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Competencias base para el desarrollo del perfil emprendedor: tendencias desde la universidad pública

Basic competences for the development of the entrepreneurial profile: trends from the public university

Competências básicas para o desenvolvimento do perfil empreendedor: tendências da universidade pública

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Resumen

En los países en desarrollo, el emprendimiento emerge como una alternativa vital ante el desempleo, aunque para ello se requiere el desarrollo de habilidades emprendedoras durante la etapa universitaria, ya que esto eleva significativamente las posibilidades de éxito en el momento en que se decide establecer un negocio propio. Sin embargo, en el contexto del empleo juvenil, la falta de experiencia o deficiencias en habilidades para emprender pueden obstaculizar la continuidad de nuevos proyectos empresariales. Esta investigación, por tanto, tiene como objetivo principal determinar el nivel de adquisición de competencias emprendedoras en estudiantes de una universidad pública que se encuentran en el último año de licenciatura en negocios y que participan activamente en iniciativas institucionales para fomentar el emprendimiento. Asimismo, se busca identificar posibles disparidades de género y diferencias entre aquellos con antecedentes previos en emprendimiento. Mediante un enfoque de muestreo no probabilístico, se recopilaron datos de 210 estudiantes a través de una encuesta en línea. Luego, se empleó un análisis de conglomerados utilizando una metodología de dos pasos, lo que permitió identificar cinco conglomerados que fueron posteriormente evaluados en su estructura mediante un análisis de varianza (ANOVA). Los resultados principales revelaron que en el ámbito de la educación superior pública, se ha promovido activamente el enfoque en el emprendimiento, lo que ha facilitado la adquisición efectiva de competencias profesionales, metodológicas, comunicativas, personales y de trabajo en equipo en la mayoría de los estudiantes. Además, se observó que los participantes de género masculino y aquellos con experiencia previa en el desarrollo de negocios mostraron un mayor nivel de adquisición de competencias emprendedoras. En consecuencia, esta investigación sugiere la necesidad de ajustes en los planes de estudio universitarios para incorporar contenidos que promuevan la identificación, desarrollo y aplicación de oportunidades de negocio, de modo que se promueva la inserción laboral de los graduados tanto en emprendimientos propios como en empleos asalariados.

Palabras clave: emprendimiento, estudiantes, estudios profesionales, habilidades, México.

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Abstract

Developing entrepreneurial skills in university enhances the chances of success when establishing a business. In developing countries, entrepreneurship serves as an alternative to unemployment, however, in the context of youth employment, Inexperience or a lack of entrepreneurial skills weaken the prospects for the continuity of new businesses. The objective of this research is to determine the degree of acquisition of entrepreneurship competencies in students from a public university who are in their last degree in bachelor's degrees with an emphasis in business and who additionally participate in institutionally developed entrepreneurship promotion activities; at the same time as determining differences by sex and having a background in entrepreneurship. Using a non-probabilistic sampling technique, data from 210 students were obtained through an online survey. A cluster analysis was applied using a two-step methodology that provided an integration of five clusters that were valued in their structure through the ANOVA analysis. The main findings indicated that in public higher education the focus on entrepreneurship has been promoted, favoring the efficient development of professional, methodological, communication, personal and cooperation skills in a large part of its student community. In addition, male participants and those with a background in small business development reported a higher degree of acquisition of entrepreneurial competencies. This research suggests adaptations to the curricula of universities to include topics that favor the identification, development and application of business opportunities that facilitate the incorporation of graduates in the labor field, both on self-employment and under the modality of subordinate personal work.

Key words: Entrepreneurship, Students, Professional Studies, Skills, Mexico

Resumo

Desenvolver habilidades empreendedoras na universidade melhora as chances de sucesso ao estabelecer um negócio. Nos países em desenvolvimento, o empreendedorismo é uma alternativa diante do desemprego, no entanto, no contexto do emprego juvenil, a inexperiência ou a deficiência nas habilidades empreendedoras enfraquecem as possibilidades de continuidade dos novos negócios. Esta investigação tem como objetivo determinar o grau de aquisição de competências empreendedoras em estudantes de uma universidade pública que cursam licenciaturas com ênfase em gestão e que adicionalmente participam em atividades de promoção do empreendedorismo desenvolvidas institucionalmente; ao mesmo tempo que determina diferenças por sexo e tem experiência em empreendedorismo. Utilizando uma técnica de amostragem não probabilística,

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foram obtidos dados de 210 alunos por meio de uma pesquisa online. Foi aplicada uma análise de cluster utilizando uma metodologia em duas etapas que proporcionou a integração de cinco clusters que foram avaliados em sua estrutura por meio de uma análise ANOVA. As principais conclusões indicaram que o ensino superior público tem promovido uma aposta no empreendedorismo, favorecendo a aquisição eficiente de competências profissionais, metodológicas, comunicativas, pessoais e de cooperação numa grande parte da sua comunidade estudantil. Além disso, os participantes do sexo masculino e aqueles com experiência em desenvolvimento de negócios foram aqueles que relataram um maior grau de aquisição de competências empreendedoras. Esta pesquisa sugere ajustes nos planos de estudos universitários para incluir temas que favoreçam a identificação, o desenvolvimento e a aplicação de oportunidades de negócios que facilitem a incorporação dos graduados no mundo do trabalho, tanto por conta própria quanto na modalidade de trabalho pessoal subordinado.

