurs? *Manag. Sci.* 53, 919–933. doi: 10.2139/ssrn.315159

Henry, C., and Treanor, L. (2010). Entrepreneurship education and veterinary medicine: enhancing employable skills. *Educ. Train.* 52, 607–623. doi: 10.1108/00400911011088944

Hu, R., Wang, L., Zhang, W., and Bin, P. (2018). Creativity, proactive personality, and entrepreneurial intention: the role of entrepreneurial alertness. *Front. Psychol.* 9:951. doi: 10.3389/fpsyg.2018.00951

Ilies, R., Morgeson, F. P., and Nahrgang, J. D. (2005). Authentic leadership and eudaemonic well-being: understanding leader–follower outcomes. *Leadersh. Q.* 16, 373–394. doi: 10.1016/j.leaqua.2005.03.002

Jamieson, I. (1984). "Education for enterprise," in *CRAC*, eds A. G. Watts and P. Moran (Cambridge: Ballinger), 19–27.

Jensen, S. M., and Luthans, F. (2006). Entrepreneurs as authentic leaders: impact on employees' attitudes. *Leadersh. Org. Dev. J.* 27, 646–666. doi: 10.1108/01437730610709273

Jin, L., Madison, K., Kraiczy, N. D., Kellermanns, F. W., Crook, T. R., and Xi, J. (2016). Entrepreneurial team composition characteristics and new venture performance: a meta-analysis. *Entrep. Theory Pract.* 41, 1–29.

Karimi, S., Biemans, H. J. A., Lans, T., Chizari, M., and Mulder, M. (2016). The impact of entrepreneurship education: a study of Iranian students' entrepreneurial intentions and opportunity identification. *J. Small Bus. Manag.* 54, 187–209. doi: 10.1111/etap.12232

Kickul, J., Gundry, L. K., Barbosa, S. D., and Whitcanack, L. (2010). Intuition versus analysis? Testing differential models of cognitive style on entrepreneurial self-efficacy and the new venture creation process. *Entrep. Theory Pract.* 33, 439–453. doi: 10.1111/j.1540-6520.2009.00298.x

Kim, P. H., and Aldrich, H. E. (2005). Social capital and entrepreneurship. *Found. Trends Entrep.* 1, 245–268. doi: 10.1561/0300000002

Klandt, H. (2004). Entrepreneurship education and research in German-speaking Europe. *Acad. Manag. Learn. Educ.* 3, 293–301. doi: 10.5465/AMLE.2004.14242226

Klapper, R. (2004). Government goals and entrepreneurship education-an investigation at a Grande Ecole in France. *Educ. Train.* 46, 127–137. doi: 10.1108/00400910410531787

Klotz, A. C., Hmieleski, K. M., Bradley, B. H., and Busenitz, L. W. (2014). New venture teams: a review of the literature and roadmap for future research. *J. Manag.* 40, 226–255. doi: 10.1177/0149206313493325

Kövesi, K. (2017). "The changing face of entrepreneurship education for engineering students in France: challenges and opportunities in a fast-evolving world," in *Proceedings of the 2017 IEEE Global Engineering Education Conference (EDUCON)* (Athens: IEEE), 1152–1157. doi: 10.1109/EDUCON.2017.7942994

Küttim, M., Kallaste, M., Venesaar, U., and Kiis, A. (2014). Entrepreneurship education at university level and students' entrepreneurial intentions. *Proc. Soc. Behav. Sci.* 110, 658–668. doi: 10.1016/j.sbspro.2013.12.910

Li, J., Zhang, Y., and Matlay, H. (2013). Entrepreneurship education in China. *Educ. Train.* 45, 495–505. doi: 10.1108/00400910310508883

Liao, J., and Welsch, H. (2003). Social capital and entrepreneurial growth aspiration: a comparison of technology-and non-technology-based nascent entrepreneurs. *J. High. Technol. Manag. Res.* 14, 149–170. doi: 10.1016/S1047-8310(03)00009-9

Liu, T. (2018). "Cultivation of college students' entrepreneurial decision-making ability in the context of supply side reform integrating EMER model," in *Proceedings of the International Conference on Intelligent Transportation, Big Data & Smart City* (Xiamen: IEEE Computer Society), 412–415.

Marshall, C., Brereton, P., and Kitchenham, B. (2015). "Tools to support systematic reviews in software engineering: a cross-domain survey using semi-structured interviews," in *Proceedings of the International Conference on Evaluation & Assessment in Software Engineering* (Nanjing: ACM), doi: 10.1145/2745802.2745827

Matlay, H. (2009). Entrepreneurship education in the UK. *J. Small Bus. Enterp. Dev.* 16, 355–368. doi: 10.1108/14626000910956100

Matlay, H. (2013). The impact of entrepreneurship education on entrepreneurial outcomes. *J. Small Bus. Enterp. Dev.* 15, 382–396. doi: 10.1108/14626000810871745

McCarthy, D. J., Puffer, S. M., and Darda, S. V. (2010). Convergence in entrepreneurial leadership style: evidence from Russia. *Calif. Manag. Rev.* 52, 48–72. doi: 10.1525/cmr.2010.52.4.48

Mckonesweet, K., Greenberg, D., and Wilson, J. (2011). "The new entrepreneurial leader: developing leaders who will shape social and economic opportunity," in *Paper Presented at the Babson Faculty Research Fund Working Papers*. Babson Park, MA.

Neck, H. M., and Greene, P. G. (2011). Entrepreneurship education: known worlds and new frontiers. *J. Small Bus. Manag.* 49, 9–21. doi: 10.1111/j.1540-627x.2010.00314.x

Normile, D. (2018). China takes new steps to lure science talent from abroad. *Science* 360, 1053–1054. doi: 10.1126/science.360.6393.1053

Okudan, G. E., and Rzasa, S. E. (2006). A project-based approach to entrepreneurial leadership education. *Technovation* 26, 195–210. doi: 10.1016/j.technovation.2004.10.012

Oosterbeek, H., Praag, M. V., and Ijsselstein, A. (2010). The impact of entrepreneurship education on entrepreneurship skills and motivation. *Eur. Econ. Rev.* 54, 442–454. doi: 10.1016/j.euroecorev.2009.08.002

Patterson, N., Mavin, S., and Turner, J. (2008). Leader and follower perspectives of entrepreneurial leadership: how is the 'g' factor experienced? *Plant J.* 54, 621–639. doi: 10.1111/j.1365-313X.2008.03492.x

Pellegrino, G., Piva, M., and Vivarelli, M. (2012). Young firms and innovation: a microeconometric analysis. *Struct. Change Econ. Dyn.* 23, 329–340. doi: 10.1016/j.strueco.2011.10.003

Peng, M. W., Lee, S. H., and Hong, S. J. (2014). Entrepreneurs as intermediaries. *J. World Bus.* 49, 21–31. doi: 10.1016/j.jwb.2013.04.003

Peterson, S. J., Walumbwa, F. O., Byron, K., and Myrowitz, J. (2009). CEO positive psychological traits, transformational leadership, and firm performance in high-technology start-up and established firms. *J. Manag.* 35, 348–368. doi: 10.1177/0149206307312512

Piperopoulos, P., and Dimov, D. (2014). Burst bubbles or build steam? Entrepreneurship education, entrepreneurial self-efficacy, and entrepreneurial intentions. *J. Small Bus. Manag.* 53, 970–985. doi: 10.1111/jsbm.12116

Pittaway, L., and Cope, J. (2016). Entrepreneurship education: a systematic review of the evidence. *Soc. Sci. Electron. Publ.* 25, 479–510. doi: 10.1177/0266242607080656

Pope, C., and Mays, N. (1995). Qualitative research: reaching the parts other methods cannot reach: an introduction to qualitative methods in health and health services research. *BMJ* 311, 42–45. doi: 10.1136/bmj.311.6996.42

Raposo, M., and Do, P. A. (2011). Entrepreneurship education: relationship between education and entrepreneurial activity. *Psicothema* 23, 453–457. doi: 10.1142/S0218495808000181

Rasmussen, E. A., and Sørheim, R. (2006). Action-based entrepreneurship education. *Technovation* 26, 185–194. doi: 10.1016/j.technovation.2005.06.012

Rindova, V. P., Yeow, A., Martins, L. L., and Faraj, S. (2012). Partnering portfolios, value-creation logics, and growth trajectories: a comparison of Yahoo and Google (1995 to 2007). *Strateg. Entrep. J.* 6, 133–151. doi: 10.1002/sej.1131

Román, C., Congregado, E., and Millán, J. M. (2013). Start-up incentives: entrepreneurship policy or active labour market programme? *J. Bus. Ventur.* 28, 151–175. doi: 10.1016/j.jbusvent.2012.01.004

Saboe, L. R., Kantor, J., and Walsh, J. (2002). Cultivating entrepreneurship. *Educ. Leadersh.* 59, 80–82. doi: 10.1080/036012702753590442

Sánchez, J. C. (2011). University training for entrepreneurial competencies: its impact on intention of venture creation. *Int. Entrep. Manage. J.* 7, 239–254. doi: 10.1007/s11365-010-0156-x

Sexton, D. L., and Landström, H. (eds) (2000). "The Blackwell handbook of entrepreneurship," in *Handbooks in Management* (Hoboken, NJ: Blackwell Publishers).

Shane, S., and Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. *Acad. Manag. Rev.* 25, 217–226. doi: 10.5465/AMR.2000.2791611

Sochett, E., and Daneman, D. (2014). Entrepreneurial leadership and performance in Chinese new ventures: a moderated mediation model of exploratory

innovation, exploitative innovation and environmental dynamism. *Creat. Innov. Manag.* 23, 453–471. doi: 10.1111/caim.12085

Tian, X., Zhang, S., and Wu, Y. (2016). Status quo and outlook of the studies of entrepreneurship education in China: statistics and analysis based on papers indexed in CSSCI (2004–2013). *Chin. Educ. Soc.* 49, 217–227. doi: 10.1080/10611932.2016.1218255

Uhl-Bien, M., Riggio, R. E., Lowe, K. B., and Carsten, M. K. (2014). Followership theory: a review and research agenda. *Leadersh. Q.* 25, 83–104. doi: 10.1016/j.leaqua.2013.11.007

Venkatesh, V., Brown, S. A., and Bala, H. (2013). Bridging the qualitative-quantitative divide: guidelines for conducting mixed methods research in information systems. *MIS Q.* 37, 21–54. doi: 10.2753/MIS0742-1222290410

Verheul, I., Wennekers, S., Audretsch, D., and Thurik, R. (2002). "An *eclectic theory* of entrepreneurship: policies, institutions and culture," in *Entrepreneurship: Determinants and Policy in a European-US Comparison. Economics of Science, Technology and Innovation*, Vol. 27, eds D. Audretsch, R. Thurik, I. Verheul, and S. Wennekers (Boston, MA: Springer). doi: 10.1007/0-306-47556-1_2

Villéger, A. (2018). The relation to time in the family business and in the start-up company: a comparative study. *J. High. Technol. Manag. Res.* 29, 247–255. doi: 10.1016/j.hitech.2018.09.009

Vries, M. F. R. K. D. (2010). The entrepreneurial personality: a person at the crossroads. *J. Manag. Stud.* 14, 34–57. doi: 10.1111/j.1467-6486.1977.tb00616.x

Wang, C. L., Tee, D. D., and Ahmed, P. K. (2013). Entrepreneurial leadership and context in Chinese firms: a tale of two Chinese private enterprises. *Asia Pac. Bus. Rev.* 18, 1–26. doi: 10.1080/13602381.2012.690257

Worsham, E. L., and Dees, J. G. (2012). Reflections and insights on teaching social entrepreneurship: an interview with Greg Dees. *Acad. Manag. Learn. Educ.* 11, 442–452. doi: 10.5465/amle.2011.0024

Wu, S., and Wu, L. (2008). The impact of higher education on entrepreneurial intentions of university students in China. *J. Small Bus. Enterp. Dev.* 15, 752–774. doi: 10.1108/14626000810917843

Xu, X., Hao, N., and Ye, Y. (2016). Factors influencing entrepreneurial intentions of Chinese secondary school students: an empirical study. *Asia Pac. Educ. Rev.* 17, 1–11. doi: 10.1007/s12564-016-9439-4

Zaech, S., and Baldegger, U. (2017). Leadership in start-ups. *Int. Small Bus. J.* 35, 157–177. doi: 10.1177/0266242616676883

Zampetakis, L. A., Bakatsaki, M., Litos, C., Kafetsios, K. G., and Moustakis, V. (2017). Gender-based differential item functioning in the application of the theory of planned behavior for the study of entrepreneurial intentions. *Front. Psychol.* 8:451. doi: 10.3389/fpsyg.2017.00451

Zhang, H., Joseph, A. A., and Jonathan, B. (2018). Toward a construct of dynamic capabilities malfunction: insights from failed Chinese entrepreneurs. *J. Bus. Res.* 98, 415–429. doi: 10.1016/j.jbusres.2018.06.020

Zhang, Y., Duysters, G., and Cloodt, M. (2014). The role of entrepreneurship education as a predictor of university students' entrepreneurial intention. *Int. Entrep. Manag. J.* 10, 623–641. doi: 10.1007/s11365-012-0246-z

Zhou, M., and Xu, H. (2012). A review of entrepreneurship education for college students in China. *Adm. Sci.* 2, 82–98. doi: 10.3390/admsci2010082

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APPENDIX

TABLE A1 | Introduces the interview topic guide for semi-structured interview conducted in the present paper.

Introduction to Interview

Thank you for agreeing to participate in this interview. Your responses will be kept completely confidential. The aim of this interview is to discuss your viewpoints and experiences relevant to the entrepreneurship cultivation at the start-up stage. There are no "right" or "wrong" answers, and we hoped that you could give us your own ideas. Now, I am going to start the interview.

Begin Interview

(1) What factors do you think will influence the entrepreneurship at the start-up stage? Why?

Prompts

- Could you provide some real examples?
- Are there some special issues in China?

(2) Have you experienced some difficulties at the start-up stage of entrepreneurship?

Prompts

- Could you provide some details?
- Do you think these difficulties are universal in current China?

(3) Have you experienced some difficulties in the entrepreneurship cultivation at the start-up stage?

Prompts

- Could you give me some reasons for these difficulties from your own perspective?
- Do you think these difficulties are universal in current China?

(4) Could you provide some suggestions for the improvement of the entrepreneurship cultivation system at the start-up stage?

Prompts

- Why do you think these suggestions are useful?
- Could you connect these suggestions to your above mentioned difficulties?

Post Interview

Really thank you for participating in this interview. No more questions about this topic. However, I would like to give you an opportunity to say anything else about the entrepreneurship cultivation at the start-up stage.

TABLE A2 | Presents some questions contained by the survey.

Questions
1 Please choose the potential influencing factors of the entrepreneurship at the start-up stage
(a) Scientific and technological achievements or patents
(b) Work experience and interpersonal relationships
(c) Regional entrepreneurship service systems
(d) Superior geographical resources
(e) High levels of social capita
(f) Sufficient funds
(g) Business operation model
(h) High-quality entrepreneurial opportunities and projects
(i) Highly cooperative teams
(j) Suitable market opportunities
(k) Marketing
2 Please choose the difficulties you have experienced at the start-up stage of entrepreneurship
(a) Low wages
(b) Poor housing
(c) Difficulty in children's education and employment
(d) Difficulty in spouse's transfer and employment
(e) Difficulty in furthering personal development
(f) Difficulty in researching results transformation
(g) Difficulty in title appraisal

TABLE A2 | Continued

Questions
(h) Difficulty in mobility (i) Difficulty in academic communication (j) Others
3 Please choose the difficulties you have experienced in the entrepreneurship cultivation at the start-up stage? First order___; Second order___; Third order___. (a) Difficulty in training mechanisms (b) Difficulty in distribution incentive mechanisms (c) Difficulty in selection and appointment mechanisms (d) Difficulty in talent flow mechanisms (e) Difficulty in talent evaluation mechanisms (f) Difficulty in guarantee mechanisms (g) Others
4 Please give some suggestions to improve the entrepreneurship cultivation system at the start-up stage. First order___; Second order___; Third order___. (a) Cultivate and enhance local talents (b) Introduce foreign and overseas students (c) Improve and implement the government talent work system (d) Introduce incentive policies for all types of talents at all levels (e) Optimize talent employment mechanisms (f) Develop intermediary talent service agencies (g) Create a good environment for growth of talent (h) Encourage talents to undertake government, science, and technology projects (i) Others

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Research on Factors Affecting the Entrepreneurial Learning From Failure: An Interpretive Structure Model

Jiangru Wei, Yuting Chen, Jing Zhang and Yonghua Gong*

School of Management, Nanjing University of Posts and Telecommunications, Nanjing, China

Based on the interpretive structure model of system dynamics, this paper constructs a hierarchical structure model of factors affecting the entrepreneurial learning from failure, which has been also tested through a case of entrepreneurship. The study finds that: (1) there are 15 factors influencing entrepreneurial learning from failure that play different hierarchical roles; (2) the entrepreneurs' self-efficacy, as a key influencing factor of entrepreneurial learning from failure, can be cultivated and improved by enriched the entrepreneurs' successful career experience. In addition, emotion regulation after the entrepreneurial failure is also a key influencing factor of the entrepreneurial learning from failure and the emotion management is deemed as an important part of entrepreneurship education; (3) the entrepreneurial education may affect the entrepreneurship learning from failure indirectly by affecting the entrepreneurs' self-efficacy; (4) the economic conditions, the policy support, the industry characteristics and the cultural sensemaking of failure are the macro factors that may affect the entrepreneurship learning from failure.

Keywords: entrepreneurial learning from failure, ISM, entrepreneurial education, self-efficacy, emotion regulation

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National Taiwan Normal University, Taiwan

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ESSEC Business School, France
Yuanqiang Lian,
Yangzhou University, China

****Correspondence:***
Yuting Chen
chenyt027@163.com

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INTRODUCTION

According to Drucker, the most important factor of success is the ability of learning from previous mistakes and applying what have been learned in a more effective way. Nevertheless, most people pay more attentions to successful enterprises both in entrepreneurship research and entrepreneurship practice due to anti-failure bias (Crane and Sohl, 2004; Razmus and Laguna, 2018), rarely from failures. There are few practice and research on the failure of entrepreneurship and subsequent learning after failure because of lack of emphasis on learning from failure and lack of a correct understanding of how to treat these failures. Recently, researchers have found that failure is also an important resource filled with skills and knowledge to update entrepreneurial activities, thus help entrepreneurs reduce their uncertainty and expand their scope of seeking new business opportunities (Mantere et al., 2013; Khelil, 2016). Meanwhile, some researchers have focused on how entrepreneurs can benefit and learn from failure (Gong et al., 2009; Benson and Han, 2011). As proposed by Cope (2011), failure can expand the entrepreneurs' scope of potential behaviors by correcting their ineffective practices and improving their skills and knowledge. Gong et al. (2009) also believed that entrepreneurs should not only learn from other successful entrepreneurs but learn from their own failure. Therefore, the study of entrepreneurial learning from failure is of important theoretical value and practical significance.

The existing studies focus on the entrepreneurial learning from failure from three perspectives. First of all is the learning style. The mode of entrepreneurial learning from failure refers to the way how the entrepreneurs learn from their entrepreneurial failure, including the influence of entrepreneurial failure on the choice of learning style (Politis, 2005) and the relationship between the style of entrepreneurial learning from failure and the learning content (Cope, 2011). The second perspective is the research on the content of entrepreneurship learning from failure (Shepherd et al., 2009b; Wang and Chugh, 2014), the studies on which are diversified, including self-learning, business learning, network and relationship learning and new enterprise management learning. Among others, the self-learning is the core of entrepreneurship learning from failure (Cope, 2011; Jenkins et al., 2014). Pittaway and Thorpe (2012) proposed that learning from failure includes the internal learning and the external learning, the former of which refers to the knowledge of creating, managing, and closing enterprises while the later refers to the opportunity identification and entrepreneurship awareness. The last one is about the mechanism of entrepreneurial learning from failure (Shepherd, 2004; Cardon et al., 2011). At present, limited researches have been carried out about the mechanism of entrepreneurial learning from failure, mostly focusing on entrepreneurial performance and sustainable entrepreneurship in the study of outcome variables (Steffens et al., 2009; Carsrud and Brännback, 2011; Gorgievski et al., 2014). To sum up, the researches on the internal structure of entrepreneurial learning from failure are still uncertain. It is unclear why the learning occurs after entrepreneurial failure and how to carry out such entrepreneurial learning from failure. Some achievements have been made in the existing research, but the research perspectives are more scattered, indicating a relatively definite system not yet established.

On the basis of literature review, this paper has sorted out the influencing factors of entrepreneurial learning from failure, finding that there are 24 factors that may influence the entrepreneurial learning from failure. Upon analysis of the expert panel, 15 factors are finally formed. In reference to the Interpretive Structure Model (ISM) method of system dynamics (Warfield, 1978; Sushil, 2012), the structure chart of the mutual relationship is thus obtained and the multi-level structure of the factors influencing entrepreneurial learning from failure is finally drawn. On this basis, this paper further revises the research model in respect of the influencing factors of entrepreneurial learning from failure through a case study.

This paper makes a number of significant contributions. First of all, an ISM of system dynamics is applied to study the factors affecting the entrepreneurial learning from failure, which is a beneficial attempt of ISM method in the field of entrepreneurial research and provides a new research tool for entrepreneurial research. Secondly, this paper explores the antecedent variables affecting the entrepreneurial learning from failure, which makes it possible to clarify the mechanism of entrepreneurial learning from failure. Thirdly, the paper provides a clear path for entrepreneurs to improve their capacity for learning from failure, in which the entrepreneurs' self-efficacy and emotion regulation deserve more attentions.

LITERATURE REVIEW

In early studies, the failure was considered to be actively avoided because it is costly and unpleasant (Baron and Markman, 2003), and may cause a vicious cycle of frustration and decline (Artinger and Powell, 2016). However, the entrepreneurial failure has been recently recognized valuable as an important resource of developing skills and knowledge, improving learning and thus raising their entrepreneurial opportunity (Cardon et al., 2011). The existing researches show that the factors affecting entrepreneurial learning from failure can be categorized into 12 individual factors, 4 enterprise factors, and 8 environmental factors, as shown in **Table 1**.

Individual Factors

Individual factors can affect the entrepreneurial learning from failure from two perspectives, one of which is the entrepreneur's personal factors. Recent researches showed that the entrepreneurial learning from failure would be influenced by the entrepreneurial failure (F_1) and would exert a positive impact on the performance of new enterprises (Boso et al., 2018). Meanwhile, the critical career experience (F_2) also plays a significant role in promoting the development of entrepreneurs' attitudes toward failure (Politis and Gabrielsson, 2009), which would enable individuals more alert to new business opportunities (F_3) (Boso et al., 2018). Boss and Sims (2008) adopted the context of failure, suggesting that the self-leadership (F_4) can help those who have experienced failure move toward recovery more easily than those who have not yet been engaged. In the conceptual framework for analysis of failure, Cotterill (2012) proposed that the entrepreneurial personality traits (F_5) have set up a new venture through entrepreneurial response and the entrepreneurial persistence (F_6) may remain steadfast in the new venture regardless of failure (Shepherd et al., 2009a). Roxane and Frank (2014) referred five cognitive processes of self-efficacy (F_7), which may allow individuals to take time to reflect on both his/her past successes and failures, contributing to a progress. Analogously, a positive effect of confidence (F_8) on entrepreneurial tasks was found for both action and judgment tasks (Trevelyan, 2008; Hogarth and Karelaia, 2012).

On the other hand, the entrepreneurs' emotional management may also affect their learning from failure. Scholars called for a balanced approach to entrepreneurship education and training by developing a sense of success and a sense of failure (F_9) in order to help them learn from failure (Oser and Volery, 2012), and further developed a model to reconcile the countervailing effects of failure (Vivianna et al., 2017). In order to delay the business failure, researches also suggested a positive effect in balancing the financial and emotional costs (F_{10}) of business failure to promote the overall recovery under some circumstances (Shepherd et al., 2009b), in which the emotional toll is the hardest (Cope, 2011), and then the emotion regulation (F_{11}) plays an important role of moderation (Vivianna et al., 2017). Another important factor

TABLE 1 | Identified factors of entrepreneurial failure learning.

Notation	Factors	Type of research	Relationship	References
F1	Entrepreneurship failure experience	Quantitative	Positive	Boso et al., 2018
F2	Critical career experiences	Quantitative	Positive	Politis and Gabrielsson, 2009
F3	Alertness	Quantitative	Positive	Boso et al., 2018
F4	Self-leadership	Qualitative	Positive	Boss and Sims, 2008
F5	Personality traits	Qualitative	Comparison	Cotterill, 2012
F6	Persistence	Qualitative	Comparison	Cotterill, 2012
		Quantitative	Inverted U shaped	Shepherd et al., 2009a
F7	Self-efficacy	Conceptual	Positive	Roxane and Frank, 2014
F8	Confidence	Quantitative	Inverted U shaped	Trevelyan, 2008
F9	Sense of failure	Qualitative	Positive	Oser and Volery, 2012
F10	Emotional costs	Quantitative	Positive	Jenkins et al., 2014
		Qualitative	Negative	Shepherd et al., 2009b
		Conceptual and Qualitative	Case	Cope, 2011
F11	Emotion regulation	Qualitative	Positive	Boss and Sims, 2008
		Quantitative	Positive	Vivianna et al., 2017
F12	Psychological capital	Conceptual	Positive	Roxane and Frank, 2014
F13	Financial costs	Qualitative	Comparison	Cardon et al., 2011
		Conceptual and Qualitative	Case	Cope, 2011
		Qualitative	Negative	Shepherd et al., 2009b
F14	Learning style	Qualitative	Comparison	Vinig and Souren, 2007
F15	Cultural sensemaking	Quantitative	Comparison	Cardon et al., 2011
F16	Failure velocity	Quantitative	Inverted U shaped	Vivianna et al., 2017
F17	Stigma of entrepreneurial failure	Qualitative	Case	Landier and Holmstrom, 2005
F18	Economic conditions	Quantitative	Comparison	Carlos et al., 2016
F19	Social capital	Qualitative	Positive	Anderson et al., 2007
F20	Industry characteristics	Qualitative	Comparison	Macpherson and Holt, 2007
F21	Environment conditions	Qualitative	Comparison	Sapovadia, 2015
F22	Policy support	Qualitative	Positive	Carayannis et al., 2003
		Qualitative	Positive	Sapovadia, 2015
F23	Luck	Qualitative	Comparison	Cotterill, 2012
		Qualitative	Comparison	Liu, 2010
F24	Entrepreneurship education	Qualitative	Positive	Carayannis et al., 2003

that cannot be ignored is the psychological capital (F_{12}), which is considered playing a moderating role in the relationship between the negative consequences of failure and the positive effects of learning from failure (Roxane and Frank, 2014).

Enterprise Factors

The factor of enterprise operation may directly affect the entrepreneurial learning from failure. Financial cost pressures (F_{13}) are critical to the entrepreneurs' ability of learning when they fail (Cardon et al., 2011). Especially, the delayed business failure can be financially costly, making it more difficult for the enterprises to recover from the failure (Shepherd et al., 2009b). In addition, the learning style (F_{14}) of enterprises also directly affects whether they can learn lessons and continue to start businesses after failure (Vinig and Souren, 2007). The research results suggested that the majority entrepreneurs use accommodative learning style by reliance on practical experience, intuition and imagination (Vinig and Souren, 2007). Some scholars also observed venture failure through the lens of cultural sensemaking (F_{15}), proposing that the stigmatization of entrepreneurs at local area would be influenced by the venture failure, which would further affect their attitude and behavior of individuals after their failure (Cardon et al., 2011). In addition, they also focused on failure velocity (F_{16}) to understand the entrepreneurs' learning from failure (Vivianna et al., 2017).

