How entrepreneurial learning impacts one's intention towards entrepreneurship

A planned behavior approach

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Abstract

Purpose – Although entrepreneurial learning is widely believed as an important factor in shaping one's entrepreneurial intention, research finds little consistent results on the direct effect of entrepreneurial learning on one's entrepreneurial intention. To solve the conflicted effects of entrepreneurial learning, the purpose of this paper is to explore how entrepreneurial learning may impact individual entrepreneurial intention.

Design/methodology/approach – Drawing on the theory of planned behavior (TPB), the authors proposed and tested on a three mediating effect model, in which entrepreneurial learning is associated with entrepreneurial intention through attitude, subjective norm and perceived behavioral control toward entrepreneurship. Moreover, the moderating role of prior exposure to entrepreneurship was proposed and tested. Based on a sample of 200 university students who have taken entrepreneurial courses in Hong Kong, the hierarchical regressions and moderated mediation tests were used to test the hypotheses.

Findings – The authors find that the positive relationship between entrepreneurial learning and entrepreneurial intention is significantly mediated by attitude, subjective norm and perceived behavioral control toward entrepreneurship; and the mediating effects of entrepreneurial learning on entrepreneurial intention via attitudes and perceived behavioral control respectively, is moderated by exposure to entrepreneurship.

Originality/value – Contributing to the literature of entrepreneurship education, this study identifies individuals who exposed to the same entrepreneurship education may perform differently in entrepreneurial learning. The findings also help us to better understand the mechanism through which and under which context one's entrepreneurial learning may enhance his/her entrepreneurial intention.

Keywords Entrepreneurial intention, Entrepreneurial learning, A planned behaviour approach, Prior exposure to entrepreneurship

Paper type Research paper

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1. Introduction

Entrepreneurial learning is widely believed as an important factor in shaping one's entrepreneurial intention (Do Paço *et al.*, 2011; Turker and Selçuk, 2009). Entrepreneurial intention, defined as:

> [. . .] a self-acknowledged conviction by a person that they intend to set up a new business venture and consciously plan to do so at some point in the future (Thompson, 2009, p. 676).

has been proven to be central to predicting the actual entrepreneurial behaviors (Do Paço *et al.*, 2011; Krueger and Carsrud, 1993; Kuehn, 2008). Katz (2007) points out that entrepreneurship education does not guarantee entrepreneurial success, but can at least enable individuals to understand and manage the risk of failure pertaining to entrepreneurial activities.

Recent research including several meta-analyses, on the linkage of entrepreneurial education to one's entrepreneurial intention generally supports such a linkage (Bae *et al.*, 2014; Lorz *et al.*, 2011; Martin *et al.*, 2013; Peterman and Kennedy, 2003). However, research on the direct effect of entrepreneurial learning on one's entrepreneurial intention finds little consistent results (Lorz *et al.*, 2011; Peterman and Kennedy, 2003). Some research finds that individuals exposed to entrepreneurial education have higher intentions to identify new opportunities and start a business (DeTienne and Chandler, 2004; Kolvereid and Moen, 1997; Turker and Selçuk, 2009), while some others suggests that one has lower levels of intentions to start a business after finishing entrepreneurial courses (Mentoor and Friedrich, 2007; Oosterbeek *et al.*, 2010).

Research mostly measures entrepreneurship education with a dummy variable (Basu and Virick, 2008; Wu and Wu, 2008), i.e. with or without exposure to such an education. A more comprehensive measurement is needed to further validate its influence on individual entrepreneurial intention. Some scholars argue that different individuals exposed to the same entrepreneurship education may eventually have different learning outcomes. Thus, following Johannisson (1991) and Souitaris *et al.*'s (2007), we will use a composite measure to capture the five aspects of entrepreneurial learning (i.e. known-why, known-what, known-how, known-who, known-when) and test its association with entrepreneurial intention. It is also necessary to consider the role of context and some contextual factors, for example, the meta-analysis done by Bae *et al.* (2014) finds pre-education entrepreneurial intentions a moderator influencing the relationship between entrepreneurship education and entrepreneurial intention. Given these theoretical and empirical evidence, we feel more should be done on the inherent linkage between entrepreneurial education and individuals' entrepreneurial intention, and focus on entrepreneurial learning to explore the mechanism through which education is associated with entrepreneurial intention and more contextual factors. In this way, we can better understand why there is such an association, and how different individuals exposed to the same education may eventually have different levels of intention toward entrepreneurship.

Research indicates that individual level factors do matter to one's intention toward entrepreneurship (Sánchez, 2011). Based on the theory of planned behavior (TPB, Ajzen, 1987, 1991; Ajzen and Fishbein, 1980), personal factors, such as one's attitudes, norms and perceived behavioral control toward entrepreneurship, have been taken into consideration by many scholars as the main antecedents of entrepreneurial intention which then shapes entrepreneurial behaviors (Autio *et al.*, 2001; Do Paço *et al.*, 2011; Engle *et al.*, 2010; Kautonen *et al.*, 2013; Krueger *et al.*, 2000). Moreover, research has emphasized the role of entrepreneurial learning in shaping these personal perceptions (Krueger and Carsrud, 1993; Souitaris *et al.*, 2007; Wilson *et al.*, 2007). As suggested by Ajzen (2005), these personal

perceptions are learnable and can be changed across different situations. Therefore, following the model of TPB, we propose that one's personal perceptions on the attitude, subjective norm and behavioral control toward entrepreneurship can be the consequences of entrepreneurial learning one is exposed to (Fayolle and Gailly, 2015), and these individual level changes in turn influence the development of his/her entrepreneurial intention.

In summary, this study will use TPB to examine a mediation model to investigate the mechanism of entrepreneurial learning influences one's intention toward entrepreneurship. We propose that entrepreneurial learning serves as external influence on entrepreneurial intention, and this influence is mediated through the changes of individual perceptions on entrepreneurial-related attitudes, subjective norms and perceived behavioral control. One important contextual factor is also considered, i.e. the moderating role of prior exposure to entrepreneurship is proposed and tested. The conceptual model is shown in Figure 1.

Our study contributes to entrepreneurship education literature and entrepreneurship research in general. This research not only allows us to develop a deeper understanding of the process by which entrepreneurial learning would influence the inclinations of future entrepreneurship but also reveals that prior exposure to entrepreneurship takes a complementary role in the influence of entrepreneurial learning on one's entrepreneurial intentions. Although intention to start a business does not equal to actual start-up activity, the level of entrepreneurial intention represents an appropriate outcome of entrepreneurial learning (Fayolle and Degeorge, 2006) and intention is the prerequisite of action. Our study also, from the educational perspective, contributes to the general entrepreneurship literature by answering a long-standing debate in the entrepreneurship field as respect to whether entrepreneurship can be taught and learnt.

