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ENTREPRENEURIAL COMPETENCES: DEVELOPMENT OF AN EVALUATION SCALE

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Abstract

Title: Entrepreneurial competences: development of an evaluation scale

Objective: The article aimed to present the process of elaboration and validation of a scale that evaluates the entrepreneurial competences developed in undergraduate entrepreneurship courses.

Method: To elaborate and validate the scale, documentary analysis, focus groups, validation by judges, semantic validation and empirical validation with 182 respondents were performed.

Originality / Relevance: The article presents an entrepreneurial competences scale developed specifically to assess the competences of undergraduate entrepreneurship courses, as opposed to existing scales that are focused on business owners, not representing the reality of students.

Results: The validated scale has 36 items, divided into 5 factors. Factor 1 was named "competences to build the business model". Factor 2 was named "selling and risk taking competences". Factor 3 was named "opportunity identification competences". Factor 4 was named "competences to accept mistakes". Finally, factor 5 was named "teamwork competences".

Theoretical / methodological contributions: The main contribution proposed by the article is the presentation of a scale capable of measuring entrepreneurial competences developed by students of entrepreneurship courses or subjects, since the existing scales are focused on business owners. The scale can be replicated for assessment of other entrepreneurship courses and its construction and validation process can be replicated.

Keywords: Entrepreneurship. Entrepreneurship Education. Entrepreneurial Competences. Evaluation.

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1 INTRODUCTION

Entrepreneurship education in high education has been growing around the world, but its results do not yet make it clear whether such courses are truly capable of training more capable and competent entrepreneurs (Martin, McNally & Kay, 2013). Therefore, in recent years, there has been a growing number of research assessing the effects of entrepreneurship education, but this research still focuses on subjective rather than behavioral indicators, such as students' intention to become entrepreneurs (Nabi, Linan, Fayolle, Krueger & Walmsley, 2017). Assessing intention is insufficient to understand the results of entrepreneurship education (Fayolle, 2013), because between intention and action there is a long distance (Martin et. Al, 2013).

One of the main outcome indicators of entrepreneurship courses researched in the literature is learning (Nabi et. Al, 2017). Learning is often measured by students' test scores (Mwasalwiba, 2011), which usually only require students to remember learning content but do not identify behavioral changes (Duval-Couetil, 2013).

According to Man (2012), one of the main ways to measure entrepreneurship learning is to assess students' acquisition of entrepreneurial competences. Measuring competences is even more important in courses that teach entrepreneurship as a method and propose the use of a range of strategies that can stimulate action and creation with active methodologies. It is not enough for the student to think about, talk about or understand what entrepreneurship is. They need to act, apply and test the knowledge gained (Neck & Greene, 2011).

Much of the entrepreneurial competence scales found in the literature (Chandler & Jansen, 1992; Man & Lau, 2002; Man, Lau & Snape, 2008; Mitchelmore & Rowley, 2010; Kyndt & Baert, 2015) were designed to measure the competences of entrepreneurs, existing business owners or intrapreneurs, ie people who have the entrepreneurial profile and work in organizations. Thus, these scales may be considered inadequate to measure the competences developed by students of entrepreneurship courses, since the learning context and the appropriate competences for the moment of the trajectory of the entrepreneur who intends to or is starting to create new businesses are different from those that run a new or established business (Mitchelmore & Rowley, 2010).

Given the above, this paper presents the process of elaboration and validation of a scale that evaluates the entrepreneurial competences developed in the context of

a university extension course. This course uses methodologies such as Design Thinking, Customer Development, Business Modeling and Lean Startup, with practical and active classes. The scale can be used to assess the competences developed by the student in the course, instead of researching only their intention to start a business, being a more appropriate measure of learning (Mwasalwiba, 2011; Man, 2012).

The main contributions proposed by the article concern the advance in the theory of entrepreneurial competences, by identifying competences related to the teaching of entrepreneurship as a method. In addition, it presents a scale capable of measuring entrepreneurial competences developed by students of entrepreneurship courses or subjects, as existing scales are focused on business owners. The scale may be replicated for assessment of other entrepreneurship courses or subjects, which have content and teaching methods similar to the assessed course. Still, its construction and validation process can be replicated for the elaboration of new instruments for evaluation of other courses.