Environmental Factors

The environmental dimension is an important factor for entrepreneurs. Researches show that different levels of cultural tolerance would affect the stigma of failure (F_{17}) in entrepreneurship (Landier and Holmstrom, 2005). Perceived low cultural tolerance is more likely to aggravate the entrepreneurial stigma (Singh et al., 2015), which thus

hinders the entrepreneurial activities (Simmons et al., 2014). The combination of fundamental entrepreneurial factors is identified as the driving force for the growth of new businesses under different economic conditions (F_{18}) (Carlos et al., 2016). Human and social capital (F_{19}), organizational systems, industry characteristics (F_{20}) and knowledge network are combined to facilitate or restrict growth (Anderson et al., 2007; Macpherson and Holt, 2007). Sapovadia (2015) referred that a supportive environment condition (F_{21}) and policy support (F_{22}) for entrepreneurial ventures or act as impediments to its growth.

Meanwhile, the environmental factors may affect the entrepreneurs' attitudes toward failure in the context of their background, including their immigration, educational and socio-economic background, reputation, and stigma (Cotterill, 2012). Luck (F_{23}) is also an important aspect of entrepreneurship practice. Liu (2010) indicated that people tended to over-attribute their own successes to superior skills but failures to bad luck. The learning from failure can be affected and restricted by many factors, two of which deserve our special attentions: the ability to face the failure and the ability to take risks (Cannon and Edmondson, 2001). As one of the most important abilities to undertake risks, the social capital has also attracted the researchers' attentions. What is particularly mentioned is the influence of entrepreneurial education (F_{24}) on the entrepreneurial learning from failure. The entrepreneurial education can improve the entrepreneurs' effective cognition of entrepreneurship failure and consider failure as a useful learning experience so as to recover from failure and continue to start a business as soon as possible (Carayannis et al., 2003).

MATERIALS AND METHODS

Methods

The ISM refers to a process that transforms unclear and poorly articulated models of systems into visible and well-defined models for many purposes (Farris, 1975; Sushil, 2012). It emphasizes that the analysis of things has to be rooted in the collection of realistic materials and the processing and analysis of data. Through theoretical deduction, it extracted the interaction mechanism among the elements of the complex system, and finally formed a theoretical concept (Valmohammadi and Dashti, 2016). ISM has been widely applied to the study of the antecedents of practical problems in the field of management (Feng and Yun, 2010; Muruganantham et al., 2018). This study adopts the method of ISM to probe into the factors influencing entrepreneurial learning from failure and makes conclusions by a hierarchical topology figure for intuitively understanding the structure of system factors. Moreover, a typical case study is conducted to analyze the key factors of entrepreneurial failure learning and test the rationality of the model.

We carry out an ISM study on the causes of entrepreneurial learning from failure through four steps: firstly, to extract the influencing factors widely on the basis of problem analysis; secondly, to screen out important influencing factors with the help of an expert panel; thirdly, to design the relationship structure of factors by using statistical software and other technical tools; fourthly, to carry out hierarchical processing to form a multi-level conceptual model of interpretative structural system. With this method, the combined elements and their relationship in complex systems can be clarified to facilitate understanding and control.

Analysis

Scholars have explained the factors influencing the entrepreneurial learning from failure from different perspectives and levels. Due to the difficulty in identifying all the factors through existing research methods (e.g., questionnaire survey and case study), we have concluded 24 factors influencing the entrepreneurial learning from failure (as shown in **Table 1**) through a comprehensive literature review in the first step.

In order to clarify the important factors affecting the entrepreneurial learning from failure and the relationship among them, an expert panel was established to identify these factors in the second step, composed of 15 members including three researchers who teach entrepreneurship theory in the universities, eight entrepreneurs, two government staff and two experts from the incubator. First of all, we made clear to all members the conception of all factors and entrepreneurial learning from failure. Fifteen experts were requested to evaluate back-to-back whether 24 factors had an impact on the entrepreneurial learning from failure. Moreover, they can write down the factors not mentioned in the literature if they had different opinions. The results showed that 13 factors were unanimously agreed by more than 10 experts and 2 additional factors (the failure expectation and the family's support) were respectively agreed by more than two thirds of experts (Kuo et al., 2010; Valmohammadi and Dashti, 2016). Upon discussion between the experts and the entrepreneurs, we removed 11 factors and added 2 factors, finally confirmed 15 factors. The purpose of removing the unimportant factors was to help entrepreneurs grasp the key factors of entrepreneurial learning from failure after their business failure.

Thirdly, the relationship between influencing factors were discussed by experts, and we adopted the majority of opinions after identification of the 15 factors. Experts were asked to conduct a pair-wise comparison of 15 factors. The factors were denoted O_i, where i = 1, 2, . . ., 15, as shown in **Table 2**. When judging the relationship between the factor O_i and O_j, the experts were asked to select from one of the following four types:

- Type V: factor O_i has a direct effect on factor O_j
- Type A: factor O_j has a direct effect on factor O_i
- Type X: factor O_i and a reciprocal effect on factor O_j
- Type O: factor O_i and factor O_j are mutually unrelated.

It is relatively easy for experts to make a consistent judgment on the relationship among the 15 factors. The final consensus on the pair-wise comparison is shown in **Table 2**.

Fourthly, we used ISM method to divide the 15 important factors that may affect the entrepreneurial learning from failure

TABLE 2 | Pair-wise comparison of the factors.

O	O	O	O	O	O	O	O	O	V	O	O	O	O	**Entrepreneurship failure experience (O_1)**
O	O	A	O	O	O	O	O	O	V	O	O	O	Entrepreneurship education (O_2)	
X	A	A	A	A	O	O	V	O	O	O	O	Environment conditions (O_3)		
O	O	O	O	O	O	O	O	X	A	A	Self-efficacy (O_4)			
O	O	O	O	O	O	O	O	O	X	Social capital (O_5)				
O	O	O	O	O	O	O	O	O	Psychological capital (O_6)					
O	O	O	O	A	A	A	A	Emotion regulation (O_7)						
O	O	O	O	O	O	X	Expectation of failure (O_8)							
A	O	O	O	O	O	Sense of failure (O_9)								
O	O	O	O	O	Personality traits (O_{10})									
O	O	O	O	Family support (O_{11})										
O	O	X	Economic conditions (O_{12})											
O	O	Policy support (O_{13})												
O	Industry characteristics (O_{14})													
Cultural sensemaking (O_{15})														

TABLE 3 | Reachable matrix of the factors.

No	O_1	O_2	O_3	O_4	O_5	O_6	O_7	O_8	O_9	O_{10}	O_{11}	O_{12}	O_{13}	O_{14}	O_{15}
O_1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0
O_2	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
O_3	0	0	1	0	0	0	0	1	0	0	0	0	0	0	1
O_4	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0
O_5	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0
O_6	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0
O_7	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0
O_8	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0
O_9	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0
O_{10}	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0
O_{11}	0	0	1	0	0	0	1	0	0	0	1	0	0	0	0
O_{12}	0	0	1	0	0	0	0	0	0	0	0	1	1	0	0
O_{13}	0	1	1	0	0	0	0	0	0	0	0	1	1	0	0
O_{14}	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0
O_{15}	0	0	1	0	0	0	0	0	1	0	0	0	0	0	1

into different levels and thus get an intuitive interpretation model. On the basis of **Table 2**, this study used a 15 × 15 square matrix to express the logical correlation among the important factors affecting the entrepreneurial learning from failure, forming an adjacency matrix A that covers any two or two elements in the whole influencing factors system. Among them, a_{ij} refers to the elements in line i and column j of a square matrix (i, j = 1, 2,. . .,15), indicating the relationship between the influencing factors O_i and O_j. "1" in row i and column j indicates that Factor i has an effect on Factor j. Besides, as the influencing factors of complex systems are not directly related, we use the reachability matrix to obtain and master the relationship between the direct and indirect effects of one factor on other factors, as well as the transitive representation of each factor.

The reachable matrix (R) is mainly used to express the transfer relationship between the direct or indirect effects of the influencing elements. The r_i can reach r_j by the distance of Unit 1, and r_j can still reach the next influencing factor by the distance of Unit 1. Based on the sum of adjacent matrix A and unit matrix I, A+I = B is formed. Boolean algebraic power operation is carried out on B, and the reachable matrix R can be obtained without producing a new "1" in the operation result. It shows all the direct and indirect relationships among the factors of the entrepreneurial learning from failure. By using the analytic logic path of reachable matrix (Kuo et al., 2010; Kannan et al., 2014), based on the analysis result of adjacency matrix, we use Matlab to calculate B^n until the calculation satisfies $B^{n-1} = B^n$ ($n = 2$). **Table 3** shows the reachability matrix R of each influencing factor.

The procedure for deriving the final multilevel structure hierarchy is shown in **Table 4**. $R(O_i)$ refers to the reachable set of O_i and $C(O_i)$ represents the precedence set of O_i. When $R(O_i) = R(O_i) \cap C(O_i)$, $R(O_i)$ is placed in a set corresponding to the level and excluded in the analysis of subsequent levels (Hussain et al., 2016; Thirupathi and Vinodh, 2016). We divide these 15 factors into different levels by this method. The result shows that the factors can be partitioned into four levels as follows (**Table 4**):

- Level 1: 4, 7
- Level 2: 5, 6, 8, 9, 10
- Level 3: 1, 2, 3, 15
- Level 4: 11, 12, 13, 14

RESULTS

After ISM analysis, the relationships among these factors were illustrated by using a multilevel structure hierarchy chart, as shown in **Figure 1**, to guide activities of the entrepreneurial learning from failure. Results of the analysis are summarized as follows:

Special attentions need to be paid to the self-efficacy (O_4) of entrepreneurs, which may directly affect the entrepreneurial learning from failure. The results also show that the social capital (O_5) and the psychological capital (O_6) can indirectly affect entrepreneurial learning from failure through self-efficacy; in other words, the social capital and the psychological capital of entrepreneurs play an important role in improving the self-efficacy. On the other hand, the entrepreneurs' failure experience (O_1) and the entrepreneurship education (O_2) can directly affect entrepreneurs' psychological capital. The entrepreneurship education has to more concern the construction of entrepreneurs' psychological capital.

The emotion regulation (O_7) plays a crucial role in the entrepreneurial learning from failure. We have demonstrated that how the entrepreneurs manage their emotions is closely related to how they learn after a failure. The personality traits (O_{10}), the expectation of failure (O_8), and the sense of failure (O_9) all have exerted influences on the emotion regulation. The environment conditions (O_3) can affect the entrepreneurs' expectations on failure and the culture sensemaking (O_{15}) can affect the sense of failure caused by entrepreneurship.

In addition, the entrepreneurial learning from failure is indirectly affected by the macro environment, including the economic conditions (O_2), the policy support (O_{13}), the industrial characteristics (O_{14}) and the family support (O_{11}). We also find that the policy support can directly affect the entrepreneurship education.

TABLE 4 | Interpretive Structure Model analysis of the factors.

Level	O_i	$R(O_i)$	$C(O_i)$	$R(O_i) \cap C(O_i)$
1	1	1,6	1	1
	2	2,6	2,13	2
	3	3,8,15	3,11,12,13,14,15	3,15
	4	4,7	4,5,6,7	**4,7**
	5	4,5,6	5,6	5,6
	6	4,5,6	1,2,5,6	5,6
	7	4.7	7,8,9,10,11	**4,7**
	8	7,8,9	3,8,9	8,9
	9	7,8,9	8,9,15	8,9
	10	7,10	10	10
	11	3,7,11	11	11
	12	3,12,13	12,13	12,13
	13	2,3,12,13	12,13,14	12,13
	14	3,14	14	14
	15	3,9,15	15	15
2	1	1,6	1	1
	2	2,6	2,13	2
	3	3,8,15	3,11,12,13,14,15	3,15
	5	5,6	5,6	**5,6**
	6	5,6	1,2,5,6	**5,6**
	8	8,9	3,8,9	**8,9**
	9	8,9	8,9,15	**8,9**
	10	10	10	**10**
	11	3,11	11	11
	12	3,12,13	12,13	12,13
	13	2,3,12,13	12,13,14	12,13
	14	3,14	14	14
	15	3,9,15	15	15
3	1	1	1	**1**
	2	2	2,13	**2**
	3	3,15	3,11,12,13,14,15	**3,15**
	11	3,11	11	11
	12	3,12,13	12,13	12,13
	13	2,3,12,13	12,13,14	12,13
	14	3,14	14	14
	15	3,15	15	15
4	11	11	11	**11**
	12	12,13	12,13	**12,13**
	13	12,13	12,13,14	**12,13**
	14	14	14	**14**

Bold values represent the factors of each level in the interpretative structural model.

CASE STUDY

In order to test the rationality of the model, we chose a typical case to study the key factors affecting entrepreneurial learning from failure. There are three main reasons. Firstly, all three entrepreneurs in this case had entrepreneurial failure experience during entrepreneurship. Secondly, they recovered from their failures and continued to start their own businesses. Thirdly, the company belongs to the high-tech industry, which is considered to have a high failure rate of entrepreneurship (Gong et al., 2009). Therefore, this case is representative for the study of factors affecting entrepreneurial learning from failure.

The case company which is engaged in the development and sales of educational software in China was founded in recent 5 years. Now it has built up its business relations with more than 30 universities in Asia by providing the original educational development software. Its sales contracts have exceeded one hundred thousand dollars in the first year with its sales growing at an average rate of more than 120% annually.

The company has three entrepreneurship partners. In order to protect the privacy of participants involved, this paper uses A, B, and C respectively instead of their names. After graduation from a university in China, A joined an education software company. Seven years later, A became the regional sales director responsible for the sales and maintenance of university education software in China. With sound social capital and network

resources (social capital) in this industry, he has established a good professional reputation (professional experience) in the industry. In the 8th year, A left the original software company and started an educational software company by himself. In the company, he is responsible for technology and product research and development, sales and management of the founding team. Partner B had three entrepreneurial experiences before joining the company. He has been engaged in entrepreneurship projects of maternal and infant e-commerce, early childhood education and online courses. With profound Internet experience and clear understanding of the customers' needs, he was an industry expert in education informatization with strong self-driving force (self-efficacy). Partner C is responsible for the company's marketing, including the market development and the maintenance of customers in the previous company. At the same time, as a technical partner highlighting rich experience in technology research and development, he is also acting as the technical architect of the company, indicating a good social capital from investors. They all suffered from failure (entrepreneurship failure) before they became partners.

At the initial stage of the company's development, disputes arose in respect of the product positioning and the company's development direction. The three partners could not persuade each other, resulting in conflicts and leading to emotional disorder (emotion regulation). In the process of development, "the company lacked the entrepreneurship education, manpower and expertise in the incubator, as well as work experience, services and business consulting" partner A said. In addition, the entrepreneurship education and the government policies were not sufficient. Partner B believed that the family support should be very important for the recovery from business failure. Partner C especially mentioned that the management of entrepreneurs' emotions was of great significance and the expectation of failure would affect the learning of entrepreneurial failure.

Respondents highlighted the social capital and the family support, which they believed as important factors for the entire entrepreneurial team. Within the entrepreneurial team, the members' self-efficacy, communication and emotional adjustment after setbacks are deemed as difficult problems; therefore, considering the above interview case, this article emphasizes that although the factors influencing the entrepreneurial learning from failure have different emphases on different entrepreneurs, they demand strong self-management and psychological control ability to support the entrepreneurship to continue. The discussion of the case is well in line with the explanatory structure model constructed in this paper, and the key factors affecting the entrepreneurial learning from failure show hierarchical characteristics.

CONCLUSION

This paper sorted out the influencing factors of entrepreneurial learning from failure and found that 15 factors influencing entrepreneurial learning from failure. By referring to the ISM method of system dynamics (Warfield, 1978; Sushil, 2012), the structure chart of the mutual relationship is thus obtained, and the multi-level structure level of the factors influencing entrepreneurial learning from failure is finally drawn.

In combination with the above research results, this research emphasizes the role of the entrepreneur's emotion regulation, which directly affects the entrepreneurial learning from failure. The entrepreneurial activity is a great challenge to the entrepreneurs, both physically and mentally, and the ability of controlling emotions is extremely important for the entrepreneurs to get recovered and learn from their failure. This finding is an important extension of the research conclusion of Cope (2011), who emphasized that the entrepreneurial emotion management shall deserve close attention. In addition to the financial cost, the emotional cost is another cost generated from entrepreneurial failure (Shepherd et al., 2009b). In this sense, the entrepreneurship emotion management is an important part of entrepreneurship education, which is different from the previous entrepreneurship education that mostly emphasizes entrepreneurship skills and business models (Honig, 2004; Henry et al., 2005; Neck and Greene, 2011). Besides, we also find in the interview that the entrepreneurs' emotions, such as loneliness, frustration and stigma, are their daily emotions rather than those only generated after failure. In this sense, the entrepreneurship education institutions need to provide entrepreneurs with spiritual mentors and more professional psychological consultation. At the same time, the entrepreneurs themselves need to conduct effective emotion management and monitoring in entrepreneurial activities to prevent the spread of negative emotions.

This paper also illustrates that entrepreneurs' self-efficacy is another key influencing factor of the entrepreneurial learning from failure (Karl et al., 2013). According to the three research perspectives of self-efficacy as divided by Bandura (1982), the entrepreneurs with a high sense of self-efficacy choose appropriate tasks, which coincide with their ability from the perspective of behavior. What's more, this research points out that the greater the possibility of success after failure, the more efforts they will make and the stronger persistence of entrepreneurial behavior will be. From the perspective of the attitude and the degree of effort, people with a high sense of self-efficacy can face up to failure and difficulties more bravely, overcome difficulties to achieve their entrepreneurial goals with their efforts in a more confident manner (Wu et al., 2019). From the perspective of the thinking model of entrepreneurial learning from failure, people can focus on analyzing the causes of failure and solving difficulties actively with a strong sense of self-efficacy, and show excellent behavioral ability and efficiency.

DISCUSSION

Implications

This study has three main aspects in theoretical contribution. Firstly, our study sorts out 24 influencing factors of entrepreneurial learning from failure according to literature review, and proposed a hierarchical model of influencing entrepreneurial learning from failure through the expert method

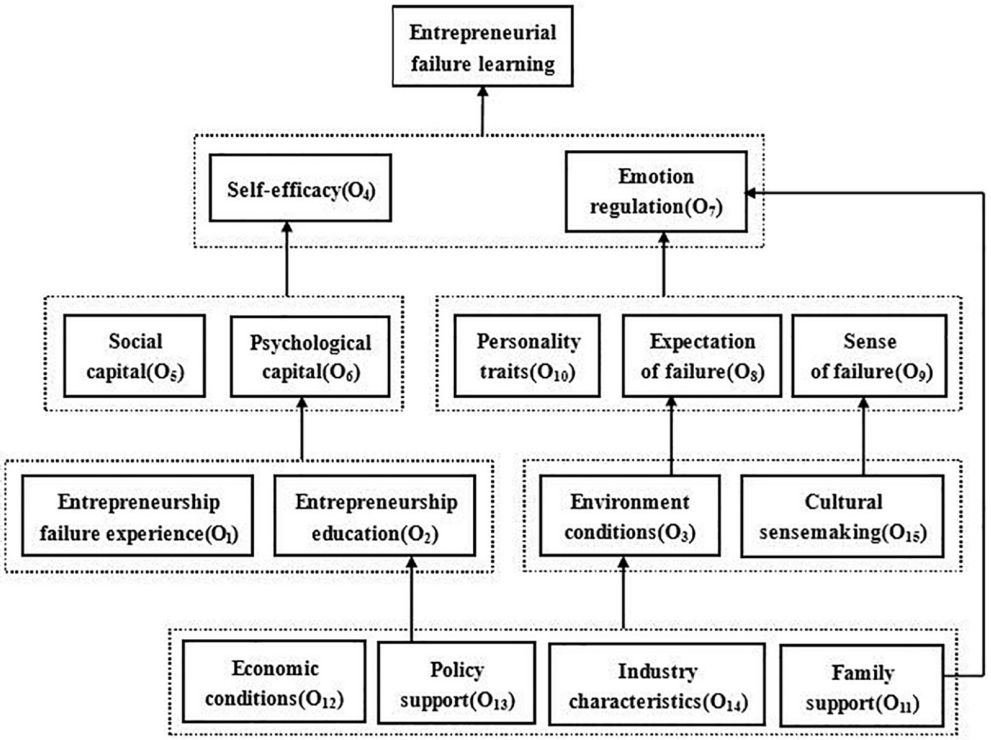

FIGURE 1 | Multilevel structure hierarchy of the factors.

based on ISM method of system dynamics. Existing studies have explored a lot of factors affecting entrepreneurial failure learning from three levels, including individual, enterprise and environmental aspects (Shepherd et al., 2009b; Carlos et al., 2016; Vivianna et al., 2017). We carry out a comprehensive research and present an intuitive ISM (as shown in **Figure 1**) for researchers. Secondly, this paper reveals that self-efficacy and emotion regulation may exert direct impacts on entrepreneurial learning from failure as key factors. Some scholars have also stressed the importance of self-efficacy and emotion regulation (Boss and Sims, 2008; Roxane and Frank, 2014). This provides a new clue to understand the study mechanism of entrepreneurial failure from comprehensive function of self-efficacy and emotion regulation. Furthermore, this study integrates the existing research dimensions and research framework, which is a beneficial exploration of the entrepreneurial learning theory and also provides a possibility for empirical study of entrepreneurial learning from failure.

In practice, our research findings have provided potential implications for entrepreneurs and organizations to build entrepreneurial systems in three aspects. This paper firstly provides a path for entrepreneurs to improve their ability of learning from failure. The entrepreneurs' self-efficacy and emotion regulation deserve high attention because they may directly affect the entrepreneurial learning from failure. Entrepreneurs should maintain a high level of self-efficacy and regulate their emotions to facilitate the beneficial transformation of entrepreneurial failure (Petrovic et al., 2016). Secondly, the entrepreneurship education may indirectly affect the entrepreneurial learning from failure by affecting the entrepreneurs' self-efficacy. As the main institution and department of entrepreneurship education, universities, governments and entrepreneurship education institutions are required to provide entrepreneurs with more accurate entrepreneurship services, such as apprenticeship entrepreneurship mentors, which will not only provide business guidance and resource integration, but also emphasize the entrepreneurs' psychological capital and emotion regulation. Thirdly, economic conditions, policy support, industry characteristics and cultural sensemaking of failure are the macro factors that cannot be ignored (Christiansen, 2006). Especially, the government has to provide vigorous innovation policy support, industry information and public services so as to create a good social atmosphere and environment for entrepreneurial activities.

Limitation and Future Research

The ISM proposed in this paper integrates and extracts the existing literature. The relationship between different influencing factors is analyzed from the perspective of system theory; besides, the model is revised and expanded by means of the case study method. Although this paper can provide enlightenment on the application of the method of ISM in the field of entrepreneurship to a certain extent, there are inevitably some limitations in this paper, providing the directions of future studies.

First, this paper uses ISM method to study the factors influencing the entrepreneurial learning from failure. Although this method has been partly applied in some field of management (Feng and Yun, 2010; Muruganantham et al., 2018), its applicability in the field of entrepreneurship needs further study. Therefore, researchers can expand the applicability of ISM method in the research of entrepreneurship.

Secondly, the combination with the entrepreneurial learning theory makes a hierarchical judgment of each influencing factor, but fails to conduct a quantitative study. It is still a subjective judgment of the causal relationship between the influencing factors in lack of strong empirical support. Therefore, the conclusion needs more empirical research to provide more evidence support. Especially, self-efficacy and emotion regulation play a key role in influencing entrepreneurial learning from failure (Roxane and Frank, 2014; Vivianna et al., 2017), interaction effect can be considered in future empirical studies.

Thirdly, from the perspective of case study, a single case is selected, which is insufficient to fully explain the model as proposed in this paper. As mentioned above, different approaches of cultural sense-making may exert different effects on individual attitudes and behaviors (Cardon et al., 2011). Therefore, future research should consider more cases from different countries to enrich the conceptual model from the cross-case perspective.

INFORMED CONSENT

The authors state that for this study written informed consent are obtained from all participants. Written informed consent was also obtained from the three entrepreneurs for the publication of the case study/description. All participants are willing to participate in this study and know the content and process of this study.

ETHICS STATEMENT

Based on the existing literature, this paper studies the factors affecting learning after entrepreneurial failure by using the Interpretive Structural Model (ISM) of systematics. The purpose, content, process and conclusion of our research do not involve ethical and moral issues. An ethics approval was not required as per applicable institutional and national guidelines.

AUTHOR CONTRIBUTIONS

JW participated in the design, drafting of the early version, and revising of the article. YC participated in model and data analysis, drafting of the early version, and revising of the article. JZ participated in the design and revise of the article. YG checked the method.

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REFERENCES

Anderson, A., Park, J., and Jack, S. (2007). Entrepreneurial social capital: conceptualizing social capital in new high-tech firms. *Int. J. Small Bus.* 25, 245–272. doi: 10.1177/0266242607076526

Artinger, S., and Powell, T. C. (2016). Entrepreneurial failure: statistical and psychological explanations. *J. Strateg. Manag.* 37, 1047–1064. doi: 10.1002/smj.2378

Bandura, A. (1982). Self-efficacy mechanism in human agency. *Am. Psychol.* 37, 122–147. doi: 10.1037/0003-066X.37.2.122

Baron, R. A., and Markman, G. D. (2003). Beyond social capital: the role of entrepreneurs' social competence in their financial success. *J. Bus. Ventur.* 18, 41–60. doi: 10.1016/s0883-9026(00)00069-0

Benson, A., and Han, L. (2011). Experiential learning from entrepreneurial failure. *Int. J. Behav. Account. Finance.* 2:21. doi: 10.1504/ijbaf.2011.038755

Boso, N., Adeleye, I., Donbesuur, F., and Gyensare, M. (2018). Do entrepreneurs always benefit from business failure experience? *J. Bus. Res.* 98, 370–379. doi: 10.1016/j.jbusres.2018.01.063

Boss, A. D., and Sims, H. P. (2008). Everyone fails! Using emotion regulation and self-leadership for recovery. *J. Manag. Psychol.* 23, 135–150. doi: 10.1108/02683940810850781

Cannon, M. D., and Edmondson, A. C. (2001). Confronting failure: antecedents and consequences of shared beliefs about failure in organizational work groups. *J. Organ. Behav.* 22, 161–177. doi: 10.1002/job.85

Carayannis, E. G., Evans, D., and Hanson, M. (2003). A cross-cultural learning strategy for entrepreneurship education: outline of key concepts and lessons learned from a comparative study of entrepreneurship students in France and the US. *J. Technov.* 23, 757–771. doi: 10.1016/s0166-4972(02)00030-5

Cardon, M. S., Stevens, C. E., and Potter, D. R. (2011). Misfortunes or mistakes? Cultural sensemaking of entrepreneurial failure. *J. Bus. Ventur.* 26, 79–92. doi: 10.1016/j.jbusvent.2009.06.004

Carlos, D., Marta, P. O., and Carlos, R. A. (2016). Entrepreneurship during economic crisis: success factors and paths to failure. *J. Bus. Res.* 69, 5366–5370. doi: 10.1016/j.jbusres.2016.04.139

Carsrud, A., and Brännback, M. (2011). Entrepreneurial motivations: what do we still need to know? *J. Small. Bus. Manag.* 49, 9–26. doi: 10.1111/j.1540-627X.2010.00312.x

Christiansen, C. R. (2006). Sense-making and entrepreneurial coalition building: a case of competing interests, cultural barriers, and interorganizational relations in a nonprofit health plan. *Int. J. Publ. Admin.* 29, 501–515. doi: 10.1080/01900690500452328

Cope, J. (2011). Entrepreneurial learning from failure: an interpretive phenomenological analysis. *J. Bus. Ventur.* 26, 604–623. doi: 10.1016/j.jbusvent.2010.06.002

Cotterill, K. (2012). A comparative study of entrepreneurs' attitudes to failure in technology ventures. *Int. J. Innov. Sci.* 4, 101–116. doi: 10.1260/1757-2223.4.2.101

Crane, F. G., and Sohl, J. E. (2004). Imperatives for venture success: entrepreneurs speak. *Int. J. Entrep. Innov.* 5, 99–106. doi: 10.5367/000000004773863255

Farris, D. R. (1975). On the use of interpretive structural modeling for worth assessment. *J. Comput. Electric. Eng.* 2, 149–174. doi: 10.1016/0045-7906(75)90004-X

Feng, Z. X., and Yun, W. Q. (2010). "Analysis on distribution efficiency influencing factors of supermarket bases on interpretive structural model," in *Proceedings of the International Conference on Logistics Systems & Intelligent Management*, (Harbin: IEEE).

