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Article

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Cogent Business & Management

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Suggested Citation: Montes, Jose et al. (2023) : Impact of entrepreneurship education on the entrepreneurial intention of university students in Latin America, Cogent Business & Management, ISSN 2331-1975, Taylor & Francis, Abingdon, Vol. 10, Iss. 3, pp. 1-23, <https://doi.org/10.1080/23311975.2023.2282793>

This Version is available at:

<https://hdl.handle.net/10419/294744>

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To cite this article: Jose Montes, Luisa Ávila, Dámaso Hernández, Lourdes Apodaca, Solange Zamora-Bosa & Franklin Cordova-Buiza (2023) Impact of entrepreneurship education on the entrepreneurial intention of university students in Latin America, Cogent Business & Management, 10:3, 2282793, DOI: [10.1080/23311975.2023.2282793](https://doi.org/10.1080/23311975.2023.2282793)

To link to this article: <https://doi.org/10.1080/23311975.2023.2282793>



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Received: 15 June 2023
Accepted: 08 November 2023

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MANAGEMENT | RESEARCH ARTICLE

Impact of entrepreneurship education on the entrepreneurial intention of university students in Latin America

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and Franklin Cordova-Buiza^{6,7}

Abstract: The correlation between entrepreneurship education and entrepreneurial intention is neither clear nor conclusive. While some studies show a positive correlation between entrepreneurship education and entrepreneurship, others confirm contradictory results. To contribute to the understanding of the relationship between entrepreneurship education and entrepreneurial intention and to contribute to the literature on this topic in Latin America, this research aimed to determine the influence of entrepreneurship education on the entrepreneurial intention of students from five Latin American universities. The type of research is quantitative, cross-sectional, and explanatory. To carry out the study, a questionnaire was applied to 1213 students from five universities in Colombia, Ecuador, Mexico, and Peru. The sample size was determined with a probabilistic design, and the sample

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PUBLIC INTEREST STATEMENT:

Understanding the connection between learning about entrepreneurship and the desire to become an entrepreneur isn't straightforward. Some studies suggest that teaching entrepreneurship positively influences students to pursue entrepreneurial paths, while others present conflicting findings. To shed light on this issue, a study in Latin America investigated how entrepreneurship education impacts students' intent to become entrepreneurs. The research focused on five universities in Colombia, Ecuador, Mexico, and Peru. Using a questionnaire, 1213 students participated in this quantitative study. Interestingly, the results didn't yield a correlation between entrepreneurship education and students' entrepreneurial intentions. In other words, the education these students received didn't seem to influence their desire to become entrepreneurs. This study contributes to the ongoing discourse on the impact of entrepreneurship education and highlights the complex relationship between education and career aspirations.

was collected randomly by convenience. The Chi-square test showed a p-value of 0.056 higher than 0.05. Therefore, the null hypothesis indicating that entrepreneurship education is independent of entrepreneurial intention was accepted. Practical and theoretical implications emerge from these findings. While acknowledging the importance of entrepreneurship education, it becomes apparent that supplementary mechanisms enhancing entrepreneurial intentions are essential. The absence of a definitive consensus on the connection between entrepreneurial education and intent emphasizes the need for further exploration.

Subjects: Business, Management and Accounting; Classroom Practice; Higher Education; International & Comparative Education; School Leadership, Management & Administration;

Keywords: entrepreneurship education; entrepreneurial intention; Latin America; theory of planned behavior

1. Introduction

Due to entrepreneurship's relevance, universities have increased their efforts to create and strengthen educational programs to foster entrepreneurial skills and improve opportunities for students through entrepreneurship (Jardim et al., 2021). However, the correlation between entrepreneurship education and entrepreneurial intention is neither clear nor conclusive (Nabi et al., 2017; Su et al., 2021). While some studies show a positive correlation between entrepreneurship education and entrepreneurship (Mei et al., 2020; Saeed et al., 2015), other findings refute this (Joensuu et al., 2013; Oosterbeek et al., 2010).

Additionally, a recent literature review by Jardim et al. (2021) indicates that many of the studies exploring the relationship between entrepreneurship education and entrepreneurial intention are conducted in Europe (Bell et al., 2016; Solesvik et al., 2014), Asia (Shi et al., 2019; Wei et al., 2020), and to a lesser extent in North America (Kerrick et al., 2016). Although some Latin American countries have underfunded educational systems and need to optimize their resources to offer quality entrepreneurship programs that respond to economic and social needs.

The dataset for this work was composed of students from careers related to administration, economics, and accounting, from five universities in Latin America. Four of them belong to the private sector and one to the public sector. 94% of respondents are 19 to 27 years old. The results show a behavior similar in entrepreneurial intent. The participating universities have implemented courses with an emphasis on entrepreneurship and on activities for the detection of entrepreneurial opportunities.

The challenge is to achieve an impact with innovative processes to create differences in actual markets. The students who participated in this research were located in five cities with a vocation, in general, for tourism and commerce; entrepreneurs play an important role in the economies of these cities. Bogotá, a capital city of great cultural, industrial, and commercial importance in Colombia. Lima, a coastal city, and one of the largest capitals in South America. Guayaquil, a port city with great touristic affluence. Samborodón, only 34 km from Guayaquil, is characterized by its commercial centers, agricultural and artisanal activities. Finally, Tecate, Mexico, a city with the denomination of Pueblo Mágico, which is attractive for regional tourism and tourism from the United States. The Small and Medium Enterprises constitute 99.5% of the businesses in the region and generate 60% of the productive formal employment (OECD/CAF, 2019).

A scan of recent literature in Scopus shows that the number of related studies is relatively low in the region. Moreover, several studies involve a single university covering only one country (Zambrano-Vargas et al., 2020), generating partial results on such a relevant topic (Bell et al., 2016). To contribute to understanding the relationship between entrepreneurship education and

entrepreneurial intention and to contribute to the literature on this topic, this research aims to answer the question: *How does university entrepreneurship education influence entrepreneurial intention in Latin American countries?*

For this purpose, the literature on entrepreneurship education and entrepreneurial intention is analyzed. On the one hand, entrepreneurship education involves on-campus actions that seek to increase knowledge, skills, and methodologies (e.g., courses, experiences, training) to motivate self-employment and develop entrepreneurial activities (Su et al., 2021; Wei et al., 2020). On the other hand, entrepreneurial intention corresponds to an individual's desire to start a venture (Ngugi et al., 2012).