2 ENTREPRENEURIAL COMPETENCES

Entrepreneurial competences are presented by individuals who start and transform businesses and are often related to business birth, survival, performance and growth (Mitchelmore & Rowley, 2013). Bird (1995) defines entrepreneurial competences as the characteristics, knowledge, motivations and competences that result in the creation and survival of companies. For Man, Lau and Snape (2008), competent entrepreneurs are those who identify opportunities for innovation, develop new products and services, find ways to increase quality and reduce costs and thus improve business performance (Man, Lau, & Snape, 2008).

Lans et al. (2008) relates entrepreneurial competences with the identification and exploitation of opportunities. According to the authors, competences go beyond business plan development and relate to the ability to find and convince investors to raise capital in the business and to build good relationships with customers and suppliers. According to Mitchelmore and Rowley (2010), in small and medium enterprises, entrepreneurial competences are used by founders and employees to best match resources, ensuring that business results are achieved.

Based on the theory of competitiveness, Man, Lan and Chang (2002) related competences with company performance and proposed an entrepreneurial competences model, based on those found in the literature. Competences were

divided into six broad areas: (1) opportunity competences, related to the ability to recognize and develop market opportunities, (2) relationship competences, which refer to the entrepreneur's ability to make contacts, communicate, relate with people and persuade them, (3) conceptual competences, which relate to various competences, such as decision making, risk taking, innovation and others, (4) organizational competences, which refer to how the entrepreneur organizes internal and external resources, (5) strategic competences, related to the formulation, implementation and monitoring of strategies for the company, (6) commitment competences, which lead the entrepreneur to persist in the business.

To confirm these results, Man et al. (2008) developed an instrument, based on a qualitative study, in which 19 successful entrepreneurs were interviewed. The instrument had 53 items and was applied to 153 small and medium business owners in Hong Kong to identify which entrepreneurial competences successful entrepreneurs possess. Through factor analysis, ten factors of entrepreneurial competences were obtained: relationship, analytical, innovation, opportunity, strategic, human, operational, commitment, persistence and learning.

In their literature review, Mitchelmore and Rowley (2010) proposed a summary of entrepreneurial competences identified in four groups: entrepreneurial competences, business management competences, human relationship competences, and conceptual competences. Morris et al. (2013), in turn, argue that entrepreneurial competences have no clear distinctions from management competences and, in an attempt to understand which competences are critical to business success and good performance, conducted three expert analyzes using Delphi method until consensus was reached. The study identified thirteen entrepreneurial competence groups: opportunity recognition, opportunity assessment, risk management, forward thinking, perseverance, creative problem solving, fundraising, guerrilla, value creation, focus, resilience, self-efficacy, building and use of contact network.

Also, Kyndt and Baert (2015) developed and tested an instrument to identify the entrepreneurial competences considered most important. The key competences identified by the authors were: perseverance, self-knowledge, learning orientation, return seeking, decision-making ability, future-planning ability, independence, persuasion, networking, opportunity identification, market knowledge, social conduct and environmental responsibility.

Figure 1 summarizes the main entrepreneurial competences identified in the literature.

Competence	Authors
Market Analysis	Man *et al*. (2008); Morris *et al.* (2013); Kyndt and Baert (2015)
Learning	Kyndt and Baert (2015); Man *et al*. (2008)
Self-knowledge	Kyndt and Baert (2015)
Self-efficacy	Morris *et al.* (2013)
Commitment	Man and Lau (2002); Man *et al*. (2008)
Conceptual	Chandler and Jansen (1992); Man and Lau (2002); Mitchelmore and Rowley (2010); Morris *et al.* (2013)
Strategic	Man and Lau (2002); Man *et al*. (2008); Kyndt and Baert (2015)
Focus	Chandler and Jansen (1992); Man *et al*. (2008); Morris *et al.* (2013)
Management	Man and Lau (2002); Mitchelmore and Rowley (2010)
Innovation	Man *et al*. (2008); Morris *et al.* (2013)
Opportunity	Chandler and Jansen (1992); Kyndt and Baert (2015); Man and Lau (2002); Man *et al*. (2008); Mitchelmore and Rowley (2010); Morris *et al.* (2013);
Perseverance	Kyndt and Baert (2015); Morris *et al.* (2013)
Persuasion	Kyndt and Baert (2015); Morris *et al.* (2013)
Relationship	Chandler and Jansen (1992); Kyndt and Baert (2015); Man and Lau (2002); Man *et al*. (2008); Mitchelmore and Rowley (2010); Morris *et al.* (2013)
Technical	Chandler and Jansen (1992); Man *et al*. (2008)

