Article

Identifying Entrepreneurial Interest and Skills among University Students

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Abstract: This study presents the profile of the participants in an online course on entrepreneurship that followed a challenge-based learning methodology and was applied to undergraduate students at a university in Mexico. Students were given challenges related to the Sustainable Development Goals (SDGs) during the course and were allowed to recognize their interest in solving these problems. This paper seeks to identify the entrepreneurial profile of university students through their experiences, interests, attitudes, and entrepreneurial skills. Although entrepreneurship courses are offered more frequently in universities, it is necessary to know the characteristics of the students' interest and their abilities to continue strengthening them. The data were collected through a questionnaire conducted with 20 multidisciplinary participants. The analysis compared the results of those who finished the course vs. those who did not to determine the significant differences in their answers. The results showed that the participants generated sustainable business ideas that favor local and global problems. Additionally, the students showed great interest in social entrepreneurship and developing companies based on the knowledge acquired during their university studies. It is recommended to continue with the training so that these ideas can become real ventures through linkages with other actors in the entrepreneurial ecosystem and favor the solution of sustainable problems. The questionnaire instrument enabled identifying the students' characteristics, interests, and entrepreneurial skills, which could be strengthened with other programs that train them. It was also possible to recognize skills that they did not possess before starting the e-learning course which require further strengthening.

Keywords: entrepreneurship skills; entrepreneurial profile; higher education; educational innovation

1. Introduction

UNESCO mentions that to achieve the goals of the 2030 Agenda [1] the global economy must be environmentally sustainable and inclusive [2]. Lifelong learning and education prepare citizens to develop competencies that make production and consumption sustainable [1,3] to have a better prepared workforce that enables inclusive economic growth focused on human wellbeing. In this sense, entrepreneurship is considered an alternative to creating employment and achieving better economic conditions [4], so educational institutions should promote entrepreneurial skills to increase the number of ventures and energize a sustainable economy [5].

In recent years, higher education institutions have increased their interest in offering entrepreneurship courses to develop their graduates' entrepreneurial skills, which enable them to create new companies that promote economic development and job creation [5,6]. In this sense, universities play a fundamental role in developing initiatives that promote the entrepreneurial interest through programs that increase the intention and motivation of students to become entrepreneurs [7–9]. This is especially important in Latin American countries where innovation and entrepreneurship still require more dynamism [10]. The

first programs approached entrepreneurship with transversal, multidisciplinary, and theoretical courses within the universities' business administration schools [11,12]. They have undergone a transformation, where the students are expected to assume a more active role in their learning and acquire the skills that facilitate developing enterprises of value to society [13].

Education for entrepreneurship has been defined as the transfer of knowledge to determine what opportunities exist in creating goods and services. Additionally, the potential of entrepreneurship education to prepare students with the knowledge and skills they need to be successful in a work context has been recognized [14]. Pedagogical programs have been created to develop an entrepreneurial profile that accomplishes that transfer of knowledge [15,16]. This profile consists of skills and personal qualities that empower individuals to create a new business [17,18] and be strengthened through various training activities [19].

Since there is no single entrepreneurial profile that distinguishes specific traits of age, gender, sociodemographic, or economic condition [20], it is important to correlate the entrepreneur's characteristics with each of the skills to be developed. First, identifying the skills and, later, strengthening and developing them are required to reach a maturity level of entrepreneurial talent [21]. Therefore, entrepreneurship programs should be oriented to active learning; students develop their ideas and generate new proposals, supported by the contents, resources, and activities that prepare them for this purpose.

On the other hand, entrepreneurship programs can also strengthen students' interests in the development of new enterprises. According to Manzi et al. [22], interest can be intrinsic, related to personal desire or intention to engage in business activities in the future. However, interest can also be affected by the characteristics of the environment and other external factors [23]. In addition, extracurricular activities developed within universities can promote interest in social projects in which students' capabilities and leadership skills can be improved [24,25]. In this sense, knowing the characteristics of the students' profile regarding their interests and skills can help develop training programs that favor them.

According to Valenzuela Keller et al. [26], knowing the profile of students in terms of their characteristics and entrepreneurship interest makes it possible to determine who will be more motivated and have a greater intention to develop new ventures. In this study, the entrepreneurial profile seeks to identify students' characteristics that promote entrepreneurial interest and lead to new business formation, which underlies the question in this study: How can university students' entrepreneurial interest and skills in an entrepreneurial ecosystem be identified and cultivated? We sought results that would lead to conducting an instrument that educational institutions can use in this context to identify the characteristics and interest of their students and develop programs that strengthen their entrepreneurial skills.

This article continues as follows. First, a literature review is presented, providing a theoretical and empirical framework of issues related to developing the entrepreneurial profile, entrepreneurial skills, and a framework of entrepreneurial competencies, as well as the definition of entrepreneurial ecosystems and the research context. It continues with the study's methodology, describing the sample, the educational intervention conducted, the description of the instrument, and the data analysis. It is followed by presenting the results with the answers posed in the instruments and analyzing the data. It then presents the discussion related to the main findings and their relationship with the consulted literature, and finally, the conclusions include recommendations for future studies and the limitations of the research.

2. Literature Review

This section presents the theoretical framework of the research with the Entrecomp competency framework and empirical studies that account for entrepreneurial education, especially in online courses. It also discusses examples of entrepreneurial ecosystems within universities and ends with the context of this research.