Palavras-chave: Empreendedorismo; Habilidades, Estudos Profissionais, Alunos, México.

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Introduction

The labor market for young people presents challenges derived from the lack of experience, the gap between the skills acquired and those required by employers, as well as the limitations to becoming self-employed (International Labor Organization [ILO], 2022a). For this reason, youth employment (15 to 29 years old) (ILO, 2022b) is a central issue in the United Nations (UN) 2030 Agenda. In fact, goal 4.4 of the *quality education objective* establishes the commitment to considerably increase between now and 2030 "the number of young people and adults who have the necessary skills, particularly technical and professional, to access employment, work decent and entrepreneurship" (UN, 2015, p. 19). In this context, entrepreneurship represents a relevant opportunity, since it contributes to the achievement of other objectives of the Agenda, such as job creation, increased social well-being, reduction of hunger and poverty, and stimulation of economic growth. among others (Ashari *et al*., 2022).

Recent studies indicate that strengthening business ecosystems drives a nation's economic growth, which is why governments are implementing policies to promote their development (Poon *et al*., 2023), as part of a strategy to boost certain regions (Liu and Qian, 2022). Likewise, universities are joining academic restructuring initiatives to respond to the current needs of society with the aim of improving the country (Kaniak and Teixeira, 2023). That is, in university

environments an entrepreneurial ecosystem is being fostered in order to promote collaboration with industry and research to strengthen the business environment (Achiquen *et al*., 2021).

This promotion of entrepreneurship in universities generates a collective dynamism in both staff and students (Guerrero and Lira, 2023), through the development of skills that can lead both to business success and to obtaining better-paid salaried jobs. (Hahn *et al*., 2022), which, in turn, contributes to reducing unemployment (Kumar and Shukla, 2023).

In the specific case of Latin America, entrepreneurship arises mostly as a response to unemployment with the objective of generating income (Querejazu, 2020). For this reason, it is crucial that universities promote training spaces that encourage the development of skills for the creation of entrepreneurial initiatives in an environment that reduces the risks associated with new businesses (Fischer *et al*., 2022). In this regard, Kaniak and Teixeira (2023) point out some mechanisms to promote the entrepreneurial spirit in universities, such as the creation of business incubators or school *startups*, the establishment of business alliances or the promotion of intellectual property. However, since this is an emerging topic, there are still no clear guidelines on entrepreneurship promotion strategies in university environments (Achiquen *et al*., 2021).

For this reason, the objective of this research is to determine the degree of acquisition of entrepreneurial skills in university students in the last year of their degree who have subjects focused on business in their study plan and participate in institutionally developed entrepreneurship promotion activities. Likewise, it seeks to identify differences according to gender and previous experience in entrepreneurship.

The results obtained will contribute to the identification of trends in the formation of an entrepreneurial profile from public universities, which is relevant to identify areas of improvement in study plans and to design institutional strategies that promote the entrepreneurial spirit and contribute to the compliance with the goals of the sustainable development objective (SDG) of quality education of the 2030 Agenda.

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Theoretical background

The term *entrepreneur* has its origin in the French word *entreprendre* (pioneer), which refers to someone who ventures to start something in a context of uncertainty, a distinctive attitude of the entrepreneur (Herrera and Montoya, 2013). This person is defined as someone who has the ability to identify opportunities in their environment, generate business ideas from them and assume the risk of carrying them out in order to obtain benefits in the future (Pennetta *et al*., 2023). According to Sánchez *et al*. (2017), the concept of *entrepreneurship* also encompasses the creation of a new company within an existing one, such as *spin- offs, joint ventures* and subsidiaries.

Due to this, entrepreneurship has acquired increasing importance over time and has been the subject of research in various areas of knowledge, which has given rise to various theories with notable differences between them (Terán-Yépez and Guerrero-Mora, 2020). For example, in 1755, Richard Cantillon addressed the topic for the first time from an economic perspective and defined it as the individual who assumes the risk by buying a product and selling it at an uncertain price (Terán-Yépez and Guerrero-Mora, 2020). On the other hand, Jean Baptiste Say, in 1803, referred to the entrepreneur as a visionary leader who mobilizes resources from a point of low performance to one of high productivity (Herrera and Montoya, 2013).

