University Students' Entrepreneurial Intentions: Does Education Make a Difference?

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Abstract Recently critical questions have been raised about the impact of entrepreneurship education on developing entrepreneurial qualities and intentions of university students. The main purpose of this study is to explore the impact of entrepreneurship education on entrepreneurial intentions of students using the theory of planned behaviour and social cognitive theory. The sample consisted of 348 Master students (171 with and 177 without entrepreneurship education) from the Faculty of Entrepreneurship, Faculty of Foreign Languages and Literature and School of Electrical and Computer Engineering, University of Tehran, Iran. The data were collected using validated questionnaires. As hypothesized, the findings indicate that entrepreneurship education significantly improves entrepreneurial intentions of the students so that students who have undertaken entrepreneurship education have higher entrepreneurial attitude, entrepreneurial self-efficacy and intentions to become an entrepreneur than the students who have not undertaken entrepreneurship education. Furthermore, entrepreneurship education enhances students' entrepreneurial intentions through significantly improving both their entrepreneurial attitude and entrepreneurial self-efficacy. Implications of the findings for entrepreneurship education and improvement of research standards at universities are discussed.

1 Introduction

The main focus of governments' policies on entrepreneurship education all over the world suggests the importance of developing entrepreneurial capabilities in students (Entrialgo and Iglesias 2016; Hannon 2006; Heinonen 2007; Holmgren et al. 2005; Sánchez 2013). This considerable attention given to entrepreneurship education also reflects the dramatically critical influences of entrepreneurs and entrepreneurial activities on individual development as well as socioeconomic growth of both

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developed and developing countries (Heinonen 2007; Heinonen and Poikkijoki 2006; Hynes and Richardson 2007; Liñán et al. 2011; Matlay 2006; Watchravesringkan et al. 2013). Entrepreneurship education has been considered as a means to achieve the goals of a knowledge-based economy and a struggle to cope with certain economic and social problems such as the growing number of unemployed graduates specifically in developing countries including Iran (Molaei et al. 2014; Ertuna and Gurel 2011; Firdaus et al. 2009; Mastura and Abdul Rashid 2008). As a result, a growing number of public and private universities are providing students with different entrepreneurship education and training programs (Busenitz et al. 2003; Fayolle et al. 2006; Heinonen 2007; Mueller and Thomas 2000; Sánchez 2013). These programs aim to improve students' intentions to pursue an entrepreneurial career by improving their self-efficacy, attitude, creativity, innovativeness, leadership, and other skills required for creating and managing a new venture (BarNir et al. 2011; Chen et al. 1998; Fayolle et al. 2006; Karimi et al. 2016; Karlsson and Moberg 2013; Liñán et al. 2011; Louw et al. 2003; Wilson et al. 2007).

Despite the growing interest in entrepreneurship and the wide expansion of entrepreneurship education all over the world, critical questions have been raised about the real impact of entrepreneurship education programs on students' entrepreneurial intentions and attitudes (Fayolle and Gailly 2015; Karimi et al. 2016). Furthermore, there is limited understanding on how education affects students' intentions to select entrepreneurship as their future career path (Anderson and Jack 2008; Entrialgo and Iglesias 2016; Fuchs et al. 2008; Hannon 2006; Liñán et al. 2011; Watchravesringkan et al. 2013). Through a comprehensive review of the literature published from 1997 to 2011, Rideout and Gray (2013) concluded that research into the effect of entrepreneurship education programs on developing students' entrepreneurial competencies and intentions is at the very early stages of development and insufficient empirical evidence exists that show the effectiveness of the programs in creating more successful entrepreneurs. The results of Fayolle's (2013) systematic analysis of the published literature from 2006 to 2012 also revealed that most of the studies (49, 22.27% of 220) found a strong and significant impact of entrepreneurship education on students' entrepreneurial intentions. Through a meta-analysis of 73 papers examining the relationship between entrepreneurship education and entrepreneurial intentions, Bae et al. (2014) suggested a significant but small association between entrepreneurship education and entrepreneurial intentions of students. Moreover, entrepreneurship education had stronger impact on students' entrepreneurial intentions than business education. However, when the authors controlled for the participants' entrepreneurial intentions before their engagement in entrepreneurship education in their regression model, entrepreneurship education had not a significant impact on students' entrepreneurial intentions.

Furthermore, research findings on the impact of education on students' entrepreneurial intentions are contradictory. The majority of the prior studies provided empirical evidence for the positive influence of education on students' entrepreneurial intentions and skills (e.g., Anderson and Jack 2008; Morris et al. 2013; Pittaway and Cope 2007; Sánchez 2013; Zhao et al. 2005) and consequently their real

involvement in establishing their own venture (Karlsson and Moberg 2013). More specifically in Iran, studies provided empirical evidence for the significant impact of entrepreneurship education on students' entrepreneurial intentions (e.g., Arasti et al. 2011; Baghersad et al. 2013; Keshavarz 2014), attitudes toward entrepreneurship and entrepreneurial self-efficacy (e.g., Gheyasi 2016; Jafarimoghadam and Etemadi 2009; Karimi et al. 2016). While, recent research showed a small (Bae et al. 2014), insignificant and even negative effect of entrepreneurship education on students' entrepreneurial motivation and skills (Oosterbeek et al. 2010; Souitaris et al. 2007). This is because these studies mostly examined the direct impact of education on students' entrepreneurial intentions (Liñán et al. 2011). While more recent studies suggest that entrepreneurship education plays an indirect role in the relationship between students' entrepreneurial intentions and its antecedents (Entrialgo and Iglesias 2016; Ertuna and Gurel 2011; Watchravesringkan et al. 2013). Therefore, researchers called for further investigations into the moderating effect of entrepreneurship education on the relationship between personal capabilities and the entrepreneurial outcomes for students (Bae et al. 2014; Fayolle 2013).