2.1. Development of the Entrepreneurial Profile and Entrepreneurship Skills

Educational programs in entrepreneurship not only help students to start new businesses, but also to develop skills for employability. Their courses focus on providing resources that lead to developing value propositions for startups and ongoing operations [27]. They also seek to develop skills in students [28]. In this environment, students must identify opportunities, market new products, manage equipment, and propose solutions based on the scientific and technological knowledge acquired during their undergraduate studies, among others [29]. Therefore, an educational program in entrepreneurship, while aiming to help students start new businesses, can help students, at the same time, develop the skills to think critically, insightfully, ethically, and creatively. Moreover, this formation applies to all levels of education. Ultimately, the development of entrepreneurship skills aligns with the goals of liberal education [30,31], where the higher education institutions have relevant roles in strengthening these skills.

The European Commission establishes that it is necessary to develop transversal, entrepreneurial skills for sustainable development and resilience [32]. Hence, skills such as entrepreneurship, critical thinking, communication, innovation, and digital transformation must be developed to prepare students for the job market to develop new opportunities [33]. In this regard, the European Commission developed Entrecomp as a set of specific teachable competencies that enable students to become more entrepreneurial [34]. These competencies are divided into three areas containing different competencies, as follows.

The Ideas and Opportunities area includes:

- Spotting opportunities: identify and seize opportunities to create value by exploring the social, cultural, and economic landscape.
- Creativity: develop creative and innovative ideas.
- Vision: visualize future scenarios to guide action and effort.
- Valuing ideas: recognize the potential of an idea in social, cultural, and economic terms to create value.

Ethical and sustainable thinking: assessing the impact and consequences of ideas on the environment, on the target community.

The Resources area includes:

- Self-awareness and self-efficacy: believing in your individual and group strengths, as well as in influencing events.
- Motivation and perseverance: turning ideas into action and being resilient in the face of pressure, adversity, and temporary failure.
- Mobilizing resources: managing limited resources in the best way.
- Financial and economic literacy: planning, establishing, and evaluating financial decisions over time.
- Mobilizing others: inspiring others and getting them to participate by demonstrating effective communication, persuasion, negotiation, and leadership.
- In the Into Action area, the following are presented:
- Taking the initiative: acting independently to achieve the objectives.
- Planning and management: setting medium- and long-term goals and adapting to unforeseen changes.
- Coping with uncertainty, ambiguity, and risk: making decisions when the outcome of that decision is uncertain, when available information is partial or ambiguous, or there is a risk of undesirable outcomes.
- Working with others: working together and cooperating with others to develop ideas and turn them into action.
- Learning through experience: learning with others, including peers and mentors. Reflect and learn from both success and failure.

In the case of Mexico, a study conducted following a Delphi methodology consulted experts on the entrepreneurship skills necessary for a successful entrepreneur. In this study, the experts identified the most important skills: opportunity identification, communication,

persistence, self-confidence, decision-making, and resilience [35]. This identification of different entrepreneurship skills allows identifying them in entrepreneurs and developing educational programs that strengthen them, such as the studies shown below.

Ortiz et al. [36] evaluated an entrepreneurship education project with engineering students using participatory methodologies in a university in northern Spain. With semi-structured interviews and participant observation and interaction with groups, these researchers analyzed the results of this program which had been in existence for ten years. They showed that the program increased students' motivation and recommended tutor training with a real-world approach. It was also regarded as necessary to replace traditional exams with entrepreneurial assessments and link the knowledge acquired with other subjects in the curriculum and other entrepreneurial ecosystem actors.

In an entrepreneurship workshop with pharmacy students in a university in Ireland, an evaluation was carried out with a questionnaire applied to 134 participants. The objective of this workshop was to promote entrepreneurship and entrepreneurial skills that would allow the creation and development of products or services related to pharmacy, considering that these necessary practice skills are not always developed throughout their undergraduate studies [37]. The results indicated that students could propose innovative ideas, and skills such as communication, problem-solving, and teamwork were developed. One limitation was that the workshop's grades were not included in the curricular grade point average. The students commented that this grade should be recognized and suggested that the course be mandatory to maintain interest.

In online courses, Calvo et al. [38] conducted a study evaluating massive open online courses (MOOCs). According to these authors, the evaluation of entrepreneurship programs should center on entrepreneurial intentions, the student's profile, the environment in which it is developed, and the impact that the knowledge acquired has on the students' intentions. Using the four levels of the Kirkpatrick model (reaction, learning, behavior, and results) and mixed methods to collect the information, such as questionnaires and interviews, the authors reported that the students had positive learning experiences, changes in behavior, greater motivation to start a business, more confidence, and ability to share their experiences and transfer their skills and knowledge to help others. The limitations were accessibility, problems with the language, and the scheduling of the courses. They also suggested that teachers participate more in supporting students and that there be additional mentors.

We discovered that few studies evaluate the effectiveness of the courses in developing the entrepreneurial profile of students. They do not present methodologies that can be replicated and used in different programs [39]. Fayolle [17] found that identifying the effectiveness of entrepreneurial education courses and programs is key for educators and policymakers to understand these initiatives' impact on creating the entrepreneurial profile. A systematic literature mapping carried out by Cantú et al. [40] found that more conceptual and empirical studies are needed to support entrepreneurial education evaluation. They also highlighted the need to document methodologies, and they pointed to the limited amount of research in formal education. Additionally, Scott et al. [39] question that many entrepreneurship studies do not evaluate the course effectiveness in achieving the desired learning objectives that allow students to develop their potential and entrepreneurial profile. Therefore, the evaluation of the results of entrepreneurship courses is still not complete and requires more research.

2.2. Academic Entrepreneurial Ecosystem

It was found that universities play a fundamental role in developing creative and innovative talent; education for entrepreneurship can strengthen entrepreneurial skills through strategies that favor them [41]. To achieve this, universities have created complex entrepreneurship ecosystems, comprised of courses that train students through interest groups, simulators, mentoring, and active learning. There are three key elements: (1) connecting community efforts to build commitment to entrepreneurship and innovation;

(2) strengthening business commitment, and (3) strengthening entrepreneurial skills [42]. These elements are developed through activities that are integrated inside and outside the school curricula.