2. Theory and hypotheses

Research on entrepreneurship education and regional innovation system (RIS) literature has long emphasized that the local government should realize the key roles of universities in industrial entrepreneurship activities and encourage universities to engage in these activities (Cooke *et al.*, 2004; Mok, 2005) by providing sources of innovation technologies, facilitating the diffusion of innovation, and educating potential entrepreneurs. These roles of universities can sustain the long-term success of RIS. Existing RIS literature has extensively investigated universities' roles in generating new technology development (Mok, 2005; Yam

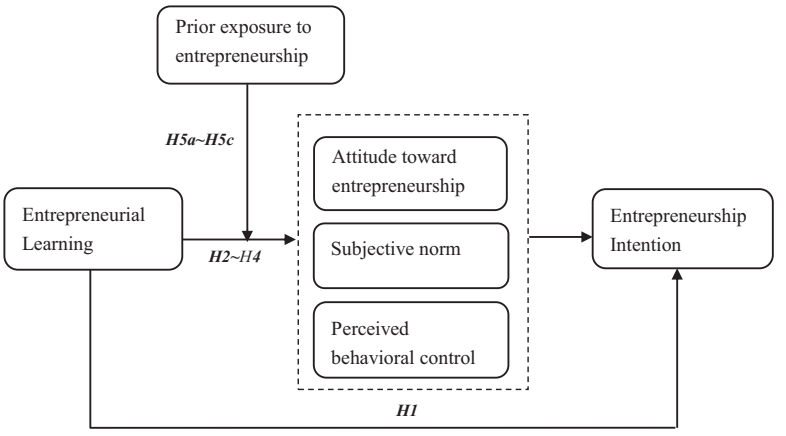

Figure 1.
The conceptual model of this study

et al., 2011), bridging technology transfer from science to industries (Friedman and Silberman, 2003) and creating spin-offs (Veld and Veld-Merkoulova, 2009). Universities do contribute to local entrepreneurship activities, though entrepreneurship education provided by universities has received less academic attention (Ollila and Williams-Middleton, 2011). Compared with entrepreneurship training, academic-focused entrepreneurship education is more associated with entrepreneurial outcomes (Martin *et al.*, 2013).

Taking an important role, universities educate and foster entrepreneurs, who are deemed as the critical factor that constitutes the source of all economic development (Schumpeter, 2000) and job creation (Miller *et al.*, 2009). Generally, entrepreneurial learning can impart knowledge to individuals and help them broaden horizons, increase self-confidence and recognize new entrepreneurial opportunities (Reynolds *et al.*, 1999). Despite this knowledge, how such an influence happens and through what a transformational process individuals are shaped to develop awareness on and intention to entrepreneurship are to be explored further, especially the psychological process (Piperopoulos and Dimo, 2015).

TPB, developed by Ajzen and his colleagues, based on the theory of reasoned action, suggest that intentions toward certain behaviors are the results of three determinants (Ajzen, 1991; Ajzen and Fishbein, 1980). The first is attitude toward certain behaviors that refer to a person's favorable or unfavorable evaluation or appraisal toward the behaviors in question. It is originated from prior experience and perceptions formed over the life (Kuehn, 2008). The second is subjective norm which refers to the degree to which the behavior in question will comply with the wishes of important others (e.g. family, friends). The third one, perceived behavioral control, reflects a person's perception of how easy or difficult to perform the behavior. This one is highly related to the concept of self-efficacy and capability and control beliefs (Ajzen, 1991, 2005).

As entrepreneurship is a planned and hence an intentional behavior (Autio *et al.*, 1997; Krueger and Carsrud, 1993), we adopt the TPB perspective to explain how entrepreneurial learning affects entrepreneurial intention. Researchers typically argue that the theory is useful to predict entrepreneurial intention with three general factors (Gelderen *et al.*, 2008; Krueger *et al.*, 2000; Wu and Wu, 2008), i.e. individual attitudes, subjective norm and perceived behavioral control toward entrepreneurship. According to TPB, positive evaluations of engaging in entrepreneurial behavior, perceptive support for entrepreneurial behavior from "significant referents" (such as parents, friends and other significant people), and feeling of capable in performing entrepreneurial activities enhance the intentions of entrepreneurship (Kautonen *et al.*, 2013).

Extant research generally supports the effectiveness of the TPB when used to predict the intention to start a business (Gelderen *et al.*, 2008; Kautonen *et al.*, 2013; Krueger *et al.*, 2000; Peterman and Kennedy, 2003). For example, a meta-analysis by Armitage and Conner (2001) confirms the usefulness of TPB. Cross-cultural studies prove that TPB does successfully predict entrepreneurial intention in various cultural contexts (Autio *et al.*, 2001; Engle *et al.*, 2010). Some longitudinal studies also find support of TPB in explaining entrepreneurial intention (Kautonen *et al.*, 2013; Kolvereid and Isaksen, 2006). Most of them focus on the direct effects of attitudes, subjective norm and perceived behavioral control toward entrepreneurship on entrepreneurial intention, but few of them have considered educational variables into the model of TPB. Some scholars suggest that entrepreneurship education should be considered into the model because it influences the antecedents of intention in the model of TPB (Krueger and Carsrud, 1993; Peterman and Kennedy, 2003). Do Paço *et al.* (2011) argue that TPB can be used to model the development of entrepreneurial intention within education or learning contexts. Therefore, we argue that entrepreneurial learning is linked to entrepreneurial intention, and this relationship is mediated by the three

antecedents of intentions based on TPB: attitude, subjective norm and perceived behavioral control toward entrepreneurship.

2.1 Entrepreneurial learning and entrepreneurial intention

There is a rapid growth in number of entrepreneurship courses and programs in the recent decades (Martin *et al.*, 2013; Walter and Block, 2016). These entrepreneurship education programs contribute significantly to the competition-intensified global economy by delivering entrepreneurial knowledge and skills; exploiting entrepreneurial spirits and intentions; and promoting creativity, innovation and growth of new business (DeTienne and Chandler, 2004; Duval-Couetil, 2013). Scholars agree that entrepreneurial learning influences individuals' future intentions to start a business (Galloway and Brown, 2002; Kolvereid and Moen, 1997; Wu and Wu, 2008). As Kuehn (2008) argues, learning activities associated with entrepreneurship are believed to be more likely to influence the students' entrepreneurial intention. This is also supported by a longitudinal study done by Henry *et al.* (2004), from which significant differences of entrepreneurial intention have been found among students who have taken entrepreneurship courses and those who have not (Fayolle and Degeorge, 2006; Kolvereid and Moen, 1997).

H1. Entrepreneurial learning is positively related to entrepreneurial intention.

2.2 The mediating role of attitudes towards entrepreneurship

Attitude is a predisposition to respond favorably or unfavorably to an action (Ajzen, 1987), formed through prior experience or perceptions over the life of a person (Kuehn, 2008). Carr and Sequeira (2007) argue that individuals' attitudes will be affected by many exogenous variables, such as prior education experience. In entrepreneurial contexts, entrepreneurship education plays an important role in developing a positive attitude toward entrepreneurial behaviors (Basu and Virick, 2008; Florin *et al.*, 2007; Galloway and Brown, 2002; Schwarz *et al.*, 2009). It may be because that entrepreneurial attitude is less stable than other personality traits and can be changed by the educators or practitioners (Schwarz *et al.*, 2009). That is, an individual is more likely to hold a positive attitude toward entrepreneurship when he/she is educated to become an entrepreneur.