Gong, Y., Baker, T., and Miner, A. S. (2009). "Failures of entrepreneurial learning in knowledge-based startups," in *Proceedings of the Babson College Entrepreneurship Research Conference (BCERC)*, (Wellesley, MA: Babson College).

Gorgievski, M. J., Moriano, J. A., and Bakker, A. B. (2014). Relating work engagement and workaholism to entrepreneurial performance. *J. Manag. Psychol.* 29, 106–121. doi: 10.1108/jmp-06-2012-0169

Henry, C., Hill, F., and Leitch, C. (2005). Entrepreneurship education and training: can entrepreneurship be taught? Part I. *J. Edu. Train.* 47, 98–111. doi: 10.1108/00400910510586524

Hogarth, R. M., and Karelaia, N. (2012). Entrepreneurial success and failure: confidence and fallible judgment. *J. Organ. Sci.* 23, 1733–1747. doi: 10.1287/orsc.1110.0702

Honig, B. (2004). Entrepreneurship education: toward a model of contingency-based business planning. *J. Acad. Manag. Learn. Educ.* 3, 258–273. doi: 10.5465/amle.2004.14242112

Hussain, M., Awasthi, A., and Tiwari, M. K. (2016). Interpretive structural modeling-analytic network process integrated framework for evaluating sustainable supply chain management alternatives. *J. Appl. Math. Model.* 40, 3671–3687. doi: 10.1016/j.apm.2015.09.018

Jenkins, A. S., Wiklund, J., and Brundin, E. (2014). Individual responses to firm failure: appraisals, grief, and the influence of prior failure experience. *J. Bus. Ventur.* 29, 17–33. doi: 10.1016/j.jbusvent.2012.10.006

Kannan, D., Diabat, A., and Shankar, K. M. (2014). Analyzing the drivers of end-of-life tire management using interpretive structural modeling (ISM). *Int. Adv. Manufactur. Technol. J.* 72, 1603–1614. doi: 10.1007/s00170-014-5754-2

Karl, W., Saurav, P., and Erkko, A. (2013). How culture moulds the effects of self-efficacy and fear of failure on entrepreneurship. *J. Entrep. Reg. Dev.* 25, 756–780. doi: 10.1080/08985626.2013.862975

Khelil, N. (2016). The many faces of entrepreneurial failure: insights from an empirical taxonomy. *J. Bus. Ventur.* 31, 72–94. doi: 10.1016/j.jbusvent.2015.08.001

Kuo, T. C., Ma, H. Y., Huang, S. H., HuChing, A. H., and Huang, C. S. (2010). Barrier analysis for product service system using interpretive structural model. *Int. Adv. Manufactur. Technol. J.* 49, 407–417. doi: 10.1007/s00170-009-2399-7

Landier, A., and Holmstrom, B. (2005). *Entrepreneurship and the Stigma of Failure*. Available at: https://ssrn.com/abstract=850446 (accessed December 24, 2018).

Liu, C. (2010). *Are Entrepreneurs likely to Mistake Luck for Skill When Evaluating Chance Outcomes?* Cambridge: University of Cambridge.

Macpherson, A., and Holt, R. (2007). Knowledge, learning and small firm growth: a systematic review of the evidence. *J. Res. Policy.* 36, 172–192. doi: 10.1016/j.respol.2006.10.001

Mantere, S., Aula, P., Schildt, H., and Vaara, E. (2013). Narrative attributions of entrepreneurial failure. *J. Bus. Ventur.* 28, 459–473. doi: 10.1016/j.jbusvent.2012.12.001

Muruganantham, G., Vinodh, S., Arun, C. S., and Ramesh, K. (2018). Application of interpretive structural modelling for analyzing barriers to total quality management practices implementation in the automotive sector. *Total. Qual. Manag Bus. Excel.* 29, 1–22. doi: 10.1080/14783363.2016.1213627

Neck, H. M., and Greene, P. G. (2011). Entrepreneurship education: known worlds and new frontiers. *J. Small Bus. Manag.* 49, 55–70. doi: 10.1111/j.1540-627x.2010.00314.x

Oser, F., and Volery, T. (2012). Sense of failure" and "sense of success" among entrepreneurs: the identification and promotion of neglected twin entrepreneurial competencies. *J. Empiric. Res. Vocat. Educ Train.* 4, 27–44.

Petrovic, P., Ekman, C. J., Klahr, J., Tigerstrom, L., Ryden, G., Johansson, A. G. M., et al. (2016). Signi?cant grey matter changes in a region of the orbitofrontal cortex in healthy participants predicts emotional dysregulation. *Soc. Cogn. Affect. Neurosci.* 11, 1041–1049. doi: 10.1093/scan/nsv072

Pittaway, L., and Thorpe, R. (2012). A framework for entrepreneurial learning: a tribute to Jason Cope. *J. Entrep. Reg. Dev.* 24, 837–859. doi: 10.1080/08985626.2012.694268

Politis, D. (2005). The process of entrepreneurial learning: a conceptual framework. *Entrep. Theory Pract.* 29, 399–424. doi: 10.1111/j.1540-6520.2005.00091.x

Politis, D., and Gabrielsson, J. (2009). Entrepreneurs' attitudes towards failure: an experiential learning approach. *J. Soc. Sci. Electr. Pub.* 15, 364–383. doi: 10.1108/13552550910967921

Razmus, W., and Laguna, M. (2018). Dimensions of entrepreneurial success: a multilevel study on stakeholders of micro-enterprises. *J. Front. Psychol.* 9:791. doi: 10.3389/fpsyg.2018.00791

Roxane, D. H., and Frank, J. (2014). Does psychological capital help to learn and bounce back from entrepreneurial failure? *J. Soc. Sci. Electr.* Available at: https://ssrn.com/abstract=2557537 (accessed January 2, 2019).

Sapovadia, V. K. (2015). *Entrepreneurship Failure: Case of Low Productivity in Nigeria*. Available at: https://ssrn.com/abstract=2589672 (accessed December 11, 2018).

Shepherd, D. A. (2004). Educating entrepreneurship students about emotion and learning from failure. *J. Acad. Manag. Learn. Educ.* 3, 274–287. doi: 10.5465/AMLE.2004.14242217

Shepherd, D. A., Wiklund, J., and Haynie, J. M. (2009b). Moving forward: balancing the financial and emotional cost of business failure. *J. Bus. Ventur.* 24, 134–148. doi: 10.1016/j.jbusvent.2007.10.002

Shepherd, D. A., Covin, J. G., and Kuratko, D. F. (2009a). Project failure from corporate entrepreneurship: managing the grief process. *J. Bus. Ventur.* 24, 588–600. doi: 10.1016/j.jbusvent.2008.01.009

Simmons, S., Wiklund, J., and Levie, J. (2014). Stigma and business failure: implications for entrepreneurs' career choices. *J. Small Bus. Econ.* 42, 485–505. doi: 10.1007/s11187-013-9519-3

Singh, S., Corner, P. D., and Pavlovich, K. (2015). Failed, not finished: a narrative approach to understanding venture failure stigmatization. *J. Bus. Ventur.* 30, 150–166. doi: 10.1016/j.jbusvent.2014.07.005

Steffens, P., Davidsson, P., and Fitzsimmons, J. (2009). Performance configurations over time: implications for growth- and profit-oriented strategies. *Entrep. Theory Pract.* 33, 125–148. doi: 10.1111/j.1540-6520.2008.00283.x

Sushil. (2012). Interpreting the interpretive structural model. *Glob. J. Flex. Syst. Manag.* 13, 87–106. doi: 10.1007/s40171-012-0008-3

Thirupathi, R. M., and Vinodh, S. (2016). Application of interpretive structural modelling and structural equation modelling for analysis of sustainable manufacturing factors in Indian automotive component sector. *Int. Prod. Res. J.* 54, 6661–6682. doi: 10.1080/00207543.2015.1126372

Trevelyan, R. (2008). Overconfidence and effort in new venture development. *Front. Entrep. Res.* 28, 1–14. Available at: http://digitalknowledge.babson.edu/fer/vol28/iss5/1 (accessed December 7, 2018).

Valmohammadi, C., and Dashti, S. (2016). Using interpretive structural modeling and fuzzy analytical process to identify and prioritize the interactive barriers of e-commerce implementation. *J. Inform. Manag.* 53, 157–168. doi: 10.1016/j.im.2015.09.006

Vinig, T. G., and Souren, F. (2007). *Failure and Entrepreneurship: A Behavioral Perspective*. Available at: SSRN: https://ssrn.com/abstract=1020570 (accessed January 3, 2019).

Vivianna, F. H., Charlotta, S., Sheetal, S., George, S., and Georg, V. K. (2017). Keep calm and carry on: emotion regulation in entrepreneurs' learning from failure. *J. Entrep. Theory Pract.* 42, 605–630. doi: 10.1111/etap.12273

Wang, C. L., and Chugh, H. (2014). Entrepreneurial learning: past research and future challenges. *Int. J. Manag. Rev.* 16, 24–61. doi: 10.1111/ijmr.12007

Warfield, J. N. (1978). Societal systems planning. *Policy complex. J. Proc. IEEE* 66, 362–363. doi: 10.1109/PROC.1978.10919

Wu, W. Q., Wang, H. X., Zheng, C. D., and Wu, Y. C. J. (2019). Effect of narcissism, psychopathy, and machiavellianism on entrepreneurial intention: the mediating of entrepreneurial self-efficacy. *J. Front. Psychol.* 10:360. doi: 10.3389/fpsyg.2019.00360

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Can Sense of Opportunity Identification Efficacy Play a Mediating Role? Relationship Between Network Embeddedness and Social Entrepreneurial Intention of University Students

Wenke Wang[1], Yingkai Tang[2], Yao Liu[2], Tao Zheng[3], Jing Liu[2]* and Haiyue Liu[2]*

[1] Business School, Sichuan Normal University, Chengdu, China, [2] Business School, Sichuan University, Chengdu, China, [3] Scientific Research Department, Sichuan Normal University, Chengdu, China

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Hsiu-Ping Yueh,
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***Correspondence:**
Yingkai Tang
tang@scu.edu.cn
Jing Liu
liujing@scu.edu.cn

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Social entrepreneurship is an entrepreneurial activity centering on solving social problems and creating social values, which can effectively alleviate the problems of sustainable development such as an excessive gap between the rich and the poor, a lack of resources and so on, and can resolve the "triple failures" of government, the market and public welfare departments to a certain extent. As the subjective attitude of entrepreneurs, entrepreneurial intention can predict a representational incidence rate of entrepreneurial behavior. Therefore, aimed at university students, a special group of entrepreneurs, this paper constructs a theoretical framework of "network embeddedness – sense of opportunity identification efficacy – university students' social entrepreneurial intention" from the perspective of social cognitive theory through 466 pieces of valid survey data, and uses Stata 14 to construct a multiple linear regression model to explore the mechanism of action between the three. The results show that university students' sense of opportunity identification efficacy can significantly and positively stimulate their social entrepreneurial intention, and the network embeddedness (network scale and network intensity) of entrepreneurs is also significantly and positively correlated with their sense of opportunity identification efficacy; however, via the hierarchical regression model, it was found that the sense of opportunity identification efficacy can only partially mediate the relationship between network embeddedness and university students' social entrepreneurial intention, which is mainly manifested in the positive correlation between university students' social entrepreneurial intention and their network scale, and is unrelated to network intensity. This research contributes to enriching the theory of social entrepreneurial intention and guides the strengthening of university students' social entrepreneurial intention in reality.

Keywords: network embeddedness, sense of opportunity identification efficacy, social entrepreneurial intention, university students, mediating role

INTRODUCTION

The continuing expansion of enrollment in universities sees a progressive increase of university graduates every year; however, the continuing downward trend of economic growth has added increasing pressure on graduates in their search for employment. Therefore, entrepreneurship has become a popular method for university graduates when facing fierce social competition and the considerable pressure to find employment. This paper will focus primarily on one of the paths university students take in entrepreneurial behavior: the subdivision of social entrepreneurship.

Social entrepreneurship is a new entrepreneurship model (Mair and Marti, 2006) primarily designed to realize social value, but also with the characteristics of commercial enterprises. Its source comes from the "triple failures" of the government, the market and the public welfare department. It is a social opportunity that can satisfy social entrepreneurs that are not satisfied by commercial enterprises or through traditional government and public welfare means (Jin and Liu, 2015). It can play a greater role in alleviating modern social problems such as resource shortages and environmental pollution (Austin et al., 2012). Therefore, intensifying the university students' entrepreneurial strength of social enterprises is helpful in accelerating social progress and building a harmonious society, which has very important practical significance (Peredo and Mclean, 2006; Xue, 2016). However, entrepreneurial intention is considered as the best predictor of entrepreneurs' potential entrepreneurial behavior, and is a subjective attitude expression of entrepreneurs' willingness to engage in entrepreneurial activities (Krueger and Carsrud, 1993; Mu, 2007), therefore the prediction and promotion of the transformation rate of entrepreneurial behavior can be realized through research on university students' social entrepreneurial intention.

At present, scholarly research on social entrepreneurial intention mainly focuses on meaning (Anderson et al., 2010; Morris et al., 2011), measure (Kraus et al., 2012; Dwivedi and Weerawardena, 2018), the individual characteristics and entrepreneurial background of entrepreneurs, and the impact of social capital on entrepreneurial intention (Fan and Wang, 2005), the impact of opportunity identification on entrepreneurial intention and the role of entrepreneurs in opportunity identification (Zahra et al., 2009; Corner and Ho, 2010; Conger et al., 2012; Alvarez et al., 2014), the relationship between entrepreneurial motivation and entrepreneurial intention (Monteiro et al., 2013; Hockerts, 2015), the role of the national system on entrepreneurial intention (Estrin et al., 2013; Mendoza et al., 2015), etc. Moreover, Liu and Zhuang (2018) found that due to the lack of systematic theoretical construction, existing research cannot further reveal the deep logical relationship between the motivation, process and performance of social entrepreneurship through combing the quantitative research documents on social entrepreneurship published in international mainstream management journals since 2005, and they suggested that the internal mechanism of social entrepreneurship should be deeply explored through intermediary variables. Generally speaking, most of the current research on social entrepreneurial intention focuses on the individual characteristics of entrepreneurs, while research into the influence of the external environment on entrepreneurial intention is very scarce.

However, it is well known that the external environment in which entrepreneurs live, that is, their network embeddedness, has a direct impact on their decision-making and behavior in the entrepreneurial process (Zadek et al., 1997; Zahra et al., 2009). Network embeddedness is a specific relationship structure between people and their social network, the source for entrepreneurs to obtain capital and support, and key to promoting the alliance between enterprises and economic relations (Wenman, 2018). Therefore, different resources and information represented by the diverse social network embeddedness of entrepreneurs will affect the intensity of their social entrepreneurial intention. However, in recent years, many scholars have gradually added the individual psychological factors of entrepreneurs to research on social networks and their entrepreneurial behavior. For example, Bandura (2000) believes that the network embeddedness of entrepreneurs is different, and their difficulty in obtaining entrepreneurial information and resources is also distinct, thus affecting the four major senses of efficacy, namely innovation, opportunity identification, risk tolerance and relationship coordination, and finally showing the diversified entrepreneurial intentions and behaviors of entrepreneurs. However, this paper holds that the identification and mastery of various opportunities in the entrepreneurial process can directly determine the development status and survival probability of the enterprise, and good opportunity identification ability gives the possibility for entrepreneurs to implement actions, achieve goals and establish new enterprises (Hills et al., 2011). Xie (2017) believes that opportunity identification in the entrepreneurial process is the personal summary of cognitive processes and entrepreneurial activities, and is the precursor of various entrepreneurial actions such as entrepreneurs' evaluation and exploration of entrepreneurial opportunities. Therefore, in the current dynamic environment with information network asymmetry and high uncertainty, attention to the opportunity identification efficacy induction of entrepreneurs is one of the key issues in the field of entrepreneurship research (Shane and Venkataraman, 2001).

However, current research does not make precise divisions of social entrepreneurs' backgrounds and research into the social entrepreneurial intention of university students is almost non-existent, despite the fact that many people regard university students one of the groups with the greatest potential for innovation and entrepreneurship as a main force in China's entrepreneurial landscape. Under the guidance of the strategy to become an innovation-oriented country, the state of social entrepreneurship education in Chinese universities has been continuously optimized. However, there still exist problems such as cognitive deviation of educational concepts, a disjointed curriculum system, and

the incomplete state of social entrepreneurship education support and guarantee systems (Qiu, 2018). That are well behind developed nations such as the United States and Japan. Therefore deviations in educational concepts, curriculum systems, guarantee systems and so on, impair university students' social entrepreneurial intention to a certain degree (Liu, 2018). In this educational environment, discovering how to research the voluntary social entrepreneurial intention of students from their own point of view and their social relations structure and network embeddedness and improve university students' social entrepreneurial intention at the source to realize a conversion rate of their social entrepreneurial behavior is of relatively important research urgency and practical significance.

To summarize, this paper selects the network embeddedness of Chinese university students as its independent variable, and the social entrepreneurial intention of university students as its dependent variable, and introduces the sense of opportunity identification efficacy as its intermediary variable, and constructs the theoretical model of "network embeddedness-sense of opportunity identification efficacy-social entrepreneurial intention of university students," and discusses the action mechanism and influence mechanism between network embeddedness, sense of opportunity identification efficacy and the social entrepreneurial intention of university students in China. The possible contributions of this paper lie in the following aspects: (1) Enrich theoretical research on network embeddedness and social entrepreneurship, particularly social entrepreneurial intention, and apply survey data as a support to empirically explore the logical relationship between the two; (2) From the perspective of psychological cognition, apply university students' own sense of opportunity identification efficacy to guide and deepen their entrepreneurial intention so as to enrich theoretical research on the sense of opportunity identification efficacy; (3) Use the results of this paper to improve the conversion rate of Chinese university students' social entrepreneurship, promote the achievement and realization of university students' social mission, and improve China's social entrepreneurship rate, to compensate for the deficiencies of government failure, market failure and charity failure to a certain extent, and contribute more to China's poverty eradication, employment solution and social environment improvement.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Social Entrepreneurial Intention and Its Theory

Krueger and Carsrud (1993) believe that entrepreneurial intention is the best indicator to predict entrepreneurial behavior. Because people's behavior is an intentional decision made through pre-judgment of their own environment, entrepreneurial behavior originates from the emergence of entrepreneurial intention. Dwivedi and Weerawardena (2018) define social entrepreneurial intention as an attitude composed of innovation, initiative, risk management, effect orientation, social mission orientation and sustainable orientation. Its purpose is to solve social market failure and create greater social value.

At present, the most widely used and credible theories on social entrepreneurial intention are the Theory of Planned Behavior and the Revised Model of Entrepreneurial Intention. The Theory of Planned Behavior was put forward by Professor Ajzen (1991), who believes that people can control their behavior themselves and make timely adjustments according to changes in their environment. Of the five main factors emphasized in this theory, attitude, subjective norm, perceived behavioral control, behavior intention and behavior, Ajzen (1991) believes that there is a correlative relationship between entrepreneurial intention and the positive nature, normalization and degree of behavioral control of an entrepreneur's attitude. The more positive the behavioral subject is, the more support from significant others they receive, and the better perceived behavioral control they have, the more behavioral intention they get; contrarily becoming smaller. Of these, correct perceived behavioral control reflects the control conditions in reality. Therefore, it can be used as an alternative measurement index of control conditions and directly predict the possibility of behavioral incidence, with the veracity of the prediction dependent on the true extent of perceived behavioral control. At the same time, Ajzen (1991) believes that factors such as personal and social culture (such as experience, age, gender, social background, etc.) can influence the subject's behavioral beliefs, indirectly influencing their behavioral attitude, subjective norm and perceived behavioral control, and finally influencing the subject's behavioral intention and behavior. The Revised Model of Entrepreneurial Intention was proposed by Krueger and Carsrud (1993) to revise the entrepreneurial event model. The model holds that entrepreneurs' entrepreneurial intention is mainly determined by three factors: entrepreneurial feasibility, entrepreneurial desire and entrepreneurial behavioral tendency.

As far as China's theoretical research on social entrepreneurial intention is concerned, it is still in its infancy. Among Chinese scholars, Sheng (2008) was the first to regard social entrepreneurial intention as the key characteristic of the social entrepreneurial behavior subject in his research. Wang et al. (2014) divided the influencing factors of social entrepreneurship into subjective factors such as the comprehensive quality and ability of entrepreneurs themselves and objective factors such as entrepreneurship education and the entrepreneurship environment. Tang (2018) believes that there is an inverted "U" relationship between the social capital owned by social entrepreneurs and their social entrepreneurial intention, and entrepreneurs' entrepreneurial self-efficacy plays a positive moderating role between the two. Generally speaking, Chinese scholars sorely lack research on social entrepreneurial intention, leaving an urgent need to conduct research on social entrepreneurial intention specifically for the Chinese market.

Network Embeddedness, Sense of Opportunity Identification Efficacy and University Students' Social Entrepreneurial Intention

Sense of Opportunity Identification Efficacy and University Students' Social Entrepreneurial Intention

Entrepreneurship is a process of pooling a series of unique resources to pursue opportunities. Therefore, opportunity identification is the core concept of entrepreneurship research, whether in the field of commercial entrepreneurship or social entrepreneurship (Austin et al., 2012). Differing from commercial entrepreneurship, the distinguishing feature of social entrepreneurship opportunity identification is to solve social problems or create social values, which often focuses on serving basic and long-term needs more effectively through innovative ways (Peredo and Mclean, 2006). Shane and Venkataraman (2001) were the first to put forward the concept of the sense of opportunity identification efficacy. They define it from the perspective of opportunity source and believe that the sense of opportunity identification efficacy originates from the imbalance of an entrepreneur's own knowledge and the asymmetry of access to information, and is the innovation demand caused by changes in environmental factors such as process, industry and population structure. Wood and Williams (2014) also point out from the perspective of internal mechanism that the sense of opportunity identification efficacy is the entrepreneur's perception of opportunities through social rules and new organizations.

Some scholars have studied the relationship between the sense of opportunity identification efficacy and the entrepreneurial intention. Hill and Villa (1997) believe that the entrepreneurial process is extremely complicated, and quick and accurate identification of the opportunities over the process is a guarantee for entrepreneurs to implement actions, achieve goals and establish new businesses, which can directly affect the entrepreneurial intention of social entrepreneurs from a psychological point of view. Qing (2006) believes that when entrepreneurs recognize that there is a greater possibility of realizing success in entrepreneurship, or that there is a wider profit margin, they will generate more identity psychology, thus enhancing their motivation and confidence in the choice and enhancing their entrepreneurial intention. In other words, the higher the identification degree of entrepreneurial opportunities, the stronger the entrepreneurial intention and this leads to faster decision-making and more significant decision accuracy (Wei, 2014). Shepherd et al. (2015) also believe that identifying entrepreneurial opportunities promotes entrepreneurs' judgment and controllability of the market, and can directly stimulate the growth of their entrepreneurial intention and the effectiveness of entrepreneurial decision-making. Thus, this paper believes that the sense of opportunity identification efficacy can have a direct effect on entrepreneurial intention to a certain degree.

However, university students differ from ordinary entrepreneurs. The disjunction between school and society makes them less sensitive to business information, and the efficiency of opportunity identification is vague. However, opportunity identification, as the prerequisite, core element and key link to entrepreneurship (Shane and Venkataraman, 2001), is an important factor that connects entrepreneurial intention and entrepreneurial behavior (Liu, 2018). Geroski (1995) points out that the ability of new enterprises to identify the environment, opportunities and cope with them by adjusting their own strategies will ultimately determine their chance of survival. And social entrepreneurship is also dissimilar from ordinary entrepreneurship, as its behavior is focused on solving social problems and realizing social values (Zahra et al., 2009; Béchervaise and Benjamin, 2013). Compared with traditional business entrepreneurs, social entrepreneurs have a stronger thirst for opportunities, policy support and access to resources (Chen, 2007). Therefore, it is of great significance to study the effect of the sense of opportunity identification efficacy on the social entrepreneurial intention of university students, a special group. This cannot only make up for the current theoretical gap, but also provide practical guidance for university students engaging in social entrepreneurship. Based on this, this paper puts forward the following assumptions:

Hypothesis 1: The sense of opportunity identification efficacy has a significant positive effect on the social entrepreneurial intention of university students.

Network Embeddedness and the Sense of Opportunity Identification Efficacy

Uzzi (1997) and Andersson et al. (2002) believed that network embeddedness is an important tool to study enterprises and is the basis for enterprises to connect and develop in economic activities and social networks. The concept of embeddedness was first put forward by Polanyi (1962), who believes that the human economic system and non-economic system are interrelated and influence each other, rather than function independently. Peng et al. (2019) believes that social entrepreneurial enterprises conform to different resources at different stages of their development, and that these resources can be divided into six areas: the enterprise's material resources, technical resources, human resources, social networks, market resources and systems. In their latest research, Ma et al. (2019) provided good proof that an entrepreneurs' network embeddedness has an influence on their sense of opportunity identification efficacy. Their research primarily focuses on entrepreneurs that had returned to China from overseas. This research proposed that these returning entrepreneurs' network embeddedness was primarily overseas and, because of this, when they returned to start entrepreneurship, because they had weak network embeddedness in their new social network, they had a much poorer identification and application effect of human and social capital compared to local entrepreneurs, and this put them in a disadvantageous position.

Opportunity identification is the basic premise of entrepreneurship, and the resources and information needed in

the process of opportunity identification are continuously transmitted and upgraded in the social network where the entrepreneur is located (Ozgen and Baron, 2007; Liu, 2014). Granovetter (1983) believes that diverse embeddedness structures of entrepreneurs in social relations will bring different information and knowledge, which will affect the deviation of entrepreneurs' cognitive behavior. Subsequently, Burt and Burzynska (2017) in-depth study believes that entrepreneurs operating in structural holes in the social network structure generally have a better and faster opportunity identification ability and competitive advantage than entrepreneurs in other network locations, because the information and resources brought by different locations are diversified. Shane and Venkataraman (2001) also believe that the degree of diversification of entrepreneurs' social network relationships is positively related to their ability to identify opportunities. Specifically, network relations with strong homogeneity can enable entrepreneurs to obtain more emotional support and practical help, realize more efficient information exchange and give them access to high-quality resources, thus improving the possibility of opportunity identification Burt and Burzynska (2017). While weak network relations formed by members of different industries can bring more heterogeneous resources to entrepreneurs, thus expanding the scope of entrepreneurial opportunities identified by entrepreneurs (Granovetter, 1983). Generally speaking, the more information entrepreneurs have, the stronger their tolerance of opportunity cost will be, and thus they have stronger entrepreneurial intention (Zhang, 2005). Lozano et al. (2016) believe that the social network structure of social entrepreneurs is one of the three entrepreneurial alertnesses, and its network quantity and diversity will help social entrepreneurs to find opportunities.

To summarize, the difference in network embeddedness directly affects the richness of information resources obtained by social entrepreneurs and their ability to identify entrepreneurial opportunities. The positive effect of network embeddedness on opportunity identification in the entrepreneurial process has been recognized by most scholars (Lin and Zhang, 2005; Ozgen and Baron, 2007). Therefore, this paper refers to Niu (2017) division of the network embeddedness of university students into two dimensions of network scale and network intensity, and puts forward the following assumptions:

Hypothesis 2a: Network scale has a significant positive impact on the sense of opportunity identification efficacy;
Hypothesis 2b: Network intensity has a significant positive effect on the sense of opportunity identification efficacy.

The Mediating Effect of the Sense of Opportunity Identification Efficacy on the Relationship Between Network Embeddedness and University Students' Social Entrepreneurial Intention

Through the previous theoretical exposition, this paper has demonstrated that entrepreneurs' network embeddedness has a significant impact on the sense of opportunity identification efficacy, and that the sense of opportunity identification efficacy also has a significant impact on social entrepreneurial intention. Referring to the mediating effect test method of Wang (2018), this paper boldly assumes that the sense of opportunity identification efficacy plays a mediating role in the interaction between network embeddedness and social entrepreneurial intention, but the specific full mediating role or partial mediating role needs to be further tested through empirical data. Based on this, this paper puts forward the following assumptions:

Hypothesis 3: The sense of opportunity identification efficacy plays a mediating role in the social entrepreneurial intention of university students in all dimensions of network embeddedness.

