GAMIFIED PLATFORM FRAMING FOR ENTREPRENEUR COMPETENCIES

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ABSTRACT

The study aims to reveal the need to propose a digital network where entrepreneurs can disseminate their skills achieved beyond formal and normative education. The general objective is to design a gamification platform based on entrepreneurial skills. For this, the specific objectives are proposing a Delphi study to 15 experts obtaining a list of priority competencies in the profiles of entrepreneurs, then the second specific objective is integrating the selected competencies within an interface based on the use of game elements, resulting in a platform that displays the 5 priority competencies, learning through experience, motivation, spotting opportunities, working with others and valuing ideas with 5 game elements respectively, experience points, feedback, leaderboards, progress bar and badges. From the results obtained, it can be concluded that the model implemented will serve as a first precedent for the display of competencies, thus providing an alternative traceability to the skills achieved by entrepreneurial initiatives.

Keywords: Entrepreneurial Skills, Gamification, Platform, Innovation, Competencies.

INTRODUCTION

In the last 20 years there has been growing attention to the issue of entrepreneurship (Castro et al., 2015). The importance given to this aspect does not only refer to educational studies, but also involves other areas of study, such as business studies, social sciences, jurisprudence, communication, among others. With respect to this issue, the main supranational organizations, among which are the European Commission, Organisation for Economic Co-operation and Development OECD, United Nations Educational, Scientific and Cultural Organization UNESCO and Organization of Ibero-American States OEI began to address issues related to this issue, producing numerous policies and frameworks (Reilly, 2018). These frameworks generated by supranational institutions are being regulated and somehow linked to the international scientific debate along with other national experiences and practices. In this sense, a theoretical definition and numerous empirical tools have been gradually produced with reference to the evaluation and planning of competition oriented to entrepreneurship (Ustyuzhina et al., 2019).

Specifically, the European Commission (2006) presents competence, sense of initiative and entrepreneurship as a person's ability to translate ideas into action. This includes creativity, innovation and risk-taking, as well as the ability to plan and manage projects to achieve objectives.

In other words, it allows people to be aware of the context in which they operate and to capture the opportunities offered by starting with the skills and knowledge that contribute to a social or business activity based on ethical values. For its part, the OECD (2015, 2016) focuses on inclusive entrepreneurship, i.e. ensuring that people from all backgrounds have the opportunity to start a business or to be self-employed. Government policy can help people who are unemployed or disadvantaged in the labour market to create their own jobs by helping them acquire entrepreneurial skills and motivation, access to finance and entrepreneurial networks so that they can have the opportunity to create their own employment. At the same time, it is important that policymakers complement these efforts and continue to support the development of entrepreneurial culture and attitudes. Beyond providing valuable information on educational policies, it emphasizes key elements for supporting entrepreneurs, encouraging collaboration with others from different disciplines and cultures, so that complex problems are solved and an economic and social environment is created (OECD, 2017). In foresight, the OECD considers that by 2030, the number of young people and adults with relevant skills, including technical and vocational skills, for employment, decent work and entrepreneurship.

Complementarily, the document produced jointly by OECD and UNESCO (2016) highlights the economic perspectives of Latin America towards young entrepreneurs, taking into account their skills, their insertion in the labor market, their innovation activities and their social, political and economic integration in the region through the opportunities for entrepreneurship and the barriers they face in these areas. Finally, McCallum (2018) explains the future of entrepreneurship possibilities, focused on employability, specific financial instruments for entrepreneurs, reduction of regulatory barriers and social mobility among young people in Latin America, as well as the search for alternative ways to link them with commercial networks and with on-the-job training programs, demonstrating a future supported by the formalization of entrepreneurship education.

For OEI (2010), although it does not specifically speak of entrepreneurship competencies, it limits itself to presenting that the political agenda of the next decade will necessarily be based on pillars such as creativity, innovation and entrepreneurship. Under this heading, the aim is to promote the development of entrepreneurial skills of students, especially those who are in a situation of social disadvantage, in order to benefit their personal autonomy and their employability through the preparation of materials and the development of networks of experiences aimed at the entrepreneurial skills of young people.

As organizations are increasingly eager to adopt gamification, entrepreneurs are echoing this technique. Indeed, Patricio (2017) research shows that gamification catalyzes the development of entrepreneurial skills and capabilities, instills team spirit, and shapes the culture of innovation-oriented support. Even more precisely, gamification has its following advantages:

1. It tackles challenges in a more structured way: it makes it easy to reach a common conclusion, getting everyone in tune and taking action in the same address.
2. Improve, enrich and develop ideas: encourage the contributions of all players, in a more balanced way and gain valuable knowledge even from the most reserved team members.
3. Encourage participation: generate results that have been developed by all participants and agree on the actions.
4. Develop critical entrepreneurship and innovation skills: promote debate and accept opposing points of view, take risks by explaining things in a different way and collaborating in a more open and committed way.