As there is no definitive consensus on the relationship between entrepreneurship education and intention, different authors suggest continuing to investigate this for several reasons. First, entrepreneurship education has played an essential role in increasing students' opportunities (Nowiński et al., 2019). Second, it could increase the chances of entrepreneurship sustainability and promote business model innovation (Su et al., 2021). The significance of this research is underscored by the identification of inconsistencies and heterogeneity in prior studies' findings. These discrepancies highlight the imperative for further enhancing research concerning the impact of educational training on entrepreneurial intention among university students. The necessity for such exploration becomes even more pronounced when considering the influence of the university environment and support on students' entrepreneurial intention (Bazan, 2022).

This research established results regarding the level of influence of entrepreneurship education on the entrepreneurial intention of university students in four Latin American countries considered in the study: Colombia, Ecuador, Mexico, and Peru. Likewise, variations in entrepreneurial intention were analyzed considering sociodemographic characteristics such as country of origin, gender, and family history of entrepreneurship. Finally, self-efficacy was evaluated in the level of intention.

The study included the participation of 1213 students from five universities in the aforementioned countries. A quantitative methodology was used to process the responses from a questionnaire on entrepreneurial intention measured with a Likert scale. Finally, this research is justified by the need to adequately understand the scope of entrepreneurship education to facilitate the design and application of optimal educational practices. It also contributes to the academic debate on the education-entrepreneurship relationship in the Latin American context to facilitate the generalizability of results in the regional context.

2. Theory

2.1. Entrepreneurship education and entrepreneurial intention

Entrepreneurship, seen as an activity that involves the discovery, evaluation, and exploitation of opportunities to introduce new goods, services, or processes to the market (Shane, 2003), is of great importance in society as it energizes the economies of countries. In the current situation of COVID-19, where many citizens have lost their jobs or seen their incomes decrease, entrepreneurship is called upon to reactivate the economy by generating employment and dynamizing local value chains (Fernández & Rodríguez, 2023). Thus, the EU Commission's European Skills Agenda for sustainable competitiveness, social fairness, and resilience includes in Action 7 the increase of STEM (Science, Technology, Engineering, and Mathematics) graduates and the promotion of entrepreneurial skills so that they can adapt more quickly to the labor market (European Commission, 2020). Additionally, it is worth highlighting the results of the Global Entrepreneurship Monitor (GEM) report (Bosma et al., 2020), which indicates that:

The relationship between educational attainment and the propensity to start a new business is complex, not least because of the positive association between education and lifetime income and any link between education and the ability to spot opportunities. In 36 out of 43 economies taking

part in the study, a graduate is more likely to start or run a new business. However, this only suggests that graduates are more likely to start a new business. The study also indicates that increasing the supply of graduates could benefit early-stage entrepreneurial activity and that including entrepreneurship courses and activities may improve their business prospects. (p.57)

Entrepreneurship education aims to develop knowledge, skills, attitudes, and intentions for starting a new business (Tiberius et al., 2023). In recent years, several researchers have continued to develop studies on the role of education in the entrepreneurial intention of university students; however, the results of these investigations are heterogeneous. Several authors indicate that, in general, entrepreneurial education, articulated with adequate government policies and the demonstration effects of successful companies and entrepreneurs, could improve students' normative beliefs and, therefore, facilitate the generation of entrepreneurial intentions (Sang & Lin, 2019). Universities may provide various programs to train students in the competencies needed to develop their entrepreneurship through tools such as content teaching, business plan training, interactive exchanges or internships, and incubation and acceleration of business ideas, among others (Sang & Lin, 2019). In this same line of research, other studies suggest that entrepreneurship education significantly impacts entrepreneurship intention among university students (Hattab, 2014).

Despite the above, some studies also suggest that education can improve entrepreneurship skills, but it does not necessarily increase the intention to start a business. These results can be evidenced in the research by Barba-Sánchez and Atienza-Sahuquillo (2018), Sánchez and Pérez (2019), and Vélez et al. (2020), who conclude, through a survey on entrepreneurial intention (Ajzen, 1991; Liñán & Chen, 2009) that participating in entrepreneurial education activities improves to the extent that these contribute to reinforce competencies in students. Additionally, studies such as that by Cera et al. (2020) and Lu et al. (2021) suggest that entrepreneurial intention is influenced by the courses taught in higher education institutions; however, this relationship is not strong.

According to Gimeno et al. (1997), entrepreneurship education, experience, and skills form a broad cognitive framework of information links that help the brain recognize potential opportunities. However, empirical evidence found in works such as those by Farhangmehr et al. (2016) reveals that entrepreneurship education does not improve university students' motivation to become entrepreneurs; however, entrepreneurial skills are a predictor of entrepreneurial motivation, which can be increased through a pedagogy that emphasizes the development of students' psychological, social and entrepreneurial skills, covering, in particular, the emotional dimension and critical thinking.

2.2. Theory of Planned Behavior

The Theory of Planned Behavior (TPB) has been widely used in various areas to explore how behavior or personality influences the use of different technologies (Acikgoz et al., 2023), energy consumption (Wang et al., 2023), the use of vaccines (Tarkar, 2023), and entrepreneurship (Drakpa et al., 2022).

The TPB states that intentions to develop behaviors of different types can be predicted by adopting *attitudes* toward the behavior, *subjective norms*, and *perceived behavioral control* (Ajzen, 1991). According to Ajzen (1991), attitudes refer to the level at which a person has a favorable or unfavorable concept about the behavior of interest. Subjective norms refer to an individual's perceptions of a specific behavior. This perception is influenced by the judgment of other significant individuals such as family members, friends, or colleagues.