Universities have integrated entrepreneurial training into their programs to contribute to social and community needs that can be satisfied through the contribution of students' startups. Therefore, they invest resources to form entrepreneurial ecosystems comprised of education programs, incubators, research parks, technology transfer offices, business creation offices, intellectual property models, relations with the government, investors, industry, and other economic actors [43]. They seek to give the students the tools to develop their ventures within the university.

These programs are found in various countries. Some have been developed at Massachusetts Institute of Technology (MIT), which has launched more than 30,000 active companies. Others include Stanford and Berkeley Universities and the Technion-Israel Institute of Technology, which played a relevant role in developing Israel's technology industry, representing 40% of its economic growth and half of its exports [44]. Since its inception, Tecnologico de Monterrey has promoted entrepreneurship activities. It created the Garza Lagüera Entrepreneurship Institute, which seeks to enhance students' entrepreneurial competencies to propose solutions for social, economic, and environmental development [45].

The benefits of these entrepreneurial ecosystems in universities have contributed to local, national, and global wellbeing. These benefits are manifested in the development of new companies and the generation of jobs through technology transfer, allowing ideas to be brought to market to contribute to countries' social and economic development [44]. To be successful in bringing these benefits, universities must connect the entrepreneur with the different stakeholders. The transfer of knowledge must occur in universities, and they must research to find solutions to society's problems, support technology companies, and facilitate the commercialization of these innovations [9,10]. Students need to present a value proposition that motivates them to turn their idea into reality [25]. These processes are facilitated by the knowledge that universities have about their students' interest and their resources to develop student competencies.

On the other hand, environmental, social, and economic changes make sustainable development more relevant than ever. However, training in universities is still technocratic and does not promote reflection on these problems [46]. There is a need to look for innovative training methods that make students reflect on global issues. However, education for sustainable development is not yet integrated into the curricula, so this topic is not a concern [47]. According to our systematic review, training entrepreneurs requires pedagogy and activities that bring the students closer to what they will experience in real life.

The innovative pedagogy would include active teaching-learning methodologies, multidisciplinary learning environments, integration of working life, research and development, flexible curricula, entrepreneurship, and international convergence [48]. In this sense, educational innovation plays an important role in developing educational and pedagogical activities that inspire students to create new companies [49,50] that are commercial, technological, and social. In this study, an e-learning course in entrepreneurship was offered to undergraduate students in different majors, aiming to identify their entrepreneurial skills; the course employed active methodologies to develop entrepreneurial competencies. An instrument was applied to identify the entrepreneurial profile of the participants.

This study was conducted in a higher education institution in northern Mexico, which has goals within its Strategic Plan for developing social and technological entrepreneurship skills by 2030. This university has proposed strategies that favor the skills of the citizens of the 21st century and is implementing the so-called Tec 21 Model. Within these skills, the model seeks to develop the entrepreneurial spirit in students as a transversal competency that must be strengthened in learners so that their graduates can better adapt to the demands of the knowledge-based society. This proposed model seeks to meet the current

challenges and the demands of the labor market to strengthen the profile of the new generations, so it uses a pedagogical approach based on challenge-based learning so that students can find a practical meaning in education while developing these competencies [51].

On the other hand, this university has an entrepreneurial ecosystem that includes incubators, business accelerators, technology parks, entrepreneurship institutes, technology transfer, entrepreneur support offices, and curricular and extracurricular entrepreneurship programs. All extracurricular activities and entrepreneurial ecosystem services are optional, and their duration depends on the type of program and the level of entrepreneurship achieved. In addition, costs also depend on the program and the time the entrepreneur invests in participating in these programs.

In this context, despite having these options to develop entrepreneurial skills, it was determined in consultation with that institution's professors that it is difficult for the students to identify their entrepreneurial skills, and there is no instrument to measure them [52]. Therefore, this study seeks to provide an instrument that allows identifying these skills in these students. These findings will be of relevance for the entrepreneurial ecosystem of the institution because it can contribute to recognizing the student profile to guide them according to their interests and attitudes towards actors of the entrepreneurial ecosystem inside or outside the institution, which will help them to continue developing entrepreneurial skills, as well as the ideas generated in the training programs.

3. Materials and Methods

In this study, we diagnosed the students' entrepreneurial skills in the entrepreneurship course as they carried out the course activities. We adapted The Engineering Entrepreneurship Survey (EES) developed at Purdue University by Duval-Couetil et al. [29,53] to identify the participants' profile and entrepreneurial skills. Other researchers have used this study to recognize university students' entrepreneurial characteristics [54,55]. A panel of 20 experts validated the instrument; the Cronbach's Alpha showed high reliability (higher than 0.86 for each measurement scale) [29].

The research problem is to determine how to identify the interests and skills of students at a university in northern Mexico that has an entrepreneurial ecosystem. The specific objectives of the study are (1) to apply a validated instrument to an online entrepreneurship course participant at a university in northern Mexico to identify their characteristics, interests, and skills; (2) to establish the differences between students' characteristics, interests, and skills who completed and did not complete the course; (3) generate recommendations for the institution to use this type of instrument within its entrepreneurial ecosystem.

3.1. Sample

The e-learning course for identifying entrepreneurship skills was part of a larger workshop conducted by the students as an extracurricular course. The study participants were 20 voluntary students from different undergraduate majors in a university in northern Mexico. The online course had a terminal efficiency of 60% so that 12 students completed it. The professors and the researchers invited the students to participate in the project voluntarily, and those who accepted indicated that they were interested in entrepreneurship and innovation. They participated in the e-learning course for five weeks to carry out the activities and answer the questionnaires at the beginning and end of the course. This project belongs to an institution initiative in which teachers can propose educational innovations and apply them in the classroom. The researchers were the course teachers and accompanied by mentors who guided the students in some of the activities.