In response, the main purpose of this study is to develop and test a model for the impact of entrepreneurship education on the relationship between the factors that shape students' entrepreneurial intentions using the theory of planned behaviour (Ajzen 1991) and the social cognitive theory (Bandura 1997). The findings highly contribute to the literature on the mechanism through which entrepreneurship education influences students' entrepreneurial intentions (Entrialgo and Iglesias 2016; Ertuna and Gurel 2011; Watchravesringkan et al. 2013). This study also advances our understanding of the direct and indirect effects of entrepreneurship education on students' entrepreneurial intentions and its antecedents. The first section of this chapter presents the conceptual and theoretical foundations of the study which constructs the basis for the hypotheses and the research model. The second section describes the methodology and the empirical analysis performed. The third part presents the findings. Subsequently, the findings are discussed in light of their implications for entrepreneurship education and research. Finally, the chapter ends by explaining the limitations, agendas for future research along with a conclusion section.

2 Theories and Hypotheses

The last four decades have seen the development of various theories and models to describe the factors that motivate and drive individuals to pursue an entrepreneurial career (Fayolle et al. 2014; Trevelyan 2011). The theory of planned behaviour (Ajzen 1991) and the social cognitive theory (Bandura 1997) have predominantly been used as reliable frameworks to examine students' entrepreneurial intentions and particularly the impact of education on improving entrepreneurial intentions among students (e.g., Entrialgo and Iglesias 2016; Fayolle et al. 2006; Karimi et al. 2016; Karlsson and Moberg 2013; Kickul et al. 2009; Pittaway and Cope 2007; Tyszka

et al. 2011; Zellweger et al. 2011). Research has shown the power of the theories specifically when integrated into a model to explain the factors that affect students' decision to become an entrepreneur (Guerrero et al. 2008; Liñán et al. 2011; Liñán 2008). Following previous studies, this research incorporated the theory of planned behaviour and the social cognitive theory (self-efficacy) to investigate the effect of education on the relationship between students' entrepreneurial self-efficacy, attitudes and intentions. The following sections review the most relevant literature on the impact of education on the relationship between entrepreneurial self-efficacy, attitudes toward entrepreneurship and entrepreneurial intentions and propose the hypotheses and the model to be tested in this study.

2.1 Entrepreneurship Education, Self-Efficacy and Entrepreneurial Intentions

Social cognitive theory self-efficacy is one of the main concepts of the social cognitive theory (Bandura 1997). Bandura (2012, p. 11) describes human behaviour as "a product of the interplay of intrapersonal influences, the behaviour individuals engage in, and the environmental forces that impinge upon them". In other words, human involvement in a particular behaviour originates from others' reflection, the nature of the behaviour and various factors in their environment. The interactions among these factors in couple with expectations from the outcomes of the behaviour shape one's beliefs in their ability to successfully complete a specific behaviour in a certain situation (Bandura 1999). Self-efficacy influences human behaviour in several ways. First, self-efficacy beliefs highly affect the selection of an action even though there are other alternatives (Bandura 1997). Second, self-efficacy influences the amount of efforts expended to perform the action and finally, the perseverance in dealing with difficulties and challenges of performing the action successfully (Bandura 1997; Dwyer and Cummings 2001). Therefore, perceptions of self-efficacy not only affect the current performance of a specific task but also the future task accomplishments (Bandura 2000). Bandura (2012) attributes this influential impact of self-efficacy to the direct and indirect relationships of the variable with other processes and factors that drive human behaviours such as goal setting, outcome expectations and perceptions toward facilitators and impediments in the environment. On the influence of self-efficacy beliefs on the selection of a career in the presence of other choices, Bandura (2012) argues that individuals mostly choose the career in which they are highly efficacious.

Self-efficacy is first conceptualized in entrepreneurship domain by Scherer et al. (1989). In the last three decades, the concept has been extensively used to explain students' entrepreneurial motivation, intentions, and behaviour (e.g., Chen et al. 1998; DePillis and Reardon 2007; Kickul et al. 2009; Liñán et al. 2011; Zellweger et al. 2011; Zhao et al. 2005). Entrepreneurial self-efficacy is defined as individuals' beliefs in their capacities to successfully perform the required tasks and roles in the

process of a new venture creation and management and their expectations toward the consequences of the venture (BarNir et al. 2011; Chen et al. 1998; Kickul et al. 2009; McGee et al. 2009). In general, self-efficacy affects the successful performance of a planned and intentional behaviour such as the decision to create a new venture (Bandura 2012; Elfving et al. 2009). It indicates individuals' degree of confidence in their competencies and skills to successfully accomplish an intended task in a specific situation. Scholars believe that perceived self-efficacy motivates and regulates one's actions through directing his/her choice of the action, the efforts he/she puts to perform the actions, and his/her persistence in the face of the challenges and difficulties to successfully execute the actions (Bandura 1997; 2012). Perceptions of self-efficacy take shape through a cognitive process through which individuals evaluate their abilities and the required tasks for a new venture creation as well as their expectations of the personal and societal outcomes of entrepreneurial activities (Bandura 2012; Mauer et al. 2009). This evaluation highly motivates and directs individuals' thoughts, efforts and behaviour particularly when they choose to carry out a challenging and novel task such as creating a new venture (Bandura 2012).

Self-efficacy highly improves one's intention to become an entrepreneur and successful performance of entrepreneurial tasks in several ways. First, perceptions of self-efficacy enable an individual to set entrepreneurship as his/her career goal (Carsrud et al. 2009). Second, self-efficacy beliefs enable the individual to plan to achieve the goal by regulating his/her thoughts and actions and perceive more facilitators than impediments in the environment (Bandura 2012). Furthermore, self-efficacy influences entrepreneurial intentions by improving individuals' perceived abilities to control the process of entrepreneurship (Carr and Sequeira 2007). Therefore, entrepreneurial self-efficacy and perceived control over behaviour (the theory of planned behaviour, Ajzen 1991) were employed interchangeably in research into entrepreneurial intentions (Liñán 2008). Entrepreneurial self-efficacy also enhances one's motivation and commitment to entrepreneurial behaviour (Elfving et al. 2009). Therefore, the motivation, intention, and commitment to establish individuals' own venture will not take form if they perceive their ability and skills as not sufficient for performing the challenging tasks in the process of entrepreneurship (Mauer et al. 2009).