A meta-analysis of 185 independent studies indicated that subjective norms are a weak predictor of intentions (Armitage & Conner, 2001). Finally, perceived behavioral control is understood as a person's perception of the ease or difficulty of performing a behavior of interest. Intentions to

perform specific behaviors and perceptions of behavioral control explain part of the variation in an individual's actual behavior (Ajzen, 1991).

This theory suggests that attitudes, subjective norms, and perceived behavioral control are related to different behavioral, normative, and behavioral control beliefs (Ajzen, 1991). In addition, intentions to develop specific behaviors are also determined by the abilities and resources of individuals and the barriers presented by the external environment (Ajzen, 2002).

The empirical analysis of the present research uses as a reference the entrepreneurial measurement questionnaire of Liñán et al. (2011), which is useful for measuring the variables of Ajzen's Theory of Planned Behavior: entrepreneurial intention, attitude, social norms, perceived behavioral control; as well as other variables, including socioeconomic characteristics, entrepreneurial education, and self-efficacy, which are analyzed in detail in this paper.

2.3. Self-efficacy and entrepreneurial intention

Self-efficacy is a term proposed by Bandura (1977) defined as the individual's belief in his/her abilities and skills to complete a specific set of tasks and to undertake a job (Shahab et al., 2018). People with a high level of self-efficacy, thanks to their self-confidence, tend to pursue their goals over and above their limitations and do not worry about what others perceive of their capabilities, which motivates them to control external factors and adapt them to obtain what they desire (Bandura, 1997).

Self-efficacy is not only widely recognized as a key construct in social learning theory (N Saraih et al., 2018) but also entrepreneurial self-efficacy is considered one of the factors that has a direct impact on entrepreneurial intention, that is, people with high levels of entrepreneurial self-efficacy tend to be more motivated to undertake and successfully develop the entrepreneurial process (D'Armas et al., 2022).

Entrepreneurial self-efficacy can include the performance of those tasks that relate to the initiation and development of new ventures, generally entrepreneurial self-efficacy is about considering the broader human competencies associated with new business development (N Saraih et al., 2018).

According to Laguía et al. (2017), self-efficacy would be related to Ajzen's (1991) Theory of Planned Behavior, which indicates that three factors strongly define an individual's intention: his or her attitudes, societal norms and Perceived Behavioral Control, this last element has similarity with Bandura's concept of self-efficacy, since both refer to the perceived ability to perform a certain behavior.

There are several studies that have analyzed the role of self-efficacy in the entrepreneurial intention of university students showing a close relationship between these two variables, among them the contributions of Gao and Huang (2022), Zhang and Huang (2021), Londono et al. (2021), Marulanda-Valencia and Valencia-Arias (2019), Morales et al. (2018), Wang et al. (2016).

3. Hypothesis

3.1. Relationship between entrepreneurship education and entrepreneurial intention

Extant literature has analyzed the relationship between entrepreneurship education and its effect on entrepreneurial intention and found that this relationship reveals trends as to whether there is a correlation between the two variables; however, it has been recognized as predominant in the development of entrepreneurial skills.

The results of a study conducted in five universities in Guayaquil, Ecuador, showed that entrepreneurship education did not have a significant impact on entrepreneurial intention (Vélez et al.,

2020). However, entrepreneurship education could improve entrepreneurial skills, enhance some practical skills at the administrative level, and improve different attitudes associated with entrepreneurship (Vélez et al., 2020). Likewise, a study developed in Indonesia concludes that curricular activities have no impact on the entrepreneurial intentions of university students (Atmono et al., 2023); these activities must be accompanied by extracurricular activities to have a significant impact on entrepreneurial intentions. Similarly, research conducted in 12 Vietnamese universities, with a sample of 559 students, concludes that entrepreneurship education does not directly affect entrepreneurial intention (Duong, 2021). These studies are in line with other research conducted in Brazil (Cassol et al., 2022) and Malaysia (Dobson & Muhammad, 2022), which also found no significant relationship between entrepreneurship education and entrepreneurial intention.

On the other hand, another study conducted in Malaysia found that maintaining a balance or combination between a student's proactive personality and a supportive university environment through entrepreneurship training programs significantly impacts students' intentions to create new businesses (Mustafa et al., 2016). Reyes-Cruz et al. (2019) analyzed the impact of university training on the entrepreneurial attitudes of Mexican students through an artificial neural network methodology and a Multilayer Perceptron (MLP) type model. The results, generated from four universities, indicate that the practical and applied training of students determines the evolution of the entrepreneurial process. Also, a survey-based study conducted in Pakistan reveals that participation in entrepreneurship education courses leads to higher perceived intentions in entrepreneurship compared to those who do not participate in such courses (Aslam et al., 2012). These intentions of university students are perceived as a basis for the creation of new ventures (Lee & Wong, 2004), and impact the self-confidence and creativity of undergraduate students (Hattab, 2014). Other studies developed in Vietnam (Nguyen & Nguyen, 2023) and India (Chahar, 2023) also found a significant and positive correlation between entrepreneurship education and entrepreneurial intention in university students.

As stated in the research described above, business education programs are not a guarantee for stimulating entrepreneurship in the student community despite their benefits. Given the relevance of business education to entrepreneurial intention, universities should pay more attention to entrepreneurship training, which requires an effective educational conversion that allows the promotion of new businesses. And although the impact of entrepreneurship education on entrepreneurial intention alone is not guaranteed to be significant, it is through other factors (Vélez et al., 2020). Considering the above approaches, the following hypothesis is proposed:

H1: Entrepreneurship education positively affects entrepreneurial intention.

3.2. Relationship between entrepreneurial self-efficacy and entrepreneurial intention

A bibliometric study developed by Marulanda-Valencia and Valencia-Arias (2019) found that besides entrepreneurial skills, personal conviction and perseverance are required to identify business opportunities and design and implement the business, thus achieving entrepreneurial self-efficacy. Several studies recognize that personality traits such as emotional stability, awareness, friendliness, extraversion, and openness are innate (Wang et al., 2016) and positively associated with entrepreneurial self-efficacy (Morales et al., 2018; Wang et al., 2016).