The benefits for the students were to have the opportunity to share with mentors and complement the training with content related to the SDGs, topics related to entrepreneurship, and innovation, in addition to receiving a certificate for passing the online course.

- This research conducts a protocol that considered ethical aspects related to educational research to maintain the data's privacy, confidentiality, and integrity, and the participants' privacy and consent. To address the ethical aspects, we follow the subse-

quent considerations: The study's objectives were clearly explained to the participants, explaining that their participation in the course workshop is part of a research project.

- The study group was visited personally to explain the work and clarify any doubts that might arise, both the time involved and the procedure to be followed during the research.
- It was made clear that participation is voluntary, and that all data are confidential.
- It was explained to the participants that they could decide not to participate during the research.
- The names of the participants will be kept confidential in the publications derived from this study. Additionally, sensitive personal data such as telephone numbers, e-mails, or other data collected in the instruments will be kept confidential.
- We sent the participants an online form with the terms mentioned above of participation, requesting their acceptance in the study.

3.2. Description of the E-Learning Course

The course contents were related to the main learning objective defined as: Identify the entrepreneurial skills that one obtains through activities that allow solving a challenge collaboratively, with the support of a mentor, while strengthening knowledge about entrepreneurship and innovation. Activities and resources were planned and were developed in five modules. The resources used were discussion forums, videoconferences, chats, videos, PDF documents, questionnaires in Google forms, and blogs. The activities were distributed each week and assigned a time on the course calendar presented to the students to fulfill the assigned tasks.

During the course, students were presented with a series of challenges related to issues in their community and had to choose one to solve together with their classmates and teachers; each challenge was aligned with the SDG as is shown in Figure 1.

Eradicate extreme poverty with a special emphasis on food poverty
- SDG 1 and 2: End poverty and zero hunger

Ensure effective coverage and access of the population to priority health conditions
- SDG 3. Health and wellbeing

Ensure the employability of young people in the productive sector
- SDG 8. Decent work and economic growth

Generate reading training programs, written culture, and development of artistic skills.
- SDG 4. Quality education

Promote physical activity and sports
- Objective 3. Health and wellbeing

Improve air quality
- SDG 11. Sustainable cities and communities

Facilitate the opening and operation of businesses
- SDG 8. Decent work and economic growth

Identify and eliminate causes, conditions, and factors of corruption
- SDG 16. Peace, justice, and strong institutions.

Promote energy security and a transition to lower impact fuels
- SDG 7. Affordable and clean energy

Strengthen and promote community and neighborhood cultures to generate social cohesion
- SDG 16. Peace, justice, and solid institutions.

Figure 1. The proposed challenges related to SDGs.

The modules were: (1) Introduction to the course: where students learned about the methodology, participated in a discussion forum on the topic of entrepreneurship and investigated the types of entrepreneurship, posting their findings on the course blog; (2) Presentation of the challenge: they chose a challenge to solve through a product or service and did a storytelling activity on the course blog about entrepreneurship skills; (3) Preparation of solution proposals: where they carried out group work to define the solution to the previously chosen challenge; (4) Final pitch: once the solution was identified, the students made a pitch to present it to possible users; individually studying the issue of intellectual property, answering the question of how they would protect their business idea, and (5) Final evaluation: they evaluated the e-learning course with the quality indicators questionnaire.

The pedagogical strategies used during the course to enhance entrepreneurial skills were:

- Challenge-based learning was used by proposing the student's challenges related to the SDGs and identifying solutions through innovative ventures.
- Mentors helped the students to achieve the learning objectives and define strategies to solve the challenge.
- Discussion forums in which students were able to reflect on the issues.
  Elevator pitches so that they could communicate their ideas.

3.3. Entrepreneurial Skills Identification Test (ESIT)

The Entrepreneurial Skills Identification Test (ESIT) is an adaptation of The Engineering Entrepreneurial Survey (EES) [29]. It was used to collect data to assemble information on the students' experiences and participation in entrepreneurial activities. This instrument is made up of 25 questions divided into four sections, as follows:

- Participant data: Twelve questions that collect information such as name, age, gender, marital status, place of residence, nationality, study center, degree(s) studied, and current job.
- Entrepreneurial experiences: Six questions related to previous entrepreneurial experiences, finding out if family members have carried out ventures, courses taken on the subject, activities related to entrepreneurial training, and study of entrepreneurship within the major being pursued.
- Interests and attitudes: Six questions with answers on a four-point Likert scale referring to students' interests and attitudes about entrepreneurship, inquiring about the activities they will develop after graduation, their interest in developing ventures, types of business that they would like to start, their reasons for starting up a company, and reasons why they would not.
- The last section refers to the entrepreneurial skills that the participant has, a question with 16 items that are scored on a four-point Likert-type scale.

This instrument was applied at the beginning and end of the course. The results of the students who finished were compared with those who did not to determine if there were significant differences.

With this questionnaire, the participants' sociodemographic data, entrepreneurial experiences, interests, attitudes, and entrepreneurial skills were determined. At the end of the course, the questionnaire was reapplied to measure the changes in interests, attitudes, and entrepreneurial skills. We applied the questionnaire to the whole group before starting the online course. At the end of all the activities, we applied the instrument to those who completed the course. The analysis followed the methodology of Duval et al. [29], determining significant differences in the responses of both groups.

3.4. Data Analysis

The information collected in the questionnaires was analyzed using descriptive statistics and tables to present the results for each item. The distribution of frequencies and

percentages was used to analyze the participant's data and previous entrepreneurial experiences [56].