A robust body of literature found entrepreneurial self-efficacy as the key personal trait that determines one's selection into entrepreneurship, endeavours to start a new venture, and persistence in the face of challenges and crisis throughout the entrepreneurship process (Barbosa et al. 2007; Chen et al. 1998; DePillis and Reardon 2007; Liñán et al. 2011; McGee et al. 2009). Notably, for students, entrepreneurial self-efficacy has been examined in order to design more effective pedagogical strategies and methods to improve their perceptions of entrepreneurial self-efficacy (Mauer et al. 2009) and direct them to develop the knowledge and skills required for the entrepreneurship process (Bandura 2012; Chen et al. 1998). Previous research has shown both the direct (Chen et al. 1998; Liñán et al. 2011; Zhao et al. 2005) and indirect (Lope Pihie and Bagheri 2013) effects of entrepreneurial self-efficacy on students' entrepreneurial intentions.

Four sources of information have been highlighted as the factors that construct one's sense of self-efficacy (Bandura 1997). These factors are: mastery experience, vicarious learning (role modelling), social persuasion, and physiological status. Various entrepreneurship education and training programs (e.g., business plan development, running small businesses, case studies, and guest speakers) have been designed based on these sources of self-efficacy in order to develop students' sense of abilities to perform specific tasks required for establishing and running their own businesses (Heinonen 2007; Wilson et al. 2007). Educators believe that students' involvement in these programs helps them evaluate their capabilities to execute entrepreneurial tasks and decide whether or not to establish their own venture (Fayolle et al. 2006; Zhao et al. 2005). Previous research has supported the significant impact of entrepreneurship education on entrepreneurial self-efficacy and consequently entrepreneurial intentions of students (Fayolle et al. 2006; Kickul et al. 2009; Wilson et al. 2007; Zhao et al. 2005). More recent research has also found the influential role that specific entrepreneurship education plays in developing students' entrepreneurial self-efficacy (Morris et al. 2013). Using an experimental research design, Karlsson and Moberg (2013) concluded that entrepreneurship education significantly improves students' self-efficacy in performing the tasks required for the process of establishing a new venture including searching, planning, marshalling, people implementation and financial implementation. Karimi et al. (2016) examined the influence of elective and compulsory entrepreneurship education on university students' entrepreneurial intentions in Iran. The authors found a significant association between both types of entrepreneurship education and students' perceived control over entrepreneurial behaviour (self-efficacy). However, the findings of the study revealed an insignificant impact of compulsory entrepreneurship education on students' entrepreneurial intentions. Few studies have also examined how students' involvement in entrepreneurship education, their entrepreneurial self-efficacy and attitude toward entrepreneurship interact to construct their entrepreneurial intentions (Mauer et al. 2009). Bandura (2012) has recently highlighted attitudes toward behaviour as one of the mechanisms through which self-efficacy affects behaviour. Therefore, we proposed and tested the following hypotheses:

H1 Entrepreneurship education has a significant positive impact on students' entrepreneurial intentions.

H2 Entrepreneurship education significantly improves students' entrepreneurial intentions through entrepreneurial self-efficacy.

2.2 Entrepreneurship Education, Attitudes Toward Entrepreneurship and Entrepreneurial Intentions

Attitude toward a specific behaviour is one of the main factors in the theory of planned behaviour (Ajzen 1991) that shape individuals' intended behaviour such as

the decision to become an entrepreneur. Carsrud et al. (2009) emphasize that individuals' positive attitudes toward entrepreneurship highly affect their intentions to become an entrepreneur. Students' attitude toward entrepreneurship has been defined as their awareness of the importance of entrepreneurship and indicates the desirability or undesirability of creating a new venture and its consequences for them (Liñán et al. 2011; Liñán 2008). Research findings highlighted students' attitudes toward entrepreneurship as a significant factor that influences their entrepreneurial career selection (Barber 2015; Peterman and Kennedy 2003). For example, using a sample of 216 university students, Harris and Gibson (2008) found that most of the university students have entrepreneurial attitudes. Liñán et al. (2011) examined the relationship between entrepreneurial attitudes, self-efficacy, knowledge and entrepreneurial intentions of final year Spanish university students. The findings confirmed the direct relationship between attitudes toward entrepreneurship and students' entrepreneurial intentions. Ferreira et al. (2012) also found that secondary school students' personal attitudes toward entrepreneurship significantly affect their intentions to become entrepreneurs. The findings of Sánchez's (2013) study revealed that entrepreneurship education significantly promotes secondary school students' attitudes toward entrepreneurship. Using a sample of university students in Denmark, Karlsson and Moberg (2013) provided empirical evidence for the influential impact of entrepreneurship education on enhancing students' attitudes toward entrepreneurship.

In addition to directly affecting entrepreneurial intentions, attitude toward entrepreneurship carries the impact of other variables on entrepreneurial intentions (Entrialgo and Iglesias 2016). The findings of a recent studies revealed the mediating role of attitudes toward entrepreneurship by carrying the effect of personal values in shaping entrepreneurial intentions of students (Entrialgo and Iglesias 2016; Watchravesringkan et al. 2013). Liñán (2008) also found that attitude toward entrepreneurship significantly moderates the relationship between university students' perceived entrepreneurial skills and their entrepreneurial career intentions.

While the impact of education on improving students' entrepreneurial self-efficacy and intentions has been established in the literature (e.g., Morris et al. 2013; Zhao et al. 2005), there is little knowledge on the relationship between education, students' attitudes toward entrepreneurship and their intentions to pursue an entrepreneurial career (Duval-Couetil 2013; Entrialgo and Iglesias 2016; Fayolle et al. 2006; Souitaris et al. 2007). Anderson and Jack (2008) highlighted the influential role that education plays in improving students' awareness of and attitudes toward entrepreneurship. Recently, Entrialgo and Iglesias (2016) found a significant influence of entrepreneurial education on entrepreneurial intentions of university students by improving the relationship between subjective norms and entrepreneurial attitude. Therefore, we proposed and tested the following hypothesis:

H3 Entrepreneurship education significantly improves students' entrepreneurial intentions through their entrepreneurial attitudes.