Additionally, different studies reveal that self-efficacy is a determining factor in the mobilization of an individual to venture into the creation of a new business (Gielnik et al., 2020). High levels of self-efficacy are related to better chances of success in the entrepreneurial activities developed (Sukru & Karayel, 2020); the level of entrepreneurial self-efficacy correlates with entrepreneurial intentions (Drnovšek et al., 2010). Considering the above, the following hypothesis is proposed:

H2: Entrepreneurial self-efficacy positively affects entrepreneurial intention.

3.3. Entrepreneurial intention among Latin American countries

Globally, there are differences between the levels of entrepreneurial intention by country, which can be explained by the social norms of the inhabitants, an element considered in Ajzen's (1991) Theory of Planned Behavior. For example, in a study of 12 countries in different geographical areas of the world, the beliefs of society were significant in determining the entrepreneurial intention of university students, and this intention was one of the highest in a Latin American country, Costa Rica, only after Ghana, Russia, and Bangladesh (Engle et al., 2010).

In studies with Latin American countries, there is divided evidence about the entrepreneurial intention levels among countries in the region. On the one hand, authors such as Krauss et al. (2018) show that students in the Northern part of Latin America, which includes countries like Ecuador, Colombia, and Mexico, have a higher probability of becoming entrepreneurs than those in the Southern region, which includes countries such as Brazil, Chile, and Uruguay. Meanwhile, authors such as Perez et al. (2022), Olarewaju et al. (2022), and Lopez et al. (2021) reveal that there are no significant differences in entrepreneurship orientation among university students from countries in the region. Based on this background, it is interesting to corroborate the hypothesis:

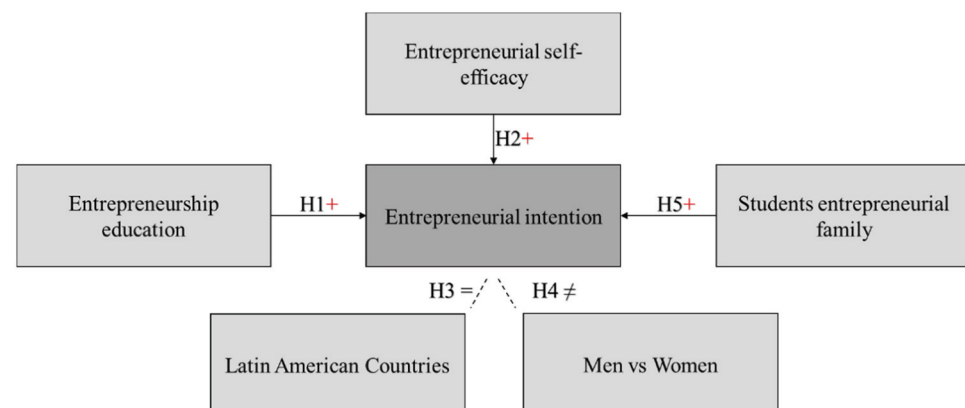
H3: Entrepreneurial intention does not change among Latin American countries.

Considering the aforementioned hypotheses, we propose the following framework (Figure 1).

3.4. Differences in entrepreneurial intentions between men and women

According to Laguía et al. (2017), in a study developed in Colombia with a sample of 316 university students, entrepreneurial intention did not present significant relationships with gender (male or female). For their part, Sánchez and Pérez (2019), in a study on the impact of education on entrepreneurial intention in a sample of 272 students, concluded that education had a more significant effect on women than on men, increasing the valuation of entrepreneurial skills and perceived behavior in women, even though the entrepreneurial intention was higher in students. Likewise, Vélez et al. (2020), in an analysis developed with a sample of 542 students from a public university in Ecuador, found no significant incidence between the demographic variable, gender, and the entrepreneurship education variable. Finally, Nowiński et al. (2019) found that women generally have low entrepreneurial intentions; however, the impact of entrepreneurship education is higher in women than in men. Given the above, the following hypothesis is proposed.

Figure 1. Research framework.



H4a: Entrepreneurial intention differs between men and women.

H4b: The impact of education on entrepreneurial intention varies between men and women.

3.5. Student's (entrepreneurial) family and their impact on entrepreneurial intentions

Among the factors analyzed in this research is the relationship between students' entrepreneurial intention and their family (entrepreneurial) context. A family business is governed and managed to form and follow the company's vision by a dominant coalition controlled by members of the same family or a small number of families in a potentially sustainable manner across generations (Navarro, 2008).

Evidence that allows considering that the family and friends context has more influence on entrepreneurial intention than the university environment has been found (Yurtkoru et al., 2014). Additionally, it has been evidenced that a relationship with parents, relatives and friends that develop entrepreneurial activities positively affects entrepreneurial intention (Martínez-Cañas et al., 2023), which may be explained by the motivation, legitimacy and support they provide (Cano & Tabares, 2017). In the same vein, Ruiz-Palomino and Martínez-Cañas (2021) posit that university student's access to family-based entrepreneurial social networks has a greater impact in entrepreneurial intention-behavior gap than friends-based entrepreneurial social networks. Similarly, according to Bandura (1997), in a study aimed at analyzing the theory of social learning with students, it is evident the contact with successful entrepreneurs becomes a potential factor that induces entrepreneurial intentions and the action to create a business. Other studies also state that family characteristics affect entrepreneurs' values and intentions to create new businesses (Aldrich & Cliff, 2003), and having entrepreneurial family members reinforces students' entrepreneurial intentions (Brío et al., 2022). Despite the above, a study involving 369 Greek university students found that having previous work experience in a family business inhibits the intention to establish a new business (Ragazou et al., 2022), which coincides with the study conducted by Ghatak and Bhowmick (2022), who conclude that family support has a negative relationship with entrepreneurial intention. Considering these divergent results, it is proposed to validate the following hypothesis:

H5: The student's (entrepreneurial) family affects entrepreneurial intention.