According to TPB, a positive attitude toward an action promotes one's intention to act the behavior (Armitage and Conner, 2001). We argue that one's positive entrepreneurial attitudes acquired from entrepreneurship courses would enhance his/her willingness to engage in entrepreneurial start-ups (Krueger *et al.*, 2000). Fayolle and Degeorge (2006) also posit that educational environments first change the attitudes toward entrepreneurial behavior, which in turn facilitates the formation of entrepreneurial intentions. As such, the attitudes toward starting a business would mediate the relationship between entrepreneurial learning and entrepreneurial intentions.

H2. Attitudes toward entrepreneurship will mediate the relationship between entrepreneurial learning and entrepreneurial intent.

2.3 The mediating role of subjective norm

Research suggests that entrepreneurship education plays an important role in developing a supportive norm toward entrepreneurial behavior (Basu and Virick, 2008). Souitaris *et al.* (2007), for example, find that entrepreneurship programs can increase students' subjective norm. They argue that participating in the same entrepreneurship programs enables a group of

entrepreneurial-minded classmates to develop a mutual support network within which individuals can get support from their teachers, classmates or even technology transfer offices of the educational institutions. Moreover, with the knowledge and know-how, and spirits acquired from the entrepreneurship courses, the students are more likely to make their business plans acceptable by their families and friends, and then to gain their support.

TPB argues that perceived support from "significant referents" (e.g. families, friends and other significant people) produces a positive subjective norm that helps potential entrepreneurs to determine whether their intentions to entrepreneurship are accepted and supported by their significant others (Ajzen, 1991). Research has found that subjective norm related to entrepreneurship significantly influences entrepreneurial intention (Kolvereid and Isaksen, 2006). Therefore, we suggest that one's subjective norm would be impacted by the entrepreneurship education he/she is exposed to and the changed subjective norm will promote his/her entrepreneurial intention.

H3. Subjective norm with respect to entrepreneurship mediates the relationship between entrepreneurial learning and entrepreneurial intention.

2.4 The mediating role of perceived behavioral control

Similar to what implied by self-efficacy (Kuehn, 2008), perceived behavioral control is assumed to be mainly influenced by one's experience and perceptions of outside impediments and obstacles. Research has found that entrepreneurship education plays an important role in developing a perceived behavioral control towards entrepreneurial behavior (Basu and Virick, 2008). Peterman and Kennedy (2003) apply self-efficacy theory and find a positive effect of entrepreneurship education programs on perceptions of desirability and feasibility of starting up a business. Such an education usually provides entrepreneurial-related knowledge, skills and competencies (Galloway and Brown, 2002; Wilson *et al.*, 2007), which can lead to changes in one's psychological status, making them more confident toward entrepreneurship (Do Paço *et al.*, 2011). Exposed to various entrepreneurship courses, one is more likely to perceive a high level of behavioral control.

According to TPB (Ajzen, 1991), with a high level of perceived behavioral control, people intend to engage in tasks that they believe can be completed (Bandura, 1997). That is, the greater one's perceived behavioral control is, and the stronger his/her intention to start up a business will be. TPB argues that perceived behavioral control reflects the beliefs of performing entrepreneurial behaviors in a given situation. Thus, we argue that one's beliefs influenced by information, knowledge or skills acquired from entrepreneurship education programs may change his/her inclination to practice entrepreneurial activities.

H4. Perceived behavioral control with respect to entrepreneurship mediates the relationship between entrepreneurial learning and entrepreneurial intention.

2.5 The moderating role of prior exposure to entrepreneurship

Entrepreneurial learning is critical to the formation of one's perception on entrepreneurship. Prior exposure to entrepreneurship also plays a role along the formation process (Singer, 1995). Much research has indicated prior exposure to entrepreneurship makes individuals access to entrepreneurial settings of their parents, relatives, friends and others, who will serve as entrepreneurial role models and positively influence the formation of potential entrepreneurs' perceptions on entrepreneurial desirability and feasibility (Krueger and Carsrud, 1993; Krueger and Brazeal, 1994; Zhang *et al.*, 2014). For example, Farmer *et al.*

(2011) argue that prior entrepreneurial exposure facilitates one's learning of practical knowledge about the specific processes of entrepreneurship (Corbett, 2007; Peterman and Kennedy, 2003). Together with the knowledge learnt in the formal education, the individuals would feel that they are more capable to understand, predict and deal with uncertainties and complexities in entrepreneurial process (Morris *et al.*, 2012).

Prior exposure to entrepreneurship offers individuals practical knowledge and skills, as well as roles models to learn, regarding to their future entrepreneurial activities (Carr and Sequeira, 2007; Farmer *et al.*, 2011). This facilitates the application of theoretical knowledge acquired from entrepreneurship-related courses. Therefore, we propose that an interaction effect exists between prior entrepreneurial exposure and entrepreneurial learning on shaping one's perceptions of attitudes, subjective norms and behavioral control toward entrepreneurship. In general, prior exposure to entrepreneurship helps one to sense and learn practically what one needs to do if becoming an entrepreneur, while entrepreneurial learning helps one to know theoretically how to do to become an entrepreneur. Prior exposure to entrepreneurship should have a supplementary effect on facilitating the role of entrepreneurial learning in forming individual entrepreneurial intention. The psychological and sociological mechanisms underlying these supplementary effects are discussed below.

First, the difficulties (i.e. uncertainties, complexities) of entrepreneurial processes will negatively influence one's attitude toward entrepreneurship (Barringer *et al.*, 2005; Morris *et al.*, 2012). Entrepreneurial learning can somehow reduce such negative effect by providing theoretical knowledge and skills of how to manage the difficulties in entrepreneurial processes. Yet without any exposure to entrepreneurial practice, one can only imagine about what kinds of difficulties occur in the real entrepreneurial processes. Prior exposure to entrepreneurship offers individuals practical information and knowledge to better familiarize them with the real difficulties in the entrepreneurial processes and so enhance their confidence in solving these problems in their future self-employed businesses (Barringer *et al.*, 2005; Farmer *et al.*, 2011). From this point of view, prior exposure to entrepreneurship would enhance the effect of entrepreneurial learning on shaping individuals' positive attitudes toward entrepreneurship, and hence increase their entrepreneurial intention.

Second, past entrepreneurial exposure endows one with social ties with business owners, who may be their family members, friends or those they have ever worked for (Gimeno *et al.*, 1997; Farmer *et al.*, 2011). These social ties create an entrepreneurial-supportive atmosphere which helps to provide useful assessments and guidance on one's future entrepreneurial behaviors (Carr and Sequeira, 2007), even direct financial or other resource support (Nanda and Sørensen, 2010). In such situation, those having entrepreneurship-related education are more likely to receive positive feedbacks from the people around them (Carr and Sequeira, 2007) and perceive more support from their significant others. Hence, their subjective norms will be enhanced and in turn, increase their entrepreneurial intention.

Third, more prior entrepreneurial exposure facilitates one's acquisition of entrepreneurial capital, such as knowledge and skills which in turn result in entrepreneurial know-how and practical wisdom necessary for starting a new business (Carr and Sequeira, 2007; Morris *et al.*, 2012). With the knowledge and skills, individuals may become more confident to accomplish a real entrepreneurial task. When combined with theoretical knowledge obtained through formal from entrepreneurial courses, they would feel more controllable in future entrepreneurial behaviors and then perceive a greater level of behavior control toward entrepreneurship that promotes their intentions to entrepreneurship.