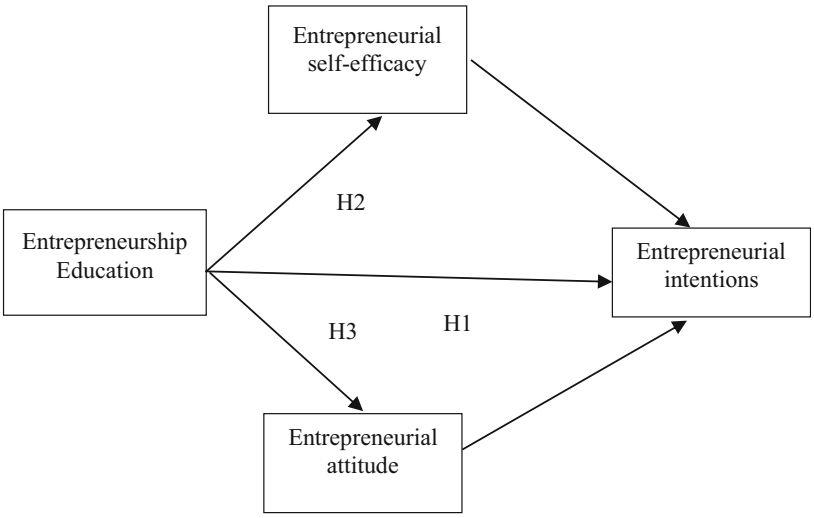

Fig. 1 Hypothesized model for the impact of entrepreneurship education on students' entrepreneurial self-efficacy, attitudes and intentions

Figure 1 presents the conceptual framework for this study that depicts the hypothesized effects of entrepreneurship education on entrepreneurial self-efficacy, entrepreneurial attitudes and entrepreneurial intentions. The framework integrates the theory of planed behaviour and self-efficacy to describe how education affects students' entrepreneurial intentions. As the framework indicates, entrepreneurial education influences entrepreneurial intentions both directly and indirectly through entrepreneurial self-efficacy and entrepreneurial attitudes.

3 Method

3.1 Participants

The students from three faculties of the University of Tehran, which is one of the largest public universities in Iran, were selected as the participants in this study. To explore the moderating impact of education on constructing students' entrepreneurial capabilities and intentions and to avoid biases of the findings toward entrepreneurship education (Matlay 2005), both students with and without entrepreneurship education were included in this study. The students with education were selected from the Faculty of Entrepreneurship which is the first faculty in the Middle East and North Africa that specifically focuses on entrepreneurship education and involves students with different entrepreneurial activities to improve their entrepreneurial capabilities and intentions. The faculty only accepts Master's and PhD students. A group of 171 Master's students from different specializations of the faculty

Table 1 Sample demographics ($n = 348$)

Demographic characteristics	With entrepreneurship education		Without entrepreneurship education	
	n = 171	Percent	n = 177	Percent
Gender				
Male	66	38.6	87	49.2
Female	105	61.4	90	50.8
Age				
20–25	7	4.1	5	2.9
26–30	59	33.5	52	29.4
31–35	56	32.7	41	23.2
36–40	32	18.8	50	28.3
>40	17	10.1	29	16.2
Business experience				
Yes	79	46.2	43	24.3
No	90	52.6	132	74.6

participated in this study. The students who did not undertake entrepreneurship education were selected from the Faculty of Foreign Languages and Literature and School of Electrical and Computer Engineering. These faculties were selected to ensure the students from both Humanities and Science fields of studies are included in this research. Of these faculties, a sample of 177 Master's students was involved in this study. Previous studies have also used a sample of university students to examine the relationship between entrepreneurial capabilities and intentions (e.g., Barber 2015; BarNir et al. 2011; Karlsson and Moberg 2013; Verheul et al. 2012; Watchravesringkan et al. 2013).

Table 1 demonstrates the demographic information of the students. As the table shows, the number of students with and without entrepreneurship education was approximately equal (171 and 177 respectively). Regarding the gender, the majority of the students were female (105, 61.4% with and 90, 50.8% without entrepreneurship education). Most of the students from the Faculty of Entrepreneurship who have undertaken entrepreneurship education aged between 26 and 36 years (115, 66.2%). The students from other two faculties who have not undertaken entrepreneurship education aged between 26 and 40 years (143, 80.9%). The majority of both students with and without entrepreneurship education had no business experience (90, 52.6%, 132, 74.6 receptively).

3.2 Measures

We used validated scales to measure the constructs in this study including, entrepreneurial self-efficacy, entrepreneurial attitude and entrepreneurial intentions. In addition, the students were asked to provide their demographic information

including: gender, age and education background and whether they had a business experience.

Entrepreneurial Self-Efficacy

Students' ESE was measured using the entrepreneurial self-efficacy scale developed by Scherer et al. (1989). Entrepreneurial self-efficacy has been considered as the strongest indicator of students' perceived confidence in their abilities to perform entrepreneurial tasks and roles (Carr and Sequeira 2007; Zhao et al. 2005). Building on previous studies (Chen et al. 1998; Karlsson and Moberg 2013; McGee et al. 2009; Wilson et al. 2007), entrepreneurial self-efficacy was measured using a multi-item scale in order to better assess students' beliefs in their skills to perform the tasks required to manage a business. The self-efficacy skills scale consists of five items including marketing (perceived capabilities to successfully perform marketing tasks of the business), accounting (perceived abilities to successfully perform monetary tasks of the business), human resources (perceived capabilities to successfully recruit competitive staff and allocate their tasks), production (perceived abilities to manage the process of production) and organizational management tasks (perceived capabilities to successfully perform tasks related to planning, organizing and controlling). An example of the items is "I can successfully complete the necessary marketing tasks related to owing a business (consider selling, selecting a location, advertising and customer service". A five-point Likert scale was used to measure this variable anchoring from 1 (strongly disagree) to 5 (strongly agree). This study also found the scale highly reliable to measure students' entrepreneurial self-efficacy ($\alpha = 0.84$).

Entrepreneurial Attitude

Students' attitudes towards establishing their own businesses were measured using five items of the Entrepreneurial Intention Questionnaire developed by Liñán (2008). These items measure the attractiveness, satisfaction, and advantages of being an entrepreneur for students. An example of the items is "Being an entrepreneur would give me great satisfaction". A five-point Likert scale was also used to measure this variable anchoring from 1 (strongly disagree) to 5 (strongly agree). This questionnaire was also reliable to assess students' entrepreneurial attitudes ($\alpha = 0.79$).