SAMPLES AND METHODS

Samples

The empirical data in this paper come from investigations and interviews.

First of all, on the questionnaire design and sample of subjects. After sorting out the relevant literature, the author made a

TABLE 1 | Measurement scale of university students' social entrepreneurial intention.

Dimension	Item	Mean value	Factor loading	Credibility and validity index
University students' social entrepreneurial intention	1. There is a very good chance that I will engage in social entrepreneurial activities within 5 years after I graduate.	2.74	0.8399	KMO Value = 0.899
	2. Sooner or later I will start my own business.	2.86	0.8630	
	3. I have already made specific plans to start my own business.	2.28	0.8585	Cronbanch's α = 0.93
	4. I have already considered the industry and products I will work in the future.	2.80	0.8293	
	5. I have always been preparing to start my own business.	2.33	0.8935	Total variance contribution = 70.3%
	6. Even if I encounter practical difficulties, I will still choose to start my own business.	2.67	0.8666	
	7. I am willing to make time to study things related to social entrepreneurship.	3.41	0.7046	

TABLE 2 | Measurement scale of network embeddedness.

Dimension	Item	Mean value	Factor loading	Credibility and validity index
Network scale	1. Compared to my classmates, I come into contact with and get to know more people.	3.25	0.8513	KMO value = 0.715
	2. Compared to my classmates, I come into contact with and get to know people in society on a greater scale.	3.21	0.8486	
	3. Compared to my classmates, I get a lot more support and help from people when I need it.	3.32	0.8497	Cronbanch's α = 0.81
Network intensity	4. I keep frequent contact with people I know that I believe are important.	3.70	0.7869	
	5. Most of the people I know that I believe are important are relatives or friends.	3.94	0.7588	Total variance contribution = 63.75%
	6. I can always quickly get informative and effective help from others.	3.50	0.7550	
	7. The people I believe are important give me a lot of help concerning my career and my personal development.	3.68	0.7982	

TABLE 3 | Measurement scale of sense of opportunity identification efficacy.

Dimension	Item	Mean value	Factor loading	Credibility and validity index
Sense of opportunity identification efficacy	1. I am good at identifying market segments.	3.11	0.8564	KMO value = 0.823
	2. I can identify valuable business opportunities.	3.11	0.9153	Cronbanch's α = 0.898
	3. I can identify potential consumer or client requirements.	3.33	0.8714	
	4. I can develop new products or find ways to improve existing products.	3.10	0.8563	Total variance contribution = 76.59%

reference to the questionnaires of Wang (2014) and Niu (2017) of which reliability and validity have passed the tests. The questions on the questionnaire are presented in **Tables 1**–**3**. Because a pre-survey was first conducted in Sichuan, the province that the author is located in, it was found after analysis of the social entrepreneur data of students in Sichuan that over 60% of participants in the survey were studying business courses, therefore this sample limited the percentage of business course students to around 60%. Furthermore, of the academies of higher learning in Sichuan, Sichuan Normal University, University of Electronic Science and Technology of China, Southwest Jiaotong University and others were of a very high technical nature and could have an academic influence. Therefore, the sample in this paper was primarily taken from students from Sichuan University, which is a more comprehensive university, to alleviate the random academic influence.

Second, as this paper's questionnaire applies the Likert scale and all the items in the model are rated by the same groups of individuals, there is a possibility that measured variance appears in its results. Therefore, when conducting the questionnaire, the author considered Kar and George (2003) and randomly distributed the questionnaire items and ensured that subjects were isolated and times were staggered, to reduce the chance of subjects interfering with one another to the greatest degree and effectively reducing the chances of measured variance.

Last, a pre-survey was conducted in Sichuan University (the data was not used) and the questionnaire was revised according to the results to make it more accurate. In addition, we also set up an investigation team to interview the investigated university students face to face to ensure that they had a full cognition and understanding of each test item. The surveyed university students have voluntarily participated and we fully reserve the personal privacy and confidentiality of participants. Finally, 500 questionnaires were distributed and 483 were recovered in this survey, 466 of which were valid, with a total effective rate of 96.48%.

Scale

All variables are measured on a 5-point Likert scale (1 for strongly disagree, 5 for strongly agree). In the 466 valid questionnaires, factor analysis and Cronbach's Alpha coefficient test were conducted using software Stata 14, and 18 questions were aggregated into the 3 dimensions of university students' social entrepreneurial intention, network embeddedness, and sense of opportunity identification efficacy. The following measures are taken, respectively.

University Students' Social Entrepreneurial Intention

University students' social entrepreneurial intention used as the dependent variable for this paper's theoretical model. This paper uses the research of Chen et al. (1998), Han Lizheng (2009) and Kraus et al. (2012) as reference, and uses 7 items (shown in **Table 1**) to describe the characteristics of university students' social entrepreneurial intention. The questionnaire data passes the reliability test (α = 0.93) and validity test (KMO = 0.899, Bartlett spherical test p-value < 0.01, factor load > 0.5, cumulative variance rate = 70.3%).

This paper divides *the network embeddedness of university students* into two dimensions: network scale and network

intensity (Niu, 2017). Network scale describes the number of members that entrepreneurs connect to in their current social network. It primarily uses the research and measurement methods of Wang (2011) for the design of 3 items. The network intensity indicates the closeness and intensity of the relationship between entrepreneurs and their connected members, which is mainly measured by referring to the research and measurement method of Granovetter (1983) to design the other 4 items and applies the 4 items, individual interaction rate, closeness of relationship, emotional intensity and reciprocal behavior to the 5-point Likert scale measurement. Finally, the 7 measure items of network embeddedness (shown in **Table 2**) all passed the reliability test ($\alpha = 0.81$), and the cumulative variance rate of the two factors of network scale and network intensity is proposed to be 63.75% by the principal component analysis method. The analysis results are basically consistent with the expected model design.

The sense of opportunity identification efficacy is an intermediate variable. Referring to Chen et al. (1998), Han Lizheng (2009), this paper designed 4 items to collect data on the measurement scale of the sense of opportunity identification efficacy. The cumulative variance rate of $\alpha = 0.898$ is 76.59%, KMO = 0.823, Bartlett sphere test p-value < 0.01, which indicates that reliability is within the acceptable range and the scale has a high level of validity.

Control Variables

This paper controls three variables, namely gender (Hechavarría et al., 2017; Lortie et al., 2017), educational level (Hörisch et al., 2016; Estrin et al., 2016) and professional background (Fan and Wang, 2005), which may have a great influence on the social entrepreneurial intention of college students and the sense of opportunity identification efficacy of intermediary variables. Descriptive statistics on these three control variables are shown in **Table 4**. Estrin et al. (2013) believe that women have a stronger concept of caring than men, so they are more inclined to the social entrepreneurial behavior of creating social value than commercial entrepreneurship (Hechavarría et al., 2017). Different scholars hold varied views on the influence of educational level on social entrepreneurial intention. According to the empirical results of Estrin et al. (2016), the higher the educational level, the more likely it is to choose social entrepreneurship; However, Hörisch et al. (2016) believe that the improvement of education level will lead entrepreneurs to prefer mature enterprises and weaken their social entrepreneurial intention.

TABLE 4 | Descriptive statistics of samples.

Items	Class	Number of samples	Percentage (%)
Gender	Male	102	21.9
	Female	364	78.1
Education background	College	14	3
	Undergraduate	446	95.7
	Master	5	1.1
	MBA	1	0.2
Specialty	Literature, history, and philosophy	12	2.6
	Economics	116	24.9
	Management	292	62.7
	Law	4	0.9
	Pedagogy	11	2.3
	Natural science	14	3
	Engineering	13	2.8
	Agronomy	3	0.6
	Medical and military	1	0.2

Methods

This paper used the verification of sense of opportunity identification efficacy as an intermediary variable to reveal the mechanism of action that network embeddedness has on a university student's social entrepreneurial intention. The various variable definitions can be seen in **Table 5**. There were many methods of analyzing and testing intermediary effect. This paper, in line with Wen and Ye (2014) research, takes the existing independent variable NE, intermediary variable SOIE, 3 control variables and the dependent variable USSEI as its model to consider NE passing SOIE and its influence on USSEI using the following test procedures:

First, regression analysis of dependent variable USSEI to independent variable NE. At this point the independent variable NE's coefficient should reach a significant level, or it would cease intermediary effect analysis; as in equation 1:

$$USSEI = \alpha + \beta_0 NE + \beta_1 Gender + \beta_2 EB + \beta_3 Spe + \varepsilon \quad (1)$$

Second, intermediary variable SOIE to independent variable NE regression; as in equation 2, assuming that NE's coefficient is β_0 at this point.

$$SOIE = \alpha + \beta_0 NE + \beta_1 Gender + \beta_2 EB + \beta_3 Spe + \varepsilon \quad (2)$$

Third, dependent variable USSIE with independent variable NE and intermediary variable SOIE regression; as in equation 3, assuming that NE's coefficient is β_4 and SOIE's coefficient is β_5.

$$USSEI = \alpha + \beta_4 NE + \beta_5 SOIE + \beta_6 Gender + \beta_7 EB + \beta_8 Spe + \varepsilon \quad (3)$$

Finally, the successive coefficient testing of β_0 andβ_5. If β_0 and β_5 are both significant then the testing coefficient isβ_4. If it is significant, then there is the existence of a partial intermediary effect and if it is not significant, then there is the existence of a complete intermediary effect. These are the traditional steps for conducting testing on regression coefficient; if at least one of β_0 or β_5 is not significant, then Sobel testing will be conducted. If this test passes, then intermediary effect exists and if it does not pass, then it proves that the intermediary effect does not exist.

TABLE 5 | Definition of variables.

	Variables	Definition
Dependent variable	University students' social entrepreneurial intention	USSEI, referring to Chen et al. (1998), Han Lizheng (2009), Kraus et al. (2012), described using the 7 items in **Table 1**
Independent variable	Network embeddedness	NE, divided into network scale and network intensity. With network scale referring to Wang (2011) and described in the 3 items in **Table 2**; and network intensity referring to Granovetter (1983) and described in the 4 items in **Table 2**
Mediating variable	Sense of opportunity identification efficacy	SOIE, referring to Chen et al. (1998), Han Lizheng (2009) and described in the 4 items in **Table 3**
Control variable	Gender	1 male; 0 females
	Education background	EB, primarily divided into college level and below and undergraduate, masters, Ph.D. and above
	Specialty	SPE, students of business related course restricted to around 60%

STATISTICAL RESULTS AND ANALYSIS

Descriptive Statistics and Relevant Analysis

Before regression analysis, the variance expansion factor VIF is used to exclude the multicollinearity test of the model (each VIF < 1.6). The correlation coefficient analysis of each variable is shown in **Table 6**. The results show that there is a significant positive correlation between the sense of opportunity identification efficacy and the social entrepreneurial intention of university students ($r = 0.6390^*$), and the two dimensions of network embeddedness (network scale and network intensity) are a significantly positive correlation with the sense of opportunity identification efficacy ($r_{\text{network scale}} = 0.5020^*$, $r_{\text{network intensity}} = 0.4227^*$), which preliminarily verifies the assumptions H1, H2a, and H2b mentioned above.

Regression Analysis

Sense of Opportunity Identification Efficacy and University Students' Social Entrepreneurial Intention

In this study, multiple linear regressions are used to verify the relationship between the sense of opportunity identification efficacy and university students' social entrepreneurial intention. The data results are shown in **Table 7**. The explained variables of the two models are university students' social entrepreneurial intention. The explanatory variables of Model 1 only include control variables to verify the influence of individual gender, educational level and professional background on their entrepreneurial intention; Model 2 adds explanatory variables on the basis of control variables to the sense of opportunity identification efficacy. The results show that after adding explanatory variables, the revised R^2 increases from 0.029 to 0.419, with a significant positive correlation between the sense of opportunity identification efficacy and university students' social entrepreneurial intention ($\beta = 0.777^{***}$), which indicates that the higher the sense of opportunity identification efficacy of entrepreneurs, the stronger the social entrepreneurial intention, assuming H1 is satisfied. The reason for this result may be that opportunity identification helps entrepreneurs to master the market and make timely controllable adjustments, thus generating positive feedback on their entrepreneurial psychology, which is consistent with the research results of Shepherd et al. (2015).

TABLE 6 | Correlation coefficient of variables.

	Entrepreneurial intention	Network scale	Network intensity	Sense of opportunity identification efficacy	Gender	Education background	Specialty
Entrepreneurial intention	1.0000						
Network scale	0.4635*	1.0000					
Network intensity	0.2898*	0.5087*	1.0000				
Sense of opportunity identification efficacy	0.6390*	0.5020*	0.4227*	1.0000			
Gender	0.1818*	0.0480	−0.0662	0.1381*	1.0000		
Education background	−0.0566	−0.0163	−0.0217	0.0450	−0.0578	1.0000	
Specialty	−0.0065	−0.0717	−0.0736	−0.0614	0.0865	0.0001	1.0000

*$p < 0.1$.

TABLE 7 | Sense of opportunity identification efficacy and university students' social entrepreneurial intention.

Variables	Model 1	Model 2
Gender	0.422***	0.204**
	(3.606)	(2.310)
Education background	−0.200	−0.347***
	(−1.014)	(−2.709)
Specialty	−0.018	0.020
	(−0.465)	(0.699)
Sense of opportunity identification efficacy		0.777***
		(17.017)
Constants	3.086***	0.854***
	(7.462)	(2.928)
Number	466	466
R^2	0.036	0.424
Adjustment of R^2	0.029	0.419

$^{**}p < 0.05$, $^{***}p < 0.01$; Robust regression is used for regression.

Network Embeddedness and Sense of Opportunity Identification Efficacy

In order to explore the relationship between network embeddedness and sense of opportunity identification efficacy, two models were designed in this paper. The regression results are shown in **Table 8**. The explained variables of the two models are the sense of opportunity identification efficacy. Model 1 only adds control variables as independent variables; Model 2 adds two dimensions to explain the network embeddedness of variables, network intensity and network scale. The regression results show that after adding network embeddedness, the revised R^2 of the model is increased from 0.021 to 0.306, and the coefficients of network intensity and network scale are significantly positive ($\beta_{\text{network scale}} = 0.327^{***}$, $\beta_{\text{network intensity}} = 0.267^{***}$), which indicates that the stronger the network intensity and the larger the network scale, the higher the entrepreneur's sense of opportunity identification efficiency, and the above assumptions H2a and H2b are satisfied. Network scale and network intensity represent to some extent the convenience and reliability of entrepreneurs in obtaining information and resources, and efficient information exchange and resource acquisition can enhance entrepreneurs' identification and grasp of opportunities (Krueger and Day, 2009; Burt and Burzynska, 2017).

The Mediating Effect of the Sense of Opportunity Identification Efficacy Between Network Embeddedness and University Students' Social Entrepreneurial Intention

This paper chooses multiple linear regressions to study the relationship among sense of opportunity identification efficacy, network embeddedness and university students' social entrepreneurial intention, and the mediating effect of sense of opportunity identification efficacy on network embeddedness and university students' social entrepreneurial intention. The three models all take university students' social entrepreneurial intention as dependent variables, respectively, introduces control variables, network embeddedness and sense of opportunity identification efficacy as independent variables, and gradually carries out hierarchical regression analysis. Through **Table 9**, it is found that the coefficient of network scale in Model 2 is significantly positive ($\beta = 0.443^{***}$), while the coefficient of network intensity is not significant ($\beta = 0.126$), which indicates that university students' social entrepreneurial intention is positively related to their network scale and has nothing to do with network intensity. Therefore, the mediating effect of sense of opportunity identification efficacy on network intensity and entrepreneurial intention is no longer considered. Through the observation of Model 3, it is found that after adding the variable of the sense of opportunity identification efficacy, the correction

TABLE 8 | Network embeddedness and sense of opportunity identification efficacy.

Variables	Model 1	Model 2
Gender	0.280***	0.271***
	(2.919)	(3.364)
Education background	0.189	0.228
	(0.721)	(1.609)
Specialty	−0.049	−0.019
	(−1.351)	(−0.483)
Network scale		0.327***
		(6.914)
Network intensity		0.267***
		(3.818)
Constants	2.873***	0.626
	(5.456)	(1.627)
Number	466	466
R^2	0.027	0.313
Adjustment of R^2	0.021	0.306

$^{***}p < 0.01$; Robust regression is used for regression.

TABLE 9 | Mediating effect of sense of opportunity identification efficacy on network embeddedness and university students' social entrepreneurial intention.

Variables	Model 1	Model 2	Model 3
Gender	0.422***	0.384***	0.203**
	(3.606)	(3.821)	(2.351)
Education background	−0.200	−0.167	−0.320**
	(−1.014)	(−1.189)	(−2.374)
Specialty	−0.018	0.013	0.026
	(−0.465)	(0.314)	(0.902)
Network scale		0.443***	0.224***
		(7.852)	(4.099)
Network intensity		0.126	−0.053
		(1.649)	(−0.865)
Sense of opportunity identification efficacy			0.670***
			(11.824)
Constants	3.086***	1.011**	0.592*
	(7.462)	(2.428)	(1.852)
Number	466	466	466
R^2	0.036	0.248	0.453
Adjustment of R^2	0.029	0.240	0.445

$^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$; Robust regression is used for regression.

R^2 increased from 0.248 to 0.453, and the coefficient of the sense of opportunity recognition efficacy is significantly positive ($\beta = 0.670^{***}$), indicating that the mediating effect of the sense of opportunity identification efficacy is significant. The powerful connection between network scale and entrepreneurial intention from Model 2 to Model 3 decreases (β decreases from 0.443 to 0.224), which indicates that the relationship between network scale and entrepreneurial intention has changed clearly after the intermediary variable sense of opportunity identification efficacy is added. This also verifies that the influence of network scale on university students' social entrepreneurial intention is realized by influencing their sense of opportunity identification efficacy, i.e., the sense of opportunity identification efficacy plays a part in mediating the relationship between network embeddedness and university students' social entrepreneurial intention, assuming H3 is partially satisfied.

DISCUSSION

Based on the research of existing scholars on the sense of opportunity identification efficacy (Shane and Venkataraman, 2001, etc.), network embeddedness (Granovetter, 1983; Uzzi, 1997, etc.) and social entrepreneurial intention (Dwivedi and Weerawardena, 2018, etc.), this paper discusses the action mechanism among the three by designing a multiple linear regression model. The main conclusions are as follows: (1) Sense of opportunity identification efficacy can significantly stimulate university students' social entrepreneurial intention. Because opportunity identification helps entrepreneurs to grasp the market and make timely controllable adjustments, thus generating positive feedback on their entrepreneurial psychology (Shepherd et al., 2015); (2) The network embeddedness (network scale and network intensity) of entrepreneurs is also significantly positively correlated with their sense of opportunity recognition efficacy. Because the larger the scale and intensity of the network where the entrepreneur is located, the deeper and broader information can be brought to the entrepreneur, thus facilitating their opportunity identification and grasp; (3) Through the hierarchical regression model, it is found that the sense of opportunity identification efficacy can only partially mediate the relationship between network embeddedness and university students' social entrepreneurial intention, which is mainly manifested in the positive correlation between university students' social entrepreneurial intention and their network scale, and has nothing to do with network intensity.

It is worth noting that when conducting multiple linear regression and hierarchical regression analysis, we found that after adding the explanatory variable, the sense of opportunity identification efficacy on the basis of control variables, the impact of academic qualifications on college students' social entrepreneurial intention becomes significant, and the higher the academic qualifications, the smaller their social entrepreneurial intentions, which is consistent with the research results of Forbes (2005) and Hörisch et al. (2016), because when the academic qualifications of individual entrepreneurs reach a certain level, they are more inclined to manage mature enterprises with more choices. However, the effect of educational background on the sense of opportunity identification efficacy has not changed much before and after joining the network embeddedness. In terms of gender, its influence on the sense of opportunity identification efficacy and the social entrepreneurial intention of university students has remained significant. However, since this paper has not conducted a more detailed study on gender, this can become the next direction of research. In terms of university students' majors, their influence on the sense of opportunity identification efficacy and the social entrepreneurial intention of university students has not changed much and is not significant, which is consistent with the research results of Chinese scholars (Fan and Wang, 2005), but it may also be due to the fact that the proportion of students majoring in economics and management in this survey is as high as 87.6%. Therefore, the next step is to compare different professional levels of the interviewed university students in groups.

Generally speaking, Chinese university students can enhance their sense of opportunity identification efficiency by expanding the scale and intensity of their social network, realize a timely grasp of various opportunities and chances in their entrepreneurial process, and use this psychological factor to maximize their entrepreneurial intention and form good positive feedback on their social entrepreneurial process.

THEORETICAL CONTRIBUTIONS

This paper primarily builds a theoretical model of "network embeddedness-sense of opportunity identification efficacy-university students' social entrepreneurial intention." Compared with previous case studies, this paper primarily explains the action mechanism among the three from an empirical perspective through a multivariate linear model. The theoretical significance of this paper is primarily summarized and listed in the following points:

First, this paper supplements research into entrepreneurial intention in the realm of social entrepreneurship, particularly as a focused study on university students. Due to the short rise of social entrepreneurship and the lack of a mature system for overall development, its theoretical research needs to be improved. At present, research on social entrepreneurship focuses more on the concept definition of social entrepreneurship related topics and the sorting out of the existing research (Du Jingjing, 2015; Fu et al., 2017). However, in-depth research on university students' social entrepreneurial intention definitely adds color to the theoretical research in the field of social entrepreneurship.

Second, this paper expands research on the relationship between network embeddedness and social entrepreneurial intention. At present, the theoretical and empirical research on entrepreneurial intention is mainly in the field of commercial entrepreneurship (Simsek et al., 2015). Research on entrepreneurial intention in the realm of social entrepreneurship is relatively lacking, while research into the relationship between entrepreneurs and their network embeddedness is even more lacking. This paper uses network embeddedness as its independent variable and social entrepreneurial intention as its dependent variable, to not only research the correlation between

the two, but also import the sense of opportunity identification efficacy, this meditating variable, to display the mechanism of action between the two. And in turn, provides a good supplement into research on the relationship between network embeddedness and social entrepreneurial intention.

Third, promote the discipline integration of social cognitive theory and social entrepreneurial research. This paper innovatively imports the concept of the "sense of opportunity identification efficacy" as a mediating variable conducting research on the individual psychological level of social entrepreneurs faced with the network embeddedness and social entrepreneurial intention as a mechanism of action, and discovered that the network scale of university students can have a significant influence on their sense of opportunity identification efficacy, which increases their timely grasp on various opportunities during the process of entrepreneurship.

PRACTICAL SIGNIFICANCE

The model of "network embeddedness-sense of opportunity identification efficacy-university students' social entrepreneurial intention" constructed in this paper has not only specific theoretical value, but also considerable practical significance.

First, entrepreneurial intention is the guiding indicator of entrepreneurial behavior. Theoretical research on entrepreneurial intention can be converted into leading guidance for entrepreneurial behavior and is a prerequisite for entrepreneurship. Positive entrepreneurial intention can increase the incubation rate of social entrepreneurial behavior, thus, to a certain extent, making up for the deficiencies of government failure, market failure and charity failure, and contributing more strength to China's poverty eradication, employment solution and improvement of the social environment.

Second, a sense of opportunity identification efficacy, as an essential factor for social entrepreneurs, can represent entrepreneurs' behavior orientation and dynamics to a large extent. The research in this paper will be helpful to, from the social entrepreneurs themselves, fundamentally help entrepreneurs carry out the reasonable adjustment of daily social entrepreneurial activities, and give full play to their subjective initiative and strengthen their social entrepreneurial intention.

Third, as one of the main forces of entrepreneurship in China, this paper shows the influencing factors of social entrepreneurial intention in students that have a certain guiding significance in maximizing their social entrepreneurial behavior. By expanding the sense of opportunity identification efficacy of university students and network embeddedness through reasonable methods, they can enhance their social entrepreneurial intention and promote the achievement and realization of their social mission.

LIMITATIONS AND PROSPECTS

Limitations

A limitation in the subjects of this questionnaire exists. This questionnaire adopted an offline survey method, mainly covering students from several universities in Chengdu, and due to time and geographical limitations, it does not have a certain randomness and is relatively limited.

There is no follow-up survey on entrepreneurial intention. Entrepreneurial intention, as the subjective attitude of entrepreneurs, is an element of dynamic change, which is not followed up in this study.

Prospects

Due to the limitations of current data, later research can use the spread and extensiveness of the Internet to expand the scope of and increase the number of samples and adopt more representative sample data for research. However, this also requires researchers to strengthen the ability of information identification, screening and analysis. In addition, this paper also mentions that there has not been any further detailed research on the gender and professional level of the interviewed university students, which will become the direction of research in the next stage.

ETHICS STATEMENT

An ethics approval was not required as per applicable institutional and national guidelines and regulations. The informed consent of the participants was implied through survey completion.

AUTHOR CONTRIBUTIONS

YT conceptualized and designed the empirical research and wrote this manuscript. WW took charge in designing the empirical research, collecting data, and wrote this manuscript. YL designed the empirical research and performed the data analysis. TZ, JL, and HL performed the data analysis, and revised the manuscript. All authors worked collectively and significantly contributed to this manuscript.

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REFERENCES

Ajzen, I. (1991). The theory of planned behavior. *Organ. Behav. Hum. Decis. Process.* 50, 179–211. doi: 10.1016/0749-5978(91)90020-T

Alvarez, S., Barney, J. B., Mcbride, R., and Wuebker, R. (2014). Realism in the study of entrepreneurship: aresponse. *Acad. Manag. Rev.* 39, 227–231. doi: 10.5465/amr.2013.0244

Anderson, P., Griego, O. V., and Helmstevens, R. (2010). Using business theory to motivate undergraduate students in goal attainment: an empirical assessment and model for high level motivation and goal attainment. *Int. Educ. Stud.* 3, 26–31.

Andersson, U., Forsgren, M., and Holm, U. (2002). The strategic impact of external networks: subsidiary performance and competence development in the multinational corporation. *Strateg. Manag. J.* 23, 979–996. doi: 10.1002/smj.267

Austin, J., Stevenson, H., and Wei-Skillern, J. (2012). Social and commercial entrepreneurship: same, different, or both? *Rev. Adm.* 47, 370–384. doi: 10.5700/rausp1055

Bandura, A. (2000). "Self-efficacy: the foundation of agency," in *Control of Human Behaviour, Mental Processes and Consciousness*, eds W. J. Perrig and A. Grob (Mahwak, NJ: Erlbaum), 17–33.

Béchervaise, N. E., and Benjamin, C. G. (2013). Visionary or criminal: from profit through morality to socially sustainable entrepreneurship. *Proc. Soc. Behav. Sci.* 99, 339–350. doi: 10.1016/j.sbspro.2013.10.502

Burt, R. S., and Burzynska, K. (2017). Chinese entrepreneurs, social networks, and guanxi. *Manag. Organ. Rev.* 13, 1–40. doi: 10.1017/mor.2017.6

Chen, C. C., Greene, P. G., and Crick, A. (1998). Does entrepreneurial self-efficacy distinguish entrepreneurs from managers? *J. Bus. Ventur.* 13, 295–316. doi: 10.1016/S0883-9026(97)00029-3

Chen, J. W. (2007). The concept definition and research perspective discussion of social entrepreneurship and social entrepreneur. *For. Econ. Manag.* 29, 10–15. doi: 10.16538/j.cnki.fem.2007.08.003

Conger, M., York, J. G., and Wry, T. (2012). We do what we are: entrepreneurship as the expression of values and identity. *SSRN Electron. J.* doi: 10.2139/ssrn.2173303

Corner, P. D., and Ho, M. (2010). How opportunities develop in social entrepreneurship. *Entrep. Theory Pract.* 34, 635–659. doi: 10.1111/j.1540-6520.2010.00382.x

Du Jingjing, W. J. (2015). Introduction of foreign social entrepreneurship education and its enlightenment to China. *J. Inner Mongolia Agric. Univ.* 17, 69–74.