Likewise, the contribution of Joseph Schumpeter has been fundamental for the study of entrepreneurship, hence various authors have used his theories as a basis to support it (Fischer *et al*., 2022; Herrera and Montoya, 2013; Pacheco-Ruiz *et al*., 2022; Terán-Yépez and Guerrero-Mora, 2020; Velandia, 2020). Schumpeter stated that the entrepreneur is distinguished by his ability to solve problems and offer innovations, whether in goods/services, in production processes, in the opening of new markets or in the allocation of resources, as well as in the creation of new forms of organization and structuring of economic activity (Carrasco and Castaño, 2008; Terán-Yépez and Guerrero-Mora, 2020).

For this author, however, these innovations or improvements cause instability in the market, hence it is up to the entrepreneur to convert the ideas into profitable actions, which gives rise to what he called “creative destruction”, a process that generates changes. and new opportunities (Herrera and Montoya, 2013; Hu *et al*., 2020). Therefore, motivation, desire and social interaction are part of the nature of the entrepreneur. In addition to this, you must be a leader, that is, be able to create and influence your social group in a way that motivates them to be part of your company and pursue the same objectives (Carrasco and Castaño, 2008).

Entrepreneurship skills to be developed at the university

Previous literature has highlighted that an entrepreneur must possess a series of competencies to successfully carry out their activities, and various classifications have been observed that present similarities to each other. According to the Royal Spanish Academy (2023), competencies are defined as the aptitudes or abilities that a person possesses to carry out a specific activity or participate in a certain matter. In the words of Fischer *et al*. (2022), an entrepreneurial profile is made up of professional, methodological, communicative, personal and cooperation skills.

Now, in this research, this position is considered relevant to analyze the promotion of entrepreneurship in Mexican public universities, since it seeks to identify whether these institutions contribute to comprehensive training that promotes entrepreneurship through academic and extracurricular activities. This will allow us to characterize regional advances in the development of the entrepreneurial profile in university students. Therefore, the fundamental competencies for entrepreneurship are defined below.

Professional competence

From a university and professional perspective, educational activities aimed at promoting the development of business skills are considered part of entrepreneurial education. Therefore, it is vital that university institutions offer disciplines that allow students to acquire the skills to compete in the labor market and cultivate entrepreneurial thinking that gives them the possibility of creating a company (Fayolle *et al*., 2006; Fischer *et al*., 2022). To achieve this, the entrepreneurial spirit must be promoted both in the curricular field through subjects in undergraduate and postgraduate courses, and in the extracurricular field through workshops, conferences and student events that involve students, professors, administrative staff, companies and the community in general (Velandia, 2020).

In this line, one of the key competencies to strengthen with the aim of contributing to the entrepreneurial profile is professional competence, which implies developing a sustainable capacity both in the intellectual and social spheres to face real situations in the professional environment (Slišāne *et al* ., 2022). DeWaters and Kotla (2023) mention that the development of professional skills in students is promoted through teaching focused on the business mentality, using as means for learning the application of strategies with emphasis on teamwork, the development of projects and case resolution.

In line with this idea, De Aquino *et al*. (2023) found evidence in students of business administration and related disciplines about a better acquisition of professional skills when challenge-based methodologies are used, which involves collaboration between team members, advice from experts on the subject, and the use of technological resources.

It can be stated, therefore, that the knowledge acquired and the information received by students will be key elements that will allow them to better take advantage of the opportunities in their environment to undertake (Sánchez *et al*., 2017). An example of a teaching-learning activity for the development of professional skills can be seen in the Shark approach. Tank , in which projects are presented that are evaluated and given feedback by business experts (De Aquino *et al*., 2023).

Methodological competence

Methodological competencies include the set of procedures, methods and specific techniques that the student needs to learn and develop to adequately perform their professional work (Cepeda, 2004). In line with this, Robledo *et al*. (2015) define them as all those skills, abilities, attitudes and values that efficiently and responsibly support professional performance.

These skills are essential because the demands of today's society and current professional challenges place the student in a new and different scenario. Therefore, higher education requires teachers to use new methodologies in the subjects they teach, no longer focused on just memorizing content. That is, an entrepreneurial, active and creative spirit must be encouraged, and knowledge must be ensured that it is not fragmented. This means that the various disciplines that the student addresses must be integrated to enhance the development of methodological skills (Rubio *et al* ., 2016). The current reality requires a new way of teaching classes, which involves the incorporation of active processes in classrooms to allow students to be autonomous in their learning and become competent professionals (Robledo *et al*., 2015).

Furthermore, it is suggested to include in the professional career curriculum, in advanced semesters, subjects that provide the tools for the development of competencies related to the construction and execution of techniques, processes, methods and procedures that are linked to entrepreneurship (Rabanal *et al*., 2020). From a business perspective, it is important to note that the Global Entrepreneurship Monitor (GEM) (2023), in its section for academics, provides methodological approaches corresponding to the study of entrepreneurship at the national level. Therefore, universities, teachers and entrepreneurs must take advantage of these activities and

relationships that are offered. In this sense, promoting methodological competencies implies the development of skills to investigate events, analyze and solve cases (Venesaar *et al*., 2022).