Based on this discussion, we propose that those who are learning entrepreneurship courses, if they have a higher extent of prior exposure to entrepreneurship, will have higher

levels of attitudes, subjective norms, perceived behavior control toward entrepreneurship, and hence entrepreneurial intentions.

H5(a). Prior exposure to entrepreneurship moderates the indirect effects of entrepreneurial learning on entrepreneurial intention via attitudes toward entrepreneurship, such that the indirect effect is stronger when prior exposure to entrepreneurship is high rather than low.

H5(b). Prior exposure to entrepreneurship moderates the indirect effects of entrepreneurial learning on entrepreneurial intention via subjective norms toward entrepreneurship, such that the indirect effect is stronger when prior exposure to entrepreneurship is high rather than low.

H5(c). Prior exposure to entrepreneurship moderates the indirect effects of entrepreneurial learning on entrepreneurial intention via perceived behavior control toward entrepreneurship, such that the indirect effect is stronger when prior exposure to entrepreneurship is high rather than low.

3. Methods

3.1 Sample and data collection

Our research context is Hong Kong universities, which is a critical empirical setting to examine the role of entrepreneurship education in fostering local entrepreneurs. In the past decades, Hong Kong has been one of the top ten innovation-driven and business-minded economies (Dowejko *et al.*, 2014), where people have increasingly valued entrepreneurship training programs and now are more willing to invest time and resources in them (Cheung, 2008). Viewing entrepreneurial activities as the most important driving force of local economic growth, Hong Kong Government has invested heavily in technology and innovation education to help transform universities in Hong Kong into entrepreneurial universities. According to World Bank, in 2013 Hong Kong Government's expenditure on education reaches 20.3 per cent of total government expenditure, which is higher than that of other regions in the world. This suggests that both policy makers and educators believe that entrepreneurship education plays an important role in driving economic development by increasing the number of new businesses and developing entrepreneurial culture as well as generating innovations in the region.

Currently, Hong Kong universities (e.g. CityU, CUHK and HKUST) became more comprehensive and professional in offering entrepreneurship-related courses, which are viewed as *entrepreneurial learning* in academics. Such education not only delivers entrepreneurial knowledge and skills but also helps the development of entrepreneurial interests, attitudes and intentions of students (Mok, 2005). Thus, it is the high time that we investigate how the universities in Hong Kong nurture local people's entrepreneurial intention that contributes largely in RIS as one of the top ten innovation-driven and business-minded economies in the world for many years (Dowejko *et al.*, 2014).

Prior research has shown that the major populations being influenced by universities' entrepreneurship education are students (Peterman and Kennedy, 2003; Souitaris *et al.*, 2007; Sánchez, 2011). They suggest that universities have a significant impact on the career choices of students and may act as important triggering environments for entrepreneurship (Kuehn, 2008). In these years, many universities in Hong Kong have emphasized the importance of introducing entrepreneurship courses into the curricula of engineering related

departments to promote technology entrepreneurship. Therefore, we selected a student sample from Hong Kong universities. To control the influence of disciplines on individual's entrepreneurial intention, the participants of this study included engineering students majored in systems engineering and industrial engineering management from three Hong Kong universities. They were classified into two groups. The first group was the undergraduate engineering students who have took and finished an entrepreneurship course, and the second group was the engineering students who had similar academic background with the first group, but did not take the course. The entrepreneurship courses offered in the universities were at the awareness level that aims to delivery entrepreneurial knowledge and skills to students and to develop their entrepreneurial attitudes and intentions. These courses all lasted for one semester, and they were similar in terms of course contents (e.g. understanding of entrepreneurship and entrepreneurs, industrial context and entrepreneurship environment, innovation and creativity, new product development, market research, business planning, finance and other topics related to business management) and methods used by teachers (lectures, group and class discussions, group projects related to business plan, written reports, seminars or talks).

Before the survey, a pilot interview was carried out to primarily collect the opinions of the entrepreneurship students regarding how they perceive the entrepreneurship phenomenon, how they feel about creating their own businesses, their interests in and attitudes toward entrepreneurship and their planning of initiating their own businesses. A preliminary version of the questionnaire was reviewed by two scholars (one entrepreneurship professional and one academic in management research) for ensuring the precision and appropriateness of the questionnaire. Subsequently, the instrument was pre-tested by administering it to ten selected undergraduate engineering students who were exposed to the entrepreneurship course and ten who were not, to verify its appropriateness and comprehensiveness. In this way, the content validity of the instruments was assessed. None of these phases revealed any major problems, but only comments on minor changes such as the length and layout of the questionnaire, the format and wording of the scales. The improved questionnaire was then used for a large-scale survey.

Questionnaires were administered to 294 engineering students who took an entrepreneurship course (either compulsory or optional) in their classes with the prior permission of their teachers and randomly to 300 students who did not take the courses in the engineering departments. In a total of 594 questionnaires were distributed and 411 useful questionnaires were collected, including 200 from entrepreneurship course takers and 210 from the non-takers. The characteristics of the respondents are shown in Table I.

The overall response rate was 69 per cent (68 per cent for the course-takers and 70 per cent for the non-taker group). In both groups, around 70 per cent were male students and 30 per cent were female students. The average age of all the respondents was 22 years old, and most of them (>96 per cent) were in their second year or the third year of study. Generally, the non-respondents and respondents did not show significant difference in terms of gender, race, age and year of study. Therefore, the data collected were considered representative.

These data collected were furthermore tested if they had similar backgrounds. We found that the two groups of respondents (the course-takers and non-takers) had homogeneous backgrounds in terms of their age, gender, year of study, work experience and role models (e.g. entrepreneur parents and friends) (as shown in Appendix 1). Therefore, it could be considered that the two groups (entrepreneurship course takers and non-takers) had similar academic background (i.e. majored in system engineering and engineering management) as well as demographic background. It can be assumed that the most salient difference between these two groups was that the former group took the entrepreneurship course while

Characteristic	Course takers (n)	Course takers (%)	Non-course takers (n)	Non-course takers (%)	All participants (n)	All participants (%)
Gender						
Female	59	29.50	48	22.86	107	26.28
Male	141	70.500	162	77.14	303	73.72
Age						
<20	2	1	9	4.33	11	2.70
20-22	121	60.500	129	62.00	250	61.52
23-25	57	28.500	60	28.80	117	28.68
>25	19	9.500	10	4.81	29	7.11
Year of study						
year2	112	56	114	54.29	226	55.23
year3	82	41	88	41.90	170	41.36
other	6	3	8	3.81	14	3.41
Work experience						
<1 year	127	63.500	129	61.43	256	62.59
1-<2 years	40	20	57	27.14	97	23.96
2-<3 years	19	9.500	17	8.10	36	8.80
≥ 3 years	12	6	7	3.33	19	4.65
Role model						
No	109	55.050	116	55.77	225	55.28
Yes	89	44.950	92	44.23	181	44.72

Table I. The characteristics of the participants

the latter group did not take the course. Therefore, comparison between these two groups regarding their entrepreneurial perceptions is appropriate.