Entrepreneurial Intentions

Students' entrepreneurial intentions were measured using six items from the Entrepreneurial Intention Questionnaire (Liñán 2008). The items measure students' desire, determination, efforts and goals to become an entrepreneur. An example of the items is "My professional goal is to be an entrepreneur". Liñán's (2008) findings indicated that the questionnaire was highly valid and reliable to measure entrepreneurial intentions and its components among university students in Spain (all of the constructs scored a Cronbach's alpha higher than 0.80). The findings of this study also confirmed high reliability of the questionnaire ($\alpha = 0.81$). The students were asked to indicate the extent to which they agreed or disagreed with each item based on a five point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Control Variables
The findings of prior studies showed the influential impact of age, gender and business experience on students' entrepreneurial capabilities and intentions (Bagheri and Lope Pihie 2014; Gupta et al. 2008, 2009; Wilson et al. 2007). Therefore, students' age, gender and business experience were controlled in this study.

3.3 Data Collection

Participation in this research was voluntary. All of the questionnaires administered were completed anonymously and the students were ensured that their responses will be confidential. Data collection was conducted during the academic year of 2016–2017. From the 453 questionnaires administered, 348 were used in the final analysis with 76.8% response rate.

3.4 Data Analysis

To test the validity of the relationship between the constructs in the research measurement model, Structural Equation Modelling (SEM) and AMOS Version 20 was employed (Hair et al. 2010; Schreiber et al. 2006). Previous researchers have also used SEM to examine entrepreneurial self-efficacy, attitudes and intentions (Watchravesringkan et al. 2013; Liñán and Chen 2009; Liñán 2008; Guerrero et al. 2008; Zhao et al. 2005). The structure and loadings of the observed variables to each of the three constructs in the measurement model (entrepreneurial self-efficacy, entrepreneurial attitude and entrepreneurial intention) were assessed by performing Confirmatory Factor Analysis (CFA) for each construct. Subsequently, we included all of the constructs and the related items in one measurement model. Then, the hypothesized relationships among the variables in the conceptual model (Fig. 1) was tested using the regression analysis.

4 Results

In this section, the results for model fit indices for measurement and structural models as well as hypothesized moderating role of entrepreneurship education in the relationship between entrepreneurial self-efficacy, entrepreneurial attitudes and entrepreneurial intentions are presented.

4.1 Assessment of Instrument Validity

Confirmatory Factor Analysis (CFA) was performed for the three constructs in this study including entrepreneurial intention, self-efficacy and attitude in order to test factor loadings and model fit indices for each construct. The results indicate that all of the items describing the constructs had higher loadings than the 0.50 threshold to their constructs (Hair et al. 2010). Table 2 presents the statistics obtained for the scale constructs and items. Analysis of the measurement model developed with all constructs in this research indicated that the model fits the data well because x^2/DF was less than 3, all of the goodness of fit indices were higher than 0.90 and RMSEA was less than the 0.05 threshold (Byrne 2010) [x^2/df = 2.68; Goodness of Fit Index (GFI = 0.91); Incremental Fit Index (IFI = 0.91); Comparative Fit Index (CFI = 0.95); Tucker-Lewis index (TLI = 0.90); and root-mean square error of approximation (RMSEA = 0.049)]. The Cronbach's *a* for each construct in the model also showed high reliability of the scale (>0.70). The composite reliability indices (CR) obtained for the constructs were also greater than the 0.7 threshold which confirms the high reliability of the constructs (Hair et al. 2010).

In particular, entrepreneurial self-efficacy is explained by five factors including students' perceived abilities in marketing, accounting, human resources, production and organizational management tasks (Cronbach's $a = 0.84$). Entrepreneurial attitude is best described by five factors which include attractiveness of entrepreneurship as a career, passion and willingness to start a business, satisfaction of becoming an entrepreneur and advantages of entrepreneurship for students. The Cronbach's *a* obtained for this section was 0.79. Finally, five items on the students' tendency to do anything to become an entrepreneur, their willingness to put in effort to establish their own business and their seriousness and determination to create a new business venture best explained the students' entrepreneurial intentions (Cronbach's $a = 0.81$).

The Average Variance Extracted (AVE) indicated the convergent validity (the portion of the construct variance explained by its items) of the constructs in the measurement model (Kline 2010). Specifically, all of the constructs scored higher than the 0.50 threshold (Table 2) indicating that the majority of the variance in each construct is explained by its items (Hair et al. 2010). Discriminant validity of the constructs was also measured by Maximum Shared Squared Variance (MSV) and Average Shared Squared Variance (ASV) (Hair et al. 2010; Kline 2010). Analysis of the indices obtained in this study showed that the ASV and MSV scores for ESE were less than the AVE. This finding indicates that all of the items have the highest loadings to their own constructs.

Table 3 presents the means, standard deviations and correlations among the variables in the model. As the table shows the students with entrepreneurship education scored higher means in all of the constructs under this investigation including entrepreneurial attitude, self-efficacy and intention and these constructs have significant correlations.

Table 2 Validity and reliability statistics for the constructs in the scale

Constructs	Items	Mean	SD	Factor loadings	Cronbach's *a*	CR	AVE	MSV	ASV
Entrepreneurial self-efficacy	Marketing	3.48	0.89	0.73	0.80	0.84	0.52	0.43	0.37
	Accounting	3.27	0.91	0.56					
	Personnel	3.50	0.87	0.77					
	Production	3.38	0.87	0.77					
	Organization	3.46	0.85	0.78					
Entrepreneurial Attitudes (EATT)	EATT1	3.64	0.98	0.76	0.79	0.75	0.53	0.45	0.40
	EATT2	3.50	0.79	0.54					
	EATT3	3.54	0.84	0.86					
	EATT4	3.34	0.84	0.73					
	EATT5	3.08	0.91	0.56					
Entrepreneurial intentions (EINT)	EINT1	3.38	0.92	0.80	0.81	0.82	0.57	0.51	0.48
	EINT2	3.55	0.82	0.68					
	EINT3	3.68	0.90	0.65					
	EINT4	3.50	0.84	0.66					
	EINT5	3.40	0.98	0.67					
	EINT6	3.29	0.82	0.53					