Finally, Velandia (2021) also maintains that, due to the current dynamics of life, there are factors external to the university that motivate changes in study programs, which must integrate knowledge, methodology and the learning process, so that all of this contributes to the resolution of current environmental problems. This must be guided by the teacher's teaching-learning method and with the active participation of both the student and all those involved.

Communicative competence

The development of communication skills is an aspect that must be given special attention during student training. It is not only about the natural ability to speak and communicate, but it is necessary to instill and work on this competence in the student to establish human, social and business relationships (Cevallos, 2016). Therefore, Hu *et al*. (2020) consider that an entrepreneur must be able to communicate effectively and establish communication networks and links to have the ability to summon and unite more people to their project.

Regarding the work of higher education institutions, according to the study by Reinoso (2017), it is crucial to work on the development of critical thinking and strengthen the student's communication skills from the classroom. This involves using various teaching resources, such as visual and textual materials, images, workshops and social networks, without neglecting the development of the four essential skills: reading, writing, speaking and listening. In this regard, it should be considered that although students are at a higher level of education, many of them lack these skills.

Furthermore, nowadays the inclusion of at least one foreign language in any professional career is of utmost importance, since the current environment is characterized by a critical moment of globalization, diversity in the markets and high competition, which makes mastery of foreign languages, such as English, one of the most spoken in the world, followed by Chinese, Hindi, Spanish and Arabic, among others (Statista, 2022). Therefore, it is essential that the student has mastery of languages such as English within the communicative competence, so that they can successfully develop in commercial and intercultural relationships (Moreira-Aguayo and Venegas-Loor, 2020).

Personal competence

From the psychological perspective, it is argued that an individual must have the ability to detect an opportunity and then have the intention to convert it into a business idea to finally materialize it in the creation of a new company. This intention is translated into the behavior of the entrepreneur and is determined by various elements, such as values, specific needs, desires or beliefs (Ajzen, 2002; Sánchez *et al*., 2017), as well as by the experience acquired and the information received from third parties, hence higher education plays an extremely important role during the training of the entrepreneurial student.

Furthermore, in the theoretical model proposed by Velandia (2021) to promote the development of entrepreneurship competencies at the university, entrepreneurial attitude, skills, and creativity stand out as competencies considered at a personal level. For their part, Fischer *et al*. (2022) point out that personal competencies involve the development of confidence, the courage to generate new projects, conflict management, timely decision-making, and the ability to adapt strategies to achieve objectives.

Another important aspect of the entrepreneur's personality, pointed out by various authors, is the ability to take risks, tolerance and decision-making in the face of uncertainty (Herrera and Montoya, 2013; Pacheco-Ruiz *et al*., 2022; Sánchez *et al.*, 2017; Terán-Yépez and Guerrero-Mora, 2020). Finally, self-regulation, motivation, empathy and control are some of the traits of an entrepreneurial profile that must be encouraged and promoted in the university student (Rabanal *et al*., 2020).

Cooperation competition

Cooperation skills are understood as the ability of a person to develop and/or possess skills and attitudes that allow them to work as a team, carry out action plans, establishing links with other people who share the same goals and ideas, and achieve participation. of those interested in the work (Fischer *et al*., 2022). Regarding this concept, Pacheco-Ruiz *et al*. (2022) believe that the skills associated with teamwork are important for the entrepreneur, since they are part of the leadership that they must possess.

Historically, in the field of sociology, authors such as Granovetter (1985) have contributed to the study of entrepreneurship and cooperation skills, exposing elements about the importance of social networks and collaborative work in entrepreneurship and business activity. This network approach refers to all those separate activities that, when joined together, generate links

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(Landström, 2005) and benefit companies, businessmen and entrepreneurs, as well as other interested people.

In relation to this type of competition, the GEM, founded in 1999, is the center with the greatest global recognition in terms of efforts and studies on entrepreneurial dynamics. It has a section aimed at the academic field to support teachers and young people to collaborate, form research teams and establish networks at an international level to study and explore in a practical and real way the dimensions of entrepreneurship and adapt it to the conditions of each country (GEM, 2023).

Now, from a technological perspective, currently, the university must also incorporate theory and practice to encourage innovative ways in the entrepreneurial student to create and maintain connections between individuals. In today's world, the use of social networks such as Facebook, Instagram, LinkedIn or TikTok, as well as video conferencing applications such as Zoom or Google Meet, has become essential for everyone involved in business and commercial activities (Hu *et al*., 2020). These platforms are positioned as new ways to promote and maintain collaborative work.