Dwivedi, A., and Weerawardena, J. (2018). Conceptualizing and operationalizing the social entrepreneurship construct. *J. Bus. Res.* 86, 32–40. doi: 10.1016/j.jbusres.2018.01.053

Estrin, S., Mickiewicz, T., and Stephan, U. (2013). Entrepreneurship, social capital, and institutions: social and commercial entrepreneurship across nations. *Entrep. Theory Prac.* 37, 479–504. doi: 10.1111/etap.12019

Estrin, S., Mickiewicz, T., and Stephan, U. (2016). Human capital in social and commercial entrepreneurship. *J. Bus. Ventur.* 31, 449–467. doi: 10.2139/ssrn.2862960

Fan, W., and Wang, C. (2005). Research on the relationship between individual entrepreneurial tendency, personality characteristics and background factors. *Ergonomics* 11, 33–35. doi: 10.13837/j.issn.1006-8309.2005.01.011

Forbes, D. P. (2005). Managerial determinants of decision speed in new ventures. *Strateg. Manag. J.* 26, 355–366. doi: 10.1002/smj.451

Fu, Y., Si, X., and Chen, H. (2017). Social entrepreneurship in the context of China: frontier research and suggested questions. *For. Econ. Manag.* 39, 40–50. doi: 10.16538/j.cnki.fem.2017.03.003

Geroski, P. (1995). Entrepreneurship, management and the structure of payoffs. *Int. J. Ind. Organ.* 13, 304–344.

Granovetter, M. (1983). The strength of weak ties: anetwork theory revisited. *Sociol. Theory* 1, 201–233. doi: 10.2307/202051

Han Lizheng, F. H. (2009). The development of a measuring scale for undergraduates' self-efficacy in starting an undertaking. *J. Nanjing Normal Univer.* 1, 113–118.

Hechavarría, D. M., Terjesen, S. A., Ingram, A. E., Renko, M., Justo, R., and Elam, A. (2017). Taking care of business: the impact of culture and gender on entrepreneurs' blended value creation goals. *Small Bus. Econ.* 48, 225–257. doi: 10.1007/s11187-016-9747-4

Hill, S. L., and Villa, A. E. P. (1997). Dynamic transitions in global network activity influenced by the balance of excitation and inhibition. *Netw. Comput. Neural Syst.* 8, 165–184. doi: 10.1088/0954-898x_8_2_004

Hills, G. E., Singh, R. P., Lumpkin, G. T., and Baltrusaityte-Axelson, J. (2011). *Opportunity Recognition: Examining How Search Formality and Search Processes Relate to the Reasons for Pursuing Entrepreneurship*. Rochester, NY: Social Science Electronic Publishing.

Hockerts, K. (2015). Determinants of social entrepreneurial intentions. *Entrep. Theory Prac.* 2014, 12465–12465. doi: 10.1111/etap.12171

Hörisch, J., Kollat, J., and Brieger, S. A. (2016). What influences environmental entrepreneurship? A multilevel analysis of the determinants of entrepreneurs' environmental orientation. *Small Bus. Econ.* 48, 1–23. doi: 10.1007/s11187-016-9765-2

Jin, R., and Liu, Z. (2015). The construction of the theoretical framework of social enterprise business model. *J. JiLin Bus. Technol. Coll.* 31, 29–32.

Kar, A. K., and George, M. A. (2003). Improved detection of thermally induced higher resonance modes and harmonics of a microcantilever. *J. Appl. Phys.* 94, 4626–4631. doi: 10.1063/1.1604953

Kraus, S., Rigtering, J. P. C., Hughes, M., and Hosman, V. (2012). Entrepreneurial orientation and the business performance of SMEs: a quantitative study from the Netherlands. *Rev. Manag. Sci.* 6, 161–182. doi: 10.1007/s11846-011-0062-9

Krueger, J. N. F., and Carsrud, A. L. (1993). Entrepreneurial intentions: applying the theory of planned behaviour. *Entrep. Reg. Dev.* 5, 315–330. doi: 10.1080/08985629300000020

Krueger, N. F. Jr., and Day, M. (2009). "Looking forward, looking backward: from entrepreneurial cognition to neuroentrepreneurship," in *Handbook of Entrepreneurship Research*, eds Z. Acs and D. Audretsch (New York, NY: Springer).

Lin, S., and Zhang, W. (2005). A study on the entrepreneurial opportunity identification:concepts, process, factors and analysis framework. *Sci. Manag. Sci. Technol.* 6, 128–132.

Liu, Y. (2014). Entrepreneurial cognition: research status and prospect. *Mod. Manag. Sci.* 12, 100–102.

Liu, Y. (2018). Social entrepreneurship education in universities: Japan's global perspective. *J. NingBo Univ.* 40, 74–79.

Liu, Z., and Zhuang, X. (2018). Quantitative research on social entrepreneurship:literature review and research framework. *R&D Manag.* 30, 123–135. doi: 10.13581/j.cnki.rdm.20180425.004

Lortie, J., Castrogiovanni, G. J., and Cox, K. C. (2017). Gender, social salience, and social performance: how women pursue and perform in social ventures. *Entrep. Reg. Dev.* 29, 155–173. doi: 10.1080/08985626.2016.1255433

Lozano, G. J., Arangurengassis, M., Varela, R., Herrera, J. L., González, J., Pérezlorenzo, M., et al. (2016). "Hydrodynamic control of phytoplankton size-structure and plankton metabolism in the Ría de Vigo (NW Spain)," in *Paper Presented at the Egu General Assembly Conference*. (Vienna).

Ma, Z., Zhu, J., Meng, Y., and Teng, Y. (2019). The impact of overseas human capital and social ties on Chinese returnee entrepreneurs' venture performance. *Int. J. Entrep. Behav. Res.* 25, 67–83. doi: 10.1108/ijebr-07-2017-0246

Mair, J., and Marti, I. (2006). Social entrepreneurship research: a source of explanation, prediction, and delight. *J. World Bus.* 41, 36–44. doi: 10.2139/ssrn.673446

Mendoza, A. K. I., Anokhin, S., and Zamudio, C. (2015). Uncovering the influence of social venture creation on commercial venture creation: a population ecology perspective. *J. Bus. Vent.* 30, 793–807. doi: 10.1016/j.jbusvent.2015.04.003

Monteiro, A. P., Soares, A. M., and Rua, O. L. (2013). "Linking entrepreneural orientation to export performance: the role of intangible resources and dynamic capabilities," in *Proceedings of the 6th Annual Conference of the EuroMed Academy of Business*. eds D. Vrontis, Y. Weber, and E. Tsoukatos (Bingley: emerald publishing limited).

Morris, M. H., Webb, J. W., and Franklin, R. J. (2011). Understanding the manifestation of entrepreneurial orientation in the nonprofit context. *Entrep. Theory Pract.* 35, 947–971. doi: 10.1111/j.1540-6520.2011.00453.x

Mu, Z. (2007). Review and analysis of overseas entrepreneurship research. *China's Econ. Netw.* 6, 53–62. doi: 10.19365/j.issn1000-4181.2007.06.008

Niu, X. (2017). *A Study on the Relationship Between College Students' Social Network, Entrepreneurial Self-Effcacy and Entrepreneurialintention*. Emeishan: SouthwestJiaotongUniversity.

Ozgen, E., and Baron, R. A. (2007). Social sources of information in opportunity recognition: effects of mentors, industry networks, and professional forums. *J. Bus. Ventur.* 22, 174–192. doi: 10.1016/j.jbusvent.2005.12.001

Peng, W., Yu, X., and Qingling, Z. (2019). Study on the resource bricolage strategy of social ventures based on the grounded theory. *Collect. Essays Finance Econ.* 1, 81–90. doi: 10.13762/j.cnki.cjlc.2019.01.008

Peredo, A. M., and Mclean, M. (2006). Social entrepreneurship: a critical review of the concept. *J. World Bus.* 41, 56–65. doi: 10.1016/j.jwb.2005.10.007

Polanyi, M. (1962). The republic of science. *Minerva* 1, 54–73.

Qing, M. (2006). Theimpacts ofregulatory focus on entrepreneurialdecisionmaking. *Chin. J. Appl. Psychol.* 12, 232–238.

Qiu, J. (2018). Difficulties and implementation approach for entrepreneurship education in colleges and universities. *J. HeiLongJiang Univ. Technol.* 18, 49–52. doi: 10.16792/j.cnki.1672-6758.2018.12.011

Shane, S., and Venkataraman, S. (2001). Entrepreneurship as a field of research: aresponse to Zahra and Dess, Singh, and Erikson. *Acad. Manag. Rev.* 26, 13–16. doi: 10.5465/AMR.2001.27879269

Sheng, N. W. C. (2008). An exploratory case study of social entrepreneurship-oriented conception. *Manag. World* 8, 127–137. doi: 10.19744/j.cnki.11-1235/f.2008.08.014

Shepherd, D. A., Williams, T. A., and Patzelt, H. (2015). Thinking about entrepreneurial decision making: review and research agenda. *J. Manag.* 41, 11–46. doi: 10.1177/0149206314541153

Simsek, Z., Jansen, J. J. P., Minichilli, A., and Escriba-Esteve, A. (2015). Strategic leadership and leaders in entrepreneurial contexts: anexus for innovation and impact missed? *J. Manag. Stud.* 52, 463–478. doi: 10.1111/joms.12134

Tang, L. (2018). *Social Capital and Social Entrepreneurial Orientation:the Moderating Role of Entrepreneurial Self-Efficacy*. Hefei Shi: University of Science and Technology of China.

Uzzi, B. (1997). Social structure and competition in interfirm networks: the paradox of embeddedness. *Adm. Sci. Q.* 42, 35–67. doi: 10.2307/2393808

Wang, L. (2014). *Research on the Relations Among New Generation Migrant Workers' Social Networks, Entrepreneurial Self-Efficacy and Entrepreneurial Intention*. Changchun: JiLing University.

Wang, Y. (2011). Analysis of the influence of social network on individual entrepreneurial intention. *Mod. Bus.* 6, 271–272. doi: 10.14097/j.cnki.5392/2011.06.116

Wang, Y. W. Z. (2018). The analyses of mediation effects based on two-condition within-participant design. *J. Psychol. Sci.* 41, 1233–1239. doi: 10.16719/j.cnki.1671-6981.20180531

Wang, Z., Liao, Y., and Wu, L. (2014). Research on the structure and operation mechanism of social entrepreneurship ecosystem. *J. Hunan Univ.* 28, 61–65.

Wei, X. Y. Y. (2014). The entrepreneurial decison-making on small and micro business. *Sci. Technol. Prog. Policy* 31, 83–87.

Wen, Z., and Ye, B. (2014). Analyses of mediating effects: the development of methods and models. *Adv. Psychol. Sci.* 22, 731–745. doi: 10.3724/SP.J.1042.2014.00731

Wenman, X. G. P. K. Z. (2018). Network relation, entrepreneurial opportunity recognition and entrepreneurial decision-making: based on new ventures in Zhejiang province. *Sci. Technol. Manag. Res.* 38, 169–177.

Wood, M. S., and Williams, D. W. (2014). Opportunity evaluation as rule-based decision making. *J. Manag. Stud.* 51, 573–602. doi: 10.1111/joms.12018

Xie, J. P. W. Y. F. (2017). The empirical study of opportunity recognition and entrepreneurial performance. *Techn. Econ. Manag. Res.* 3, 37–42.

Xue, Y. Z. Y. (2016). Construction on the theoretical model of social entrepreneurship and the suggestions of the key issues. *J. Tianjin Univ.* 18, 12–23.

Zadek, S., Evans, R., and Pruzan, P. (1997). *Building Corporate Accountability: Emerging Practice in Social and Ethical Accounting and Auditing*. Abingdon: Earthscan.

Zahra, S. A., Gedajlovic, E., Neubaum, D. O., and Shulman, J. M. (2009). A typology of social entrepreneurs: motives, search processes and ethical challenges. *J. Bus. Ventur.* 24, 519–532. doi: 10.1016/j.jbusvent.2008.04.007

Zhang, F. (2005). Ananalysis on conditions and reasons of firm's innovative network formation. *Sci. Manag. Res.* 23, 5–8. doi: 10.19445/j.cnki.15-1103/g3.2005.04.002

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How Does the Entrepreneurship Education Influence the Students' Innovation? Testing on the Multiple Mediation Model

Xingjian Wei[1,2], *Xiaolang Liu*[1]* *and Jian Sha*[1,3]

[1]School of Business Administration, South China University of Technology, Guangzhou, China, [2]Youth Development Research Center, Guangxi University, Nanning, China, [3]College of Animal Science and Technology, Guangxi University, Nanning, China

This study aims to explore the multiple mediating effects of political skills and entrepreneurial opportunity recognition between perceived entrepreneurship education and innovation. Structural equation is used to analyze data collected from 269 Chinese student entrepreneurs. Results showed that (1) there is a positive relationship between perceptions of entrepreneurship education and perceptions of innovation, (2) political skills and entrepreneurial opportunity recognition individually play a mediating role between perceived entrepreneurship education and innovation, and (3) political skills and entrepreneurial opportunity recognition play a chain mediating effect between perceived entrepreneurship education and innovation.

Keywords: entrepreneurship education, innovation, political skills, entrepreneurial opportunity recognition, multiple mediating effect

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***Correspondence:**
Xiaolang Liu
liuxiaolang0507@163.com

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INTRODUCTION

Entrepreneurship education cultivates innovative talents, which are an important driving force for future development. At present, innovation-driven development strategies place new demands on entrepreneurship education. However, most of the current research and discussion in this field focuses on the construction of teaching staff in the entrepreneurial education ecosystem (Ruskovaara and Pihkala, 2015), curriculum development (Falck et al., 2016), and whether entrepreneurship education can influence the Intention of entrepreneurship (Martin et al., 2013; Pittaway and Cope, 2016). Based on the theory of social cognitive, the individual traits and environmental of learners greatly influence the realization of entrepreneurship education. In-depth study of the mechanism of entrepreneurship education, which drives innovation and development, can further improve the research on entrepreneurship education (Baum et al., 2001; Morris et al., 2013).

Innovation is seen as an internal driver; innovation relates to an entrepreneurial mindset; thus, development of new products or entrance to new markets is the result of entrepreneurship (Miller, 1983; Covin and Slevin, 1989). Entrepreneurship education is an important way for entrepreneurs to acquire resources, enhance innovative ability and innovative personality, and build multi-level learning channels for entrepreneurs by integrating various knowledge and value systems. From knowledge learning to skills improvement, entrepreneurship education

includes general ability development and improvement of professional ability. Entrepreneurial competence, which is important for success, mainly refers to the ability to identify opportunities and develop the necessary resources and capital (Arthurs and Busenitz, 2006; Kettunen et al., 2013), in addition to technical, financial, and legal knowledge (Kuratko, 2005). Considering that entrepreneurship ability is diversified, Bacigalupo et al. (2016) build an entrepreneurial competency framework that includes opportunity identification, entrepreneurial skills that represent "resources," action areas, and 15 competency lists. Gianesini et al. (2018) compared models and classifications of entrepreneurial abilities, arguing that entrepreneurial abilities consist of personality traits, entrepreneurial knowledge, and skills. The research on entrepreneurial ability is increasingly concerned with relevant knowledge and experience to improve skills and develop potential resources to enhance the innovation.

Entrepreneurship education is concerned with fostering creative skills that can be applied in practices, education, and environments supporting innovation (Binks et al., 2006; Gundry et al., 2014). Student entrepreneurs use multi-party interaction to achieve knowledge iteration in the learning network; the innovation process is the result of interactions among the environment, organization, and entrepreneurs (Anderson et al., 2014). Entrepreneurial ability involves adaptive behaviors and strategies to influence others' actions in relational contexts (Ferris et al., 2005; Tocher et al., 2012), thereby driving innovation and bringing high returns. The entrepreneurship framework by Bacigalupo et al. (2016) considers opportunity identification, entrepreneurial skills, and action as three key areas of entrepreneurial competence. Studies have shown that political skills can help entrepreneurs feel a sense of confidence and control over their work environment. They are likely to be engaged confidently in the dynamics of the environment, and effectively alter attitudes and behaviors to adapt to uncertain conditions (Ferris et al., 2005), with political skills said to explain how individuals recognize opportunities (McAllister et al., 2016). Student entrepreneurs with highly developed political skills can effectively integrate existing resources, accurately identify and interpret social cues from the environment, and gradually become a major force in technology and product innovation. This study selects political skills and entrepreneurial opportunities as mediators to explore how perceived entrepreneurial education influences innovation.

THEORETICAL BASIS AND HYPOTHESIS

Social cognitive theory conceives individuals as agents and active contributors to the development of the circumstances that surround their lives (Bandura, 2018). Individuals are tended to pursue their goals if they consider their own abilities and actions are capable of achieving the desired results (Bandura et al., 2003). Entrepreneurship education helps improve their cognition, constantly adjust their thoughts and actions, and make their entrepreneurship more directional, coherent and meaningful. This study employs the theory of social cognition to examine how learners in entrepreneurship education can enhance their ability to identify opportunities through political skills, which in turn affects entrepreneurs' innovative awareness, innovative ability, and innovative personality. Learning from observation (Bandura, 1978) to participation (Sims and Sinclair, 2008; Tavella and Franco, 2015), in a network (Berkes, 2009; Chen and Chang, 2014), learning is no longer a single behavior but is implemented in a complex system of relationships. Individuals can transcend immediate circumstances, through self-guidance, shape the present toward the realization of outcomes and goals (Bandura, 2018). General education focuses on the overall development of students, and the entrepreneurial curriculum system lays the foundation for the overall improvement of students' entrepreneurial ability. From observation to participation, the social learning network provides multi-level learning channels for student entrepreneurs to continuously improve their skills in learning and practice. Therefore, entrepreneurship education might enhance the confidence of the students that he will be able to solve new and unexpected problems.

Skills are described as the ability to apply knowledge in practice, a special ability that drives innovation and development. In entrepreneurship, highly developed political skills can help student entrepreneurs accurately identify and acquire effective resources in a dynamic and complex social environment, as well as create a new combination of technology and knowledge with the support of organizations. Entrepreneur must possess the savviness to effectively understand others in the workplace and adjust their behaviors accordingly. The actual process of opportunity recognition is an interaction between individuals and their environments. Komarkova et al. (2015) argue that skills and opportunities can be used to examine entrepreneurial innovation capabilities. The prior experience and skills of entrepreneurs affect the opportunity recognition process (Dencker et al., 2009; Odia and Odia, 2013). Highly developed political skills transform the resources and experience acquired by entrepreneurship education into the ability to identify and create new products or services; motivate the entrepreneurs to learn together; and enhance innovative awareness, innovative ability, and innovative personality. To deepen the reforms in entrepreneurship education, we have to fully consider the needs and characteristics of student entrepreneurs. Paying attention to the cultivation of students' entrepreneurial skills is conducive to the realization of the goals of entrepreneurial education organizations, and the overall development needs of entrepreneurial activities.

The Influence of Perceived Entrepreneurship Education on Innovation

Students' views on their entrepreneurship education are related to their perception of innovation; fostering innovation through entrepreneurship education is the primary task of universities. Innovative awareness and innovative ability are the core process of students' innovation activities, which are also influenced by innovation personality. The educational system of universities has to provide an academic environment that may serve as a catalyst for high-technology start-ups (Franke and Lüthje, 2004).

If learners are constantly challenged to expand their content knowledge they will be motivated to broaden their cognitive levels (Bandura, 1999), form a defense mechanism to eliminate the negative impact caused by perceived pressure (Granieri et al., 2017). Entrepreneurs are made, not born, by imparting the knowledge and skills needed for a new business venture. The process of shaping the ability of student entrepreneurs is a social interaction process in which information resources are acquired and transformed in the form of observation or direct participation in entrepreneurship education. This process also involves creating new knowledge through transforming experience and putting knowledge into practice. Entrepreneurship education may change a student's attitudes toward entrepreneurship (Galloway and Brown 2002). Students' perception and attitudes toward entrepreneurship education can determine whether students' creativity will be expressed and constitutes a self-judgment of one's perceived competence in generating novel ideas (Brown and Ulijn, 2004; Beghetto and Kaufman, 2010), forming an internal, lasting, and stable innovative personality. At the same time, entrepreneurship education provides student entrepreneurs with the information, knowledge, and other resources they need, thereby forming a strong atmosphere of innovation and entrepreneurship, reducing environmental uncertainty, and creating a good environment for innovation and development. Entrepreneurship education provides a comprehensive learning management for student entrepreneurs, helping them to establish correct values and cognitive systems, enhance their perceptions of innovation and continuously integrate, and accumulate new knowledge to shape their innovative ability and personality.

> *Hypothesis 1*: There will be a positive relationship between perceptions of entrepreneurship education and perceptions of innovation.

Mediating Role of Political Skills

The primary objective of entrepreneurship education is to develop all essential entrepreneurial skills to meet entrepreneurial success (Lazear, 2004; Audretsch et al., 2016). Traditional entrepreneurial knowledge learning can no longer meet the dynamic environment's demand for entrepreneurial ability. Entrepreneurship education builds a multi-level social network and comprehensive learning management for the professional ability of entrepreneurs. Entrepreneurship education develops students' entrepreneurial skills, enabling them to cope with environmental uncertainties and new challenges (Brian and Norma, 2010; Seikkula-Leino, 2011; Premand et al., 2016). Ferris et al. (2000) interpret political skills from four dimensions, namely, networking ability, interpersonal influence, social astuteness, and apparent sincerity. Political skill refers to "*the ability to effectively understand others at work and to use such knowledge to influence others to act in ways that enhance one's personal and/or organizational objectives*" (Ferris et al., 2005). Politically skilled individuals have superior social astuteness, can help people better understand, and influence others in complex environments, thereby achieving personal and organizational goals (Ferris et al., 2005; Munyon et al., 2015). Political skill helps span boundaries and make up for the shortcomings of social networks on college campuses and facilitate a successful development and usage of network ties (Wei et al., 2012; Fang et al., 2015). Politically skilled individuals are adept at forging relationships with others who have valuable resources and locate themselves in advantageous positions within their social network (Fang et al., 2015). Through social networks, individuals gain access to inaformation, role models, and mentors, establish connections and achieve the esteem and support of peers. The ability of the entrepreneur to gain the trust of others is absolutely essential (Tocher et al., 2015). Since individuals are more willing to openly share knowledge and ideas with those whom they trust (McEvily et al., 2003). Student entrepreneurs with political skills demonstrate problem-solving skills through specific behaviors in relational contexts (Perrewé et al., 2005; Treadway et al., 2013). Highly politically motivated student entrepreneurs can effectively control dynamic and ambiguous environments and make them predictable (Kacmar et al., 2013), and can positively influence innovation by enhancing the personal charm of entrepreneurs (Baron and Tang, 2009). Entrepreneurship education provides multiple channels for student entrepreneurs to obtain resources. The human capital social network built by highly skilled student entrepreneurs enhances the ability of entrepreneurial teams to acquire resources, reduces the cost of resource acquisition, and promotes the willingness of entrepreneurs to share knowledge. With reciprocity, combining access to resources and existing resources, integration generates new knowledge and contributes positively to innovation (Tolstoy, 2009). Therefore, we assumed that political skills would play a mediating role in the associations between perceived entrepreneurship education and innovation.

> *Hypothesis 2*: Political skills play a mediating role in the associations between perceived entrepreneurship education and innovation.

Mediating Role of Entrepreneurial Opportunity Recognition

Entrepreneurs will have to engage in three important tasks, which mainly are opportunity recognition and exploitation, risk taking, and innovating (Chandler and Hanks, 1994). Opportunity recognition is defined as the process of recognizing new and potentially successful ideas (Shane and Eckhardt, 2003), which are influenced by individual characteristics and contextual factors. Entrepreneurship opportunity recognition is the core activity in the early stage of student entrepreneurship; it is the process of correctly understanding and judging market demand, and continuously processing related resources acquired in entrepreneurship learning to shape their innovative ability and personality. Entrepreneurial selecting promises business opportunities, devising, and executing strategies for leveraging them (Chandler and Hanks, 1994). Such competence is often developed experientially through learning by doing (Mitchelmore and Rowley, 2010). Social learning itself is an iterative process of learning, action, reflection, and continuous cooperation. The iterative learning process is considered to be a key component of adapting to environmental changes. In an uncertain

entrepreneurial environment, opportunity recognition is becoming a major driver of entrepreneurial behavior (Wang et al., 2013). Student entrepreneurs acquire resources through entrepreneurial education, identify effective knowledge from a large amount of information, integrate processing into new products or services, form new opportunities, improve opportunities for success, and contribute to team creation. We assumed that entrepreneurial opportunity recognition would play a mediating role in the associations between perceived entrepreneurship education and innovation.

> *Hypothesis 3*: Entrepreneurial opportunity recognition has a mediating role in the associations between perceived entrepreneurship education and innovation.

Multiple Mediating Role of Political Skills and Entrepreneurial Opportunity Recognition

Entrepreneurial opportunity recognition, skills, and behaviors together constitute entrepreneurial abilities. Enhancing skills allows entrepreneurs to discover and exploit opportunities that enable they to be more innovative (Fillis and Rentschler, 2010). Political skill is instrumental in gaining access to the information, influence, and referrals necessary for success (Fang et al., 2015). Politically motivated people know what they need to do to succeed, and can make the right actions at the right time to achieve their goals (Blickle et al., 2010). Similarly, we contend that political skill can be used to explain how entrepreneur recognize social influence opportunities (McAllister et al., 2016). High levels of political skill enable entrepreneurs to demonstrate a keen sense of society (Brouer et al., 2011); the social astuteness is conducive to accurately obtaining the key resources needed for entrepreneurship in a dynamic and complex environment. The astute agility of entrepreneurs is a necessary condition for the success of opportunity recognition (Ardichvili et al., 2003). The social network and interpersonal relationships help student entrepreneurs expand the scope of resource acquisition and improve the ability of resource integration. Interpersonal relationships help participants to understand and implement innovative decisions, and improve the efficiency of resource development and product innovation. The apparent sincerity helps entrepreneurs achieve knowledge sharing, and provide a basis for product or service innovation. We assumed that political skills and entrepreneurial opportunity recognition would play a continuous intermediary role in the associations between perceived entrepreneurship education and innovation.

> *Hypothesis 4*: Political skills and entrepreneurial opportunity recognition play a continuous intermediary role in the associations between perceived entrepreneurship education and innovation.

Hypothesized model are shown in **Figure 1**. Through sharing and cooperation, entrepreneurship education is brought into social learning network from a single level, and completes the acquisition of new knowledge and skills with continuous iterations, enhancing the ability of student entrepreneurs to adapt to changes in the entrepreneurial environment. The entrepreneurial ability of entrepreneurs is considered as a resource in stimulating creativity and the ability to identify opportunities (Kor et al., 2007). Political skill facilitates individuals' accurate assessment of their work environment and the intentions of others. Driven by innovation, entrepreneurship education constantly improves the path of learning management, and is committed to the improvement of entrepreneurial skills of student entrepreneurs.

MATERIALS AND METHODS

Participants

The participants were recruited from a University located in Nanning, Guangxi Province, China. Questionnaires were distributed to 300 Chinese student entrepreneurs, and 269 valid questionnaires were collected, giving a response rate of 89.67%. Among the respondents, males accounted for 49.17% and females accounted for 50.83%, which shows a relatively balanced gender proportion. Samples from large and medium-sized cities, county-level cities, townships, and rural areas were 30.1, 24.2, 12.3, and 33.5%, respectively. The respondents were all types of students; undergraduate and lower levels accounted for 72.5%, master's and doctoral students accounted for 27.5%, science and engineering students accounted for 56.9%, followed by economic management accounting for 18.2% and agronomy

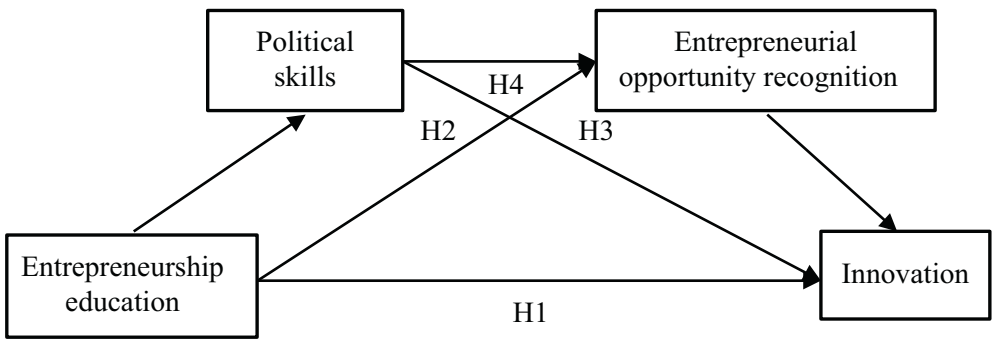

FIGURE 1 | Hypothesized model.