Table 3 Means, standard deviations and correlations among the study variables

	Variables	Mean	SD	With education		Without education		1	2	3
				Mean	SD	Mean	SD			
1	Entrepreneurial attitude	3.05	0.58	3.28	0.64	2.84	0.41	1		
2	Entrepreneurial self-efficacy	3.41	0.70	3.62	0.53	3.20	0.77	0.64**	1	
3	Entrepreneurial intentions	3.30	0.50	3.44	0.44	3.17	0.52	0.65**	0.73**	1

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

4.2 Test of Hypotheses

To test the model proposed in this study, the direct impact of entrepreneurial self-efficacy, attitude and education were examined. The results indicated significant direct effect of the variables on entrepreneurial intentions of both students with and without entrepreneurship education. More specially, entrepreneurial self-efficacy significantly improves students' entrepreneurial intentions ($\beta = 0.57$, $p < 0.001$). Importantly, this effect was also significantly positive when students' age, gender, business experience and education were controlled ($\beta = 0.56$, $p < 0.001$). In accordance with previous studies (Bagheri and Lope Pihie 2014; Barbosa et al. 2007; DePillis and Reardon 2007; McGee et al. 2009), these findings highlight the impactful influence of entrepreneurial self-efficacy on students' intentions to become an entrepreneur. This study also found a significant positive and direct relationship between entrepreneurial attitude and students' entrepreneurial intentions ($\beta = 0.65$, $p < 0.001$). Furthermore, when the demographic variables were controlled the relationship was also significant and positive ($\beta = 0.57$, $p < 0.001$). The direct associations between entrepreneurship education and entrepreneurial self-efficacy ($\beta = 0.27$, $p < 0.001$) and entrepreneurial attitude were also significant and positive ($\beta = 0.39$, $p < 0.01$).

Hypothesis 1 predicts that entrepreneurship education has a significant positive impact on students' entrepreneurial intentions. The finding indicates that entrepreneurship education significantly and positively influences students' entrepreneurial intentions ($\beta = 0.45$, $p < 0.001$). Based on hypothesis 2, entrepreneurship education significantly improves students' entrepreneurial intentions through entrepreneurial self-efficacy. As Table 4 shows, this hypothesis was confirmed and entrepreneurship education was significantly associated with students' entrepreneurial intentions by improving their entrepreneurial self-efficacy ($\beta = 1.29$, $p < 0.001$).

This analysis also tested hypothesis 3 on the significant impact of entrepreneurship education on students' entrepreneurial intentions by improving their entrepreneurial attitude. As Table 5 presents, entrepreneurship education has a significant influence on entrepreneurial intentions of students by enhancing their entrepreneurial attitude ($\beta = 0.45$, $p < 0.001$).

Table 4 Standardized coefficients for the impact of entrepreneurship education on entrepreneurial intentions and self-efficacy

Variables	Model 1	Model 2	Model 3	Model 4
Control variables				
Age	−0.004	0.044	0.049	0.031
Gender	0.031	0.013	−0.033	−0.013
Entrepreneurship experience	1.075**	0.041	0.005	0.008
Entrepreneurship education	–	0.457***	0.316***	0.908***
Entrepreneurial self-efficacy	–	–	0.479***	0.416***
Education × entrepreneurial self-efficacy	–	–	–	1.294***
R^2	0.021	0.209	0.419	0.545
ΔR^2	–	0.188	0.210	0.126

$^{**}p < 0.01$, $^{***}p < 0.001$

Table 5 Standardized coefficients for the impact of entrepreneurship education on entrepreneurial intentions and attitude

Variables	Model 1	Model 2	Model 3	Model 4
Control variables				
Age	−0.004	0.044	−0023	−0023
Gender	0.031	0.013	0.002	0.002
Entrepreneurship experience	1.075**	0.041	0.046	0.046
Entrepreneurship education	–	0.457***	0.242***	0.242***
Entrepreneurial attitude	–	–	0.566***	0.242***
Education × entrepreneurial attitude	–	–	–	0.269***
R^2	0.021	0.209	0.483	0.493
ΔR^2	–	0.188	0.274	0.000

$^{**}p < 0.01$, $^{***}p < 0.001$

Finally, this study examined the simultaneous impact of entrepreneurship education on entrepreneurial self-efficacy and attitude of students and consequently their entrepreneurial intentions including the variables in a model (Fig. 2). Interestingly, the impact of entrepreneurship education on entrepreneurial intentions highly improved when the interactions between entrepreneurship education and entrepreneurial self-efficacy and entrepreneurship education and entrepreneurial attitude ($\beta = 3.84$, $p < 0.01$) were included in the model. More specifically, entrepreneurship education improves students' entrepreneurial intentions by enhancing their entrepreneurial self-efficacy ($\beta = 0.22$, $p < 0.001$). Entrepreneurship education also significantly improves students' entrepreneurial attitude. The R square for the model also indicates that the model fits the data well ($R^2 = 0.61$). Of the demographic variables controlled in this study (age, gender and entrepreneurship experience), only entrepreneurship experience significantly influences students' entrepreneurial intentions ($\beta = 1.07$, $p < 0.01$).

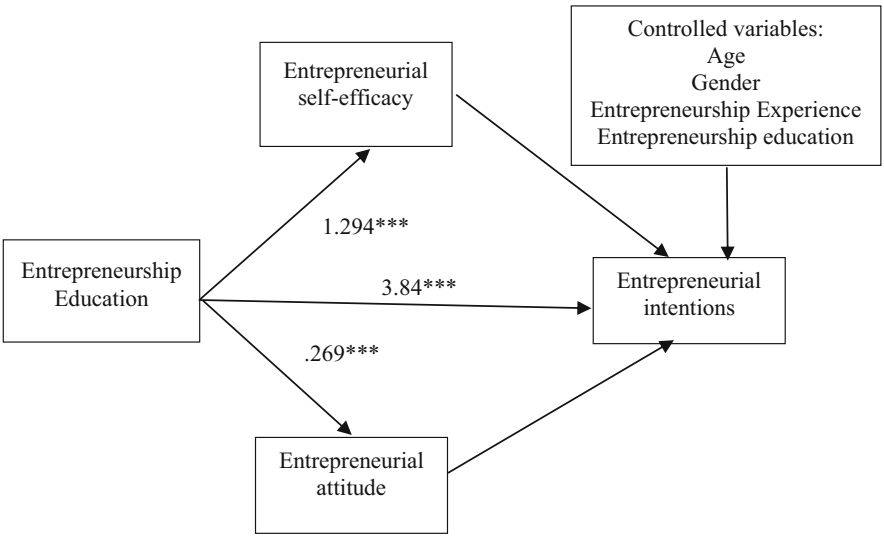

Fig. 2 Results on the impact of entrepreneurship education on students' entrepreneurial self-efficacy, attitudes and intentions