Having explained the above, this research presents the following working hypotheses:

- H1: Public university students who study bachelor's degrees with an emphasis on business and who participate in activities to promote entrepreneurship develop the necessary competencies of the entrepreneurial profile.
- H2: There are significant differences by sex in the degree of acquisition of entrepreneurship skills.
- H3: University students who have or have had a business have a greater acquisition of entrepreneurial skills compared to those who have not developed a business.

Method

Design of the investigation

To determine the degree of acquisition of entrepreneurship skills and develop the entrepreneurial profile of university students in public institutions, a quantitative investigation was carried out, which used multivariate analysis, specifically the cluster analysis technique. Additionally, non-parametric tests were performed using the Mann-Whitney U to determine population mean differences based on the sex and entrepreneurship background of the participants. Specifically, the design used was non-experimental and cross-sectional.

Sample

The population studied consisted of students in their final bachelor's degree who, as part of their study plan, had subjects with an emphasis on business and participated in entrepreneurship promotion activities developed by the institution. For this purpose, a public university located in the north-central region of Mexico was selected as the unit of analysis. The sample was made up of 210 volunteer participants from five faculties who were pursuing degrees in Administration, Public Accounting and Finance, Management and Public Policy, Marketing and Sustainable Tourism. Of the total participants, 67.6% were women and 32.4% were men, with an average age of 23 years. Additionally, 44.3% reported having experience in developing a business.

Instrument and procedure

The instrument used consisted of six sections. The first was dedicated to collecting demographic data of the sample, while the second to sixth addressed indicators corresponding to professional, methodological, communicative, personal and cooperation skills. These indicators were obtained and adapted from the instrument developed by Fischer *et al*. (2022). The response scale used was a five-point Likert type, where one corresponded to completely disagree, and five corresponded to completely agree.

Likewise, the online survey technique was used, for which authorization was requested from the academic coordination of the seven participating majors, as well as their support for the distribution of the electronic address through institutional contact means.

Before carrying out the planned analyses, the reliability of the instrument was verified (Table 1). Cronbach's alpha coefficient for the five entrepreneurship competencies was above the minimum acceptable criteria of 0.700 (Nunnally, 1978). The review of the communalities allowed us to determine that all the indicators presented high correlations towards entrepreneurship competencies, which indicated a good explanatory variance of the study variables by obtaining values greater than 0.500 (Hair *et al*., 2014). This situation was maintained when reviewing the factor loadings, in which the threshold of 0.400 indicated for sample sizes close to 200 observations was also met (Hair *et al*., 1999).

Table 1. Validation of constructs for entrepreneurship competencies.

Competencies	Communalities	factor loadings	Cronbach's alpha	Competencies	Communalities	factor loadings	Cronbach's alpha
Professional				*Cooperation*			
PROF1	0.544	0.746	0.904	COOP1	0.511	0.685	0.908
PROF2	0.552	0.752		COOP2	0.709	0.865	
PROF3	0.626	0.833		COOP3	0.704	0.856	
PROF4	0.678	0.826		COOP4	0.753	0.898	
PROF5	0.726	0.886		COOP5	0.601	0.774	
Methodological				*Staff*			
METO1	0.630	0.836	0.902	PERS1	0.598	0.796	0.914
METO2	0.628	0.830		PERS2	0.565	0.788	
METO3	0.573	0.798		PERS3	0.733	0.872	
METO4	0.684	0.882		PERS4	0.726	0.866	
METO5	0.438	0.693		PERS5	0.602	0.799	
Communicative							
COMU1	0.565	0.778	0.925				
COMU2	0.741	0.900					
COMU3	0.628	0.817					
COMU4	0.741	0.888					
COMU5	0.661	0.834					

Source: self made

Results

The determination of the degree of acquisition of entrepreneurship skills in final degree students and the generation of their entrepreneurial profile was carried out through a cluster analysis, a method capable of classifying the sample into small groups whose elements share common characteristics with each other. (Heredia *et al*., 2012), although they are incompatible at the group level due to internal similarities (Hair *et al*., 1999).

The selection of the clusters was carried out using the two-step methodology proposed by Hair *et al*. (1999). The first consisted of the hierarchical method to allow the data to be freely integrated into the necessary number of clusters, using the linkage clustering method between groups with the interval measure Euclidean distance squared, which resulted in five clusters that were verified visually through the dendrogram. In the second step, the non-hierarchical method was executed specifying the five clusters previously identified.

Once the clusters were obtained, a descriptive analysis was carried out with the intention of detailing the characteristics and identifying trends in the group studied (Hernández *et al*., 2014). In this sense, the research classifies the degree of acquisition of entrepreneurship skills into five levels,

ranging from a low weight corresponding to the minimum possible value of five points, to a high value of 25 maximum points, as presented in the table 2.