Moreover, self-selection is considered in this study. For example, students enrolled in the entrepreneurship courses had higher entrepreneurial intention might be a result of students with higher entrepreneurial intention self-selecting into these courses. However, the participants of this study included both those who were compulsory (in one university) and optional (in tow universities) to take the entrepreneurship course. The compulsory group included students who were interested and not interested in entrepreneurship. The optional group included who were interested in the entrepreneurship, and also those who might not be interested in entrepreneurship because no choice was for other elective courses or the entrepreneurship courses was pre-registered by the department office (so just followed it). The respondents from the three universities including compulsory and not compulsory (interested and not interested) were tested against their perceptions about entrepreneurship, as shown in Appendix 2. The respondents whether were interested or not interested in entrepreneurship did not have significant differences regarding their entrepreneurial intentions, attitudes toward entrepreneurship, subjective norm or perceived behavioral control ($p > 0.05$). Thus, the self-selection bias was not significant in this study.

Finally, Harman's single-factor test was also used to deal with the issues of common method bias (Podsakoff *et al.*, 2003). It is suitable to diagnose the extent to which common method bias may be a problem (Podsakoff *et al.*, 2003). If multiple factors emerge from the factor analysis, it indicates that common method variance is not a major problem. Our results for the two groups of data showed that the unroated factor solution demonstrated

multiple factors emerged from the factor analysis. This indicated that no major method bias exist in this survey study.

3.2 Measurement

There are six major variables in this study, five of them (entrepreneurial intention, attitude toward entrepreneurship, subjective norm, perceived behavioral control and entrepreneurship education) shown in Figure 1 were measured by multiple items. Each item was measured by a seven-point Likert Scale. Students were asked to agree or disagree with each statement with 1 representing "strongly disagree" to 7 representing "strongly agree." The moderator, i.e. prior exposure to entrepreneurship was measured with a dummy variable.

3.2.1 Entrepreneurial intention. Entrepreneurial intention is measured as the likelihood that one will engage in entrepreneurship at some time in the future (Autio *et al.*, 2001; Kolvereid, 1996; Kolvereid and Isaksen, 2006). As the participants of this study are engineering students on campus, we adapted the items for entrepreneurial intention to fit the context of the students as well as the university environment (e.g. entrepreneurial activities/programs offered in university). Based on the questions used by Autio *et al.* (2001) and Kolvereid (1996) and Kolvereid and Isaksen (2006), this study developed four items to measure the entrepreneurial intention of students. These items concern the likelihood that the students would be involved in the on-campus entrepreneurial programs/activities (which aim to assist students in creating new ventures) and the likelihood that they would start own business in the future. A sample item is, "I will join on-campus entrepreneurial programs/activities which assist students in creating own business if available".

3.2.2 Attitude toward entrepreneurship. Kolvereid (1996) measures attitude toward entrepreneurship by emphasizing one's belief about different aspects of organizational employment and self-employment. However, these behavioral beliefs are the antecedents of attitude rather than attitude itself (Ajzen, 1991, 2005) and an aggregate scale is more appropriate for the attitude construct (Krueger *et al.*, 2000). The study of Kolvereid and Isaksen (2006) evidences that aggregate attitude is more effectively associated with entrepreneurial intention. Based on the items used by Kolvereid and Isaksen (2006), this study used a three-item scale to measure students' attitude toward entrepreneurship. These items capture the extent to which a student has a favorable or unfavorable attitude toward creating his or her own business. A sample item is, "I'd rather be my own boss than have a secure job".

3.2.3 Subjective norm. Despite the measurement of some research which uses the multiplicity of beliefs and motives to comply (Kolvereid, 1996; Souitaris *et al.*, 2007), the meta-analysis on TPB by Armitage and Conner (2001) indicates that a general measure with multiple-item of subjective norm is more appropriate to predict intention than other forms of measures. Moreover, such a general measure of subjective norm has been validated by many studies on entrepreneurship (Autio *et al.*, 2001; Carr and Sequeira, 2007). These studies, based on the definition of Ajzen (1991), stressed the influences of several significant referents (such as parents, friends, important people) on the respondents' opinion of creating own businesses. Adopting this measure, we used a three-item scale to reflect how a student perceived the normative considerations (e.g. the opinions of family, closest friends and important others about their entrepreneurial behaviors). A sample item is, "I believe that my closest family thinks that I should pursue a career by creating my own business".

3.2.4 Perceived behavioral control. As perceived behavioral control is highly correlated to self-capability (Krueger and Carsrud, 1993; Krueger *et al.*, 2000), some researchers measured this factor using the perception of self-efficacy (Chen *et al.*, 1998; Kolvereid and Isaksen,

2006). In a broader way, Ajzen (2002) argues that perceived behavioral control includes both the concept of self-efficacy or capability and control beliefs about initiating an entrepreneurial behavior. Therefore, the measures used in this study include both the perceptions of personal capability to create new business and the extent of control over this entrepreneurial endeavor. The measures were developed based on the items used by Autio *et al.* (2001) and Kolvereid (1996). Three items used represent the easiness or difficulty in creating own businesses that a student may perceive. The students were instructed to indicate their level of agreement with the statements on their feeling of capability and controllability regarding creating own business. A sample item is, "If I start my own business, the chances of success would be very high".

3.2.5 Entrepreneurial learning. Most of prior research measures entrepreneurial learning by using a dummy variable (Basu and Virick, 2008; Wu and Wu, 2008). Following Johannisson (1991), we adapted Souitaris *et al.*'s (2007) measurement for a 21-item scale of entrepreneurial learning. The measure captures five aspects of the perception of learning from an entrepreneurship program. The first aspect is about "why do entrepreneurs act", with a sample item of "The entrepreneurship course increases my understanding of the attitudes of entrepreneurs (i.e. how they view entrepreneurship and why they act)." The second is about "what needs to be done," with a sample item of "The entrepreneurship course increases my understanding of generating innovative ideas." The third is about "how do I start the venture," with a sample item of "The entrepreneurship course enhances my skills to develop a business plan." The forth aspect is associated with "who do I need to know," with a sample item of "The entrepreneurship course enhances my ability to develop networks (e.g. obtaining useful advice/information from professors, guest speakers or classmates)." The final is about "when do I need to act" and a sample item is, "The entrepreneurship course enhances my ability to identify a business opportunity".

3.2.6 Prior exposure to entrepreneurship. We referred to Peterman and Kennedy's (2003) measure to evaluate the extent of respondents' prior exposure to entrepreneurship. The respondents were asked three questions – Have your parents ever started a business, have your friends ever started a business, and have you ever worked for a small or new company? – with "yes" or "no" answers. The sum of scores for the three questions is calculated as the measure of respondent's prior exposure to entrepreneurship.

3.2.7 Control variables. Three demographic variables (gender, age and year of study) were covered in the study to control the potential confounding effects from the profiles of the respondents. These variables are also considered in the previous studies on entrepreneurial intention (Krueger and Carsrud, 1993; Sánchez, 2011).