5 Discussion

The wide expansion of entrepreneurship education and training programs specifically at universities have raised many questions about effectiveness of the programs in developing favourable attitudes toward and competencies in choosing entrepreneurship as their future career among students (Fayolle and Gailly 2015; Fuchs et al. 2008; Pittaway et al. 2009; Karlsson and Moberg 2013; Sánchez 2013). In addition, previous research failed to find a significant direct (Oosterbeek et al. 2010) and strong (Bae et al. 2014) relationship between entrepreneurship education and students' motivation, skills and intentions to become an entrepreneur. This study contributes to the validity and efficacy of entrepreneurship education by highlighting both significant direct and indirect influence of such education on constructing students' entrepreneurial intentions, self-efficacy and attitudes. The findings of this study also suggest entrepreneurial self-efficacy and entrepreneurial attitude as two mechanisms through which entrepreneurship education affects students' entrepreneurial intentions (Entrialgo and Iglesias 2016; Fayolle et al. 2006; Sánchez 2013; Zhao et al. 2005). Analysis of the data also supported the hypothesised impact of education on the relationship between entrepreneurial self-efficacy and students' entrepreneurial intentions. This is sharply in contrast with the studies that could not find a significant association between entrepreneurship education and students' entrepreneurial skills and intentions (Liñán et al. 2011; Oosterbeek et al. 2010; Souitaris et al. 2007). Specifically, our findings imply that entrepreneurial self-efficacy of students who received entrepreneurship education had a higher impact on their entrepreneurial intentions than students without entrepreneurship education.

With a higher efficacy on their entrepreneurial skills, students with entrepreneurship education are more likely to set entrepreneurship as their career goal, make plans to establish their own businesses and are more capable of performing entrepreneurial tasks (Carsrud et al. 2009; Karlsson and Moberg 2013; Elfving et al. 2009; Chen et al. 1998). Therefore, educators may need to provide students with entrepreneurship education programs and learning opportunities that improve their perceived self-efficacy in performing the tasks required for the entrepreneurship process by emphasizing more experiential and social interactive learning (Heinonen and Poikkijoki 2006; Man and Yu 2007; Morris et al. 2013; Pittaway and Cope 2007).

Furthermore, the findings of this study revealed the role of education in influencing students' entrepreneurial intentions by improving their attitudes toward entrepreneurship such that entrepreneurial attitudes of students who had received entrepreneurship education had a significant higher impact on their intentions to become an entrepreneur than their counterparts without such education. This confirms previous research findings on the impact of entrepreneurship education on improving students' entrepreneurial attitudes (Entrialgo and Iglesias 2016; Karlsson and Moberg 2013; Sánchez 2013), and consequently their entrepreneurial intentions. It also expands prior research on the relationship between entrepreneurial attitudes and intentions (Entrialgo and Iglesias 2016; Harris and Gibson 2008; Liñán 2008) by exploring the effects of education on improving students' attitudes. This finding suggests the necessity to develop more attractive, enjoyable and inspiring entrepreneurship education programs rather than the traditional methods of entrepreneurship teaching and learning in order to promote favourable attitudes toward establishing their own business among students and thereby enhance their entrepreneurial intentions (Ferreira et al. 2012; Hannon 2006; Hynes and Richardson 2007; Morris et al. 2013; Liñán et al. 2011). To do so, educators can highlight the advantages of entrepreneurship for personal development as well as the socio-economic growth of the country (Heinonen 2007; Heinonen and Poikkijoki 2006; Hynes and Richardson 2007; Liñán et al. 2011). Educators may also need to explore more effective entrepreneurship teaching and learning methods in order to promote positive attitudes toward entrepreneurship among students (Ferreira et al. 2012).

In particular, analysis of the data confirmed the critical role that both entrepreneurial self-efficacy and attitude play in shaping students' entrepreneurial intentions (Liñán et al. 2011; Liñán 2008). Karlsson and Moberg (2013) emphasise that "These two factors are central aspects for understanding the future behaviour of entrepreneurship students" (p. 7). Therefore, students' efficacy in performing entrepreneurial tasks and their attitudes toward entrepreneurship greatly determine their intentions to establish their own business and their ultimate engagement in entrepreneurial activities (Verheul et al. 2012). Due to the strong associations between entrepreneurial self-efficacy and attitude (Bandura 2012; Zhao et al. 2005) and the significant impact of entrepreneurship education on both students' entrepreneurial self-efficacy and attitude emerging from this study, entrepreneurship educators should focus on improving these two key factors if they are to create more competent entrepreneurs out of university students. Finally, this study confirmed the significant influence of entrepreneurship experience on students' entrepreneurial intentions. This finding

highlights the importance of experiential teaching methods that involve students in the learning opportunities to experience the process of establishing their own new business (Anderson and Jack 2008; Pittaway and Cope 2007; Wilson et al. 2007).

6 Conclusion

Based on the findings of this study, it can be concluded that entrepreneurship education improves students' entrepreneurial intentions in several ways. The programs not only provide the appropriate environment that create a desirable attitude toward entrepreneurship in students but develop students' entrepreneurial self-efficacy by engaging them in empirical leaning activities (Heinonen and Poikkijoki 2006; Man and Yu 2007; Morris et al. 2013; Pittaway and Cope 2007).