Table 2. Degree of acquisition of entrepreneurship skills

Score obtained	Acquisition grade
05-08 points	Low
09-12 points	Medium low
13-16 points	Half
17-20 points	Medium high
21-25 points	High

Source: self made

Table 3 shows the results for the five clusters. In cluster 1, the degree of acquisition of the five entrepreneurship competencies (professional, methodological, communicative, personal and cooperative) is medium low, with 14 observations. In cluster 2, a high acquisition of skills was recorded with a size of 47 observations. Regarding clusters 3 and 4, the data were very similar, since in both cases the prevalence of skill acquisition was medium-high; A difference was only observed in the personal competence of cluster 4, which was placed in the high weighting. For these clusters, sizes of 53 and 70 were recorded, respectively. Finally, cluster 5 showed an average value for the acquisition of the five competencies, with a frequency of 26 observations.

Table 3. Final cluster centers

	Cluster				
	1	2	3	4	5
Professional	Medium low	High	Medium high	Medium high	Half
Methodological	Medium low	High	Medium high	Medium high	Half
Communicative	Medium low	High	Medium high	Medium high	Half
Staff	Medium low	High	Medium high	High	Half
Cooperation	Medium low	High	Medium high	Medium high	Half
Cluster size	14	47	53	70	26
Percentage	6.67%	22.38%	25.24%	33.33%	12.38%

Source: self made

Analysis of variance is an appropriate technique to validate the clusters formed, since it provides consistency of the solution (Hair *et al*., 1999). Therefore, an ANOVA analysis was carried out (table 4) that allowed us to corroborate ($p < 0.05$) the appropriate structure of the clusters by detecting significant differences in the mean values of a group of data (Peña *et al*., 2018). In addition, the squared ETA values were examined to explain the percentage of the variance of entrepreneurship competencies based on membership in the determined clusters (Bakeman , 2005).

Although ETA squared is interpreted as R^2, its interpretation should be done with caution as it is criticized for providing bias (Iacobucci *et al* ., 2023) because "it overestimates the population proportion of the explained variance" (Bakeman, 2005, p. 383) . For this reason, it is recommended to use partial ETA squared; however, in the case of a one-way ANOVA, the effect size is the same for ETA squared and partial ETA squared (Iacobucci *et al*., 2023).

In this sense, as can be seen in Table 5, it is concluded that the five clusters obtained explain 79.8% of the variance in professional competence, 83.5% of the variance in methodological competence, 80.7% of the variance in communicative competence, 84.8% of the variance in personal competence and 83.1% of the variance in cooperation competence.

Additionally, Figure 1 presents the self-perceptions of the degree of acquisition of entrepreneurship skills, which outline the profile of the university students described below:

Table 4. Analysis of variance (ANOVA)

			Sum of squares	gl	mean square	F	Next.	ETA squared
Professional * Cluster Case Number	Between groups	(Combined)	2762.063	4	690,516	202,290	0.000	0.798
	Inside of groups		699,765	205	3,413			
	Total		3461,829	209				
Cluster case number	Between groups	(Combined)	3263.607	4	815,902	258,521	0.000	0.835
	Inside of groups		646,988	205	3,156			
	Total		3910.595	209				
Communicative * Cluster case number	Between groups	(Combined)	3072,486	4	768,121	214,421	0.000	0.807
	Inside of groups		734,371	205	3,582			
	Total		3806.857	209				
Personal * Cluster Case Number	Between groups	(Combined)	3219,770	4	804,942	285,414	0.000	0.848
	Inside of groups		578,154	205	2,820			
	Total		3797,924	209				
Cooperation * Cluster case number	Between groups	(Combined)	3411,963	4	852,991	252,018	0.000	0.831
	Inside of groups		693,852	205	3,385			
	Total		4105.814	209				

Source: self made

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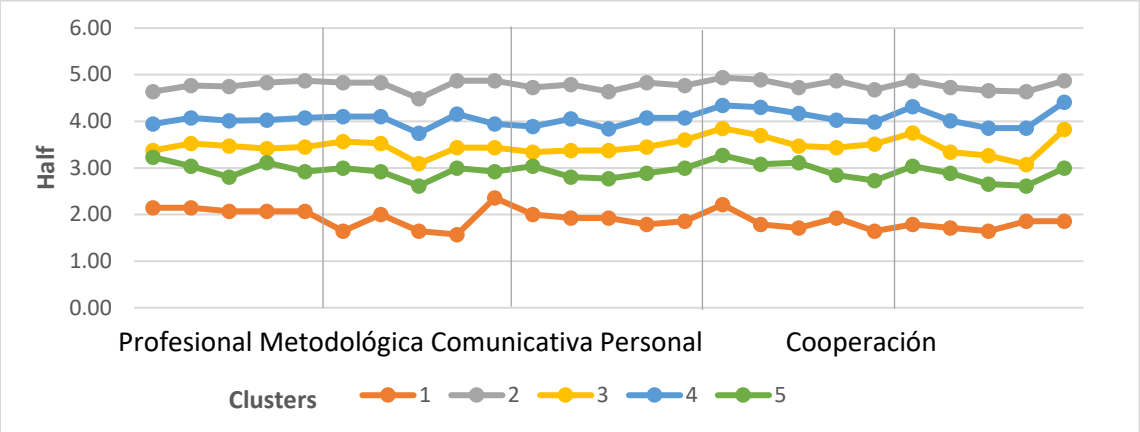
Figure 1. Entrepreneurial profile of the university student