To measure whether there was a significant difference between the skills obtained from the beginning to the end of the course, we performed a comparative statistical analysis of the responses in both questionnaires (ESIT 1 General and ESIT 2 of the group that completed the course). The questionnaires inquired about the students' interests and attitudes about entrepreneurship, the activities that they would develop after graduating, their interest in developing an entrepreneurial venture, the types of business startups, their entrepreneurial skills, and their reasons why or not for starting a business. For this, a comparative analysis of related samples was carried out [57]. First, the normality and homoscedasticity assumptions necessary to apply parametric tests were determined; this analysis was carried out in the Minitab 19 program. As it was determined that the data did comply with the assumptions, we applied the Fisher test to obtain the *p*-value and determine whether there was a significant difference in the results, following the analytical methodology of Duval-Couetil et al. [29].

4. Results

To identify the participating university students' profiles, we used the ESIT data to define the e-learning course participants' characteristics. We examined the role of entrepreneurship in the students' major and determined the perception of their entrepreneurship skills. Following the methodology of Duval et al. [29], we divided the entire group between those who enrolled but did not finish the e-learning course and those who did complete it to identify the differences in their results.

The analysis examined the differences between the two groups: (1) those who enrolled but did not complete the course, and (2) those who did complete the course. Sixty percent of the sample participants were women. Of the group that did complete the course, 67% were women and 23% men, so women were the ones who had the greatest participation. Regarding the place of origin, the highest percentage completing the course were out-of-state students (67%), and it was also the largest group who started the course (75%). The majors of the students are shown in Figure 2.
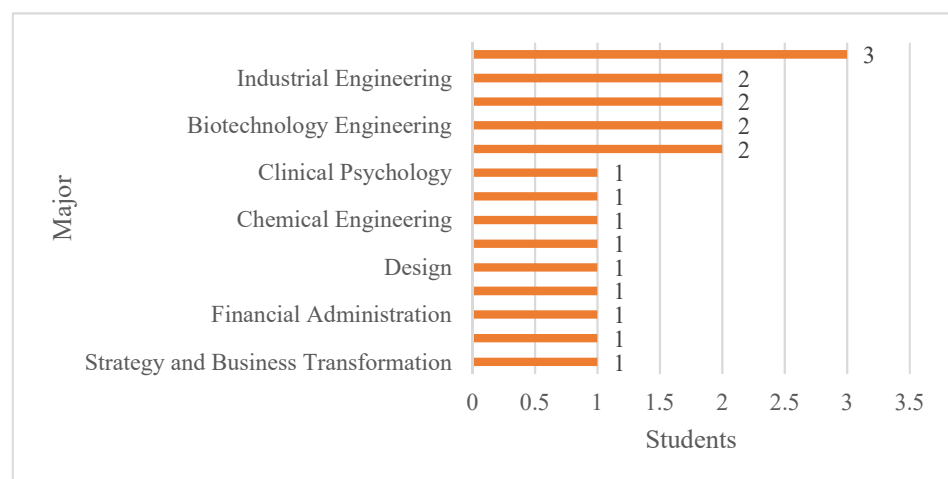

Figure 2. Participants by major. Source: own elaboration.

Regarding the students whose parents were entrepreneurs, 37% of those who did not finish the course said their parents were entrepreneurs, and 67% of the students completing the course said their parents were. Fifty percent of those who did not finish the course said they had not taken any entrepreneurship course, while 42% of the group who finished it said they had not. Of the majors completing the course, 92% were engineering and 8% clinical psychology. None of the business administration students finished the course; the engineering students had the most interest.

For behavior measurement, we asked the students about their prior participation in entrepreneurial activities (Table 1). Of those completing the course, 63% indicated that they had a previous entrepreneurship course in their major, mainly the one offered in all the programs. Of those who did finish the course, 67% mentioned taking courses previously, most being the course offered in all majors. In the group that did not finish the course, most (75%) had worked with an entrepreneur, representing a significant difference from the group that finished the course (17%) ($p = 0.019$). Only 13% of the group that did not finish, and 17% of the group that had, developed a product for a real client. Only 13% of the group that did not finish had made an elevator pitch. Neither group had applied for a patent. Another significant difference was found in the completion of extracurricular courses ($p = 0.49$). It is noteworthy that only 38% had taken entrepreneurial courses outside their curriculum in the group that did not finish, and none in the other group, considering the opportunity for them to take extracurricular courses within the university.

Table 1. Previous activities carried out related to entrepreneurship.

Item	Did Not Finish the Course	Finished the Course	p	ESIT 1-GENERAL	ESIT 2-FINAL
I have taken entrepreneurship courses throughout my major.	63%	67%	1	55%	70%
I have worked for an entrepreneur or a startup.	75%	17%	0.019	35%	20%
I have conducted market research for a new product or technology.	38%	33%	1	35%	60%
I have developed a product or technology for a real client.	13%	17%	1	15%	30%
I have made an "elevator pitch" or a presentation to a panel of judges.	13%	50%	0.16	40%	70%
I have patented or protected a product or technology.	0%	0%	1	0	0%
I have participated in entrepreneurship or business activities.	50%	42%	1	45%	70%
I have written a business plan.	38%	50%	1	45%	90%
I have participated in competitions related to entrepreneurship.	50%	50%	1	50%	70%
I have participated in extracurricular entrepreneurship workshops.	38%	0%	0.049	15%	100%

Source: own elaboration.

Comparing the results of ESIT 2, after the course, the percentage increased by 22% in the group that did not finish and 27% in the group that did finish in the item, "I have conducted market research for a new product or technology". Several of the activities increased after completing the course: participating in entrepreneurship or business activities (28%), writing a business plan (40%), participating in entrepreneurial-related competitions (28%), and participating in extracurricular entrepreneurship workshops (100%).