4. Analysis and results

4.1 Construct validity

To test construct validity of the multiple-item measures, we conducted a confirmatory factor analysis of an overall five-factor measurement model to test the validity of the latent constructs. As shown in Table II, the base line model with specified five variables used in the hypotheses fitted the data well ($\chi^2[109] = 222.773$, CFI = 0.945, TLI = 0.931, RMSEA = 0.072), and all factor loadings were significant, demonstrating convergent validity. We then estimated the discriminant validity of the five constructs by comparing the baseline model to alternative models. Model comparison results (Table II) showed that the five-factor model fitted the data significantly better than any other alternative models. Thus, the distinctiveness of the five constructs in the study was achieved.

Model	χ^2	Df	TLI	CFI	RMSEA
Five-factor model	222.773	109	0.931	0.945	0.072
Four-factor model	311.396	113	0.884	0.904	0.093
Attitude and SN combined					
Four-factor model	316.001	113	0.882	0.902	0.095
Attitude and PBC combined					
Four-factor model	330.916	113	0.873	0.894	0.098
SN and PBC combined					
Three-factor model	443.037	116	0.814	0.841	0.118
EI, attitude and SN					
Three-factor model	390.844	116	0.844	0.867	0.109
EI, attitude and PBC combined					
Three-factor model	401.800	116	0.838	0.861	0.111
Attitude, SN and PBC combined					
Two-factor model	505.930	118	0.783	0.812	0.128
EI, attitude, SN and PBC combined					
One-factor model	837.951	119	0.602	0.651	0.173
EI, attitude, SN, PBC and EE combined					

Table II.
Results of confirmatory factor analysis

Notes: PBC = perceived behavioral control; SN = Subjective norm; EL = Entrepreneurial learning; EI = entrepreneurial intention; TLI is the Tucker-Lewis index; CFI the comparative fit index; and RMSEA the root-mean-square error of approximation

4.2 Hypotheses testing and results

The correlation results were shown in Table III. As the model predicts, entrepreneurial learning was significantly correlated with entrepreneurial intention and all the mediators (i.e. attitude, subjective norm and perceived behavioral control toward entrepreneurship). All the mediators were also significantly correlated to entrepreneurial intention. This suggests that it was appropriate to examine the relationships among these variables in the subsequent hypothesis testing.

To test the first hypothesis, we first used the *t*-test to compare the differences between the entrepreneurship course takers and non-course takers regarding their entrepreneurial intention, attitude toward entrepreneurship, subjective norm and perceived behavioral control, as shown in Table IV. The average values of the four entrepreneurial perceptions of the course takers were higher than those of the non-takers. This was supported by the *t*-test results that the course takers had significantly more favorable perceptions about entrepreneurship ($p < 0.01$). That is, the students who took the entrepreneurship course were more likely to show interests in the entrepreneurship phenomenon, be considered suitable to pursue entrepreneurial career, have capability to deal with the entrepreneurial uncertainties and intentions to start up. This finding supports the results of Souitaris *et al.* (2007) and Fayolle *et al.* (2006) who find that students having completed an entrepreneurship course or program have significantly higher level of entrepreneurial intention and attitudes compared with those having not been exposed to the course or program. Thus, entrepreneurial learning is useful to enhance the entrepreneurial attitudes and intentions.

Further, we conducted multiple regression analysis to test *H1*. As was shown in the Model 2 of Table V, after controlling for gender, age and year of study, entrepreneurial learning was significantly and positively associated with entrepreneurial intention ($\beta = 0.412, p < 0.001$), supporting *H1*.

The mediation hypothesis was tested by following the three-step statistical procedure recommended by Baron and Kenny (1986), as shown in Table V. The results indicated that

Variables	Mean	SD	1	2	3	4	5	6	7	8	9
1. Sex	0.705	0.457	–								
2. Age	2.465	0.679	0.169*	–							
3. Year of study	2.690	0.921	0.116	0.521**	–						
4. Prior exposure to entrepreneurship	1.565	1.205	−0.024	0.095	0.226**	–					
5. Entrepreneurial learning	4.765	0.812	0.028	0.120	0.097	0.111	*(0.951)*				
6. Attitude	4.410	1.082	0.097	0.102	0.229**	0.176*	0.373**	*(0.826)*			
7. Subjective norm	4.220	1.144	0.157*	0.107	0.146*	0.211**	0.392**	0.600**	*(0.875)*		
8. Perceived behavior control	4.685	0.963	0.058	0.064	0.207**	0.091	0.445**	0.476**	0.487**	*(0.771)*	
9. Entrepreneurial intention	4.384	1.038	0.152*	0.139*	0.300**	0.168*	0.440**	0.586**	0.591**	0.594**	*(0.883)*

Notes: N = 200; $^{+}p < 0.10$; *$p < 0.05$; **two-tailed test; the italic numbers in parentheses are reliability coefficients

Table III.
Means, standard deviations and correlations

the significance and coefficient of the direct effect of entrepreneurial learning on entrepreneurial intention (in Model 2, $\beta = 0.412$, $p < 0.001$) was significantly reduced when the indirect effect of entrepreneurial learning through attitude was included in a total effect model (in Model 3, $\beta = 0.259$, $p < 0.001$). The results of Sobel test ($t = 4.407$, $p < 0.001$) further indicated that the reduction is significant. When considering the indirect effect of entrepreneurial learning through subjective norm and perceived behavior control in Models 4 and 5, the regression coefficients of entrepreneurial learning on entrepreneurial intention were also significantly reduced ($\beta = 0.245$, $p < 0.001$ and $\beta = 0.215$, $p < 0.001$, respectively). The results of Sobel test ($t = 4.641$, $p < 0.001$ and $t = 5.007$, $p < 0.001$) reaffirmed these reductions. Thus, *H2*, *H3* and *H4* were all supported.

In *H5a*, *H5b* and *H5c*, we proposed that prior exposure to entrepreneurship moderates the indirect effects of entrepreneurial learning on entrepreneurial intention. Specifically, we suggested that prior exposure to entrepreneurship enhances the effect of entrepreneurial learning on the three mediators, i.e. first-stage moderation. Model 8 showed that the interaction term between entrepreneurial learning and prior exposure to entrepreneurship had a positive and significant effect on the attitude toward entrepreneurship ($\beta = 0.163$, $p < 0.05$) and Model 12 also showed a positive and significant effect of the interaction between entrepreneurial learning and prior exposure to entrepreneurship on perceived behavior control ($\beta = 0.146$, $p < 0.05$). These findings are supportive of the moderating role of prior exposure to entrepreneurship for the effects of education on attitudes and perceived behavior control as proposed in *H5a* and *H5c*. Figures 2 and 3 portray these moderating relationships. However, we did not find support for *H5b*, that is, in Model 10 the moderating effect of prior exposure to entrepreneurship for the effects of education on subjective norm was not significant.