Source: self made

Cluster 1: This cluster has a reduced representativeness, with 6.67% of the student sample. Its members reported the lowest levels in the acquisition of the five competencies analyzed. Although they show greater strength in professional skills, they fail to reach the general average observed in the entire sample studied. Among his main weaknesses is his difficulty in making quick decisions, establishing new contacts to collaborate, generating proposals for projects and insecurity in the design of business ideas. Regarding the sex composition, 78.57% are women and 21.43% are men. Furthermore, in this group, 71.43% indicated that they had not experienced entrepreneurship practices in their daily lives.

Cluster 2: This cluster represents 22.38% of the sample and presents the best levels in the acquisition of entrepreneurial skills. Their perceptions of the degree of acquisition of skills range between 94.96% and 96.44%. The distinctive characteristics of this cluster include a high capacity to resolve conflicts, identify opportunities, effectively manage information, organize ideas, apply techniques and procedures, communicate appropriately and timely, adapt to changes, make decisions and collaborate in networks. The sex composition of this cluster is 55.32% women and 44.68% men. Furthermore, 72.34% of the members have a history of having started a business, while 27.66% have not done so.

Cluster 3: This cluster is made up of 25.24% of the study participants, whose entrepreneurship skills were slightly above the average, indicating a medium-high development. It is made up of 81.13% women and 18.87% men. Regarding experience in practical entrepreneurship activities, 32.08% indicated having had them, while 67.92% had no previous experience in this area.

Cluster 4: It is the cluster with the highest representation in the sample (33.33%). Their degree of acquisition of entrepreneurial skills was ranked second among the five clusters, with levels between 83.4 and 79.8%. Its best results are observed in personal and cooperation skills, specifically in identifying the importance of working as a team, adapting to change and developing, organizing and communicating ideas. The distribution by sex is 65.71% women and 34.29% men. It was identified that 41.43% have or have had some entrepreneurship, while 58.57% do not have this experience.

Cluster 5: This cluster represents 12.38% of the sample and shows an average acquisition of entrepreneurship skills, although its weight is below the average of the total participants. It is made up of 61.54% women and 38.46% men. Regarding the development of entrepreneurship, only 34.62% have applied it practically, while 65.38% have never been related to this approach.

As the last step of the descriptive analysis, the differences in entrepreneurship competencies were investigated according to the sex of the participants and whether they had previous experience in generating a venture. For this, non-parametric tests were applied, since the entrepreneurship competencies did not present a normal distribution ($p < 0.05$).

Table 5 shows that the means for both grouping variables were different, with significance values less than 0.05. Specifically, the results showed that men reported greater acquisition of entrepreneurial competencies compared to women. The greatest difference was recorded in cooperation competence, while the smallest difference was observed in personal competence. For both women and men, personal competence was the most developed. However, when observing the least developed competence, it was identified that for women it was communicative and for men it was methodological.

For their part, those who have or have had an entrepreneurship reported greater acquisition of skills compared to those who have not had the experience of entrepreneurship. The most marked difference between the two groups was detected in methodological and cooperation competences, and the smallest difference in professional competence. Personal competence was the most developed in both those who have experienced entrepreneurship and those who have not; However, for those who have already undertaken it, they perceived themselves as having weaker communicative competence, while for those who have not done so, the greatest weakness was methodological.

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Table 5. Test statistics grouped by sex and entrepreneurship background

	Grouping variable	PROF	ME TO	COMU	COOP	PERS	Entrepreneur profile
Mann-Whitney U	Sex	3782,500	3777,500	3812,500	3829,500	3738,000	3718,500
	Background in entrepreneurship	3651,000	3469,500	3763,000	3664,500	3479,500	3483,000
Z	Sex	-2,547	-2,558	-2,476	-2,435	-2,654	-2,693
	Background in entrepreneurship	-4,107	-4,522	-3,853	-4,080	-4,498	-4,477
Sig. asin. bilateral	Sex	0.011	0.011	0.013	0.015	0.008	0.007
	Background in entrepreneurship	0.000	0.000	0.000	0.000	0.000	0.000
Socks	Sex						
	Female	18,479	18,246	18,176	18,887	18,296	18,417
	Male	20,000	19,765	19,838	20,324	19,985	19,982
	Total	18,971	18,738	18,714	19,352	18,843	18,924
	Background in entrepreneurship						
	Yeah	20,097	20,118	19,946	20,634	20,226	20,204
	No	18,077	17,641	17,735	18,333	17,744	17,906
	Total	18,971	18,738	18,714	19,352	18,843	18,924

Note: PROF = Professional, METO = Methodological, COMU = Communication, COOP = Cooperation, PERS = Personal
Source: self made

Discussion

Although the promotion of entrepreneurship among university students is crucial to address current challenges in the social and commercial spheres, the development of skills is essential to achieve this (Fischer *et al*., 2022). Therefore, the objective of this research was to determine the degree of acquisition of entrepreneurship skills in university students in their final year of bachelor's degree, who take subjects with an emphasis on business within their curriculum and who also participated in activities to promote entrepreneurship. institutionally developed. To do this, we sought to identify differences according to sex and previous experience in entrepreneurship.