In the questionnaire, an item inquired about the degree to which entrepreneurship was found in their majors (Table 2). Most participants felt that students should learn more about entrepreneurship: 88% of those who did not finish the course and 75% of those who finished it. Only 25% of students agreed there is an instrument to know the entrepreneurial skills in their major. In the group that completed the course, 50% considered that students are encouraged to take entrepreneurship courses throughout their major. In these items, no significant differences were found between the two groups ($p > 0.1$). One hundred percent of those who did not finish the course believed that they learn these skills in their major. In the group that finished, 67% answered "a lot" or "enough" regarding learning these skills

in their major. Between the two groups, there was a significant statistical difference in this item ($p = 0.026$).

Table 2. Activities related to entrepreneurship within the major.

Item	Did Not Finish the Course	Did Finish the Course	p
Entrepreneurship is discussed.	75%	67%	0.433
Students learn about entrepreneurship skills.	100%	67%	0.026
Students are encouraged to develop entrepreneurial skills.	88%	92%	0.567
Students are encouraged to take entrepreneurship courses.	75%	50%	0.343
It is required to participate in activities related to entrepreneurship.	63%	58%	0.794
Students are encouraged to consider starting new businesses.	100%	75%	0.178
Entrepreneurship is presented as a career option worth developing.	75%	67%	0.586
There are opportunities to interact with entrepreneurs.	88%	67%	0.139
Students should learn more about entrepreneurship.	88%	75%	0.141
Some instrument is applied to know the entrepreneurial skills of the students.	38%	25%	0.212

Source: own elaboration.

The students were asked about their level of interest in different options after graduation (see Table 2). Of the students who did not finish the course, 88% wanted to start businesses and be self-employed. Of those who did finish the course, 83% indicated this. Half of those who finished wanted to work in a small company and 67% in a medium or large company. Both groups expressed less interest in working for the government or a non-profit organization; the percentage was the same for both groups. No significant difference was found in the opinions of these participants.

When comparing the percentages for the total participants at the beginning of the course with those who finished, we note the following: the interest of the students towards starting their own business increased to 90% (10% more than ESIT 1, the general percentage, and 7% more than the group that finished the course). There was also an increase in interest in working in a medium or large company (23% more) and a 30% increase in interest in working in a non-profit organization (80%). On the other hand, the interest in just studying for a postgraduate degree decreased 38% in the group that finished the course, with a significant difference of 0.006 (see Table 3).

Table 3. Students' interests after completing the course.

Item	Did Not Finish the Course	Finished the Course	p	ESIT 1-GENERAL	ESIT 2-FINAL
Start my own business and be self-employed.	88%	83%	0.807	80%	90%
Work for a small business or startup.	38%	50%	0.734	45%	40%
Work for a medium or large company.	75%	67%	0.336	75%	90%
Work for the government.	13%	25%	0.365	20%	10%
Work for a non-profit organization.	50%	50%	0.869	45%	80%
Want to continue studying for a postgraduate degree or other careers.	25%	58%	0.006	45%	20%

Source: own elaboration.

The results showed that the students have a great interest in being entrepreneurs. The group that finished the course showed more interest in taking entrepreneurship courses (100%). In both groups, all considered that entrepreneurship education would broaden

their perspectives and career options (100%). A significant difference ($p < 0.1$) was found in the item that they would like to learn about entrepreneurship in their major's classes; 75% of the group that did not finish the course indicated this, as well as 100% of the group that completed the course (see Table 4).

Table 4. Students' interest in entrepreneurship.

Item	Did Not Finish the Course	Finished the Course	p	ESIT 1-GENERAL	ESIT 2-FINAL
I have a general interest in the topic of entrepreneurship.	100%	100%	0.860	100%	100%
I want to be an entrepreneur.	88%	92%	0.899	90%	100%
I have an idea for a business or technology product.	75%	83%	0.618	80%	90%
I would like to know if I have what it takes to be an entrepreneur.	100%	83%	0.889	90%	80%
I am interested in taking entrepreneurship classes.	88%	100%	0.679	95%	90%
Entrepreneurship education can broaden my career prospects and options.	100%	100%	1	100%	100%
I want to learn about entrepreneurship in my major's classes.	75%	100%	0.085	90%	100%

Source: own elaboration.

Regarding the students' interest in undertaking startup ventures in the future, the majority in both groups were interested in starting a business in the next year and the following five years. In the group that finished the course, this percentage reached 100% and was maintained once the training is finished. In the group that did not finish the course, 88% had plans to start a business this year; the group that finished the course moved from 83% to 90% at the end of the training (see Table 5).

Table 5. Interest in starting a business in the future.

Item	Did Not Finish the Course	Finished the Course	p	ESIT 1-GENERAL	ESIT 2-FINAL
I had my own business.	25%	16%	0.569	20%	10%
I currently have my own business.	13%	8%	1	10%	10%
I would like to start a business next year.	63%	66%	0.809	65%	70%
I would like to start a business in the next five years.	63%	100%	0.166	85%	100%
I would like to start a business in the next ten years.	76%	74%	0.745	80%	70%
I have no plans to start a business at this time.	88%	83%	1.0	85%	90%

Source: own elaboration.

In the items about starting a business, significant differences were found between the two groups in wanting to start a business to have more free time ($p = 0.024$), to gain status ($p = 0.037$), and to undertake a venture to manage people ($p = 0.002$) (see Table 6). The latter was significantly higher in the group that did not complete the course (100%) vs. the group that did complete (33%). Both groups expressed 100% interest in having more flexibility and independence, earning more money, and creating jobs. On the other hand, the interest in following a family tradition was only 25% in the group that did not finish and 17% in the one that did. After completing the course, the greatest difference was found in the item "being in charge of an organization", which fell from 83% to 55%. Solving a social problems increased to 100% in the group that finished (see Table 6).