To further demonstrate how the indirect effects of education on intention differ depending on prior exposure to entrepreneurship, we used a bootstrapping procedure to quantify the indirect effects at low (-1SD), mean (0SD) and high (+1SD) levels of prior exposure to entrepreneurship (Preacher *et al.*, 2007). Table VI presented the indirect effects at different values of prior exposure to entrepreneurship and provided 95 per cent confidence level intervals for these effects. As none of the confidence intervals contained zero, we concluded that the indirect effects are statistically significant ($p < 0.01$) at low, mean and high values of the moderator. Furthermore, we could observe that, in line with *H5a*, the indirect effect of entrepreneurial learning on entrepreneurial intention through attitude was stronger at high rather than low levels of prior exposure to entrepreneurship, as the coefficient grew from 0.051 (low prior exposure to entrepreneurship) to 0.143 (high prior exposure to entrepreneurship). Similarly, we observed that the indirect effect of entrepreneurial learning on entrepreneurial intention though perceived behavior control grew from 0.102 for individuals with low prior exposure to entrepreneurship to 0.208 for individuals with high prior exposure to entrepreneurship.

Table IV.
Comparison between entrepreneurship group and control group

	Course takers		Non-takers		Equality of variances		*t*-test for equality of means		
Variables	Mean	SD	Mean	SD	*F*-value	Sig.	*t*-value	df	Sig.(2-tailed)
Entrepreneurial intention	4.380	1.038	3.798	1.184	2.837	0.090	5.860	409.000	0.000
Attitude	4.410	1.082	3.791	1.111	4.499	0.040	5.690	396.500	0.000
Subjective norm	4.220	1.144	3.272	1.167	5.459	0.020	8.860	396.200	0.000
Perceived behavioral control	4.685	0.963	3.941	1.045	1.314	0.250	8.220	409.000	0.000

Table V.
Results of direct, indirect and moderating effects

	Entrepreneurial intention					
	(Model 1)	(Model 2)	(Model 3)	(Model 4)	(Model 5)	(Model 6)
Control variables						
Gender	0.129†	0.125*	0.091	0.058	0.107	0.061
Age	−0.039	−0.079	−0.050	−0.075	−0.030	−0.032
Year of study	0.280**	0.270***	0.183**	0.241***	0.173**	0.151*
Prior exposure to entrepreneurship (PEE)	0.112	0.072	0.028	−0.002	0.070	0.009
Main effect						
Entrepreneurial learning (EL)		0.412***	0.259***	0.245***	0.215**	0.124*
Mediating effects						
Attitude			0.439***			0.221**
Subjective norm				0.459***		0.242***
Perceived behavior control					0.452***	0.282***
Moderating effects						
EL* PEE						
R^2	0.117	0.282	0.438	0.449	0.439	0.546
R^2 change		0.165***	0.156***	0.167***	0.157***	0.264***
F-value	6.451***	15.273***	25.027***	26.239***	25.143	28.739***

Notes: N = 200; Standardized coefficients are reported; $^{\dagger}p < 0.10$; *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$; two-tailed tests

(*continued*)

Table V.

	Attitude		Subjective norm		Perceived behavior control	
	(Model 7)	(Model 8)	(Model 9)	(Model 10)	(Model 11)	(Model 12)
Control variables						
Gender	0.078	0.082	0.145*	0.147*	0.039	0.043
Age	−0.066	−0.061	−0.009	−0.006	−0.108	−0.104
Year of study	0.198*	0.201**	0.062	0.064	0.215**	0.218**
Prior exposure to entrepreneurship (PEE)	0.101	0.090	0.160*	0.154*	0.005	−0.005
Main effect						
Entrepreneurial learning (EL)	0.348***	0.343***	0.365***	0.362***	0.436***	0.431***
Mediating effects						
Attitude						
Subjective norm						
Perceived behavior control						
Moderating effects						
EL* PEE		0.163*		0.100		0.146*
R^2	0.194	0.220	0.208	0.217	0.234	0.255
R^2 change		0.026*		0.009		0.021*
F-value	9.313***	9.064***	10.165***	8.938***	11.863***	11.037***

5. Discussion

The purpose of this study is to develop a conceptual model to test how one's entrepreneurial learning is associated with the development of his/her entrepreneurial intention. Building on the TPB, we propose that entrepreneurial learning shapes one's entrepreneurial intention through changing their attitudes, subjective norm and perceived behavioral control toward entrepreneurship. We find support for all these mediating effects. These help to deepen our understanding of the psychological process through which entrepreneurial learning would influence inclinations of future entrepreneurship (Collins *et al.*, 2004; Wu and Wu, 2008). Our findings thereby have several contributions to existing literature.

First, adopting a more rigorous measure of entrepreneurial learning, we find support of a positive relationship between entrepreneurial learning and entrepreneurial intention, which help to validate prior findings based on a dummy measure of entrepreneurial learning (Bae *et al.*, 2014; Fayolle and Degeorge, 2006; Fayolle *et al.*, 2006). This well responded to the appeal by Fayolle and Liñán (2014), who call for the use of a more methodologically rigorous measurement for entrepreneurship education. On the other hand, this finding also

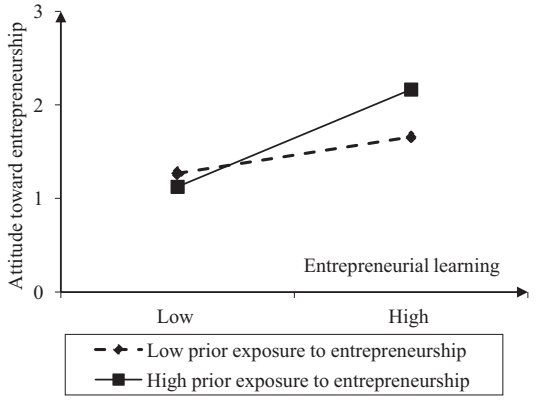

Figure 2.
The moderating effect of prior exposure to entrepreneurship in the relationship between entrepreneurial learning and attitude toward entrepreneurship

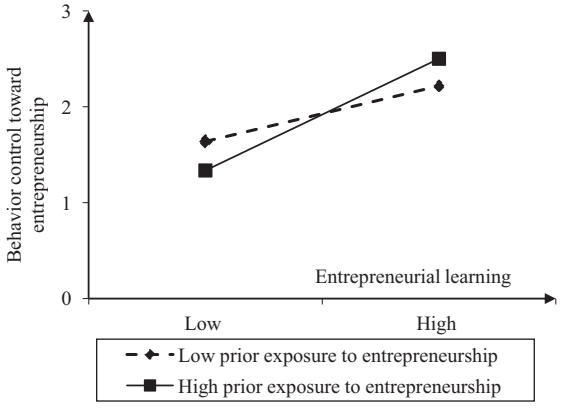

Figure 3.
The moderating effect of prior exposure to entrepreneurship in the relationship between entrepreneurial learning and perceived behavior control toward entrepreneurship

contributes to the research on antecedents of entrepreneurial intention, which has examined how external environments such as prior family business exposure (Carr and Sequeira, 2007) influence their entrepreneurial intention (Fayolle *et al.*, 2006). Conforming to Peterman and Kennedy (2003), we further approve that exposure to entrepreneurship education, as an additional variable to prior entrepreneurship experience, should be included in entrepreneurial intentions models. This suggests that experiencing entrepreneurial learning is indeed another critical incentive for students to choose an entrepreneurial career.