Figure 1 - Entrepreneurial competences identified in the literature
Source: the authors (2019)

2.1 Entrepreneurship Education

Given the technological and communication changes that the world is going through, people will increasingly need to acquire entrepreneurial competences and abilities that can help them cope with the challenges and uncertainties of the future. Regardless of the career path chosen, everyone can benefit from learning how to solve problems in an innovative way, learning to adapt better to change, and developing their creativity through entrepreneurship. Hence the need for entrepreneurship education is increasing everyday (Henry, Hill & Leitch, 2005). In the 1970s, only 16 US universities had entrepreneurship courses in their curriculum. That number has increased to over 2300 universities and colleges in 2016 (Bauman & Lucy, in press).

Advances in the internet and technology have enabled new working arrangements, with professionals working remotely and collaboratively from anywhere in the world. The new generation of workers, millenials, want to balance their work with their life projects, and prefer to create their own companies than work for existing ones, and have therefore seen entrepreneurship education as the opportunity to develop new career options. (Bauman & Lucy, in press).

Although there is no common agreement of entrepreneurship education's goals, Mwasalwiba (2011), in his literature review, identified the main terms used as objectives of entrepreneurship education, such as the development of competences, intentions, entrepreneurial behaviors, the identification of opportunities, increasing entrepreneurial spirit, developing an entrepreneurial culture, creating and managing new businesses and contributing to society.

Rocha and Freitas (2014) identified that the goal of entrepreneurship education should be to lead students to understand entrepreneurship, to develop their ability to be creative and innovate, to discover opportunities, to plan new businesses, to take risks, to make decisions, to work in teams, to run the business, and to learn from mistakes.

Neck and Greene (2011) present different perspectives on the teaching of entrepreneurship. The first of these is focused on the characteristics and behaviors of the entrepreneur, indicating their successful characteristics. Students may or may not identify with the profiles presented, which may lead to demotivation if the student does not see that they have the characteristics necessary to be successful. The process perspective considers entrepreneurship as linear and predictable, which can be taught from the creation to the extinction of the company. In the cognitive process approach, the focus is on understanding the decision process and the mental models adopted by the entrepreneur. Finally, the perspective of entrepreneurship as a method suggests that entrepreneurship is not predictable and demands action. Therefore, it is not enough to understand the concepts of entrepreneurship and how entrepreneurs think, but it is necessary to use a series of practices that lead students to act and create.

It is already known that entrepreneurship can be taught (Fiet, 2000; Kuratko, 2005), but teachers need to cross the barrier between academia and the real world, ensuring that students have access to more than interesting stories about entrepreneurs to delve into the real problems faced in starting new businesses. Teachers need to become more competent to teach entrepreneurship, being willing to

use technologies and expand their methods with innovative pedagogies (Kuratko, 2005).

Therefore, new approaches to entrepreneurship education have relied on effectuation theory and concepts such as Lean Startup and Customer Development to propose new teaching techniques and experiences (Sá & Kretz, 2015).

According to the effectual logic, the entrepreneur starts the process with an idea, defines what he wants to do and how much he is willing to lose and starts interacting with potential stakeholders to identify whether or not to change his business idea (Sarasvathy, 2001).

According to Steve Blank (2013) the Lean Startup methodology encourages experimentation rather than excessive planning, customer feedback and insights rather than assumptions and intuitions, and an iterative Design Thinking process. Therefore, it requires the entrepreneur to get out of the business plan creation fallacy and be willing to test and validate his business idea with potential customers.

From these concepts, Sá and Kretz (2015) identified that instead of a business plan, students are encouraged to develop a business model framework called Business Model Canvas. Canvas is a nine-area chart that summarizes key information and decisions about value proposition, market segments, customer relationships, channels, key partnerships, key activities, key resources, cost structure, and business revenue sources (Osterwalder & Pigneur, 2010). Additionally, students should use prototypes or minimum viable products with potential customers, suppliers, manufacturers, and partners to gain feedback, reflect, and make necessary changes to the proposed product or service (Ries, 2011). Despite the increasing use of these new approaches, there are no evaluations proving that the use of these methodologies is effective, as there is not enough research comparing different teaching methods (Fayolle, 2013).