Although gamification has had repercussions in multinational companies, supranational organizations have pronounced their support to the use of this technique, highlighting the United Nations Organization through the Office of Information and Communication Technologies in the Technovation Talks, the European Commission through its Horizon 2020 program maintaining the theme "*Gaming and Gamification*" in which more than a hundred projects were exposed and the Organization for Economic Cooperation and Development in its Public Sector Innovation Observatory, combining the development of new programs for public policies applying gamification.

In short, gamification is a fixed technology of the productive sector (Rivera & Van der Meulen, 2014), its versatility and adaptation to different contexts means a safe bet for its application in companies of the entrepreneurial ecosystem, thus systematically addressing the needs of each company, enhancing its corporate identity and as it will be demonstrated in this research, also a as a tool for traceability in entrepreneurship competencies.

Basically, in the present study we designed a gamification platform based on priority entrepreneur competencies obtained from the European Commission (2017) that carries out the "*EntreComp Conceptual Model*" consisting of 3 competence areas and 15 dimensions with 442 indicators in 8 micro levels of proficiency.

METHODS

This study is based on the achievement of 2 specific objectives, the first being a list of priority competencies in the profiles of entrepreneurs, then the second specific objective is integrating the selected competencies within an interface based on the use of game elements. The list of competencies comes from EntreComp Conceptual Model (European Commission, 2017) divided into 3 competence areas and 15 dimensions, this analysis is organized in 3 phases: pilot test with 3 experts, execution of the study through the judgement of 15 international experts and formulation of a list of priority competences. In this study, the experts were selected from Italy, Spain and Ecuador corresponding to people with a doctorate degree and more than 10 years teaching in the area of entrepreneurship.

Based on the dimensions of EntreComp and with the intention of allowing the prioritization and valuation of the main items, a questionnaire is carried out with 15 questions (one per dimension), with the option of an answer on a 10 level Likert scale, the minimum value (1) being "*totally dispensable*" and the maximum value (10) "*totally indispensable*".

The second objective focuses on designing a digital interface to implement 5 entrepreneurship skills applying different mechanics belonging to gamification in order to provide traceability and visibility of the skills presented by the participants. The selection of the gamification elements is based on the dimension called creation and maintenance of expectations that contains the following indicators (Torres Toukoumidis et al., 2018):

1. Playing elements: levels, challenges, goals, etc.
2. Reward systems: leaderboards, medals, points (PBL).
3. Promotion of competition/collaboration.

Regarding the computer programming interface, the requirements that has been raised a system consisting of two servers, the first server will provide the website to the user and interact

with the second server through web services. The second server allows to manage the data of all users and will also provide a web interface for the administrator.

For the server that provides the user's web page, it is proposed to use html5 technology in order to facilitate access from different operating systems and an adaptation to any device from which it is accessed.

On the other hand, for the storage and administration server, it is intended to have security and stable data management, for which it has been planned to use the Java JPA framework and a PostgreSQL database. The client will be built with the atom text editor for its ease of configuration and variety of extensions that facilitate the rapid development of code and order in it (Table 1).

Table 1
TEXT EDITOR DESCRIPTION

Name	**Atom**
Download link	https://atom.io/
Package installed	atom-beautify atom-live-server emmet file-icons platformioide-terminal

The server will use the JPA framework for java so it will be developed on the oxygen eclipse platform using the Wildfly server to run the application. It is also planned to have an adaptation of content for all types of devices by choosing the Bootstrap 4 library which allows this process. On the other hand, it was also required to make a game within the web environment and for this we will use another library called Phaser 3, which is a game engine for web environments.

RESULTS

The questionnaire, in pilot test stage, was developed in the month of January 2019 and was validated through a judgment of 3 experts, taking into consideration its evaluation in appearance, construction, content and criteria, being the elements to evaluate the following (Table 2):

Table 2
CONSTRUCTION CRITERIA FOR THE VALIDITY OF THE DATA COLLECTION INSTRUMENT

Code	**Criteria**
A1	The instrument collects the information needed to respond to the research problem raised
A2	The proposed instrument responds to the objectives of the study
A3	The structure of the instrument (sections, areas and competences) is adequate
A4	The items of the instrument respond to the operationalization of the variables
A5	Sequence of questions (items) facilitates understanding of the instrument
A6	Items are clear and understandable
A7	The number of items is appropriate for your application

Since the validity test is performed in conjunction with the reliability test, only three experts assess the construct and content of the questionnaire, obtaining the following data (Table 3):