This study provides several contributions to the literature and research on entrepreneurial intentions and entrepreneurship education. First, it supports the influential roles that entrepreneurship education can play in improving students' entrepreneurial self-efficacy, attitude and intentions. The model for the relationship among the variables emerging from this study explains the construction of students' entrepreneurial intentions as dynamic interactions between personal and environmental factors. These interactive effects that have been mostly overlooked by entrepreneurship researchers and educators can be considered in the research into the factors that affect students' entrepreneurial intentions as well as providing them with more effective entrepreneurship education (Liñán et al. 2011). Second, it identified the potential mechanisms for the influence of entrepreneurship education on a range of personal and socially constructed factors that shape students' entrepreneurial intentions. Third, this study confirmed the appropriateness of the theory of planned behaviour (Ajzen 1991) and self-efficacy (Bandura 1997) in explaining the relationship between entrepreneurship education and the factors that shape students' entrepreneurial intentions which has been criticised for lacking robust theoretical foundations (Fayolle 2013).

This study also provides contributions to entrepreneurship education particularly in Iran by highlighting entrepreneurship education, entrepreneurial self-efficacy and attitudes toward entrepreneurship as the influential factors that construct students' entrepreneurial intentions (Arasti et al. 2011; Baghersad et al. 2013; Gheyasi 2016; Jafarimoghadam and Etemadi 2009; Keshavarz 2014). The findings of this study also confirmed the significant impact of entrepreneurship education on university students' attitude toward entrepreneurship and entrepreneurial self-efficacy specifically in Iran (Karimi et al. 2016). Educators can use the model emerging from this study in order to provide university students with more effective entrepreneurship education and training programs. By including both students with and without entrepreneurship education, this study also makes great contributions to the literature on the role that education plays in developing students' entrepreneurial capabilities and intentions (Karimi et al. 2016; Karlsson and Moberg 2013; Matlay 2005). Particularly, the findings of this study contributes to one of the first empirical

evidence for the effectiveness of entrepreneurship education programs offered by the Faculty of Entrepreneurship in developing students' entrepreneurial attitude, self-efficacy in managing their own business and ultimately their entrepreneurial intentions. Conducting a comparative analysis, this study also explains the differences between the students of this faculty and two of other faculties of the University of Tehran in their intentions to become an entrepreneur, entrepreneurial attitude and self-efficacy. Furthermore, the findings of this study confirmed the validity and reliability of the EIQ (Liñán 2008) in measuring university students' attitudes toward entrepreneurship and their entrepreneurial intentions in the context of higher education in Iran as was supported in Malaysia (Bagheri and Lope Pihie 2014). Future researchers can use the EIQ to measure students' entrepreneurial intentions and its antecedents.

6.1 Limitations and Future Research

This study has some limitations that suggest agendas for future research. First, this research attempted to examine the impact of education on the factors that shape students' intentions to choose entrepreneurship as their career. Therefore, only students were selected as the participants of this study. Although, students have often been used as the sample for examining entrepreneurial attitudes and self-efficacy and intentions (BarNir et al. 2011; Entrialgo and Iglesias 2016; Karimi et al. 2016; Karlsson and Moberg 2013; Liñán et al. 2011; Liñán 2008; Molaei et al. 2014; Zellweger et al. 2011; Zhao et al. 2005) the findings are constrained in terms of generalization to explain real entrepreneurs' entrepreneurial intentions. Future research might examine the interactions among the factors that shape entrepreneurial intentions and the effect of education on the relationships among these factors with a sample of nascent and real entrepreneurs to better explain entrepreneurial intentions and behaviour. Second, this study only focused on the effect of education on two of the most influential factors in shaping students' entrepreneurial intentions which are: entrepreneurial self-efficacy and attitudes toward entrepreneurship (Liñán et al. 2011; Liñán 2008). Since a combination of cognitive (Fayolle et al. 2014; Molaei et al. 2014), personal and social factors construct students' entrepreneurial intentions (BarNir et al. 2011; Liñán 2008) and education may affect other factors than those examined in this study, future studies should investigate the interactions among factors such as creativity (Zampetakis 2008; Zampetakis and Moustakis 2006), family business background (Carr and Sequeira 2007; Ertuna and Gurel 2011), subjective and social norms (Entrialgo and Iglesias 2016; Liñán 2008) and students' intentions to pursue an entrepreneurial career path. Further investigations can also be undertaken to explore the aspects of the entrepreneurship education that have the most influential impact on enhancing students' entrepreneurial self-efficacy and attitudes.

Third, this study only included Master students from three faculties of University of Tehran. Further investigations can explore the relationships emerging from this

study using undergraduate and PhD students from public and private universities. This research also measured students' entrepreneurial intentions using a self-report questionnaire rather than their actual behaviour in establishing their own venture. Although individuals' intentions have a direct effect on their actual involvement in entrepreneurship (Verheul et al. 2012), this measure does not allow drawing any conclusions if students will take action and establish their own businesses (Krueger et al. 2000; Liñán et al. 2005). It will be enlightening for future longitudinal studies to examine whether students with high entrepreneurial intentions will launch their own venture after graduation. Future comparative studies can also be conducted across countries to include the differences between countries regarding their entrepreneurship education programs and activities. Further investigations can also be undertaken to explore if the reinforcing effects of education on the relationship between entrepreneurial intentions and its antecedents change at different education levels. Furthermore, this study used a cross-sectional research design to investigate the role that entrepreneurship education plays in shaping students' entrepreneurial intentions. Future studies can also use more reliable designs such as a quasi-experimental method in order to better explore the effects of entrepreneurship education and assist policy makers and educators to provide students with more effective entrepreneurship education and training programs (Rideout and Gray 2013). Finally, another possible limitation of this study is that the present entrepreneurial self-efficacy findings are highly related to students' perceived skills in running an established business. These managerial skills may not fully describe the tasks required for the process of establishing a new venture (Mauer et al. 2009; McGee et al. 2009). It would be valuable to examine the impact of education on improving students' entrepreneurial self-efficacy by a process-oriented instrument in order to better explain their capacity to perform the tasks needed for the process of entrepreneurship (Karlsson and Moberg 2013; McGee et al. 2009). Research into the development of effective teaching and learning methods to improve students' entrepreneurial self-efficacy and attitude also provides great contributions to entrepreneurship education.

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