Nabi, Lina, Fayolle, Krueger and Wamsley (2017) identified in their literature review that the main indicators of the effects of entrepreneurship education researched are: attitudes, knowledge, intention, number of start-ups and existing company performance.

Given that the expected learning outcomes of entrepreneurship education are competences acquisition (Man, 2012), it is necessary to identify whether courses are being able to develop the desired competences.

3 METHODOLOGICAL PROCEDURES

This research is exploratory and aimed to report the process of developing and validating a scale of entrepreneurial competences developed in a university entrepreneurship course. To elaborate and validate the scale, documentary analysis, focus groups, validation by judges, semantic validation and empirical validation with 182 respondents were conducted. The procedures will be detailed below.

3.1 The course assessed

The course that subsidized the construction of the competency scale is thirty-two hours long, with eight meetings of four hours each. It was chosen because it was created specifically for the purpose of facilitating the development of entrepreneurial competences at the University and for accessibility issues, as researchers would have access to teachers and students for focus groups and questionnaires.

The course takes place once a semester and one hundred and sixty places are offered, divided into four classes with forty places each. All students, faculty and staff of the University may participate in it. Each class is led by a teacher, all of whom are linked to the UFG Entrepreneurship and Incubation Center and students or graduates of the University's Graduate Program in Management, Strategy and Entrepreneurship and Innovation research.

The contents covered in the course are: What is Entrepreneurship and Entrepreneurial Behavior (4 hours), Creativity (4 hours), Design Thinking and Lean Startup (8 hours), Business Model Canvas (10 hours) and Pitch (2 hours), plus a final panel for the presentation of all projects (joint class with all classes, lasting 4 hours). According to the objectives described in the course materials, at the end of the course it is expected that the student will be able to: evaluate which entrepreneurial competences they have and which ones they need to develop; team work; develop a business model; defend what is the value proposition of the chosen business; validate the business model with potential customers, suppliers and partners using Design Thinking and Lean Startup tools; sell their business idea to others even under pressure.

In the first class there is an introduction of all students through a dynamic and one or two guest entrepreneurs participate telling their story and, especially, the difficulties and mistakes made when undertaking. The discussion of the competences that an entrepreneur has or should have is made from these reflections. Next, some

concepts of entrepreneurship are presented and a challenge is proposed for the students. They get R$ 20 and have a week to multiply the money, however they choose, as long as they don't do illegal activities or name the University.

In the next class, creativity content is presented, with practical activities that take students out of their comfort zone. Then, the concepts of Design Thinking and Lean Startup are presented and, upon identifying a real problem, students have a business idea that will be worked on throughout the course. Theoretical and practical activities are alternated so that at the end of the course students have a validated business model that is presented and evaluated in a pitch section. The three best ideas are selected by an appraisal board and awarded.

3.2 Competences Scale Development

To broaden the understanding of the course and its objectives, two focus groups were conducted in September and October 2016. The first focus group was conducted with the three course professors and the coordinator of the University's technological innovation nucleus. Its objective was to identify which entrepreneurial competences the course intended to develop and what were the educational objectives of each activity performed. The focus group was recorded with participants' authorization and lasted for fifty-three minutes. In addition, all instructional objectives of the course activities were transcribed for later consultation.

The second focus group was conducted with six students, graduates of the course, who participated in the classes of the first semester of 2016. Its objective was to identify which entrepreneurial competences were, in fact, developed during the course. Initially, the definition of entrepreneurial competence was presented, asking students to individually write on a blank sheet the competences they believed they had developed in the course. This activity was twenty-five minutes long. Then each student read what they wrote and a group discussion was held. The second stage lasted forty-two minutes. The focus group was also recorded, with the permission of the participants, and the sheets were kept for later consultation.

Data analysis was based on transcription and fluctuating reading of all material from focus groups, allowing for categorization and elaboration of items (Bardin, 1989). The categories were defined a posteriori, based on the corpus analysis of 34 pages and 10,413 words. Three independent researchers categorized the entrepreneurial competences cited in the corpus of analysis. The categories gave rise to the

dimensions that made up the initial version of the instrument with 40 items: relationship, communication, risk taking, accepting mistakes, business modeling, and customer understanding. The items were elaborated from the instructional objectives of the course and the entrepreneurial competences identified in this qualitative stage.