Table 3 RESULT OF THE INTER-JUDGE CONCORDANCE TEST FOR INSTRUMENT VALIDITY					
	Judges				
Criteria	A	B	C	Val of P (Sum)	Cohen's Kappa
1	1	1	1	3	1
2	1	1	1	3	1
3	1	1	1	3	1
4	1	1	1	3	1
5	1	1	1	3	1
6	1	1	1	3	1
7	1	1	0	2	1
Total	7	7	6	20	0.95

Cohen's Kappa (0.951) is high, so any degree of agreement ≥ 0.700 is an acceptable result. In question A6, corresponding to the criterion of comprehension of the items, the judge who did not agree recommends changes in circumstantial complements to the description of the question, but not directly on the dimension to be studied, for which reason the reliability of the instrument is analyzed through a pilot test. The questionnaire, designed on the Google Docs® digital platform, is self-administered and contains, as mentioned above, three phases or areas (Table 4), made up of 15 questions in total, one for each dimension of the EntreComp Conceptual Model (3 areas and 15 competencies). The execution of the pilot test yielded the following results, ordered by competencies:

Table 4 RATING AVERAGE PER COMPETENCE			
Competence	Arithmetic mean	Standard deviation (σ)	Variance (σ^2)
Spotting opportunities	8.666	1.211	1.466
Creativity	8.678	1.505	2.266
Vision	8.500	2.258	5.100
Valuing ideas	8.166	2.639	6.966
Ethical and sustainable thinking	8.666	2.338	5.466
Self-awareness and self-efficacy	8.333	2.422	5.866
Motivation and perseverance	9.839	0.408	0.166
Mobilizing resources	7.835	1.329	1.766
Financial and economic literacy	7.500	1.643	2.700
Mobilizing others	8.500	1.048	1.100
Taking the initiative	7.833	1.834	3.366
Planning and management	9.166	0.752	0.566
Coping with uncertainty, ambiguity and risk	8.664	1.032	1.066
Working with others	8.653	1.861	3.466
Learning through experience	9.666	0.816	0.666

Obtaining the variance per item σ^2 (Table 5), the sum of the variance per item gives a total of 42, with an average variance of 2.8. For the calculation of statistical reliability of the pilot test, the formula to obtain the Cronbach coefficient is executed, giving the following results:

Table 5 RELIABILITY STATISTICS		
Cronbach's Alpha	Cronbach alpha based on typified elements	No of elements
0.840	0.842	15

As assumed, the Cronbach coefficient reliability values range from 0 (null reliability) to 1 (total reliability). In the case of the identified instrument (Table 6), a high of 0.840 was obtained, which is between a respectable and excellent reliability (excellent ≥ 0.900). According to the results of this coefficient, the reliability of the instrument is meridianally validated. The second phase of the first specific objective was implemented in January 209. The 13 experts selected for the study considered the following hierarchy of competencies:

Table 6
EXPERT JUDGEMENT RESULTS

Competence	Arithmetic mean	Standard deviation σ	Variance σ^2	Ranking
Spotting opportunities	9.307	0.769	0.594	3
Creativity	8.692	1.505	2.266	12
Vision	8.846	2.258	5.1	9
Valuing ideas	9	2.422	5.866	5
Ethical and sustainable thinking	8.846	2.338	5.466	10
Self-awareness and self-efficacy	8.923	2.639	6.966	7
Motivation and perseverance	9.461	0.408	0.166	2
Mobilizing resources	8.695	1.329	1.766	14
Financial and economic literacy	7.923	1.643	2.733	15
Mobilizing others	8.692	1.048	1.119	11
Taking the initiative	8.678	1.834	3.366	13
Planning and management	9.255	1.861	3.466	6
Coping with uncertainty, ambiguity and risk	8.846	1.032	1.066	8
Working with others	9	1.211	1.466	4
Learning through experience	9.615	0.816	0.665	1

The Institutional Framework elaborated with EntreComp Conceptual Model represents the international reference on the topic of the promotion (projection-evaluation-teaching) of the competence "*spirit of initiative and entrepreneurship*" as we have provided in the analysis. The research work done allows us to identify, throughout the 15 competences, which are indeed the 5 priority competences and which gamification elements will be applied on the interface (Table 7):

Table 7
PRIORITIZATION OF RESULTS

Competence	Ranking	Gamification elements according to Torres Toukoumidis et al. (2018)
Learning through experience	1	Experience points (XP)
Motivation and perseverance	2	Feedback
Spotting opportunities	3	Leader boards
Working with others	4	Collaboration
Valuing ideas	5	Badges

The application carried out for each competence and its link with the game elements (Figure 1). First of all, the header contains the user's basic information: photo, name, surname and email accompanied by a link called "*Generar CV*" that creates you an automatic curriculum vitae following the information of the 5 competencies. Next, there is a progression bar as an extra gamification element, which is responsible for demonstrating whether the user has filled in the corresponding information, along with a network diagram that appears as a measuring tool on the skills achieved by each user in the competencies.