4. Methodology

To answer the research question, a non-experimental quantitative research was carried out, i.e., the variables under study were not manipulated; the phenomenon of interest was observed and analyzed in its natural state. Based on convenience sampling, a questionnaire of 39 questions, mainly with a Likert scale, was applied to 1213 students. This form, widely used in similar research, was previously designed, validated, and implemented by Liñán and Chen (2009). The form was slightly adapted to collect additional information of interest to us and to facilitate the students' understanding of it.

4.1. Design and adaptation of the data collection instrument

Taking into account the structure of the questionnaire designed and validated by Liñán and Chen (2009) and other authors, the data collection instrument consists of the following parts: the objective of the project and participating institutions; instructions on how to fill out the questionnaire; anonymity and responsible handling of information; training and experience; business knowledge; professional attractiveness; social value; entrepreneurial capacity; entrepreneurial intention; entrepreneurial education; and personal data.

4.2. Population and sample calculation

The population and sample consisted of VI to X semester students from five Latin American universities in Colombia, Ecuador, Mexico, and Peru (two universities). Students from VI to X

semester were selected to ensure they had taken courses, workshops, or other studies on entrepreneurship in their respective institutions. Taking into account these criteria, the total population was 2028 students, with a final sample of 1213 students.

To determine the sample size to guarantee statements on the distribution of the percentages of the different types (categories) with proportions of 10%, 20%, 30%, and 50% of different questions with k categories evaluated with sufficient precision, the sample size formula proposed by Tortora (1978), was used, where it is sought to obtain an absolute precision of $\pm 5\%$ for each proportion and a confidence coefficient of 95%.

Where: B is the percentile $(\alpha/K) \times 100$ of a Chi-square distribution with one degree of freedom, and K is the number of categories (7 categories of the Likert scale)

The appropriate sample size is defined by calculating the pairs n_i, p_i , and the largest sample size is selected. This process is repeated for each university to have a representative sample size. The sample size was 1213 students (Table 1). Although the sample size was established with probabilistic methods, the sample, in the end, is not probabilistic since convenience sampling was used to complete the sample size number (classroom by classroom and mass mailing to the population floating during school hours).

For each course/program selected from the universities of interest, the universe of students (individuals in the VI to X semesters) is obtained. Based on this, the sample size is estimated considering the finite population adjustment. The size of the universe of students in each country and degree programs (faculties) in the VI semester onwards (individuals under study) is obtained, and the sample size is estimated based on the aforementioned adjustment for a finite population.

The sample size was calculated for the population of each university, and not for the entire population of the objective universities, programs, and semesters. In this way, a sample size of 1,213 students was obtained. 2.3 times the sample size (518) obtained considering the entire population and methodology. And although, the selection of the sample was carried out by convenience sampling, interviews in salons. The sample size 1213 (59.8%) of the population is large enough to be considered representative.

4.3. Data collection

The data collection instrument was shared by e-mail through Microsoft Forms. Classroom visits were also made to encourage students to complete the form from their cell phones or computers. The electronic form was designed so that students in semesters lower than VI could not fill it out. The information was collected between April and September 2022.

4.4. Data analysis

Regarding data analysis, for each group of questions and demographic information, the relationship with the objective variable (entrepreneurial intention) and proportions were evaluated; and for the table of absolute values, the Chi-square test for contingency tables was applied, and the V-Cramer index was calculated to evaluate the strength of association. Statistics, p -value, test results, and V-Cramer were obtained for each variable.

5. Results

5.1. H1: Entrepreneurship education positively affects entrepreneurial intention

Table 2 shows the relationship between knowledge about university entrepreneurship education and entrepreneurial intention. The Chi-square test of this relationship presented a p -value of 0.056, higher than 0.05; therefore, the null hypothesis indicating that entrepreneurship education is independent of entrepreneurial intention is accepted. Likewise, the V-Cramer of 0.14, close to zero, reaffirms the non-existent or weak relationship between education and intention. Students

Table 1. Sample characteristics and technical specifications

Sample	1213 students		
Semester	VI: 235 (19%) VII: 256 (21%) VIII: 322 (27%) IX: 254 (21%) X: 146 (12%)		
Age	16–18: 7 (1%) 19–21: 439 (36%) 22–24: 566 (47%) 25–27: 136 (11%) 28 or older: 65 (5%)		
Gender	Men: 498 (41%) Women: 715 (59%)		
Country	Colombia: 413 (34%) Mexico: 80 (7%) Peru: 437 (36%) Ecuador: 283 (23%)		
City	Bogotá : 413 (34,0%) Guayaquil: 143 (11,8%) Lima: 434 (35,8%) Samborondón: 139 (11,5%) Tecate: 80 (6,6%) Other: 4 (0,3%)		
University type	Public: 76 (6%) Private: 1137 (94%)		
Method	Tortora (1978)	Sample Selection Method	Collection method
K	7	Sampling for convenience, floating population in classes, auditoriums, etc.	Shared electronic form, with uniqueness controls
Alpha	7,25		
Absolute precision	±5 %		
Confidence coefficient	95%		
Population	2028		
Sample Size	1213		

who mentioned having little or no knowledge of entrepreneurship training have entrepreneurial intention levels above 80%. Additionally, students who reported having higher levels of knowledge in entrepreneurship training reached levels higher than 93% of entrepreneurial intention. However, these levels are not statistically significant, as demonstrated by the test.

For the measurement of knowledge related to courses, training centers, and others, there is more relationship with the knowledge of loans for special aids, technical aids, and advisory services.

Other support for entrepreneurship: On the other hand, there is a significant relationship between knowledge about concessional loans, technical assistance to start the business, and advisory services and entrepreneurial intention (Table 3). The results of the above tests indicate a relationship but do not indicate causality between the variables, and this may mean that the student's intention causes the search for knowledge on some topics related to entrepreneurship, e.g., concessional loans, technical assistance, and advisory services. However, students who show low levels of knowledge about concessional loans, technical assistance, business incubation, and seed capital funds have significant levels of entrepreneurial intention; however, those who show higher levels of knowledge have levels of intention above 93%. The relationship between business incubation and seed capital is different, as shown by the test (no relationship).