3.3 Validation of the Scale

The elaborate scale is 11 point Likert type, anchored at the ends. The instrument in its initial version with 40 items was submitted to analysis by expert judges in October 2016 to identify its suitability. Judges were two professors and entrepreneurship researchers and a specialist in the construction of measuring instruments. Initially, the judges indicated which dimension they believed each item belonged to. The items that had agreement among the judges were kept in their respective dimensions.

Next, a qualitative analysis of the data was performed with three judges. All items were analyzed to identify their relevance and semantics. Two items were excluded and two were rewritten, according to the judges' suggestions, as they were repetitive items, which would cause redundancy in the analysis. Three dimensions initially proposed were also changed, as suggested by the judges. The “relationship” dimension has been replaced by “teamwork competences”. The “communication” dimension was called “competences to sell the business idea” and the “customer understanding” dimension has been called “competences to identify opportunities based on customer demand”. Thus, the following dimensions began to exist: competences to work in teams, to sell the business idea, to take risks of failure, to accept mistakes, to elaborate a business model and to identify opportunities based on customer demand.

Then, the scale was submitted to semantic analysis, still in October 2016, which was attended by four other students, graduates of the course, also from the classes of the first semester of 2016. The instrument was presented to students already in its digital format. They were asked to answer all questions and at the end to inform if there was any difficulty in understanding the items or instructions. Two students made suggestions to improve understanding of the initial instruction, which were incorporated into the final version of the instrument, now with six dimensions and thirty six items.

For the empirical validation of the scale, it was applied to the graduates of the second semester of 2016 and the first semester of 2017. In the second semester of 2016, 145 students completed the course and 81 answered the competences

questionnaire, obtaining a response rate of 55%. In the first semester of 2017, 152 students completed the course and 102 of them answered the questionnaire, obtaining a response rate of 67%.

The 182 valid numerical responses were subjected to exploratory factor analysis and internal consistency using the SPSS version 20 software, following the proposal by Hair et al. (2005), who consider it necessary that the number of respondents be at least five times the number of the instrument variables.

Of the respondents, 102 (56%) were male and 80 (44%) were female. Eighty-eight of them (48.4%) were between 18 and 22 years old; Fifty-one (28%) were between 23 and 26 years old; twenty-eight (15.4%) were between 27 and 30 years old and 15 (8.2%) were over 30 years old. A total of 22 respondents (12.1%) already owned their own business, while 48 (26.4%) of them had parents who own a business. When asked about entrepreneurial intent, 162 (89%) reported that they intend to start their own business.

Initially, the database was examined for missing data. As the percentage of absent cases was less than 5%, the values were replaced by the mean (Hair et al., 2005). A Pearson correlation analysis between the variables was also performed. From the values obtained, it was noted that there was no strong linear correlation between the variables. Thus, it was inferred that the variables were somewhat linearly correlated, but this association was not strong enough to be problematic to the point where there is a need to exclude variables from the analysis.

Finally, to verify if factor analysis was an appropriate technique for data analysis, tests were conducted to identify the factorability of the matrix. The value of the KMO test (0.922) is considered meritorious and Bartlett's sphericity test indicates the matrix factorability (sig = 0.001) (Hair et al., 2005).

The commonality analysis showed that no item had extreme values (close to 0 or 1). The principal component analysis results indicated 7 eigenvalues greater than 1 with only six explaining more than 3% of the variance. When inspecting the scree plot sedimentation graph, it was noted that two components are indicated, since this is where a break of the curve is observed, with the other components side by side. Still, the parallel analysis performed indicated the extraction of three factors.

As this is an exploratory analysis of the structure, structures with 2, 3, 4, 5, 6 and 7 factors were tested. Orthogonal and oblique rotations were tested for the best fit and, since Cronbach's alphas did not differ in relation to the methods used, we opted

for extraction using the PAF method and Promax rotation to identify which one was more in line with the theme theory, as recommended by Hair et al (2005).

The extraction of 5 factors was considered the most appropriate, because the scales have content compatible with the scientific literature on the subject. Factorial loads greater than 0.45 were considered, according to the recommendation of Tabachnick and Fidell (2013). The results are presented in Table 1. Factor 1 was named “competences to design the business model” (α = 0.95). Factor 2 was called “selling and risk taking competences” (α = 0.89). Factor 3 was called “opportunity identification competences” (α = 0.89). Factor 4 was called “error-accepting competences” (α = 0.87). Finally, factor 5 was called “teamwork competences” (α = 0.83).