Table 6. Reasons to start a business.

Item	Did Not Finish the Course	Finished the Course	p	ESIT 1-GENERAL	ESIT 2-FINAL
Focus on a technology that interests me.	75%	67%	1	70%	88%
Satisfy a market need.	75%	92%	0.659	85%	100%
Solve a social problem.	88%	83%	0.351	85%	100%
Create something of my own.	88%	92%	0.708	90%	100%
Have more flexibility and independence.	100%	100%	1	100%	89%
Have more free time.	88%	58%	0.024	70%	66%
Earn more money.	100%	100%	1	100%	77%
Be in charge of an organization.	88%	83%	0.388	85%	55%
Manage people.	100%	33%	0.002	60%	22%
Create jobs.	100%	100%	1	100%	100%
Follow a family tradition.	25%	17%	0.395	20%	11%
Gain status.	50%	42%	0.037	45%	33%

Source: own elaboration.

Among the reasons they would not start a business, there was a significant difference (0.065) in the item "being excessively risky"; among those who did not finish the course, the percentage was high (75%). This percentage decreased to 33% in the final questionnaire (Table 7). There was also a significant difference in the item "lack of family support" since the group that did not finish indicated that this is no reason not to start a business (0%) compared to those who finished (17%). This percentage decreased to zero in the second questionnaire, having a significant statistical difference in the same group (0.76).

Table 7. Reasons why you would not start a business.

Item	Did Not Finish the Course	Finished the Course	p	ESIT 1-GENERAL	ESIT 2-FINAL
Lack of ideas on how to start a business.	50%	58%	0.618	55%	44%
Lack of available assistance to assess business viability.	63%	67%	0.799	65%	33%
Being excessively risky.	75%	58%	0.065	65%	33%
Lack of starting capital.	75%	67%	0.137	70%	44%
Lack of legal advice or assistance.	75%	75%	0.717	75%	55%
Lack of knowledge about the business world and the market.	63%	50%	0.677	55%	33%
Lack of experience in administration and finance.	63%	42%	0.934	50%	33%
The current economic situation.	75%	67%	0.348	70%	55%
Irregular income.	50%	67%	0.749	60%	22%
Lack of support from people around me (family, friends, etc.).	0%	17%	0.041	10%	0% $p = 0.76$
Fear of failure.	50%	50%	1	50%	33%
Doubts about my abilities.	75%	50%	0.645	60%	22%
Long work hours.	0%	25%	0.188	15	11%
Problems with employees and colleagues.	25%	8%	0.310	15	0%

Source: own elaboration.

Regarding entrepreneurial skills, a significant difference was found in the item "self-confidence" ($p = 0.060$). Thirty-eight percent of the participants who did not finish the course indicated this compared to 75% of those who did. There was also a significant difference in "risk-taking" ($p = 0.033$): 63% of the group who did not finish indicated this vs. 92% of the group who did; the latter increased to 100% in the final questionnaire. Regarding "entrepreneurial intention", there was a difference between the initial group (75%) compared to the one that ended (100%) ($p = 0.095$). Finally, in "resilience", there was a significant difference in the percentage of the first group (88%) with those in the second group (100%) ($p = 0.085$). At the end of the course, the skill that presented the greatest significant difference was "leadership", where 100% of the group that finished cited this ($p = 0.024$) (see Table 8).

Table 8. Entrepreneurship skills identified by students.

Item	Did Not Finish the Course	Did Finish the Course	p	ESIT 1-GENERAL	ESIT 2-FINAL
Creativity.	88%	92%	0.619	90%	70%
Risk-taking.	63%	92%	0.033	80%	100%
Innovation.	100%	83%	0.152	90%	90%
Self-confidence.	38%	75%	0.060	60%	60%
Communication.	63%	75%	1	70%	70%
Leadership.	75%	92%	0.724	85%	100% $p = 0.024$
Internal control.	63%	83%	0.803	75%	90%
Persistence.	75%	92%	0.383	85%	90%
Networking.	75%	67%	0.672	70%	50%
Self-efficacy.	75%	58%	0.929	65%	70%
Entrepreneurial intention.	75%	100%	0.095	90%	100%
Orientation to change.	88%	92%	0.708	90%	80%
Resilience.	88%	100%	0.085	95%	100%
Search for opportunities.	100%	83%	0.304	90%	100%
Initiative.	100%	100%	0.734	100%	100%
Decision-making.	88%	83%	0.789	85%	90%

Source: own elaboration.

5. Discussion

This study made it possible to determine the profile of the participants in the e-learning course developed for this study. The students were undergraduates studying in their majors' last semesters; most were from places other than the campus where the study was conducted. Most of the students who finished the course were women. Another characteristic is that most of the participants had entrepreneurial parents. Although the students indicated wanting to start a business, this was not to follow a family tradition. This is consistent with studies indicating that family history in entrepreneurship influences students' entrepreneurial intent [26,52]. Additionally, most of the students who completed the course were from engineering majors, making the tool that has been used for students of this major relevant [29,55]. Finally, the students indicated that they had taken none or only one entrepreneurship course before taking the e-learning course, which is noteworthy because the university has a wide entrepreneurial ecosystem.

Regarding previous entrepreneurial experiences, the difference was significant in students who completed the course who had no experience working with an entrepreneur. There was also a significant difference between the students who finished the course who and had not taken any entrepreneurship course. Students answered that throughout their majors, they should learn more about entrepreneurship. Only a quarter indicated that there is an instrument to identify entrepreneurial skills, and half considered that students are encouraged to take entrepreneurship courses. This represents an opportunity for improvement within the university's entrepreneurial ecosystem because the resources invested in these programs should generate companies developed within the university [43]. Therefore, the experiences and attitudes that are being generated by these efforts must be analyzed.