5.2. H2: Entrepreneurial self-efficacy positively affects entrepreneurial intention

The perception of self-understanding of capabilities and skills shows, in all cases, a direct relationship with entrepreneurial intention, and opportunity detection and the ability to develop new products are the most consistent with a proportion of 97%, followed by leadership and communication skills with 95%, and creativity, problem-solving and networking with professionals with 94% (Table 4). For all items, the p-value is less than 0.05. Given the above, H2 is accepted: Entrepreneurial self-efficacy positively affects entrepreneurial intention.

Table 2. Relativity per entrepreneurship training

Entrepreneurship training topics	
Knowledge scale	Specific training for young entrepreneurs
Total lack of knowledge	81%
2	86%
3	86%
4	84%
5	93%
6	93%
Perfect knowledge	93%
Chi.2 Test and V-Cramer	
p-value:	0,056
Stat:	23,26
Dependent	(H0 holds true)
V-Cramer	0,14

5.3. H3: Entrepreneurial intention changes among Latin American countries

The results in Table 5 indicate no significant differences in the entrepreneurial intention of university students, considering their country of origin. For each country participating in the study, the levels of intention are above 86% and with a maximum range of dispersion of 4%.

The statistical data analysis shows that the Chi-square test of this relationship presented a p-value of 0.92, higher than 0.05; therefore, the null hypothesis of independence of the country of origin with the level of entrepreneurial intention is accepted. Likewise, the V-Cramer of 0.05, close to zero, reaffirms a non-existent or weak relationship between the two variables.

5.4. H4: Entrepreneurial intention differs between men and women.

Although the percentage of entrepreneurial intention of men (89.96%) is higher than that of women (86.57%), the results indicate that entrepreneurial intention does not differ significantly between men and women (Table 6). The p-value of 0.596, higher than 0.05, reveals that the null hypothesis is accepted. Consequently, H4: Entrepreneurial intention does not differ between men and women, is rejected. The V-Cramer of 0.048 shows a moderate relationship between the two variables.

5.5. H5: The student's (entrepreneurial) family affects entrepreneurial intention

Concerning H6: The student's family (entrepreneurial) affects entrepreneurial intention. The parents' education does not demonstrate significance that proves causality with entrepreneurial intention; however, the current occupation shows a positive tendency, although only the primary education of the father is statistically significant (93%), where the intention of students with autonomous or entrepreneurial parents stands out in a higher proportion. With 92.35%, the null hypothesis is accepted. (Tables 7 and 8).

For these items, according to the statistical analysis, the p-value is higher than 0.05, and the V-Cramer regarding the level of studies attained by the mother or legal guardian is 4.23E-02, and 5.22E-02 for the father; and concerning occupation, for the mother it is 0.1327 and for the father it is 0.13890, thus showing a weak relationship with a positive tendency.

Likewise, the results in Table 10 show that, according to the statistical analysis of the data with the chi-square test, a p-value of 0.475, higher than 0.05, was presented; therefore, the null

Table 3. Other support for entrepreneurship						
Entrepreneurship training topics						
Knowledge scale	Particularly concessional loans	Technical assistance for starting the business	Business Incubation	Advisory or consulting services on concessional terms	Seed capital funds for entrepreneurs	
Total lack of knowledge	82%	82%	86%	79%	87%	
2	84%	86%	86%	87%	83%	
3	83%	85%	87%	90%	87%	
4	87%	84%	86%	84%	85%	
5	93%	92%	89%	91%	91%	
6	94%	95%	93%	95%	94%	
Perfect knowledge	95%	96%	95%	94%	94%	
Chi.2 Test and V-Cramer						
p-value:	0,036	0,022	0,874	0,014	0,323	
Stat:	24,83	26,50	0,08	28,12	15,84	
Dependent	(reject H0)	(reject H0)	(H0 holds true)	(reject H0)	(H0 holds true)	
V-Cramer	0,14	0,15	0,08	0,15	0,12	

Table 4. Relativity per personal capacity self-understanding						
	Opportunity detection	Creativity	Problem-solving	Leadership and communication skills	Development of new products and services	Networking and professional contacts
No capacity	0%	0%	20%	17%	33%	55%
2	43%	75%	50%	60%	79%	84%
3	81%	77%	64%	77%	74%	72%
4	80%	86%	84%	76%	81%	81%
5	88%	86%	84%	83%	86%	89%
6	92%	89%	92%	92%	96%	92%
Very high capability	97%	94%	94%	95%	97%	94%
Chi.2 Test and V-Cramer						
p-value:	1E-12	1E-09	4E-08	5E-12	1E-13	9E-07
Stat:	87,82	71,68	62,53	84,21	92,95	54,79
Dependent	(Reject H0)	(Reject H0)	(Reject H0)	(Reject H0)	(Reject H0)	(Reject H0)
V-Cramer	0.2714	0.2452	.2290	0.265	0.279	0.214

Table 5. Entrepreneurial intention by country of origin

Country	Intention Proportion
Colombia	86%
Ecuador	88%
Mexico	90%
Peru	89%
General total	88%
Chi.2 Test and V-Cramer	
P -value:	0.9272
Stat:	3.110
Independent	Independent (H0 holds true)
V-Cramer	0.0510

Table 6. Entrepreneurial intention and gender

Student Gender	Intention Proportion
Man	89,96%
Woman	86,57%
General Total	87,96%
Chi.2 Test and V-Cramer	
p-value:	0,596
Stat:	2,77
Dependent	(H0 holds true)
V-Cramer	0.0482

Table 7. Relativity per parent's formation

Parent's education	What is the level of education attained so far by your mother or legal guardian?	What is the level of education attained so far by your father or legal guardian?
Elementary	83,95%	93,02%
High school/secondary school	88,85%	86,75%
Technical training	89,55%	89,45%
University education	87,44%	87,31%
General total	87,96%	87,96%
Chi.2 Test and V-Cramer		
p-value:	9,76E-01	9,18E-01
Stat:	2,14E+00	3,25E+00
Dependent	(H0 holds true)	(H0 holds true)
V-Cramer	4,23E-02	5,22E-02