11.2%. Among the subjects, 91.1% have been student cadres, and have social networks and interpersonal relationships.

Procedure

This study selected Chinese student entrepreneurs as the survey object. The participants are involved in entrepreneurial activities such as courses, training programs, and competitions in varying degrees. The participants receive support from teachers and the school with regard to funds, use of venues, and other needs. The survey participants were able to understand the issues involved in this study, thereby meeting the requirements of empirical analysis. In March 2018, we contacted the teachers responsible for entrepreneurship in colleges and universities, to email the participation invitation of this study to their student entrepreneurs. The student entrepreneurs were informed that the data will be used only for research purposes and we will keep their personal information confidential, that participation was voluntary and that they could either refuse to participate in or withdraw from the study at any time. We ask student entrepreneurs to return a form only if they want to participate in the research. The study protocol was approved by the ethics committee of South China University of Technology.

Measures

To ensure the accuracy of empirical research, this study references important literature published locally and abroad, and selects maturity scales with high reliability and validity. Through in-depth interviews with entrepreneurial team members, this study combines specific scenarios of entrepreneurial education in colleges and universities, and modifies the scales of entrepreneurship education and political skills to make the measurement suitable for student entrepreneurs, finally forming the research scale. This study uses a five-point Likert scale where "1" means "completely inconsistent" and "5" means "very consistent." The entrepreneurial team members evaluate the corresponding items based on their own real situation.

Entrepreneurship Education

The entrepreneurship education measured in this study focuses on the perspective of social cognitive from the aspects of environment, organization, and individual learning and behavior. Through interviews with responsible teachers, we can understand the main concerns related to entrepreneurship education in colleges and universities. We start from three aspects: entrepreneurial atmosphere, entrepreneurship curriculum, and entrepreneurial activities. Our main references are Franke and Lüthje (2004) and Qi (2017). To measure the participation of individual entrepreneurs in entrepreneurship education, the education scale has a total of six items such as "A creative university campus atmosphere has inspired your entrepreneurial dream," "Startup course learning provides the knowledge you need to start a business," and "The university provides funding for your business, office space, and entrepreneurial tutors". The Cronbach's alpha coefficient of this scale was 0.848, indicating that the scale has good reliability.

Political Skills

The political skills measured in this study are mainly based on the individual level of student entrepreneurs. Based on the work of Ferris et al. (2000), 18 items including networking ability, interpersonal influence, social astuteness, and apparent sincerity were retained for measurement. The results show that the overall Cronbach's α coefficient of the political skill scale is 0.955, and the scale has good reliability.

Entrepreneurial Opportunity Recognition

The study draws on Chandler and Hanks (1994) for the measurement of entrepreneurial opportunity recognition and Cai et al. (2014) for the recognition of entrepreneurial opportunities, and measures the ability of student entrepreneurs to identify new opportunities, with four items such as "products and services that can effectively identify customers' needs". The results show that the overall Cronbach's α coefficient of the entrepreneurial opportunity recognition scale is 0.877, indicating that the scale has good reliability.

Innovation

Miller (1983) was the first to come up with "proactive" innovations and believes innovativeness is one of the important dimensions of entrepreneurial firm. Covin and Slevin (1989) developed a scale to measure the dimensions of innovativeness; the measures involved a mix of traits and attitude. This study agrees with the idea of Naldi et al. (2007) that innovation has a positive relationship with initiative, improved the scale of Covin and Slevin (1989). The higher the subjective initiative of student entrepreneurs, the more obvious is the innovation. The final innovative scale adopts the following items: "I have strong curiosity," "I like to think and solve problems from multiple angles," "I always have many new methods and new ideas," and "I can absorb and apply new ideas faster." Four items, such as that regarding the "new method," measure the innovation awareness, innovation ability, and innovation personality of student entrepreneurs. The results show that the Cronbach's α coefficient of the scale is 0.904, and the scale has good reliability.

Control Variables

The study controls demographic variables, such as gender and education level of student entrepreneurs, and excludes the possible effects of perceived entrepreneurial education and innovative relationships.

RESULTS

This study uses SPSS 22.0, AMOS 22.0, and other data analysis instruments. The analysis is divided into three steps: (1) test measurement model including model fit, reliability, and validity test; (2) descriptive statistics on each variable; and (3) we performed multi-mediation tests using the regression bootstrapping method in the PROCESS module (Model 6) developed by Hayes (2013).

Common Method Deviation Test

This paper uses Harman's single factor analysis to evaluate the common source variance. Exploratory factor analysis was performed without rotation. The results showed that the variance of the first factor interpretation was 21.694%, and the cumulative interpretation total variance was 50.928%. The first factor explained the variance that was less than half of the cumulative total variance. Therefore, no common method bias effect was observed between the measured variables.

Confirmatory Factor Analysis

To test the discriminant validity of each variable in this study, a confirmatory factor analysis was performed on each variable using AMOS 22.0 software. The results of **Table 1** showed that compared with the single-, two-, and three-factor models, the four-factor model used in this study was the most suitable. The combined effect was ideal, the fitting indexes of the four-factor model were up to standard, and the model fitting degree was good.

Descriptive Statistics and Correlations

The mean, standard deviation, and correlation coefficient of latent variables were statistically analyzed using SPSS 22.0. As shown in **Table 2**, the mean and standard deviation of each variable were within the acceptable range. According to the correlation coefficient between variables, a significant correlation exists between entrepreneurship education, political skills, entrepreneurial opportunity recognition, and innovation. A significant correlation also exists between gender and entrepreneurship education, and between gender and innovation. The results of descriptive statistics and related analysis preliminarily illustrate the relationship between variables, providing a basis for further data analysis.

Structural Equation Model Analyses

First, the main effect was tested, with entrepreneurship education as the independent variable and innovation as the dependent variable to construct the structural equation model 1. The fitting index of model 1 meets the requirements (χ^2/df = 2.753, CFI = 0.959, GFI = 0.938, TLI = 0.945, IFI = 0. 959, NFI = 0.937, and RMSEA = 0.081); thus, the model fit is good. The main effect test results show that entrepreneurship education positively affects innovation (β = 0.608, $p < 0.001$), and H1 is supported.

Second, models 2 and 3 were established with political skills and entrepreneurial opportunity recognition as single mediators. The results show that the model fits well (Model 2: χ^2/df = 1.002, CFI = 1.000, GFI = 0.905, TLI = 0.998, IFI = 0. 999, NFI = 0.957, and RMSEA = 0.003; Model 3: χ^2/df = 1.490, CFI = 0.989, GFI = 0.958, TLI = 0.982, IFI = 0. 989, NFI = 0.966, and RMSEA = 0.043). Through process V3.1, the bootstrap method was used to repeat the sampling 5,000 times to test the mediating effect. The results are shown in **Figure 2**. The mediating effect of political skills was 0.374, with 95% confidence interval [0.2983, 0.4534], excluding 0, based on the assumption that H2 was verified. The mediating effect of entrepreneurial opportunity recognition is 0.371, with 95% confidence interval [0.3021, 0.4454], excluding 0, based on the assumption H3 is verified.

Finally, the chain multiple mediation effect was tested. A correlation was observed between the two mediator variables in the political skills and entrepreneurial opportunity recognition. The study assumes that the two variables play a mediating role in the impact of perceived entrepreneurship education on innovation. Therefore, Hayes' multiple mediation method was used to test the mediating effect. According to process V3.1, the 95% confidence interval of the mediating effect was

TABLE 1 | Confirmatory factor analysis results of variable discriminant validity.

Model	χ^2	df	χ^2/df	CFI	GFI	TLI	IFI	NFI	RMSEA
Four-factor model	461.849	336	1.375	0.980	0.907	0.973	0.981	0.932	0.037
Three-factor model	549.356	326	1.685	0.965	0.890	0.950	0.966	0.919	0.051
Two-factor model	585.679	315	1.859	0.957	0.884	0.937	0.958	0.914	0.057
Single-factor model	610.411	308	1.982	0.952	0.876	0.928	0.954	0.910	0.061

Four-factor model: entrepreneurship education, political skills, entrepreneurial opportunity recognition, and innovation. Three-factor model: entrepreneurship education + political skills, entrepreneurial opportunity recognition, and innovation. Two-factor model: entrepreneurship education + political skills + entrepreneurial opportunity recognition and innovation. Single-factor model: entrepreneurship education + political skills + entrepreneurial opportunity recognition + innovation.

TABLE 2 | Means, standard deviations, and correlations for variables (*N* = 269).

Variable	Mean	SD	1	2	3	4	5	6
1. Gender	0.509	0.501	1					
2. Education level	0.275	0.447	–0.111	1				
3. Entrepreneurship education	3.910	0.742	–0.168**	0.022	1			
4. Political skills	3.811	0.660	–0.117	0.059	0.622**	1		
5. Entrepreneurial opportunity recognition	3.841	0.764	–0.103	0.077	0.603**	0.777**	1	
6. Innovation	4.013	0.714	–0.167**	0.073	0.619**	0.771**	0.781**	1

*$p < 0.05$; **$p < 0.01$.*

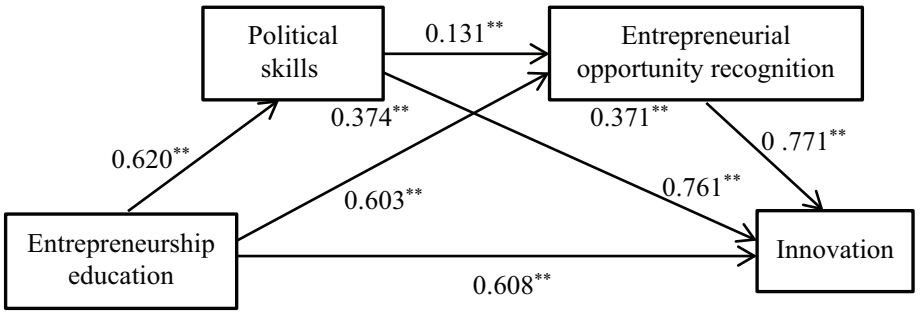

FIGURE 2 | The unstandardized path coefficients in model testing.

TABLE 3 | Results of the multiple mediation model.

				95% confidence interval	
Effect	**Intermediate path**	**Effect value**	**Boot standard error**	**Upper limit**	**Lower limit**
Direct effect	EE → I	0.133	0.045	0.0470	0.2188
Intermediary effect	EE → PS → I	0.240	0.040	0.1650	0.3203
	EE → EOR → I	0.082	0.025	0.0430	0.1314
	EE → PS → EOR → I	0.131	0.026	0.0830	0.1851

EE, entrepreneurship education; PS, political skills; EOR, entrepreneurial opportunity recognition; I, innovation.

estimated by extracting 5,000 bootstrap samples, and the chain multi-mediation effect of political skills and entrepreneurial opportunity recognition was tested significantly. The results are shown in **Table 3**. Entrepreneurship education → political skills → innovative mediating effect is 0.240, 95% confidence interval is [0.1650, 0.3203], excluding 0, and mediating effect is significant. Entrepreneurship education → environmental opportunity recognition → innovation, the mediating effect is 0.082, the 95% confidence interval is [0.0430, 0.1314], excluding 0, and the mediating effect is significant. Entrepreneurship education → political skills → entrepreneurial opportunity recognition → innovative chain multi-mediating effect is 0.131, 95% confidence interval [0.0830, 0.1851], excluding 0, indicating that political skills and entrepreneurial opportunity recognition are between entrepreneurial education and innovation, and H4 is verified.

DISCUSSION

Research Conclusions

The study explored the impact mechanism of the influence of perceived entrepreneurship education on innovation based on social cognitive theory. The structural equation model was used to simultaneously test the individual and continuous mediation roles of political skills and entrepreneurial opportunity recognition, and verify the political skills and entrepreneurial opportunity recognition ability of student entrepreneurs. The chain-based multi-mediating role in innovative relationships provides a new path toward considering the impact of perceived entrepreneurial education on the innovation of intermediary mechanisms. The empirical research shows the following results: (1) main effect test. The results show that there will be a positive relationship between perceptions of entrepreneurship education and perceptions of innovation. (2) Intermediary effect test. The test results show that political skills and entrepreneurial opportunity recognition play an intermediary role in perceived entrepreneurship education and innovation, respectively. Political skills enhance the ability to identify entrepreneurial opportunities and play a continuous intermediary role in the impact of perceived entrepreneurship education on innovation.

Theoretical Implications

The findings inform our understanding of how skills acquired in the entrepreneurship education are associated with innovative awareness, innovative ability, innovative personality, and answer the question of whether entrepreneurship and innovation is perceptible. Entrepreneurship education not only provides human capital such as knowledge and skills but may also transform the attitudes and behaviors of students. For the most part, entrepreneurship education as environmental influences on changing attitudes has been overlooked (Baron, 2006; Medvedeva, 2011). From the social cognitive theory, the research postulates that human behavior is determined by the environmental influences, and description between having capabilities and believing in those capabilities. Individuals are tended to pursue their goals if they consider their own abilities and actions are capable of achieving the desired results. Social cognitive theory conceives individuals as agents and active contributors to the development of the circumstances that surround their lives, through cognitive and motivational, humans can create visualized futures.

We adopt a unique approach in understanding how skills taught within an entrepreneurship education can influence innovation. Base on the social cognitive theory, individuals not only learn skills but also immerse themselves in the entrepreneurial community through entrepreneurship education, which is improving their ability to recognition entrepreneurial opportunities and capture real entrepreneurial opportunities through the community. Entrepreneurial ability is multidimensional and dynamic in nature (Zahra et al., 2006). Skills and entrepreneurial opportunity recognition are the main components of entrepreneurial ability. Explicit political skills based on persuasion, infection, and appeal are the general abilities of entrepreneurs, while entrepreneurial opportunity recognition is the professional skill that entrepreneurs need. Structural equation modeling is used to verify political skills and entrepreneurship opportunity recognition play the multiple mediating role of the relationship between perceived entrepreneurship education and innovation, and clarifies the specific path and internal mechanism of entrepreneurial competence in the impact of perceived entrepreneurship education on innovation. The research results verify that the perceived entrepreneurial education, in the process of shaping the entrepreneurial ability from general to professional, reveals the main factors driving the development of innovation.

Managerial Implications

As the main body of learning in entrepreneurship education, students should consider their obvious campus characteristics. In student entrepreneurship, many entrepreneurial projects are based on innovative technology transformation and creativity. Innovation is the driving force for the development of entrepreneurial projects. The focus of entrepreneurship education is not on the transfer of theoretical knowledge in the classroom but on the basis of action to improve entrepreneurial professional skills (Kassean et al., 2015). Through participation in learning, student entrepreneurs form a learning network in a good entrepreneurial education environment, use their influence to continuously acquire and exchange valuable resources through persuasion and collaboration, build a shared social resource network, and enhance professional skills. The effectiveness and conversion rate of innovative knowledge strengthens the impact of perceived entrepreneurship education on innovation.

The skills of entrepreneurs can be shaped (Volery et al., 2015) and entrepreneurship education serves as a new incubator of innovative talents, focusing on the improvement of entrepreneurial professional ability. Social cognitive theory can be used to understand the influence of environmental factors on individual innovation awareness, innovative ability and innovative personality. Universities organize and carry out various forms of teaching practice activities; entrepreneurship education enhances the professional competence of students through social learning networks. Student entrepreneurs are regarded as executives with learning and entrepreneurial practices, their high political skills such as good interpersonal relationships, and large social networks can enhance the ability of identify opportunities. Thus, these student entrepreneurs are more likely to become core talents of entrepreneurial teams, playing a role in the impact of perceived entrepreneurship education on innovation.

Limitations and Future Study Directions

In terms of research samples, owing to the limitations of the research objects, this study only judges the evaluation of entrepreneurship education from the unilateral aspect of the student entrepreneurs and fails to collect the relevant data on the entrepreneurial education managers. Second, considering perception at different times has different influences on human behavior and choice, future studies might consider dynamic tracking from the perspective of organizational managers; research techniques are also biased toward static analysis and are characterized by lack of dynamic tracking. Furthermore, the impact of perceived entrepreneurship education on innovation is multifaceted and multidimensional. In the future, studies can increase the dimensions of research variables in entrepreneurship education and further enrich and develop the research models and conclusions. The present study only considers the mediating factors between entrepreneurial education and innovation. Thus, future research should consider incorporating intermediaries and regulatory factors into the research framework.

ETHICS STATEMENT

This study was carried out in accordance with the recommendations of ethics committee of South China University of Technology with written informed consent from all subjects in accordance with the Declaration of Helsinki. The protocol was approved by the ethics committee of South China University of Technology.

AUTHOR CONTRIBUTIONS

XW led the research design, data analysis, and drafted this paper. XL guided the research design and revised the manuscript substantially. JS made contributions in data analysis and paper revision. All authors approved the final version.

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REFERENCES

Anderson, N., Potočnik, K., and Zhou, J. (2014). Innovation and creativity in organizations: a state-of-the-science review, prospective commentary, and guiding framework. *J. Manag.* 40, 1297–1333. doi: 10.1177/0149206314527128

Ardichvili, A., Cardozo, R., and Ray, S. (2003). A theory of entrepreneurial opportunity identification and development. *J. Bus. Ventur.* 18, 105–123. doi: 10.1016/S0883-9026(01)00068-4

Arthurs, J. D., and Busenitz, L. W. (2006). Dynamic capabilities and venture performance: the effects of venture capitalists. *J. Bus. Ventur.* 21, 195–215. doi: 10.1016/j.jbusvent.2005.04.004

Audretsch, D. B., Kuratko, D. F., and Link, A. N. (2016). Dynamic entrepreneurship and technology-based innovation. *J. Evol. Econ.* 26, 603–620. doi: 10.1007/s00191-016-0458-4

Bacigalupo, M., Kampylis, P., Punie, Y., and Van den Brande, G. (2016). EntreComp: the entrepreneurship competence framework. (Luxembourg: Publication Office of the European Union). doi: 10.2791/593884

Bandura, A. (1978). Social learning theory of aggression. *J. Commun.* 28, 12–29. doi: 10.1111/j.1460-2466.1978.tb01621.x

Bandura, A. (1999). "Social cognitive theory of personality" in *Handbook of personality.* 2nd Edn. eds. L. A. Pervin and O. P. John (New York: Guilford Press), 154–196.

Bandura, A. (2018). Toward a psychology of human agency: pathways and reflections. *Perspect. Psychol. Sci.* 13, 130–136. doi: 10.1177/1745691617699280

Bandura, A., Caprara, G. V., Barbaranelli, C., Gerbino, M., and Pastorelli, C. (2003). Role of affective self-regulatory efficacy in diverse spheres of psychosocial functioning. *Child Dev.* 74, 769–782. doi: 10.1111/1467-8624.00567

Baron, R. (2006). Opportunity recognition as pattern recognition: how entrepreneurs "connect the dots" to identify new business opportunities. *Acad. Manag. Perspect.* 20, 104–119. doi: 10.5465/amp.2006.19873412

Baron, R. A., and Tang, J. (2009). Entrepreneurs social skills and new venture performance: mediating mechanisms and cultural generality. *J. Manag.* 35, 282–306. doi: 10.1177/0149206307312513

Baum, J. R., Locke, E. A., and Smith, K. G. (2001). A multidimensional model of venture growth. *Acad. Manag. J.* 44, 292–303. doi: 10.5465/3069456

Beghetto, R. A., and Kaufman, J. C. (2010). *Nurturing creativity in the classroom: How to discourage creative thinking in the classroom*. New York: Cambridge University Press.

Berkes, F. (2009). Evolution of co-management: role of knowledge generation, bridging organizations and social learning. *J. Environ. Manag.* 90, 1692–1702. doi: 10.1016/j.jenvman.2008.12.001

Binks, M., Starkey, K., and Mahon, C. L. (2006). Entrepreneurship education and the business school. *Tech. Anal. Strat. Manag.* 18, 1–18. doi: 10.1080/09537320500520411

Blickle, G., Wendel, S., and Ferris, G. R. (2010). Political skill as moderator of personality-job performance relationships in socioanalytic theory: test of the getting ahead motive in automobile sales. *J. Vocat. Behav.* 76, 326–335. doi: 10.1016/j.jvb.2009.10.005

Brian, J., and Norma, I. (2010). Enterprise education as pedagogy. *Educ. Train.* 52, 7–19. doi: 10.1108/00400911011017654

Brouer, R. L., Harris, K. J., and Kacmar, K. M. (2011). The moderating effects of political skill on the perceived politics-outcome relationships. *J. Organ. Behav.* 32, 869–885. doi: 10.1002/job.718

Brown, T. E., and Ulijn, J. (2004). "Innovation, entrepreneurship and culture: the interaction between technology" in *Progress and economic growth*. London: Edward Elgar Publishing.

Cai, L., Tang, S.-Q., Ma, Y.-L., and Gao, X. (2014). 创业学习、创业能力与新企业绩效的关系研究 [The effect of entrepreneurial learning and entrepreneurial capability on new venture performance]. *Stud. Sci. Sci.* 32, 1189–1197. doi: 10.16192/j.cnki.1003-2053.2014.08.029

Chandler, G. N., and Hanks, S. H. (1994). Founder competence, the environment and venture performance. *Entrep. Theory Pract.* 18, 77–89. doi: 10.1177/104225879401800306

Chen, C.-M., and Chang, C.-C. (2014). Mining learning social networks for cooperative learning with appropriate learning partners in a problem-based learning environment. *Interact. Learn. Environ.* 22, 97–124. doi: 10.1080/10494820.2011.641677

Covin, J. G., and Slevin, D. P. (1989). Strategic management of small firms in hostile and benign environments. *Strateg. Manag. J.* 10, 75–87. doi: 10.1002/smj.4250100107

Dencker, J., Gruber, M., and Shah, S. (2009). Individual and opportunity factors influencing job creation in new firms. *Acad. Manag. J.* 52, 1125–1147. doi: 10.5465/amj.2009.47084648

Falck, O., Gold, R., and Heblich, S. (2016). Lifting the iron curtain: school-age education and entrepreneurial intentions. *J. Econ. Geogr.* 17, 1111–1148. doi: 10.1093/jeg/lbw026

Fang, R., Chi, L., and Chen, M. (2015). Bringing political skill into social networks: findings from a field study of entrepreneurs. *J. Manag. Stud.* 52, 175–212. doi: 10.1111/joms.12107

Ferris, G. R., Perrewé, P. L., Anthony, W. P., and Gilmore, D. C. (2000). Political skill at work. *Organ. Dyn.* 28, 25–37. doi: 10.1016/S0090-2616(00)00007-3

Ferris, G. R., Treadway, D. C., Kolodinsky, R., and Hochwarter, W. A. (2005). Development and validation of the political skill inventory. *J. Manag.* 31, 126–152. doi: 10.1177/0149206304271386

Fillis, D., and Rentschler, R. (2010). The role of creativity in entrepreneurship. *J. Enterprising Cult.* 18, 49–81. doi: 10.1142/S0218495810000501

Franke, N., and Lüthje, C. (2004). Entrepreneurial intentions of business students: a benchmarking study. *Int. J. Innov. Technol. Manag.* 01, 269–288. doi: 10.1142/S0219877004000209

Galloway, L., and Brown, W. (2002). Entrepreneurship education at university: a driver in the creation of high growth firms? *Educ. Train.* 44, 398–405. doi: 10.1108/00400910210449231

Gianesini, G., Cubico, S., Favretto, G., and Leitão, G. C. C. (2018). "Entrepreneurial competences: comparing and contrasting models and taxonomies" in *Entrepreneurship and the industry life cycle*. Vol. 6, eds. S. Cubico, G. Favretto, J. Leitão, and U. Cantner (Cham, Switzerland: Springer International Publishing), 13–32. doi: 10.1007/978-3-319-89336-5_2

Granieri, A., La Marca, L., Mannino, G., Giunta, S., Guglielmucci, F., and Schimmenti, A. (2017). The relationship between defense patterns and DSM-5 maladaptive personality domains. *Front. Psychol.* 8, 1–12. doi: 10.3389/fpsyg.2017.01926

Gundry, L. K., Ofstein, L. F., and Kickul, J. R. (2014). Seeing around corners: how creativity skills in entrepreneurship education influence innovation in business. *Int. J. Manag. Educ.* 12, 529–538. doi: 10.1016/j.ijme.2014.03.002

Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York: Guilford Press.

Kacmar, K. M., Andrews, M. C., and Harris, K. J. (2013). Ethical leadership and subordinate outcomes: the mediating role of organizational politics and the moderating role of political skill. *J. Bus. Ethics* 115, 33–44. doi: 10.1007/s10551-012-1373-8

Kassean, H., Vanevenhoven, J., Liguori, E., and Winkel, D. (2015). Entrepreneurship education: a need for reflection, real-world experience and action. *Int. J. Entrep. Behav. Res.* 21, 690–708. doi: 10.1108/IJEBR-07-2014-0123

Kettunen, J., Kairisto-Mertanen, L., and Penttilä, T. (2013). Innovation pedagogy and desired learning outcomes in higher education. *On the Horiz.* 21, 333–342. doi: 10.1108/OTH-08-2011-0024

Komarkova, I., Gagliardi, D., Conrads, J., and Collado, A. (2015). Entrepreneurship competence: an overview of existing concepts, policies and initiatives. *Jrc Work. Papers* 11, 1–158. doi: 10.2791/067979

Kor, Y. Y., Mahoney, J. T., and Michael, S. C. (2007). Resources, capabilities and entrepreneurial perceptions. *J. Manag. Stud.* 44, 1187–1212. doi: 10.1111/j.1467-6486.2007.00727.x

Kuratko, D. F. (2005). The emergence of entrepreneurship education: development, trends, and challenges. *Entrep. Theory Pract.* 29, 577–598. doi: 10.1111/j.1540-6520.2005.00099.x

Lazear, E. P. (2004). Balanced skills and entrepreneurship. *Am. Econ. Rev.* 94, 208–211. doi: 10.1257/0002828041301425

Martin, B. C., McNally, J. J., and Kay, M. J. (2013). Examining the formation of human capital in entrepreneurship: a meta-analysis of entrepreneurship education outcomes. *J. Bus. Ventur.* 28, 211–224. doi: 10.1016/j.jbusvent.2012.03.002

McAllister, C. P., Parker Ellen, B. III, Perrewé, P. L., and Ferris, G. R. (2016). Checkmate: using political skill to recognize and capitalize on opportunities

in the 'game' of organizational life. *Bus. Horiz.* 58, 25–34. doi: 10.1016/j.bushor.2014.09.008

McEvily, B., Perrone, V., and Zaheer, A. (2003). Introduction to the special issue on Trust in an Organizational Context. *Organ. Sci.* 14, 1–4. doi: 10.1287/orsc.14.1.1.12812

Medvedeva, T. A. (2011). Developing an innovative style of thinking and innovative behavior. *Syst. Pract. Action Res.* 25, 261–272. doi: 10.1007/s11213-011-9221-9

Miller, D. (1983). The correlates of entrepreneurship in three types of firms. *Manag. Sci.* 29, 770–791. doi: 10.1287/mnsc.29.7.770

Mitchelmore, S., and Rowley, J. (2010). Entrepreneurial competencies: a literature review and development agenda. *Int. J. Entrep. Behav. Res.* 16, 92–111. doi: 10.1108/13552551011026995

Morris, N. M., Kuratko, D. F., and Pryor, C. G. (2013). Building blocks for the development of university-wide entrepreneurship. *Entrep. Res. J.* 4, 45–68. doi: 10.1515/erj-2013-0047

Munyon, T. P., Summers, J. K., Thompson, T. W., and Ferris, G. R. (2015). Political skill and work outcomes: a theoretical extension, meta-analytic investigation, and agenda for the future. *Pers. Psychol.* 68, 143–184. doi: 10.1111/peps.12066

Naldi, L., Nordqvist, M., Hellerstedt, K., and Wiklund, J. (2007). Entrepreneurial orientation, risk taking, and performance in family firms. *Fam. Bus. Rev.* 20, 33–47. doi: 10.1111/j.1741-6248.2007.00082.x

Odia, J., and Odia, A. A. (2013). Developing entrepreneurial skills and transforming challenges into opportunities in Nigeria. *J. Educ. Soc. Res.* 3, 289–298. doi: 10.5901/jesr.2013.v4n3p289

Perrewé, P. L., Zellars, K. L., Rossi, A. M., Ferris, G. R., Kacmar, C. J., Liu, Y., et al. (2005). Political skill: an antidote in the role overload-strain relationship. *J. Occup. Health Psychol.* 10, 239–250. doi: 10.1037/1076-8998.10.3.239

Pittaway, L., and Cope, J. (2016). Entrepreneurship education: a systematic review of the evidence. *Soc. Sci. Electron. Publish.* 25, 479–510. doi: 10.1177/0266242607080656

Premand, P., Brodmann, S., Almeida, R., Grun, R., and Barouni, M. (2016). Entrepreneurship education and entry into self-employment among university graduates. *World Dev.* 77, 311–327. doi: 10.1016/j.worlddev.2015.08.028

Qi, W. H. (2017). 创业学习对创业意向的作用机制研究 *[Research on the mechanism of entrepreneurial learning effect on entrepreneurial intention]*. Jilin: Jilin University.