In this regard, it was considered that knowing the entrepreneurial profile of the students who are about to graduate represents an opportunity to strengthen successful strategies and identify areas that require greater attention to promote the development of the necessary skills in the business field. The results revealed a segmentation into five clusters regarding the degree of acquisition of entrepreneurial skills. Three of them showed levels above average, with the cluster with the highest levels consisting of 22.38% of the participants. Likewise, two clusters, which represented the majority of participants (58.57%), reported medium-high levels, while another

cluster showed a medium level (12.38%). Finally, a less representative cluster (6.67%) was located in the medium-low level.

These findings suggest that the designed study plans and extracurricular activities contribute to the formation of an entrepreneurial profile in students, which is a positive indicator of the effectiveness in entrepreneurship management at the public university analyzed.

Regarding the type of competence, it was observed that personal competence obtained the best acquisition results for the entire sample of students, while professional, methodological, communicative and cooperation competences showed similar evaluations with each other with positive evaluations. In this regard, the results presented by Ochoa Hernández *et al*. (2015) indicate that university students from a business and administration school exhibited an entrepreneurial profile characterized by their capacity for creativity and innovation, risk-taking skills, and self-determination traits, aspects considered as indicators of entrepreneurial competencies in this research.

On the other hand, the analysis based on the sex of the participants indicated a greater development of entrepreneurial skills in men than in women. Furthermore, it was identified that those who have or have had experience in entrepreneurship have greater competencies compared to those who have not had it. These data show some discrepancies with previous studies, such as that carried out by Ortiz and Olaz (2015) in young Spanish people, where both men and women showed little interest in entrepreneurship and a low acquisition of skills related to the ability to recognize business opportunities and take risk.

In summary, the results of this study suggest the importance of making adjustments to university curricula to include topics that encourage the identification, development and application of business opportunities. This can facilitate the incorporation of graduates into the labor market through the creation of their own businesses, as well as improve the skills required by employers when they decide to work in established companies.

Finally, it should be noted that these results were obtained in the context of a public university located in north-central Mexico, with students studying bachelor's degrees related to the business environment, so they cannot be generalized to all higher education institutions.

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Conclusions

From a multivariate analysis using the cluster technique and analysis of variance, it is concluded that the results obtained in this research support the idea that students from public universities who study degrees with an emphasis on business and participate in business promotion activities entrepreneurship develop the necessary skills for the entrepreneurial profile: professional, methodological, communicative, personal and cooperation.

In particular, the cluster analysis made it possible to identify five entrepreneurial profiles, of which in four the degree of acquisition of skills is considered satisfactory. A notable finding in the cluster with the lowest acquisition of entrepreneurship skills is that it is mostly made up of women and people who mentioned not having previously experienced entrepreneurship practices in their daily lives.

On the other hand, through the Mann-Whitney U test, support was found for the existence of significant differences by sex in the degree of acquisition of entrepreneurship skills, since men were the ones who reported better results. Likewise, with this test it was identified that university students who have or have had a business have a greater acquisition of entrepreneurial skills compared to those who have not developed any business.

Based on the above, it is recommended that public universities adopt approaches that promote not only the entrepreneurial spirit in the classrooms, but also use institutional programs to foster skills for business generation. Likewise, it is suggested that the gender perspective be included to encourage the participation of women in the entrepreneurial field.

Finally, the creation of spaces where students can practically develop the business ideas that arise as a result of their academic training is proposed, since, as observed in the results, those who have the opportunity to experience a real entrepreneurship are the who manage to achieve a higher degree in entrepreneurial skills.

Future lines of research

In future research, it would be interesting to strengthen the results by expanding the analysis to a sample of students from other areas of knowledge and from different geographic regions. In addition, it is suggested to develop qualitative research using the case analysis technique to carry out an in-depth study of the successful ventures that emerged through the projects developed in public universities.

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Additionally, as a future contribution, it is contemplated to analyze the impact of entrepreneurial skills in the generation of sustainable businesses, since this would allow us to determine the implications of working on the development of entrepreneurial skills as a support mechanism to address problems related to sustainable development goals (SDG), which seek to contribute to the development of economic, social and environmental dimensions in a comprehensive manner.

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