Table 8. Relativity per occupancy

Parent's Occupation	What is your mother's current occupation?	What is your father's current occupation?
Not applicable	88,83%	88,83%
Self-employed or entrepreneur	92,35%	92,35%
Unemployed	90,98%	90,98%
Private sector employee	83,72%	83,72%
Public sector employee	85,62%	85,62%
Chi.2 Test and V-Cramer		
p-value:	5,05E-02	2,77E-02
Stat:	2,10E+01	2,30E+01
Dependent	(H0 holds true)	(reject H0)
V-Cramer	0.1327	0.13890

In addition to the above, as can be seen in Table 9, the academic semester is not related to the entrepreneurial intention, given that the p-value is 0.919, higher than 0.05, revealing that the null hypothesis is accepted, and the V-Cramer of 6.18E-02 shows, according to the statistical analysis, an insignificant relationship between these two variables.

Table 9. Relationship between academic semester and entrepreneurial intention

Relativity per Study Semester

Academic Semester	Intention Proportion
VI	84,68%
VII	88,28%
VIII	88,82%
IX	90,55%
X	86,30%
General Total	87,96%
P-value:	0,919
Stat:	4,56
Dependent	(H0 holds true)
V-Cramer	6,18E-02

hypothesis is accepted. Regarding the V-Cramer of 0.0898, they show that age does not have a significant impact on the entrepreneurial intention of university students, which is consistent with Vélez et al. (2020), who found that entrepreneurial intention does not show significant relationships with age.

Part of the guarantee of the non-exclusion of relevant variables in the model is supported by the validity of the instrument argued in the literature and its own consistency test (Cronbach's alpha: 0.9285 I.C [0.923, 0.934]). The existing literature on the relationships between the variables in question is analyzed. Now, under the suspicion of a strong endogeneity and given the results of the model that show significance for the existence of an Entrepreneurship Model, a model is generated that includes the Likert variables associated with the level of closeness with these models,

Table 10. Relationship between age and entrepreneurial intention

Relativity per Student's age	
Age	Intention Proportion
16–18	88,83%
19–21	92,35%
22–24	90,98%
25–27	83,72%
28 or older	85,62%
General Total	87,96%
Chi.2 Test and V-Cramer	
P-value:	0,475
Stat:	9,62
Dependent	(H0 holds true)
V-Cramer	0.0898

generating a new model, in this as it is Hausman's test methodology is applied, in this case two logistic models were running, one with the same Logit model (annex one) and another adding the variables.

"Does the measure know your activity as an entrepreneur F?"

"Can you consider yourself a good businessman F?"

"Does measure know your activity as entrepreneur A?"

"Do you think you can be considered an 'A good businessman'?"

"Does measure know your activity as an entrepreneur J/S?"

"Do you think you can be considered a 'good J businessman'?", here

Following the method: Calculate the estimators of the models, compute the covariance matrices, calculate the covariance matrix of the differences, calculate the Hausman statistic

Hausman Statistic: 8.859

Degrees of Freedom: 19

P-value: 0.9757

Fail to reject the null hypothesis: No evidence of endogeneity.

6. Discussion

Some authors (Vélez et al., 2020) state that entrepreneurship education allows for improving entrepreneurial competencies and enhancing some practical managerial skills, understanding of attitudes, and values associated with entrepreneurship. According to Sang and Lin (2019), entrepreneurship education aims to develop knowledge and skills for entrepreneurship and foster it. The

study reflects that different majors show a similar proportion in entrepreneurial intention, which rules out a causality by major, remembering that the measurement of knowledge is related to courses, training centers, and others. There is more relationship with the knowledge of loans, special aids, technical assistance, and advisory services, which, according to Sang and Lin (2019), facilitates the generation of entrepreneurial intentions. However, when we refer to specific training for young entrepreneurs, the null hypothesis is accepted by presenting a p-value of 0.056, higher than 0.05, indicating that entrepreneurship education is independent of entrepreneurial intention. Similar results were found in the research by Sánchez and Pérez (2019), Barba-Sánchez and Atienza-Sahuquillo (2018), and Vélez et al. (2020).

This research found that entrepreneurial self-efficacy positively affects entrepreneurial intention since the perception of self-understanding of capabilities and skills shows, in all cases, a direct relationship with entrepreneurial intention, identifying the detection of opportunities, leadership ability, and problem-solving, among others. Similar findings were reported in studies such as those by Bouarir et al. (2023) and Bandura (1997), where it was found that perceived self-efficacy had a positive influence on entrepreneurial activity.

The results obtained by statistically testing hypothesis 3 demonstrate what part of the literature argues, namely, that there are no significant differences in the entrepreneurial intentions of students in Latin American countries. In this sense, studies such as GEM (2022) indicate that Latin America is one of the most entrepreneurial regions, with high levels of early entrepreneurship worldwide per country.

Additionally, the results allow rejecting hypothesis 4; entrepreneurial intention differs between men and women, which indicates that higher or lower entrepreneurial intention levels are unrelated to gender. These results are consistent with the findings of Laguía et al. (2017) but differ from the results proposed by Sánchez and Pérez (2019), who conclude that entrepreneurship education has a more significant effect on women than on men, increasing the valuation of entrepreneurial skills and perceived behavior in women.

When comparing the results for the current occupation of the parents, a p-value of $5.05E-02$ is observed for the mother, accepting the null hypothesis; and $2.77E-02$ for the father's occupation, accepting H5. Concerning V-Cramer, for the mother, it is 0.1327, and for the father, it is 0.3890, showing a weak relationship with a positive tendency. This can be related to the position of Maleki et al. (2023), Xu et al. (2022), and Bandura (1997), who argue that the contact and support of the family, as well as their background, becomes a potential factor for making or not the decision to become an entrepreneur, where the influence of family and friends allows molding values, ideas, and principles that lead to the development of behavior that favors the entrepreneurial intention.