Table 1 - Factor extraction results

Factor	Item	M	DP	Loads	h_2
Competences to design the business model (Alpha = 0.948)	I defend what is the value proposition of my business.	8.25	1.480	0.568	0.669
	I demonstrate the benefits of my product / service.	8.46	1.268	0.639	0.694
	I demonstrate how the various areas of my business are related.	8.12	1.377	0.674	0.616
	I correctly assess the customer segment (s) that will be served by my business.	8.02	1.520	0.628	0.618
	I choose the channels that will be used for the product to reach the customer.	8.21	1.462	0.707	0.651
	I design customer relationship strategies.	8.17	1.601	0.758	0.587
	I declare the sources of revenue for my business.	7.76	1.862	0.629	0.511
	I formulate what activities are necessary for the business to function.	8.09	1.560	0.640	0.631
	I investigate what resources are required to run the business.	7.93	1.572	0.791	0.619
	I identify the partnerships needed to optimize the business.	7.95	1.602	0.837	0.65
	I state what the cost sources of my business are.	7.88	1.585	1.003	0.695
	I identify business opportunities from customer expectations.	8.12	1.540	0.564	0.637

Competences to Sell and Take Risks (Alpha = 0.890)	I sell my business idea to other people even under pressure.	7.55	1.905	0.485	0.545
	I present my ideas clearly.	7.80	1.514	0.700	0.67
	I feel confident to speak in public.	7.49	2.273	0.600	0.485
	I defend my business idea to others objectively.	7.81	1.691	0.839	0.759
	I confidently answer questions from others about my business.	7.90	1.646	0.689	0.624
	I participate in activities that simulate risks of failure.	7.06	2.213	0.631	0.471
	I perform tasks that are outside my comfort zone.	7.94	1.893	0.413	0.382
	I expose my ideas to others without fear of being judged.	8.01	1.864	0.572	0.424
Opportunity Identification Competences (Alpha = 0.888)	I create products / services from the opinions of the potential customer.	7.90	1.778	0.516	0.677
	I create prototypes to validate my product / service with the potential customer.	7.76	1.804	0.878	0.69
	I develop a minimum viable product to test the product with the potential customer.	7.48	1.977	0.907	0.749
	I validate my business idea with potential clients before executing it.	7.96	1.736	0.847	0.689
	I validate my business idea with potential key partners before executing it.	7.57	1.830	0.603	0.453
Competences to accept mistakes (Alpha = 0.867)	I remember mistakes I made in the past.	8.05	1.752	0.713	0.536
	I identify mistakes made by others when trying to undertake.	8.24	1.360	0.762	0.554
	I draw lessons from my mistakes.	8.35	1.668	0.807	0.718
	I learn from mistakes made by others.	8.25	1.527	0.877	0.696
	I conclude that mistakes are part of the entrepreneurial process.	9.05	1.327	0.540	0.434
Teamwork Competences (Alpha = 0.830)	I work cooperatively so the team can achieve results.	8.43	1.404	0.810	0.668
	I identify how each member can contribute to the achievement of results.	7.93	1.622	0.683	0.498
	I divide the tasks between the members according to their potentials.	7.80	1.783	0.605	0.522
	I accept different opinions from mine.	8.62	1.388	0.653	0.433

I conciliate different opinions.	8.33	1.560	0.521	0.477
% total variance explained = 64.677				
N = 182				

Source: the authors (2019)

4 DISCUSSION

Entrepreneurship education aims to encourage the student to understand how the market works in real life, to develop competences to design and test new ideas, to identify opportunities, to evaluate a new business, to assess and scale the risks of the intended business, to build the ability to learn collectively, to act as a team, to pass and receive constructive criticism (Rocha & Freitas, 2014). Effectual theory-based methodologies help students develop multiple versions of a product or service to arrive at the optimal version, create and test prototypes, seek to mitigate risk, and commit only a limited amount of resources to the business at a time, to respond to new opportunities and know how to present and negotiate (Salusse & Andreassi, 2016).