After graduating, the largest number of students who did not finish the course indicated they wanted to start their own businesses. After taking the course, those who did finish increased their interest in entrepreneurial businesses and non-profit organizations. Their interest in studying for a graduate degree decreased. All of this accords with the interests of international organizations such as the European Commission that seek to develop sustainable and resilient enterprises that meet the needs of society [32]. Students indicated that they are interested in being entrepreneurs and that entrepreneurship education can broaden their career prospects. Those who completed the course showed an increased interest in learning more about entrepreneurship. A significant difference was found between the groups finishing and not finishing in the item they would "like to learn about entrepreneurship in their major's classes". This is in line with studies that indicate that these programs increase interest in entrepreneurial education [9].

Students indicated that they had an interest in starting a business within the next five years, and those who finished the course increased their interest at the end of the training. Regarding the reasons for wanting to start a business, the significant differences were greater in the group that did not finish in the items "wanting to have more free time", "manage people", and "gain status". At the end of the course, the students had more interest in solving a social problem and satisfying market needs and decreased interest in being in charge of an organization. This agrees with García Gonzáles and Ramírez Montoya [19], who indicated that promoting social entrepreneurship transversally in the institution increases this competency among students, irrespective of the discipline.

Regarding the reasons for not starting a business, at the end of the course, the students attached less importance to the challenges of undertaking ventures, especially due to "doubts about their abilities", "excessive risks", and "irregular income". This reinforces the idea that education for entrepreneurship increases confidence in one's abilities and entrepreneurial intention, reducing the fear of failure [58]. Among entrepreneurial skills, the difference between students who did not finish the course and those who did was significant in "risk-taking", "self-confidence", "entrepreneurial intention", and "resilience", where the results were higher for students who did finish the course.

The greatest significant difference in the group results that did finish vs. the general questionnaire occurred in "leadership". In this sense, students indicated being able to influence others and guide other peers to achieve common goals; this skill is related to Entrecomp's mobilizing others, where through effective communication, one can motivate and negotiate to inspire others [33,34]. When comparing the results of the entrepreneurial skills of the students who finished the course, of the answers given to the first questionnaire with those of the exit questionnaire, it was found that the greatest changes were in the skills of self-confidence and leadership; internal control, entrepreneurial intention, and search for opportunities.

The implications of identifying entrepreneurship skills for education, in general, are broad. The development of creativity, innovation, and leadership strengthens students' competencies in their future jobs [14]. This achievement is significant for the Latin American context in which it is necessary to strengthen the creation of new companies with a social sense, in which the different actors of the entrepreneurial ecosystem intervene [10]. The development of these competencies will also favor transferring knowledge from educa-

tional institutions to social needs [19], as was seen in this study. The objective should be to enable students to generate value for others, promoting student participation in the problems of their environment. As for the actors immersed in the entrepreneurial ecosystem, knowing the interests and skills that students have can help guide them towards creating companies or to other actors that can support them.

Our study reinforces the concept that entrepreneurship education can contribute to achieving relevant educational goals. Presenting challenges related to the SDGs to students, which were solved by them critically and creatively, presents an education-oriented awareness of social problems [30,31]. This proposal makes it possible to guide training that develops entrepreneurial skills with a focus on value creation.

6. Conclusions

This study's main objective was to identify the entrepreneurial profile of university students through their experiences, interests, attitudes, and entrepreneurial skills. It is important to note that in the profiles of the students, although the majority are in the advanced semesters of their majors, they have only taken one entrepreneurship course or have not taken any, despite the number of extracurricular entrepreneurship courses offered in the university. Although the number of participants limits this study, it indicates that the institution's entrepreneurial ecosystem could be strengthened by a broader scope of programs taught and the measurement of their results.

Previous studies indicate that when students have taken more than one entrepreneurship course, there are significant differences in entrepreneurial skills compared to those who have not taken any, creating an incremental benefit with each additional course [29]. Therefore, there is an opportunity to promote these courses to improve the students' perceptions of their entrepreneurial skills. There is also an opportunity to conduct research using larger samples to establish the effectiveness of the programs that are carried out.

One of the limitations of this study is the limited number of participants. The study is limited to the context of this university because this institution requires strengthening entrepreneurship competencies according to its 2030 educational model. Moreover, despite having an entrepreneurial ecosystem, no instrument is identified that allows us to know the interests and skills of students [35,51]. Although our intention is not to generalize the data, we seek to present an instrument that can be applied to larger groups within the same university or other contexts, considering that this instrument has already been validated in several studies. At the end of the course, there was an increase in students' interest in entrepreneurship and education for entrepreneurship and social entrepreneurship as career options. This identification allowed knowing the depth of the students' characteristics, interests, and abilities. By identifying these, universities can offer other programs that strengthen their students' entrepreneurial competencies. Additionally, entrepreneurship training based on the needs of the SDGs can increase students' interest in developing these solutions, which is why programs should encourage the resolution of society's problems. As we mention before, far from being exhaustive, this work presents limits deriving from the small sample, but the aim was to give insights for identifying the entrepreneurial profile of university students. Thus, the implementation of the instrument used in this research can be valuable in identifying entrepreneurial skills in students and strengthening them transversally in multidisciplinary courses throughout their curricular studies broadening the vision of human capital formation towards sustainability.

Author Contributions: Conceptualization, M.P.C. and M.G.G.Z.; methodology, M.P.C. and M.G.G.Z.; software, M.P.C.; validation, M.P.C. and M.G.G.Z.; writing—original draft preparation, M.P.C.; writing—review and editing, M.P.C. and M.G.G.Z.; supervision, M.G.G.Z. Both authors have read and agreed to the published version of the manuscript.

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