FIGURE 1
HEADER OF GAMIFIED PLATFORM

Regarding the gamification elements, the experience points (XP) are presented for learning through experience (Figure 2). The maximum score is 100 points, and this will depend on the work experience of the user, that is to say, the more years the user has worked, the better the score the user will accumulate. Secondly, there is motivation and perseverance which is linked to feedback as gamification element evidenced when other users validate the skills of other users.

FIGURE 2
MOTIVATION AND PERSEVERANCE COMPETENCE

According to spotting opportunities competence, a leaderboard table as gamification element is created for the people registered in the platform that allows to determine according to a computer algorithm the academic and professional events that the user has attended, the number of hours and the role of the event (Figure 3). For its part, the fourth competence called working with others is connected to collaboration. The more friends you have belonging to a knowledge area, it will be reflected on the diagram. This competence allows to demonstrate that independently of the area to which the user belongs, the circle of friends can potentially articulate multidisciplinary projects. Finally, the competence called valuing ideas seeks to achieve the coincidence of the user's ethics with the mission, vision and values of the institution it belongs to. A series of hidden keywords are determined for the user, which at the moment of presenting their entrepreneurial ethics will reflect their coincidence through badges. In this case, it seeks that the ethics of entrepreneurship adjust to the values of the Salesian Polytechnic University, so that the user gets 5 words right receives golden badge, 4 or 3 to silver badge, while 2 or 1 receives bronze badge.

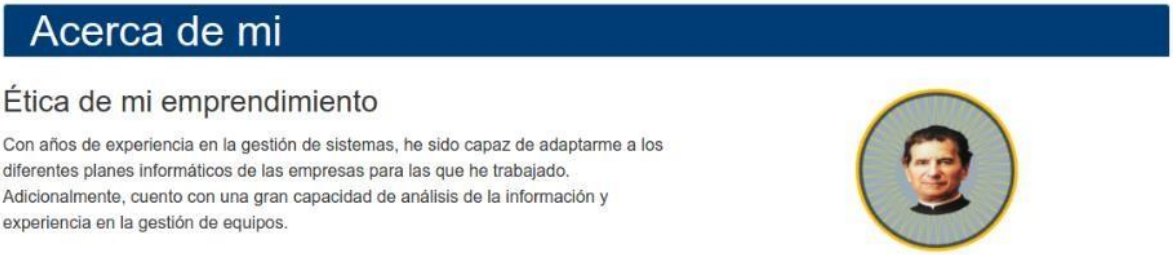

FIGURE 3
VALUING IDEAS COMPETENCE

The results clearly show that, according to experts, there is a priority over entrepreneurial skills, emphasizing learning through experience, motivation, spotting opportunities, working with others and valuing ideas. In short, the 5 entrepreneurial competencies enhance their visualization and traceability through the use of game elements.

CONCLUSION

This research correctly fulfils both of these specific objectives. The first of them, is denoted with the hierarchy glimpsed on the following entrepreneurial competencies: (1) Learning through experience, (2) Motivation and perseverance, (3) Spotting opportunities, (4) Working with others, (5) Valuing ideas, (6) Planning and management, (7) Self-awareness and self-efficacy, (8) Coping with uncertainty, ambiguity and risk, (9) Vision, (10) Ethical and sustainable thinking, (11) Mobilizing others, (12) Creativity, (13) Taking the initiative, (14) Mobilizing resources and (15) Financial and economic literacy, while the second objective, manages to include elements of games based on creation and maintenance of expectations that contains playing elements as levels, challenges, goals; reward systems as leaderboards, medals, points (PBL) and promotion of competition/collaboration (Torres Toukoumidis et al., 2018). The findings reinforce the acceptance of the entrepreneurship competency models presented by the European Commission UNESCO, OECD and OEI, demonstrating that they can be involved in empirical and pedagogical scenarios, as it happens in this case creating a gamified web interface oriented towards alternative skills reaching the production of a curriculum vitae with the previously mentioned competencies.

Therefore, as it is an exploratory model, a series of obstacles are revealed, such as determining a large pilot sample to test the interface, a more exhaustive analysis of the gamification elements, segmenting between dynamics, mechanics and aesthetics. In short, researchers must continue to investigate this issue, discovering ways to highlight entrepreneurial skills by proposing their teaching in both formal and informal education accentuating their dissemination in the business context in order to progressively legitimize them in the professional profile.

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