Second, we find support for the mediating mechanisms of individuals' attitude, subjective norm and perceived behavioral control toward entrepreneurship in the relationship between entrepreneurial learning and entrepreneurial intention. Our findings extend Souitaris *et al.* (2007) by identifying the mediating mechanisms between entrepreneurial learning and entrepreneurial-related outcomes, and also respond to BarNir *et al.* (2011) who suggest that future research should focus more on the mediation process of the formation of entrepreneurial intention. Through investigating the mediating process underlying education-intention linkage, we add further evidence to this line of literature, helping to resolve any inconsistency found on the direct linkage (Martin *et al.*, 2013).

Third, we propose and test on the complementary effect of prior exposure to entrepreneurship to that of entrepreneurship education. We find prior exposure of entrepreneurship moderates the indirect effects of entrepreneurial learning on individual entrepreneurial intentions by strengthening the effects of entrepreneurial learning on individuals' attitudes and perceived behavior control toward entrepreneurship, respectively, confirming that they work together to facilitate the formation process of individual entrepreneurial intention. This finding adds nuance to previous accounts of the effect of prior entrepreneurial exposure on entrepreneurial intention (Krueger and Carsrud, 1993; Kolvereid, 1996; Krueger and Brazeal, 1994; Peterman and Kennedy, 2003), through identifying a unique aspect of the situation that individual might leverage to better elevate the extent to which entrepreneurial learning translates into attitudes, perceived behavioral control and finally entrepreneurial intentions.

Fourth, our study also helps to enrich the TPB. TPB has been used to explain the mediating role of motivational process (e.g. attitudes and norm) in the relationship of perceived entrepreneurial skill (Liñán, 2008), prior family business (Carr and Sequeira, 2007) and perceived age norms (Kautonen *et al.*, 2011) with entrepreneurial intention. Our research goes one step further and adds in another exogenous factor, i.e. entrepreneurship education, into the model of TPB and test on the antecedent role of entrepreneurial intention, together

Table VI.
Conditional indirect effects of entrepreneurial learning on entrepreneurial intention, through attitude, subjective norm and perceived behavior control at different values of prior exposure to entrepreneurship

	Conditional indirect effects of entrepreneurial learning			
	Prior exposure to entrepreneurship	Effect[a]	LLCI95%[b]	ULCI95%[b]
Attitude	−1.205 (−1SD)	0.051 (0.037)	0.001	0.153
Attitude	0 (Mean)	0.097 (0.046)	0.027	0.218
Attitude	+1.205 (+1SD)	0.143 (0.065)	0.038	0.303
Subjective norm	−1.205 (−1SD)	0.081 (0.081)	0.025	0.190
Subjective norm	0 (Mean)	0.113 (0.113)	0.049	0.217
Subjective norm	+1.205 (+1SD)	0.144 (0.144)	0.064	0.260
Perceived behavior control	−1.205 (−1SD)	0.102 (0.102)	0.016	0.217
Perceived behavior control	0 (Mean)	0.155 (0.155)	0.072	0.253
Perceived behavior control	+1.205 (+1SD)	0.208 (0.208)	0.103	0.333

Notes: [a]Bootstrapping standard errors in parentheses; [b]95% confidence intervals presented

with three mediating processes (i.e. attitude, subjective norm and perceived behavioral control). These findings provide empirical evidence to support the appropriateness to include exposure to entrepreneurial learning as exogenous variables in the TPB model.

Finally, our findings contribute to the general entrepreneurship literature regarding the intention to start a business by taking the perspective of education. Although entrepreneurial intention, as a powerful theoretical framework, has been paid much attention (Fayolle and Liñán, 2014), not much research done from an educational perspective. We find that entrepreneurial intention can be developed by entrepreneurial learning through certain aspects of psychological changes. This finding to some extent may answer a long-standing debate on whether entrepreneurship can be taught. Our findings with some micro level evidence support Gorman *et al.*'s (1997) viewpoint of the teachableness of entrepreneurship and offer a more complete explanation of the complexities inherent in the entrepreneurial process, especially for predicting the probability of individuals' entrepreneurial willingness.

5.1 Practical implications

The findings of this study provide empirical evidence that students who enrolled the entrepreneurship courses offered in the universities in Hong Kong had significantly higher level of desirability and abilities to initiate entrepreneurial activities than those who did not take the course. This suggests that entrepreneurial learning is indeed helpful in developing entrepreneurial culture and spirits that influence students' entrepreneurial attitudes and intentions, generating more entrepreneurial activities and contributing to the RIS in HK. Although government policies and related supports may not directly lead to entrepreneurship, the emphasis and investment in entrepreneurship education in universities y are truly helpful for promoting local entrepreneurial activities.

In addition, our findings help to direct educators' and practitioners' attention to the intermediate processes along entrepreneurship education, i.e. changes in individuals' attitudes, perceptions of subjective norm and perceived behavioral control (Fayolle and Degeorge, 2006, p. 82). It is well noted that the attitudinal and perceptual changes are key points in shaping students' intention to entrepreneurship. This provides significant advices for entrepreneurship educators, who should pay more attention to these changes along the educating process.

5.2 Limitations and future research

There are some limitations in this study. First, the cross-sectional data collection on student samples is commonly used in entrepreneurial intention literature (Kolvereid and Isaksen, 2006). However, the influences of entrepreneurial learning on entrepreneurial-related outcomes may not be immediate (Fayolle *et al.*, 2006). A longitudinal design in future study would add more validity to studies on the formation of entrepreneurial intentions and increase the generalizability of the results. Second, we work on a broad concept of entrepreneurship education. Some research has emphasized the roles of entrepreneurship course characteristics in affecting students' entrepreneurial-related outcomes (Mueller, 2011). Future research may touch upon more specific educational aspects, such as course design, methods or ways of teaching, campus environments and so forth. Finally, this study focuses on entrepreneurial intention, not actual entrepreneurial action. Based on the intention theory that entrepreneurial behavior is significantly determined by entrepreneurial intention, this study, like many other studies on entrepreneurship, uses entrepreneurial intention as the dependent variable. The settings of this study could be

extended to include the actual entrepreneurial activities of the students who take the entrepreneurship course in future research.

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Appendix 1

Table AI. Demographic differences between the two groups

Demographic factors	Value	df	Sig. (2-tailed)
Age	6.245	3	0.102
Gender	2.593	1	0.107
Year of study	0.305	2	0.859
Work experience	3.762	3	0.288
Role model	0.041	1	0.840

Appendix 2

Table AII. Differences of respondents (n = 200)

	Sum of squares	df	Mean square	F	Sig.
Entrepreneurial intention					
Between Groups	1.042	2	0.521	0.518	0.596
Within Groups	198.958	198	1.005		
Total	200	200			
Attitude					
Between Groups	3.774	2	1.887	1.904	0.152
Within Groups	196.226	198	0.991		
Total	200	200			
Subjective norm					
Between Groups	0.686	2	0.343	0.341	0.712
Within Groups	199.314	198	1.007		
Total	200	200			
Perceived behavioral control					
Between Groups	0.672	2	0.336	0.334	0.717
Within Groups	199.328	198	1.007		
Total	200	200			

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