Ruskovaara, E., and Pihkala, T. (2015). Entrepreneurship education in schools: empirical evidence on the Teacher's role. *J. Educ. Res.* 108, 236–249. doi: 10.1080/00220671.2013.878301

Seikkula-Leino, J. (2011). The implementation of entrepreneurship education through curriculum reform in Finnish comprehensive schools. *J. Curric. Stud.* 43, 69–85. doi: 10.1080/00220270903544685

Shane, S., and Eckhardt, J. T. (2003). "The individual-opportunity nexus" in *Handbook of entrepreneurship research*. ed. Z. Acs (Great Britain, England: Kluwer Academic Publishers), 161–191. doi: 10.1007/0-387-24519-7_8

Sims, L., and Sinclair, A. J. (2008). Learning through participatory resource management programs: case studies from Costa Rica. *Adult Educ. Q.* 58, 151–168. doi: 10.1177/0741713607309802

Tavella, E., and Franco, L. A. (2015). Dynamics of group knowledge production in facilitated modelling workshops: an exploratory study. *Group Decis. Negot.* 24, 451–475. doi: 10.1007/s10726-014-9398-2

Tocher, N., Oswald, S. L., and Hall, D. J. (2015). Proposing social resources as the fundamental catalyst toward opportunity creation. *Strateg. Entrep. J.* 9, 119–135. doi: 10.1002/sej.1195

Tocher, N., Oswald, S. L., and Shook, C. L. (2012). Entrepreneur political skill and new venture performance: extending the social competence perspective. *Entrep. Reg. Dev.* 24, 283–305. doi: 10.1080/08985626.2010.535856

Tolstoy, D. (2009). Knowledge combination and knowledge creation in a foreign-market network. *J. Small Bus. Manag.* 47, 202–220. doi: 10.1111/j.1540-627X.2009.00268.x

Treadway, D. C., Breland, J. W., and Williams, L. M. (2013). Social influence and interpersonal power in organizations roles of performance and political skill in two studies. *J. Manag.* 39, 1529–1553. doi: 10.1177/0149206311410887

Volery, T., Mueller, S., and von Siemens, B. (2015). Entrepreneur ambidexterity: a study of entrepreneur behaviours and competencies in growth-oriented small and medium-sized enterprises. *Int. Small Bus. J.* 33, 111–112. doi: 10.1177/0266242613484777

Wang, Y.-L., Ellinger, A. D., and Wu, Y.-C. J. (2013). Entrepreneurial opportunity recognition: an empirical study of R&D personnel. *Manag. Decis.* 51, 248–266. doi: 10.1108/00251741311301803

Wei, L. Q., Chiang, F. T., and Wu, L. Z. (2012). Developing and utilizing network resources: roles of political skill. *J. Manag. Stud.* 49, 381–402. doi: 10.1111/j.1467-6486.2010.00987.x

Zahra, S. A., Sapienza, H. J., and Davidsson, P. (2006). Entrepreneurship and dynamic capabilities: a review, model and research agenda. *J. Manag. Stud.* 43, 917–955. doi: 10.1111/j.1467-6486.2006.00616.x

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How the New Type of Entrepreneurship Education Complements the Traditional One in Developing Entrepreneurial Competencies and Intention

Shu-Mei Wang[1], Hsiu-Ping Yueh[1,2] and Pei-Chang Wen[3]**

[1] Department of Bio-Industry Communication and Development, National Taiwan University, Taipei, Taiwan, [2] Department of Psychology, National Taiwan University, Taipei, Taiwan, [3] Chung-Hua Institution for Economic Research, Taipei, Taiwan

While business schools aim to train students to develop specialized professional competencies, knowledge, and skills related to management and corporate functions according to their major programs, entrepreneurship education in higher education intends to develop students' entrepreneurial competencies and intention. However, the entrepreneurial and managerial domains are not mutually exclusive but overlap to a certain extent. This study utilized the National Taiwan University (NTU) as a case to explore the effects of two paths of entrepreneurial education at NTU on the development of students' entrepreneurial competencies and intention. The aim of this study was to investigate differences in business school students' entrepreneurial competencies and intention between those who took the Creativity and Entrepreneurship Program (CEP) and those who did not, and to explore the context limits or facilitations in the entrepreneurship education of college students in different academic disciplines of management school. Results of the study showed that the CEP course did have positive impacts on all entrepreneurial competencies and intention, that the effectiveness on the attitude domains was more evident than that on the knowledge or skills domains, and that academic disciplines did have a context effect on students' entrepreneurial competencies and intention. This study sheds further light on the "black box" of context limits or facilitations in entrepreneurship education. Implications of the study are that it may lead to a complementary framework of effectively integrating the entrepreneurial program with the business and management courses, which would better facilitate students' learning of entrepreneurship competencies and may increase their intention to become future entrepreneurs.

Keywords: entrepreneurship education, business and management education, entrepreneurial competency, entrepreneurial intention, higher education

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****Correspondence:***
Hsiu-Ping Yueh
yueh@ntu.edu.tw
Pei-Chang Wen
pam@cier.edu.tw

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INTRODUCTION

Entrepreneurship has been one of the most potent economic forces in the world for the past few decades (Kuratko, 2005; Aparicio et al., 2016). Due to the high levels of unemployment amongst young people, youth entrepreneurship has also gained attention as a way to foster employment opportunities. Therefore, many studies in the literature address the importance of

entrepreneurial education in colleges and try to explore factors that affect entrepreneurial intention across disciplines, including business and management schools (i.e., Kaijun and Sholihah, 2015; Gelaidan and Abdullateef, 2017; Hockerts, 2017). However, the development of a method of actually assessing the effects and the impact of entrepreneurship programs has increased in importance, and methods to clarify their relationships to management education deserve more research attention.

While a knowledge base is one major aspect of context, some researchers have investigated how context limits or facilitates the effects of entrepreneurial education. Previous studies have shown that the effects of entrepreneurial education on strengthening entrepreneurial intention are dissimilar in various disciplines (i.e., Iwu et al., 2016; Maresch et al., 2016; Refai and Klapper, 2016). Meanwhile, entrepreneurship education is deemed as a different pedagogy from those in typical business education and management training. Debate continues on the future of the business and management schools (Pfeffer and Fong, 2002; Kaplan, 2018) for the rising tides of youth entrepreneurship. One radical realignment suggests a move away from conventional wisdom and toward a constructivist framework that emphasizes the social aspects of learning in entrepreneurship education (Rae, 1997; Kirby, 2004; Löbler, 2006). From the perspective of education system design, such a move is neither necessary nor practical, and both enterprise management and start-up development are equally important to the economy.

As Kuratko (2005) contended, a core objective of entrepreneurship education is that it is different from business and management education. Business and management education emphasize the operation of an ongoing business (Gartner and Vesper, 1994), whereas entrepreneurial education must address business entry (Gartner et al., 1992). While students of business schools are trained in specialized professional competencies, knowledge, and skills related to management and corporate functions according to their major programs, they may not necessarily learn entrepreneurship during their academic training. In fact, as Ireland et al. (2003) argued, because the entrepreneurial and managerial domains are not mutually exclusive but overlap to a certain extent, it might be more effective to integrate management school courses and entrepreneurship programs into a more complementary education framework to cultivate talents in enterprise management and start-up development with a minimum restructuring of the education system.

Previous studies have tried to compare the effects of students' professions on their knowledge and intention to become entrepreneurs. However, few researchers have explored the effects of students in different programs of business and management schools on their performance and attitude toward entrepreneurship. The aim of this current study was to explore the context effects, including various academic disciplines of typical business school training and an entrepreneurial program, on students' learning of entrepreneurship and their entrepreneurial intention.

The research aimed to answer the following research questions: (1) Are there differences in students' entrepreneurial competencies between those who minored in an entrepreneurship program and those who did not? (2) Are there differences in students' entrepreneurial intention between those who minored in an entrepreneurship program and those who did not? (3) Are there differences in students' entrepreneurial competencies among students in different majors in management school, including Accounting, Business Administration, Finance, and International Business? (4) Are there differences in students' entrepreneurial intention among students in different majors of management school, including accounting, business administration, finance, and international business?

It is anticipated that this study will shade a light on the "black box" of context limits or facilitations in the entrepreneurship education of college students. It is expected to lead to a complementary framework for effectively integrating the entrepreneurial program with business and management courses, which would better facilitate students' learning of entrepreneurship competencies and may increase their intention to become future entrepreneurs.

LITERATURE REVIEW

Competency Development in Business and Management Education

The world's first business school, ESCP Europe, was established in 1819 in Paris, France. Since its founding, the world has seen the development of various types of business schools, such as schools of business, business administration, and management. Kaplan (2018) proposed a model called the "four corners of a building analogy" to categorize the roughly 13,000 business schools worldwide with continuums into eight types. The four criteria/corners are culture (Europe–United States), compass (international/global–regional/local), capital (public–private), and content (teaching–research). While many business schools typically teach courses in areas such as entrepreneurship, finance, marketing, and strategy, many also offer highly specialized programs such as executive education programs (MBA, EMBA, Global MBA) and innovation and entrepreneurship programs. In addition, they often adopt accreditation systems to monitor their quality assurance of business and management.

According to the American Assembly of Collegiate Schools of Business (AACSB), one of the main accreditation agencies for business schools in the United States, the educational outcomes provided by business schools can be grouped into two categories: (1) content and (2) skills and personal characteristics (AACSB International Accreditation Coordinating Committee and AACSB International Accreditation Quality Committee, 2013). The content category comprises seven knowledge areas of the core courses offered by business schools, as follows: accounting, business environment and strategy, finance, human resources and organization theory, marketing, management information systems, quantitative analysis/operations research/production, and operation management. As for "learning and teaching," the AACSB, 2018 business accreditation standards (update of 2013 version) indicate that all general management and

specialist degree programs at the bachelor's, master's, and doctoral levels should normally include learning experiences that address the following general skill areas and general business and management skill areas. General skill areas include written and oral communication, ethical understanding and reasoning, analytical thinking, interpersonal relations and teamwork, diverse and multicultural work environments, reflective thinking, application of knowledge, and integration of real-world business experiences. General business knowledge areas include economic, political, regulatory, legal, technological, and social contexts of organizations in a global society; social responsibility, including sustainability, diversity and ethical behavior; approaches to management, financial theories, analysis, reporting, and markets; systems and processes in organizations, including planning and design, production/operations, supply chains, marketing, and distribution; group and individual behaviors in organizations and society; and other specified areas of study related to concentrations, majors, or areas of emphasis (AACSB Business Accreditation, 2019).

Although many accreditation institutions have defined a rather broad range of knowledge and skills for business schools to teach, they have tended to offer a rather general approach, as Kaplan (2018) argued. Many researchers have also proposed competencies that business and management education should ensure that students possess, such as leadership, oral communication/presentation skills, written communication, planning and organizing, information gathering and problem analysis, decision making, delegation and control, self-objectivity, and disposition to lead. Moreover, the continued fragmentation of business education into ever narrower specializations (Zeithaml and Rice, 1987) enlarges the gaps in the core competencies between the departments of business and management colleges. Therefore, whether business schools can really ensure that students learn the necessary business and management knowledge and skills and possess the requisite competencies, and especially whether they can apply what they have learned in real business contexts, remains controversial and demands more research investigations.

Entrepreneurial Competency and Intention Development in Entrepreneurship Education

As noted above, most business schools around the world are running specific programs such as innovation and entrepreneurship programs. Entrepreneurship education in higher education intends to develop students' entrepreneurial competencies and intention (Souitaris et al., 2007). Entrepreneurial competencies are argued to have impacts on the willingness and capability to perform the entrepreneurial tasks of new value creation, and they could be used as predictors of business success (Kraiger et al., 1993; Fisher et al., 2008; Sánchez, 2011; Lackéus, 2015).

To define entrepreneurial competencies, the three domains that must be considered are knowledge, skills, and attitudes. The knowledge domain, considered the basis of entrepreneurial competency, includes basics of entrepreneurship, value creation, idea generation, opportunities, accounting, finance, technology, marketing, risk, and other key concepts (Kraiger et al., 1993). As for entrepreneurial skills, Fisher et al. (2008) defined a framework for analyzing learning outcomes in entrepreneurship education based on the marketing, resource, opportunity, interpersonal, learning, and strategic skills that are useful in the entrepreneurial process. Literature contributing to the linkage between entrepreneurial education and the entrepreneurial attitudes identifies the following themes of attitudes as positive: entrepreneurial passion/inspiring entrepreneurial passion (Fisher et al., 2008), entrepreneurial identity/believing in entrepreneurial value (Krueger, 2005, 2007), innovativeness/novel thoughts and actions (Krueger, 2005; Murnieks, 2007), and self-insight/knowledge of personal fit with being an entrepreneur (Kraiger et al., 1993).

Lackéus (2015) further proposed a classification of entrepreneurial competencies based on the framework constructed by Fisher et al. (2008). This classification categorized eleven themes of entrepreneurial competencies grouped into three domains (see **Table 1**). In this study, this framework was used to develop our measures of students' entrepreneurial competencies.

On the other hand, entrepreneurial intention is considered as a personal orientation to start a business, become self-employed, or lead venture creations. Entrepreneurial intention is the key element in understanding entrepreneurship for the reason that creating a new business is a planned behavior (Bird, 1988). Many studies have investigated entrepreneurial intention utilizing the Theory of Planned Behavior (TPB) (i.e., Krueger et al., 2000; Souitaris et al., 2007; Karimi et al., 2013; Kaijun and Sholihah, 2015) and found that intention is the best predictor of planned behavior. Entrepreneurial intention is considered as an antecedent of entrepreneurship, and the determinants of entrepreneurial intention are well explored (Saeed et al., 2015; Yukongdi and Lopa, 2017).

Based on the TPB framework, previous studies have explored the impact of education on entrepreneurial intention. Entrepreneurship education is considered to be one of the key instruments for increasing entrepreneurial intention, and many researchers have confirmed the positive linkage between entrepreneurship education and entrepreneurial intentions (i.e., Souitaris et al., 2007; Zhang et al., 2014; Kaijun and Sholihah, 2015; Rauch and Hulsink, 2015; Westhead and Solesvik, 2016).

However, some previous studies do not support the positive relationship between entrepreneurial education and entrepreneurship intention (Oosterbeek et al., 2010). The contextual differences, such as those resulting from a knowledge base either from entrepreneurship education or personal professions, should be taken into consideration as deceptive sources (Martin et al., 2013; Maresch et al., 2016). To education system designers, both potential sources of contextual differences are equally important and worthy of further investigation. The current study intended to test the effects of an entrepreneurial education program and of the academic disciplines of business schools on students' entrepreneurial competencies and intention to become entrepreneurs.

TABLE 1 | The classification of key entrepreneurial competencies.

Domain	Themes	Interpretation
Knowledge	Basic business knowledge	Basics of entrepreneurship, value creation, idea generation, opportunities, accounting, finance, technology, marketing, risk, etc.
Skills	Marketing skills	Conducting market research, assessing the marketplace, marketing products and services, persuasion, getting people excited about your ideas, dealing with customers, communicating a vision
	Resource skills	Creating a business plan, creating a financial plan, obtaining financing, securing access to resources.
	Opportunity skills	Recognizing and acting on business opportunities and other kinds of opportunities, product/service/concept development skills
	Interpersonal skills	Leadership, motivating others, managing people, listening, resolving conflict, socializing
	Learning skills	Active learning, adapting to new situations, coping with uncertainty
	Strategic skills	Setting priorities (goal setting) and focusing on goals, defining a vision, developing a strategy, identifying strategic partners
Attitudes	Entrepreneurial passion	"I want." Need for achievement
	Entrepreneurial identity	"I am/I value." Deep beliefs, role identity, values
	Innovativeness	"I create." Novel thoughts/actions, unpredictable, radical change, innovative, visionary, creative, rule breaker
	Self-insight	Knowledge of personal fit with being an entrepreneur/being entrepreneurial

Adapted and modified from Lackéus (2015).

METHODS

The Context: Management Education and Creativity and Entrepreneurship Program at NTU

This study utilized the National Taiwan University (NTU) as a case to explore the effects of two paths of entrepreneurial education at NTU on students' entrepreneurial competencies and intention development. The management education of NTU was first founded in 1948. As of today, the college of management of NTU provides leading business programs in Taiwan and was ranked 48th by the ESSEC Business School in 2018 (ESSEC Business School, 2018). It consists of five departments for undergraduates: Accounting, Business Administration, Finance, International Business, and Information Management. Except for the department of Information Management,[1] these departments are considered to be representative of typical management education disciplines.

As shown in **Table 2**, the capabilities of the core courses of the four departments of the college of management at NTU consist mostly of knowledge and skills orientation, in accordance with their academic disciplines. All courses in the department of finance can be grouped into solely professional skills, while there are five groups of professional skills among the courses of the department of international business. Other than knowledge and skills, the abilities to lead or execute teamwork are provided by courses of three of the departments, all but the department of accounting. The ability to identify and solve problems and the ability to innovate are solely provided by the department of business administration. With noticeable variations among the course attributes of the four departments of the college of management, it is reasonable to expect students from these four departments to be equipped with different knowledge bases according to their majors. Meanwhile, students' abilities of leadership, problem-solving and innovation are anticipated to be unevenly distributed among the four departments due to disparities in the courses.

On the other hand, the Creativity and Entrepreneurship Program (CEP) at NTU was initiated in 2008, so it is 60 years younger than those of the traditional management education. CEP is designed to act as an entrepreneurial platform program to recruit students who aspire to become entrepreneurs or who would like to understand entrepreneurship, and it provides them with instruction and genuine hands-on experience. Through cross-disciplinary orientation courses in active learning and participation classrooms, the learning path of CEP intends to motivate students to try entrepreneurial thinking and engage in cooperative activities. One featured learning activity of core CEP courses is the opportunity for interaction between students and experienced entrepreneurs from the real business world.

As for the courses offered by CEP, it is very different from the courses of the departments of the college of management. It is designed to provide opportunities for students to actively participate in learning and to accumulate experience from practical exercises. Despite course rotations among semesters, the spirit of CEP courses is to equip enrolled students with teamwork capabilities and problem-solving skills. Most CEP courses can be characterized as problem-oriented, theme-based, and hands-on learning activities. The learning pattern of CEP requires students to mobilize all their capabilities to solve specific issues or problems through teamwork practice.

[1]There are two reasons: (1) Information Management is not viewed as part of the traditional management knowledge domain regarding corporate functions; (2) the Department of Information Management of NTU has been placing more emphasis on information technology than on management, so it will soon be dissociated from the College of Management and merged into the Department of Computer Science and Information Engineering, College of Electrical Engineering and Computer Science, NTU.

TABLE 2 | Capabilities of core courses of four departments of the college of management, NTU.

Capabilities	Capabilities: number of core course (% of all courses)			
	Accounting number of courses: 89	**Business Administration number of courses: 101**	**Finance number of courses: 97**	**International Business number of courses: 98**
Knowledge	• Basic business knowledge: 24 (27%) • Humilities/legal knowledge: 20 (22%)	• Knowledge of industry environment and development: 44 (44%) • Abidance of professional ethics: 27 (27%)	• Financial ethics and social responsibility: 45 (46%)	•Theoretical foundations of business management: 30 (31%)
Language and communication skills	• Language and communication skills: 33 (37%)	• Oral and written presentation and communication skills: 68 (67%) • Global perspectives and foreign language ability: 35 (35%)	• Global view and proficiency in foreign language: 42 (43%)	(None)
Professional skills	• Professional accounting knowledge: 46 (52%) • Management knowledge and ability: 29 (33%) • Information analysis and application ability: 11 (12%)	• Professional knowledge and skills: 90 (89%) • Ability in the applications of analytical and quantitative tools: 54 (53%)	• Masterful in financial theory and practice: 91 (94%)	• Application of financial management and economics: 44 (45%) • International business management capability: 41 (42%) • International branding and marketing capability: 27 (28%) • Industrial analyzing capability: 26 (27%) • Quantitative logical thinking and analyzing capability: 20 (20%)
Ability to lead or for teamwork	(None)	• Ability for teamwork: 58 (57%) • Ability to lead: 24 (24%)	• Ability to work as a team member: 51 (53%)	• The awareness of teamwork and social responsibility: 24 (24%)
Ability to identify and solve problems	(None)	• Ability to identify and solve problems: 91 (90%)	(None)	(None)
Ability to innovate	(None)	• Ability to innovate: 46 (46%)	(None)	(None)

Authors, compiled from course maps of each department of the management college of NTU.

It therefore provides connectivity and convergence of the knowledge and professional skills they have acquired in their regular departmental courses. Students enrolled in CEP are requested to draw up business plans with real market pain points, on their own or in a group. Throughout the journey of CEP courses, students are expected to be motivated to transfer their learnt skills, fragmented by the course subjects of their departments, into experience by exercising problem solving on their proposed business plans.

Research Participants

Purposeful sampling was used to recruit participants from students enrolled in the four departments of the college of management, including both students who had taken and those who had not taken CEP courses. Respondents were fully informed about the research purpose on the questionnaire, and they returned the questionnaires voluntarily. Per applicable institutional and national guidelines, no additional consent approval was required, as all respondents were voluntary and anonymous. In total, 267 fully completed questionnaires were returned. As seen in **Table 3**, the descriptive analysis of the sample showed well-balanced sampling among genders, CEP taken or not, and departments of the college of management.

Measures

In this study, the classification of entrepreneurial competencies proposed by Lackéus (2015) with entrepreneurial intention was adopted to compose the survey measures (see **Appendix**). The questionnaire consisted of 20 items, to which participants responded on a six-point Likert-type scale (ranging from 1 = strongly disagree to 6 = strongly agree). The collected data were analyzed in SPSS for Windows version 22.

RESULTS AND DISCUSSION

To answer the research question and objectives, an independent-sample *t*-test was conducted to compare CEP-taken (CEP-Y) and CEP-not-taken (CEP-N) for each student group of the departments of the college of management. The integrated results are shown in **Table 4**, and the significance of score differences is noted in the "Diff" column. The means of each entrepreneurial competency and intention by sample groups are shown in **Figure 1** to visualize the comparisons. **Table 5** summarizes the

TABLE 3 | Descriptive analysis of sample.

Variable	*n* = 267	
	Frequency	%
Gender		
Female	139	52.1
Male	128	47.9
Class		
Freshman	21	7.9
Sophomore	37	13.9
Junior	98	36.7
Senior	111	41.5
CEP-taken		
Yes	126	52.8
No	141	47.2
Department		
Accounting	65	24.3
CEP-taken-Yes	31	
CEP-taken-No	34	
Business Administration	65	24.3
CEP-taken-Yes	31	
CEP-taken-No	34	
Finance	68	25.5
CEP-taken-Yes	30	
CEP-taken-No	38	
International Business	69	25.8
CEP-taken-Yes	34	
CEP-taken-No	35	

test results of entrepreneurial competencies and intention by department among the sample.

The CEP-Y Students Showed Significantly Higher Scores on Entrepreneurial Competencies and Intention Than the CEP-N Students Did

As seen in **Table 4**, almost every comparison presented a high level of significance between the CEP-Y and CEP-N groups. These results suggested that CEP courses really did have significant effects on entrepreneurial competencies and intention with regard to every competency of all the respondents of one group "Total," as well most competencies of the CEP-Y and CEP-N groups of each department of the College of Management, NTU. In general, the CEP-Y students scored significantly higher on entrepreneurial competencies and intention than did their CEP-N counterparts.

Among all, the sample from the department of business administration showed full consistency in the significance of CEP-taken-or-not in all competencies and intention, while students of the department of accounting showed the fewest significant results out of the CEP-taken-or-not tests on competencies. These results suggest that the bodies of knowledge and skills of the four departments might diversify the effectiveness of CEP courses on entrepreneurial competencies and intention, as will be discussed in section "Diverse

TABLE 4 | The differences in entrepreneurial competencies and intention by CEP-taken or not-taken among samples.