By using Business Model Canvas and testing their assumptions weekly, students find out if potential customers would actually buy their products and are able to further develop their business creation process (Sá & Kretz, 2015). Also, typical content and methodologies of the entrepreneurship approach as a method, such as hypothesis testing (Ries, 2011), business modeling (Osterwalder & Pigneur, 2010) and customer development (Blank & Dorf, 2012) stimulate experimentation, obtaining feedback, designing minimum viable prototypes and products, validating business ideas through contact with potential customers, suppliers, partners and manufacturers, and constantly adapting the product or service to increase the chances of success for a new business (Osterwalder & Pigneur, 2010; Ries, 2011; Blank & Dorf, 2012).

Although teaching entrepreneurship as a method is highly recommended (Neck & Greene, 2011), it is not yet known if the results of this teaching method are really superior to the others, mainly because the results are not evaluated from the teaching objectives (Fayolle, 2018). In the present article, the competence scale was built from the instructional objectives of the course and, therefore, can in fact measure whether learning has taken place.

Fayolle (2013) and Nabi et al. (2017) indicate that the effects of entrepreneurship education are mainly researched through the intentions of starting a business. The scale presented is, therefore, an assessment alternative, which will be

based on learning and behavior and not just on the intention of starting the business itself.

The scale can be applied to entrepreneurship courses with content and objectives similar to those used in the course evaluated in this paper, such as Business Model Canvas, Design Thinking, and Pitch, to assess learning effects and their changes over time. In addition, it can be used in conjunction with other assessment measures, such as entrepreneurial intent, for example, to identify whether students who intend to start their business are those with the highest competences development, and to investigate whether there are moderation and mediation relationships between the variables.

5 CONCLUSIONS

Entrepreneurship is seen by political actors as one of the best ways to stimulate economic growth and to solve social problems and by individuals as a way to stimulate their personal growth and increase their incomes. Still, it can help companies increase their competitiveness (Fayolle, 2018). Therefore, the number of entrepreneurship couses has increased in recent years and also the research to identify their results (Fayolle, 2018).

The assessment of entrepreneurship education meets the demands of the various stakeholders. Students are interested in acquiring competences that have value in the job market and are useful for starting a business. Teachers want to demonstrate that students really learn in their classes. Administrators want to demonstrate that courses impact students and the community. And the government wants to demonstrate that it invests in entrepreneurship education, which in turn can have impacts on society and the economy (Duval-Couetil, 2013). Most research assesses the effects of subjects on entrepreneurial intent (Nabi et. al, 2017) and therefore more research is needed to understand the effects of courses on learning and entrepreneurial competences acquisition (Man, 2012).

The literature on entrepreneurial competences is extensive, but focused on the competences that entrepreneurs who have already started their business have or should have. The study contributes to the literature on entrepreneurship education by surveying entrepreneurial competences that can be developed through entrepreneurship courses and by proposing an assessment scale for entrepreneurship

that can be used as a tool for measuring whether entrepreneurship courses and subjects are achieving the expected goals.

Moreover, the scale presented is in line with recent transformations in entrepreneurship education that, based on effectuation theory and concepts and tools such as Lean Startup, Design Thinking, Business Model Canvas and Customer Development, recommends that learning take place through practice and creation. Thus, it can be used to evaluate various courses that are emerging around the world using these new approaches.

The description of the course content, objectives and characteristics enable those interested in applying the developed scale to identify whether the course or subject they intend to evaluate is similar to that described in this article, ensuring that its use is appropriate. In addition, the process of constructing and validating the entrepreneurial competences scale developed by a university extension course can be replicated to the development of scales that aim to assess the effects of other courses or subjects.

As limitations, it is pointed out that the scale was elaborated from the analysis of materials and focus groups with students, teachers and coordinators of only one course. Performing a similar process with other courses is suggested.

Furthermore, it is suggested that the instrument is applied in pre- and post-tests to assess the change in student's entrepreneurial competences before and after the course, making it a way of assessing whether course outcomes and objectives are being achieved. It is recommended to perform more than one post-test, because according to Ployhart and Vanderberg (2010) the use of two measurements only provides a linear view of the change. One can apply the instrument right after the course ends, three months after the course, and so on, to identify if the increase or decrease in entrepreneurial competences continues over time. Finally, comparisons can be made between groups of students to identify if there are differences in competences according to gender, age, previous experience, participation in student movements and others.

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