When analyzing whether the academic semester affects entrepreneurial intention, no relationship is identified. These results diverge from the findings described by Dehghanpour (2015) and Lee and Wong (2004), for whom factors that may affect an individual's motivations to start a business include characteristics of their professional context, underlying personal dispositions, as well as characteristics of the situational context (such as academic semester). Loli et al. (2010) consider that interest in entrepreneurship changes according to the academic semester in which university students are enrolled since the differences in perception vary according to it. This leads to infer that the academic semester influences the attitude toward creativity and entrepreneurship, probably because these attitudes vary as students continue their studies and, as they get closer to graduation, their intention changes, perhaps because the entrepreneurial intention is replaced by the opportunity to enter the labor market. For this study, the perception of entrepreneurial intention averages 87.96% from the sixth to the tenth semester, with a higher propensity of 90.55% in the ninth semester, when most students are fully developing their entrepreneurial projects, with a slight decrease (to 86.30), which, according to Loli et al. (2010), occurs when students enter professional internships or the labor market.

The findings of this research also indicate that age does not affect entrepreneurial intention. This is consistent with the results found in the study by Laguía et al. (2017), where entrepreneurial intention did not present significant relationships with age.

7. Conclusion

The main objective of this research was to determine the influence of entrepreneurship education on entrepreneurial intention in Latin American university students. It also sought to determine whether entrepreneurial self-efficacy affected entrepreneurial intention; whether entrepreneurial intention changed between Latin American countries; whether it differed between men and women; and whether the student's family affected entrepreneurial intention.

The results showed that entrepreneurship education is independent of entrepreneurial intention in the population of Latin American university students in this study. As for entrepreneurial self-efficacy, the results showed that it positively affects entrepreneurial intention in students. The data suggest that students' perceived self-understanding of their capabilities and skills improves their confidence to start a venture.

On the other hand, the independence between the student's country of origin and the level of entrepreneurial intention was determined, confirming a non-existent or weak relationship between the two variables. Similar findings were reported in research conducted with university students.

Regarding entrepreneurial intention by gender, the results indicate no significant difference between men and women. Similar results were obtained when exploring whether the family (entrepreneurial) affected the entrepreneurial intention of the students, determining that the parents' education does not demonstrate significance that proves causality with the entrepreneurial intention. The current occupation of their parents shows a weak relationship with a positive tendency where the intention of students with self-employed or entrepreneurial parents stands out in higher proportion, with the father's activity exerting more influence.

According to Ajzen (1991), the TPB proposes that the intentions to develop certain behaviors can be predicted by adopting attitudes toward the behavior, subjective norms, and perceived behavioral control (self-efficacy). In the context of this research, our findings show that perceived behavioral control influences entrepreneurial intention among university students. However, we found that entrepreneurship education, which is expected to foster positive attitudes towards entrepreneurial intention, does not seem to be associated with the intention to start a business.

Practical implications: Entrepreneurship education should be accompanied by other alternative mechanisms that favor and foster the intention to become an entrepreneur. Given the significant relationship between activities that complement entrepreneurship education, such as technical assistance for starting a business and advisory or consulting service, and entrepreneurial intention, it is recommended, if possible, to strengthen and disseminate them more intensely within the framework of university entrepreneurship courses. This would possibly allow for improving the entrepreneurial intention levels in university students and generate additional spaces of accompaniment for future entrepreneurs.

Theoretical implications: Despite the different studies developed, there is still no consensus on the relationship between entrepreneurship education and entrepreneurial intention, mainly in the Latin American context. This research contributes theoretically to the study of this relationship by finding, in a sample of 1213 students, the independence between entrepreneurship education and entrepreneurial intention and elucidating other aspects (concessional loans, technical assistance to start a business, advisory services, entrepreneurial self-efficacy, father's occupation (self-employed father or entrepreneur) that influence in some way, in the context studied, the entrepreneurial intention. This lays the groundwork for further studies to continue exploring the education-entrepreneurship interaction in developing countries.

Limitations and future research: Given its nature, this study has two main limitations: first, limited sample. Only students from five universities in four Latin American countries were included. Second, follow-up over time. Measurements and comparisons were not made before and after the students took courses related to entrepreneurship. Future research could focus on other Latin American countries involving more universities. Furthermore, other studies could focus on exploring entrepreneurial intention in university students in a longitudinal manner. Additionally, further studies could explore in a more detailed way the role that gender plays on entrepreneurial intention through qualitative methods and in a larger set of universities.

Acknowledgments

We thank the Universidad Privada del Norte for the support in the translation process. We also thank the editor and the anonymous reviewers for their developmental feedback. Special thanks to the Accreditation Council for Business Schools and Programs (ACBSP Region 9), Universidad del Rosario, Universidad Ricardo Palma, Universidad Autónoma de Baja California, and Universidad Ecotec.

Funding

This research was approved by the Universidad del Rosario Ethics Committee, Social Sciences Board, on May 3, 2022. Approval number DVO005 607-CS370. All the participants provided appropriate informed consent, which was collected through an online form.

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Disclosure statement

No potential conflict of interest was reported by the authors.

Data availability statement

The data is available upon reasonable request.

Additional information

Please check Annex 1 in the following link https://uredumy.sharepoint.com/:w:/g/personal/joseo_montes_urosario_edu_co/Efa4vtq7TVNAGR_y23tjJVgBfGokt4nd1l0HgZimfhvjw?e=r4SoDG

Supplemental material

Supplemental data for this article can be accessed online at <https://doi.org/10.1080/23311975.2023.2282793>

Citation information

Cite this article as: Impact of entrepreneurship education on the entrepreneurial intention of university students in Latin America, Jose Montes, Luisa Ávila, Dámaso Hernández, Lourdes Apodaca, Solange Zamora-Bosa & Franklin Cordova-Buiza, *Cogent Business & Management* (2023), 10: 2282793.

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