Department	Total					Accounting					Business Administration					Finance					International Business				
	CEP-N		CEP-Y		Diff.	CEP-N		CEP-Y		Diff.	CEP-N		CEP-Y		Diff.	CEP-N		CEP-Y		Diff.	CEP-N		CEP-Y		Diff.
Competencies	Mean	SD	Mean	SD		Mean	SD	Mean	SD		Mean	SD	Mean	SD		Mean	SD	Mean	SD		Mean	SD	Mean	SD	
Knowledge	3.23	1.00	4.10	1.37	**	3.56	0.99	3.77	1.36		2.85	0.96	4.11	1.35	**	3.74	0.76	4.67	1.56	**	2.71	0.93	3.91	1.11	**
Marketing skills	3.15	0.96	4.27	1.47	**	2.51	0.75	3.01	1.24		3.44	0.99	4.65	1.20	**	3.24	0.88	4.93	1.60	**	3.41	0.95	4.51	1.08	**
Resource skills	4.06	1.14	4.48	1.20	*	4.09	1.24	4.16	1.16		3.85	1.28	4.61	1.38	**	4.08	1.11	4.53	0.90		4.21	0.93	4.62	1.28	
Opportunity skills	3.11	0.89	4.50	1.12	**	3.01	0.85	4.58	1.26	**	3.01	0.98	4.48	1.06	**	3.29	0.95	4.73	1.02	**	3.11	0.76	4.24	1.13	**
Interpersonal skills	2.67	0.96	3.34	1.20	**	2.47	0.96	3.45	1.18	**	2.74	0.90	3.55	1.18	**	2.74	1.06	3.41	1.38	*	2.71	0.92	3.01	1.04	
Learning skills	2.29	0.85	3.12	1.38	**	2.35	0.92	2.97	1.48	*	2.35	0.81	3.35	1.45	**	2.18	0.90	3.61	1.32	**	2.29	0.79	2.62	1.10	
Strategic skills	2.98	1.09	3.99	1.28	**	2.91	1.06	3.77	1.36	**	3.03	1.14	4.11	1.33	**	2.95	1.13	4.13	1.33	**	3.03	1.07	3.97	1.14	**
Entrepreneurial passion	2.60	1.11	3.79	1.53	**	2.47	0.99	3.11	1.56		2.74	1.24	3.91	1.45	**	2.68	1.06	3.51	1.71	**	2.49	1.15	4.59	1.02	**
Entrepreneurial identity	2.86	0.87	3.86	1.13	**	2.76	0.92	3.87	1.61	**	2.91	0.91	4.09	1.38	**	2.97	0.85	3.41	1.30		2.77	0.81	4.03	1.17	**
Innovativeness	3.02	0.94	4.30	1.01	**	3.15	0.96	4.11	0.98	**	3.06	0.89	4.32	1.19	**	3.21	1.04	4.61	0.89	**	2.66	0.77	4.21	0.93	**
Self-insight	2.77	0.95	3.75	1.22	**	2.76	0.92	3.48	1.15	**	2.85	0.93	4.16	1.10	**	2.74	1.06	3.41	1.38	*	2.71	0.93	4.03	1.17	**
Entrepreneurial intention	2.46	1.48	3.64	1.67	**	2.03	1.11	2.23	1.12		1.91	1.14	3.42	1.34	**	1.95	1.14	3.63	1.85	**	3.97	1.40	5.15	0.74	**

*Scale measurements of which ranging from 1 (strongly disagree) to 6 (strongly agree) out of a six-point Likert-type scale. Posteriori test: LSD. *P < 0.05. **P < 0.01.*

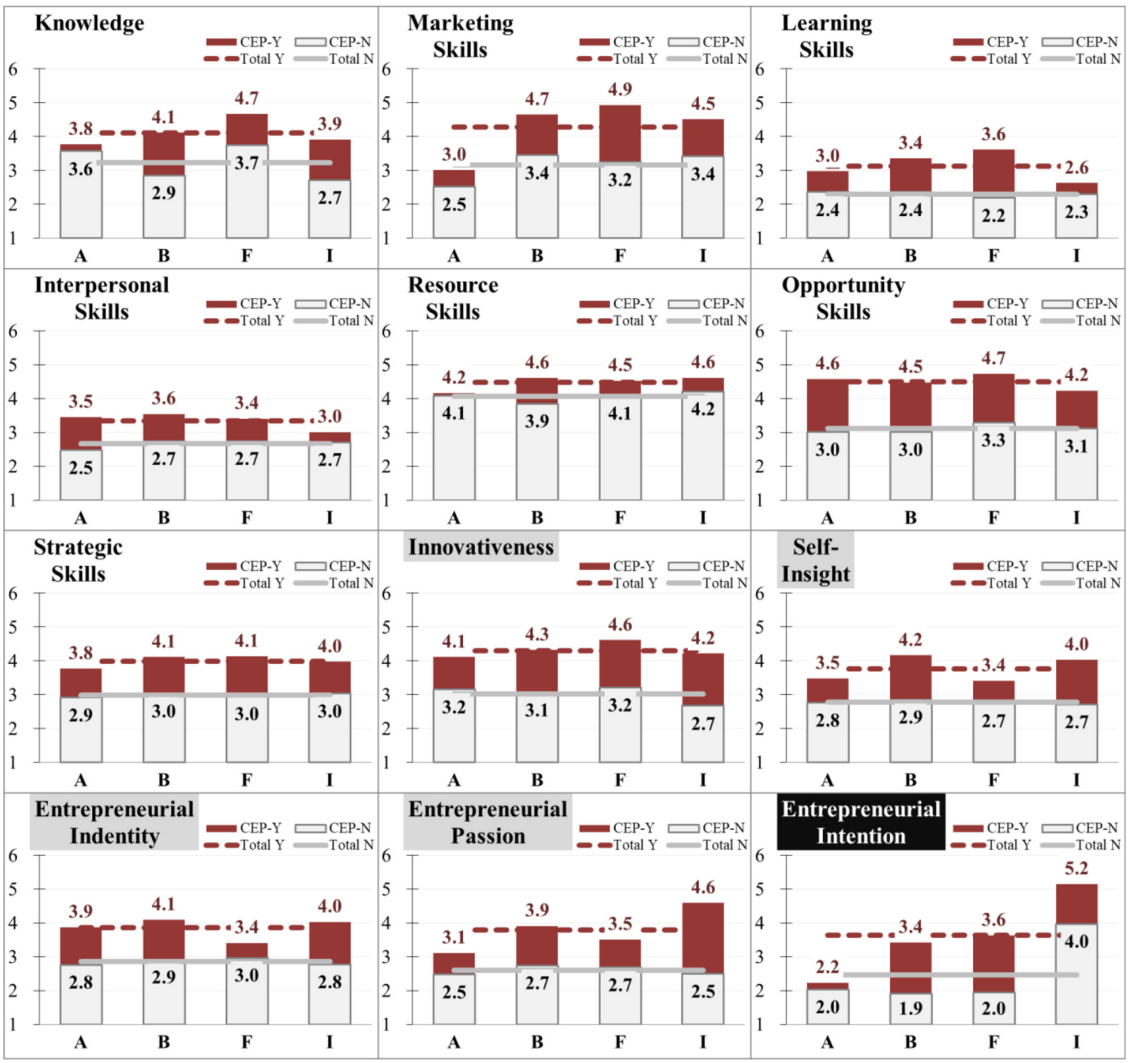

FIGURE 1 | Comparisons of entrepreneurial competencies and intention among samples. Department A: Accounting; Department B: Business Administration; Department F: Finance; Department I: International Business. Scale measurements of which ranging from 1 (strongly disagree) to 6 (strongly agree) out of a six-point Likert-type scale.

Effectiveness of CEP Courses on Entrepreneurial Competencies Among Four Departments of the College of Management."

CEP Affects Attitudes and Intention More Than It Does Knowledge and Skills

As **Figure 1** shows, between the CEP-Y and CEP-N groups, greater differences were found in the attitude domains and entrepreneurial intention than in competencies of knowledge and skills. This finding might be related to the self-selectiveness of CEP-Y students, who aspire to be entrepreneurs or would like to learn about entrepreneurship. However, it is irrefutable that, through CEP courses featuring problem/issue-oriented and hands-on activities, the new type of entrepreneurship education contributes to inspiring students and possibly leads to higher self-assessments on the scales of the attitude domains and entrepreneurial intention.

Diverse Effectiveness of CEP Courses on Entrepreneurial Competencies Among Four Departments of the College of Management

CEP Courses Are Less Effective on Enhancing the Entrepreneurial Competencies and Intention of Students of the Department of Accounting

It is notable that five domains in **Table 4** had insignificant gaps of entrepreneurial competencies and intention according to CEP-Y or CEP-N in the sample of the department of accounting. Their self-reported scales of entrepreneurial intention and passion were mostly the lowest of the four departments, whether they were in the CEP-N or CEP-Y group of the department of accounting. In addition, the differences in entrepreneurial intention and passion of the CEP-Y and CEP-N groups were the smallest among all the departments, as can easily be seen in **Figure 1**. For the knowledge,

TABLE 5 | Test results of entrepreneurial competencies and intention by departments among samples.

Competencies/ Departments	CEP chosen-yes						CEP chosen-not					
	A vs. B	A vs. F	A vs. I	B vs. F	B vs. I	F vs. I	A vs. B	A vs. F	A vs. I	B vs. F	B vs. I	F vs. I
Knowledge		**F > A				**F > I	*B > A		**A > I	**F > B		**F > I
Marketing skills	**B > A	**F > A	**I > A				**B > A	**F > A	**I > A			
Resource skills												
Opportunity skills						*F > I						
Interpersonal skills						*F > I						
Learning skills		*F > A		**F > B	**B > I	**F > I						
Strategic skills												
Entrepreneurial passion		*F > A	**I > A		*I > B	**I > F						
Entrepreneurial identity				**B > F		*I > F						
Innovativeness		*F > A							*A > I			*F > I
Self-insight	*B > A		*I > A	*B > F		*I > F						
Entrepreneurial intention	**B > A	**F > A	**I > A		**I > B	**I > F			**I > A		**I > B	**I > F

*Posteriori test: LSD. Department A: Accounting; Department B: Business Administration; Department F: Finance; Department I: International Business. *P < 0.05. **P < 0.01.*

marketing skills and learning skills, similar results were found. For students of the department of accounting, it seemed that CEP courses were less effective on enhancing entrepreneurial competencies and intention, as compared with students in the other departments of the college of management.

CEP Courses Highly Improved the Self-Assessed Scores of Several Skills of the Students of the Department of Finance

Figure 1 illustrates that the scores of the students of the department of finance on many entrepreneurial skills and intention were higher in the CEP-Y group than in the CEP-N group, while minimum scale gaps on attitudes such as self-insight and entrepreneurial identity were noted. This was a dissimilar pattern from the general finding that CEP impacted on attitudes more than on skills. Students of the department of finance indicated that CEP courses highly improved their self-assessed scores of some skills, such as marketing, learning and strategic skills. The difference in entrepreneurial intention of the CEP-Y and CEP-N groups was also the largest among the four departments. It is reasonable to argue that CEP courses worked better on score improvements of these skills for students of the department of finance than they did for students of other departments of the college of management.

CEP Courses Provided Well-Balanced Enhancement of Self-Assessed Scores of All Entrepreneurial Competencies and Intention for the Students of the Department of Business Administration

Comparing the CEP-Y and CEP-N groups of the department of business administration, significant differences existed in each test result of the score gaps of entrepreneurial competencies and intention. It can be concluded that the CEP courses provided well-balanced enhancement of the self-assessed scales of all entrepreneurial competencies in the domains of knowledge, skills and attitudes, and intention to students of the department of business administration. The most comprehensive increases in entrepreneurial competencies suggested that the students of the department of business administration were the greatest beneficiaries of the CEP courses among the four departments of the college of management.

CEP Courses Increased the Self-Assessed Scores of Entrepreneurial Attitudes and Intention More Than They Did the Knowledge and Skills of the Students of the Department of International Business

For the groups in the department of international business, all differences in entrepreneurial attitudes and intention were highly significant for the CEP-Y and CEP-N groups, but a few differences in the skills domains were found to be insignificant, namely, the resource skills, interpersonal skills and learning skills. The highest scores of the entrepreneurial intention of CEP-N students were considerably lower than those of the CEP-Y students of the department of international business. This result could be taken as positive support for the CEP courses as they significantly reinforce the entrepreneurial intention of the enrolled students, regardless of how high the scores of their CEP-N counterparts were.

Comparisons of Four Departments of the College of Management

CEP Courses Amplified Differences in Entrepreneurial Intention Among Departments

Table 5 presents comparisons among the samples for all CEP-Y and CEP-N students. This table helps to clarify the context issues with better understanding of the relative relationships of the self-assessed scores of entrepreneurial knowledge, skills, and attitudes between any two departments.

For both CEP-N and CEP-Y students, those in the department of international business always showed stronger entrepreneurial intention than those in other departments. In the other three departments, students' entrepreneurial intentions revealed more cases of significant differences only for CEP-Y students.

Moreover, students in the department of accounting had the lowest self-assessed scores of entrepreneurial intention of all CEP-Y students. It seemed that the CEP courses amplified the differences in entrepreneurial intention among the four departments of the college of management. The CEP-Y students of the department of international business had the highest self-assessed scores of entrepreneurial intention among the departments, while those of the department of accounting had the lowest.

CEP Courses Created Scale Gaps Among the Departments in Attitudes More Than in Knowledge and Skills

For all CEP-N students, the self-assessments of the majority of the skills domains had no significant differences among the four departments. Only on marketing skills were the self-assessed scores of students of the department of accounting significantly lower than those of any of the other departments. Another domain with significant differences among departments was that of knowledge; the self-assessed scores were in the order of the department of finance, then the department of business administration, then the department of accounting, and finally the department of international business.

As for CEP-Y students, although the department of accounting had the lowest self-assessed scores of marketing skills, the order of scales of knowledge was not as clear as that of CEP-N students. Similarly, to those of the CEP-N students, the self-assessed scores of knowledge of the CEP-Y students of the department of finance were significantly higher than those of the departments of accounting and international business. However, learning skills was revealed to be another domain with significant gaps among departments; the scores of the department of finance were higher than those of all other departments.

Therefore, CEP courses significantly increased scale gaps in the knowledge and skills domains among the departments. For the attitude domains, comparing results presented another pattern among departments. For all CEP-N students, innovativeness was the only attitude domain in which significant differences could be found among the departments. Yet for all CEP-Y students, significant differences among departments existed in all attitude domains. Although the order of the departments could not easily be determined, it was noted that the department of international business tended to have higher scores on attitude than did the other departments, while the departments of accounting and finance more frequently had lower scores as compared with the other two departments. As a result, it can be concluded from the above observations that the CEP courses affected the scale gaps of the departments more in the attitude domains than in the knowledge and skills domains.

CONCLUSION

The aim of this study was to contribute knowledge on the context issue based on the effects of an entrepreneurial program. To be specific, it was expected that differences in business school students' entrepreneurial competencies and intention would be found between those who had taken an entrepreneurship program and those who had not. This study also explored the context limits or facilitations in the entrepreneurship education of college students in different academic disciplines of a management school. The findings of this study have theoretical and practical implications as follows.

CEP Courses Showed Effectiveness on All Entrepreneurial Competencies and Intention

The results of this study showed significantly higher gains in entrepreneurial competencies and intention in the CEP-Y groups than in the CEP-N groups of the same departments of the college of management, regardless of which one. The score differences in the attitude domains and entrepreneurial intention between groups were greater than those of the knowledge and skills domains. Both the self-selectiveness of CEP-Y students and the CEP courses, featuring problem/issue-oriented and hands-on activities, contributed to the results. This finding reconfirmed that CEP courses were successful in effectively improving students' self-assessments of their entrepreneurial competencies and intention, as the program was designed to do.

The Effectiveness of CEP Courses Was More Evident in the Attitude Domains Than in the Knowledge or Skills Domains

In general, the results of this study demonstrated the higher effectiveness of the CEP courses in the attitude domains than in the knowledge or skills domains. This finding was not unexpected, for CEP was designed to facilitate the accumulation of experiences and to provide both connectivity and the convergence of knowledge and professional skills acquired from the courses of the departments. In the unique learning pattern of the CEP courses, CEP-Y students were continuously motivated and encouraged by invited lecturers; entrepreneurs and participants in the start-ups eco-systems shared their knowledge of real market dynamics and exchanged ideas with the CEP students. Although some classes of a typical business school would also provide this kind of connectivity, they would not provide it as significantly as the CEP program course did, which was designed with this central feature.

Bodies of Learned Knowledge or Future Outlooks on Employment and Rewards Might Contribute to the Dissimilar Patterns of Students of the Department of Finance

However, it can be concluded that the positive impacts of the new type of entrepreneurial program on promoting entrepreneurial competencies or entrepreneurial intentions do not equally benefit the students of the four departments of the college of management. This point raises the context issue, for students are equipped with different bodies of knowledge on corporate management, depending on their majors.

For example, a dissimilar pattern was found for students of the department of finance, for whom the effectiveness of the program was stronger in the knowledge and skills domains than in the attitude domains. This case has two possible explanations. First, the single dimension of professional skills of the course map of the department of finance suggested that students were equipped with a greatly focused body of professional knowledge and skills, which were further consolidated and better appraised through CEP courses. Second, future outlooks or expectations for employment and rewards of the graduates of the department of finance were less vulnerable, which could have led to conservative attitudes and reluctant intention toward entrepreneurship. The second explanation could apply to graduates of the department of accounting as well. From this perspective, it was understandable that minimal variance in the competencies comparisons was found in the CEP-Y and CEP-N students of the department of accounting. Moreover, regardless of the domain or the CEP-Y or CEP-N classification, the self-assessed scores of each entrepreneurial competency and intention of the students of the department of accounting were the lowest among the departments of the college of management.

It is evident that other factors, such as professional skills trained or the context conditions of employment, could contribute to variations in the effectiveness of the CEP courses on entrepreneurial intention. It is recommended that these findings be referenced for future studies.

Implications for Practice

Suggestion 1: Design to Improve the Effectiveness of CEP for Students Trained With Professional Skills Inconsistent With Entrepreneurship

In terms of education design, this study raises a profound issue: Should CEP equally take all students from any department of the college of management, or should it selectively take those who will demonstrate greater effects from the courses, considering the limited resources of CEP? For example, this study found that students of the department of accounting were the least affected group among the four departments of the college of management. The disciplinary and compliancy values of the professional knowledge and skills of accounting present fundamental conflicts with the hidden core value of entrepreneurship, innovativeness. Taking the inconsistency in the core values of specific professions and the entrepreneurship of CEP into account, should the design of CEP include a special path for students from departments like the department of accounting to enhance the effectiveness of the CEP courses? This is a question for those who plan and execute the strategies of CEP.

Suggestion 2: Maximize the Effectiveness of CEP by Selecting Students With Highly Trained Professional Skills

The CEP courses were designed to provide connectivity and the consolidation of knowledge and skills acquired in the regular department courses. The notable effectiveness on students of the department of finance led to the observation that strong professional skills lead to better effectiveness of the CEP courses in the skills domains. A possible explanation is that the students' professional knowledge and skills provide the fundamentals of effective learning in the CEP classrooms. Therefore, the strong focused professional skills of the department of finance were further enhanced by the CEP courses providing connectivity and consolidation. A contrary case was found for the students of the department of international business, whose professional skills diverged from the course map of the department. Their improvements in the scores of the skills domains provided by the CEP courses were not significant. Therefore, profoundly trained professional skills could be a preliminary condition for the strengthening of skills in the CEP courses.

Suggestion 3: The Implementors of the CEP Courses Should Be Aware of the Results of This Study and Modify Their Requirements for Enrolled Students so as to Increase the Effectiveness of Their Entrepreneurship Coaching Efforts

The implementors of the CEP courses should be aware of the results of this study to understand how the effectiveness of their efforts varies in students from the four departments of the college of management. Such understanding should help the implementors to modify their requirements for enrolled students so as to enhance the effectiveness of their coaching efforts for higher entrepreneurship.

The results presented in this study should guide CEP system designers in orienting their efforts on a framework for more effectively consolidating students' learned professional knowledge and skills, as well as for providing greater encouragement of students' attitude domains. As a result, the new type of entrepreneurial program, CEP, will better facilitate the entrepreneurship competencies of students with training from traditional management courses.

AUTHOR CONTRIBUTIONS

All authors have contributed equally to the conception and design of the study, organized the database, performed the statistical analysis, wrote the first draft of the manuscript. All authors approved the final version of the manuscript.

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REFERENCES

AACSB Business Accreditation (2019). *AACSB 2018 Business Accreditation Standards*. Available at: https://www.aacsb.edu/-/media/aacsb/docs/accreditation/business/standards-and-tables/2018-business-standards.ashx?la=en&hash=B9AF18F3FA0DF19B352B605CBCE17959E32445D9 (accessed July 10, 2019).

AACSB International Accreditation Coordinating Committee and AACSB International Accreditation Quality Committee (2013). *AACSB White Paper*. Available at: http://web.nchu.edu.tw/pweb/users/wtsay/lesson/11680.pdf (accessed July 10, 2019).

Aparicio, S., Urbano, D., and Audretsch, D. (2016). Institutional factors, opportunity entrepreneurship and economic growth: panel data evidence. *Technol. Forecast. Soc. Change* 102, 45–61. doi: 10.1016/j.techfore.2015.04.006

Bird, B. (1988). Implementing entrepreneurial ideas: the case for intention. *Acad. Manag. Rev.* 13, 442–453. doi: 10.5465/amr.1988.4306970

ESSEC Business School, (2018). *ESSEC Business School, 2018*. Available at: http://www.essec.edu/en/ (accessed June 25, 2019).

Fisher, S., Graham, M., and Compeau, M. (2008). "Starting from Scratch: Understanding the Learning Outcomes of Undergraduate Entrepreneurship Education," in *Entrepreneurial Learning: Conceptual Frameworks and Applications*, eds R. T. Harrison and C. Leitch (New York, NY: Routledge).

Gartner, W. B., Bird, B. J., and Starr, J. A. (1992). Acting as if: differentiating entrepreneurial from organizational behavior. *Entrepreneursh. Theory Pract.* 16, 13–32. doi: 10.1177/104225879201600302

Gartner, W. B., and Vesper, K. H. (1994). Experiments in entrepreneurship education: success and failures. *J. Bus. Ventur.* 9, 179–187. doi: 10.1016/0883-9026(94)90028-0

Gelaidan, H. M., and Abdullateef, A. O. (2017). Entrepreneurial intentions of business students in Malaysia: the role of self-confidence, educational and relation support. *J. Small Bus. Enterp. Dev.* 24, 54–67. doi: 10.1108/jsbed-06-2016-0078

Hockerts, K. (2017). Determinants of social entrepreneurial intentions. *Entrepreneursh. Theory Pract.* 41, 105–130. doi: 10.1371/journal.pone.0199924

Ireland, R. D., Hitt, M. A., and Sirmon, D. G. (2003). A model of strategic entrepreneurship: the construct and its dimensions. *J. Manag.* 29, 963–989. doi: 10.1016/s0149-2063(03)00086-2

Iwu, C. G., Ezeuduji, I., Eresia-Eke, C., and Tengeh, R. (2016). The entrepreneurial intention of university students: the case of a university of technology in South Africa. *Acta Universitatis Danubius. OEconomica* 12, 164–181.

Kaijun, Y., and Sholihah, P. I. (2015). A comparative study of the Indonesia and Chinese educative systems concerning the dominant incentives to entrepreneurial spirit (desire for a new venturing) of business school students. *J. Innov. Entrepreneursh.* 4, 1–16.

Kaplan, A. (2018). A school is "a building that has four walls…with tomorrow inside": toward the reinvention of the business school. *Bus. Horiz.* 61, 599–608. doi: 10.1016/j.bushor.2018.03.010

Karimi, S., Biemans, H. J., Lans, T., Chizari, M., Mulder, M., and Mahdei, K. N. (2013). Understanding role models and gender influences on entrepreneurial intentions among college students. *Proc. Soc. Behav. Sci.* 93, 204–214. doi: 10.1016/j.sbspro.2013.09.179

Kirby, D. A. (2004). Entrepreneurship education: can business schools meet the challenge? *Educ. Train.* 46, 510–519. doi: 10.1108/00400910410569632

Kraiger, K., Ford, J. K., and Salas, E. (1993). Application of cognitive, skill-based, and affective theories of learning outcomes to new methods of training evaluation. *J. Appl. Psychol.* 78, 311–328. doi: 10.1037//0021-9010.78.2.311

Krueger, N. F. (2005). "The cognitive psychology of entrepreneurship," in *Handbook of Entrepreneurship Research: An Interdisciplinary Survey and Introduction*, eds Z. J. Acs and D. B. Audretsch (New York, NY: Springer).

Krueger, N. F. (2007). What lies beneath? The experiential essence of entrepreneurial thinking. *Entrepreneursh. Theory Pract.* 31, 123–138. doi: 10.1111/j.1540-6520.2007.00166.x

Krueger, N. F., Reilly, M. D., and Carsrud, A. L. (2000). Competing models of entrepreneurial intentions. *J. Bus. Ventur.* 15, 411–432. doi: 10.1016/s0883-9026(98)00033-0

Kuratko, D. F. (2005). The emergence of entrepreneurship education: development, trends, and challenges. *Entrepreneursh. Theory Pract.* 29, 577–597.

Lackéus, M. (2015). *Entrepreneurship in Education: What, Why, When, How. (OECD Report)*. Available at: https://www.oecd.org/cfe/leed/BGP_Entrepreneurship-in-Education.pdf (accessed July 10, 2019).

Löbler, H. (2006). Learning entrepreneurship from a constructivist perspective. *Technol. Anal. Strateg. Manag.* 18, 19–38. doi: 10.1080/09537320500520460

Maresch, D., Harms, R., Kailer, N., and Wimmer-Wurm, B. (2016). The impact of entrepreneurship education on the entrepreneurial intention of students in science and engineering versus business studies university programs. *Technol. Forecast. Soc. Change* 104, 172–179. doi: 10.1016/j.techfore.2015.11.006

Martin, B. C., McNally, J. J., and Kay, M. J. (2013). Examining the formation of human capital in entrepreneurship: a meta-analysis of entrepreneurship education outcomes. *J. Bus. Ventur.* 28, 211–224. doi: 10.1016/j.jbusvent.2012.03.002

Murnieks, C. Y. (2007). *Who Am I? The Quest for an Entrepreneurial Identity and an Investigation of its Relationship to Entrepreneurial Passion and Goal-Setting*. Ph.D. thesis, University of Colorado, Boulder, CO.

Oosterbeek, H., van Praag, M., and Ijsselstein, A. (2010). The impact entrepreneurship education on entrepreneurship skills and motivation. *Eur. Econ. Rev.* 54, 442–454.

Pfeffer, J., and Fong, C. T. (2002). The end of business schools? Less success than meets the eye. *Acad. Manag. Learn. Educ.* 1, 78–95. doi: 10.5465/amle.2002.7373679

Rae, D. M. (1997). Teaching entrepreneurship in Asia: impact of a pedagogical innovation. *Entrepreneursh. Innov. Change* 6, 193–227.

Rauch, A., and Hulsink, W. (2015). Putting entrepreneurship education where the intention to act lies: an investigation into the impact of entrepreneurship education on entrepreneurial behavior. *Acad. Manag. Learn. Educ.* 14, 187–204. doi: 10.5465/amle.2012.0293

Refai, D., and Klapper, R. (2016). Enterprise education in pharmacy schools: experiential learning in institutionally constrained contexts. *Int. J. Entrepreneur. Behav. Res.* 22, 485–509. doi: 10.1108/ijebr-07-2015-0162

Saeed, S., Yousafzai, S. Y., Yani-De-Soriano, M., and Muffatto, M. (2015). The role of perceived university support in the formation of students' entrepreneurial intention. *J. Small Bus. Manag.* 53, 1127–1145. doi: 10.1111/jsbm.12090

Sánchez, J. C. (2011). University training for entrepreneurial competencies: its impact on intention of venture creation. *Int. Entrepreneursh. Manag. J.* 7, 239–254. doi: 10.1007/s11365-010-0156-x

Souitaris, V., Zerbinati, S., and Al-Laham, A. (2007). Do entrepreneurship programmes raise entrepreneurial intention of science and engineering students? The effect of learning, inspiration and resources. *J. Bus. Ventur.* 22, 566–591. doi: 10.1016/j.jbusvent.2006.05.002

Westhead, P., and Solesvik, M. Z. (2016). Entrepreneurship education and entrepreneurial intention: do female students benefit? *Int. Small Bus. J.* 34, 979–1003. doi: 10.1177/0266242615612534

Yukongdi, V., and Lopa, N. Z. (2017). Entrepreneurial intention: a study of individual, situational and gender differences. *J. Small Bus. Enterp. Dev.* 24, 333–352. doi: 10.1371/journal.pone.0199924

Zeithaml, C. P., and Rice, G. H. (1987). Entrepreneurship/Small business education in American universities. *J. Small Bus. Manag.* 25, 44–50.

Zhang, Y., Duysters, G., and Cloodt, M. (2014). The role of entrepreneurship education as a predictor of university students' entrepreneurial intention. *Int. Entrepreneursh. Manag. J.* 10, 623–641. doi: 10.1007/s11365-012-0246-z

Conflict of Interest Statement: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

APPENDIX

APPENDIX 1 | The entrepreneurial competencies and intention scale.

Main theme	Sub theme	Description
Knowledge and skills	Knowledge	The professional management courses are useful for starting a business
	Marketing skills	My qualification has provided me with sufficient marketing skills to start a business Marketing skills include conducting market research, assessing the marketplace, marketing products and services, persuasion, getting people excited about your ideas, dealing with customers, communicating a vision, and so on
	Learning skills	My qualification has provided me with sufficient learning skills to start a business Learning skills include active learning, adapting to new situations, coping with uncertainty, and so on
	Interpersonal skills	My qualification has provided me with sufficient interpersonal skills to start a business Interpersonal skills include leadership, motivating others, managing people, listening, resolving conflict, socializing, and so on
	Resource skills	My qualification has provided me with sufficient resource skills to start a business Resource skills include creating a business plan, creating a financial plan, obtaining financing, securing access to resources, and so on
	Opportunity skills	My qualification has provided me with sufficient opportunity skills to start a business Opportunity skills include recognizing and acting on business opportunities and other kinds of opportunities, product/service/concept development skills, and so on
	Strategic skills	My qualification has provided me with sufficient strategic skills to start a business Strategic skills include goal setting, focusing on goals, defining a vision, developing a strategy, identifying strategic partners, and so on
Attitude	Innovativeness	I am a rule breaker
	Self-insight	Amongst various options, I would rather be an entrepreneur
	Entrepreneurial passion	A career as an entrepreneur is totally attractive to me
	Entrepreneurial identity	Being an entrepreneur implies more advantages than disadvantages to me
Intention	Entrepreneurial intention	I will make every effort to start and run my own business

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