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Startup Day UPF 2019: Gamification as a Tool for Innovation

Startup Day UPF 2019: Gamificação Como uma Ferramenta para Inovação

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ABSTRACT

The purpose of this work was to evaluate the effectiveness of Gamification as an innovation tool in the process of developing new businesses. Qualitative and quantitative study approaches were used in the research. For qualitative research, the non-participant observation technique was applied, performed throughout the event. For quantitative research, data collection employed the application of a questionnaire, which was sent to potential participants through electronic means, which obtained 85 responses. The analysis of the qualitative data was performed by content analysis, and the quantitative data were tabulated and analyzed statistically. The relevance of the study lies in its object of study, which consists of a 24-hour event, where participants receive a challenge and then go through 10 stages based on Design Thinking to create a business. The results obtained through the two data collections, indicate that gamification can be efficient to develop innovation and potentialize new businesses. The findings highlight the existence of the four elements of gamification in the case studied: motivation, elements of the game, types of users and rewards. Through the mapping of these elements, it is possible to map Gamification in events like the one studied. The study's contribution is in the structuring of a process for the recognition of innovation in events that use Design Thinking and Gamification as the main methodologies, which thus creates an environment conducive to the generation of innovation.

Keywords: Innovation. Gamification. Entrepreneurship. Design Thinking.

RESUMO

O Propósito deste trabalho foi avaliar a eficácia da Gamificação como ferramenta de inovação no processo de desenvolvimento de novos negócios.Utilizou-se na pesquisa as abordagens qualitativa e quantitativa de estudo. Na qualitativa foi aplicada a técnica de observação não participante, realizada durante o evento. Para a pesquisa quantitativa, a coleta de dados empregou a aplicação de um questionário, o qual foi encaminhado aos potenciais participantes através de meio eletrônico, o qual se obtiveram 85 respostas. A análise dos dados qualitativos foi realizada por análise de conteúdo, e os dados quantitativos foram tabulados e analisados estatisticamente. A relevância está no objeto de estudo que consiste em um evento com 24 horas de duração, onde os participantes recebem um desafio e depois passam por 10 etapas baseadas no *Design Thinking* para a criação de um negócio. Os resultados obtidos através das duas coletas de dados, indicam que a gamificação pode ser eficiente para desenvolver inovação e potencializar novos negócios. Os achados destacam a existência dos quatro elementos de gamificação no caso estudado: motivação, elementos do jogo, tipos de usuários e recompensas. Através do mapeamento destes elementos permite-se mapear a Gamificação em eventos como o estudado. A contribuição do estudo está na estruturação de um processo para o reconhecimento da inovação em eventos que usam como principais metodologias o *Design Thinking* e a *Gamificação,* que cria assim um ambiente propício para a geração da inovação.

Palavras-chave: Inovação. Gamificação. Empreendedorismo. Design Thinking.

1 INTRODUCTION

The importance of innovation, in general, is perceived as essential for survival in an increasingly competitive and globalized scenario. However, few companies exercise any kind of initiative to put it into practice. There are two causes for this not to happen so often: the view on innovation and the lack of tools that help putting it into practice (MOTA, 2008).

Mechanisms that enable the "innovative logic" have been developed both in the context of the innovation of organizations, and in the scientific field, with the articulation of studies. This relationship is established and developed by the agents of the strategic public to be reached by the present innovation, with the advent of generating competence, technology and innovation, so that companies start to absorb such innovations to make them available to the market (SCHNEIDER, 2017).

Gamification is the use of game mechanics and dynamics to engage people, solve problems and improve learning, motivating actions and behaviors in environments outside the context of games (ROSSATO; NECKEL; MOZZATO, 2018). According to the authors, the use of Gamification focusing on the development of new business ideas can bring greater engagement, optimizing results and boosting physical and virtual markets. The process helps to obtain feedback faster, thus improving the potential for improvement.

StartUp Day is an event which has been held annually at the University of Passo Fundo since 2017, using Gamification to develop a new business based on a challenge proposed at the beginning of each event. In the 2019 edition the challenge was creating innovative business solutions for health. Thus, during the 24 hours of the event, participants are challenged to find technological solutions to a problem. This way, multidisciplinary groups are formed to carry out the proposed activities, as in a competition.

Since Gamification is a training mechanism for the competitors because it facilitates the development of skills for a new business, the research problem of this paper is: how efficient is the use of the Gamification tool in an immersion event for the development of new businesses?

First, a literature retrospective about innovation, gamification and design thinking is presented. Subsequently, the methods that were used are shown. Then, the results and discussion are presented. Finally, the conclusion shows if gamification may help developing new businesses.

2 THEORETICAL REVIEW

This theoretical review brings a literature retrospective about innovation, gamification and design thinking. All these elements are used in the StartUp Day event.

2.1 Innovation

The term innovation comes from the Latin word “innovare”, meaning: “to do the new, renew, to make changes”. Simply put, according to Terra *et al*. (2007), innovation comes down to a new idea or the creation of a new application for something that already exists, in order to be transformed into novelty for people.

Innovation is a new idea that has a real impact, creativity, and is feasible to be implemented. However, it can present itself as the improvement of something that already exists in the market, thus causing innovation (DRUCKER, 1986; TERRA *et al.,* 2007). The integration of different actors is also essential in the innovation process, as they contribute to creativity and know-how. Faced with an innovation context, creativity plays a significant role, corroborating organizational capacity and expressing a source of competitive advantage (PARJANEN; HYYPIÄ, 2019).

The reflexes of technological revolutions that today permeate our daily lives lead us to questions about the possibility of generating innovation, adding knowledge to the production processes, as well as creating new processes and products that can improve the lives of people to be impacted by these methods. According to Drucker (1986), innovation is a phase of the entrepreneurial personality and is a consequence of the means to reach entrepreneurship and ultimately generate an innovation. The author points out that innovation comprises the spirit and the act of creating new forms of financial resources or well-being for people who benefit from its creation and reaching the target audience.

Innovation can be divided into categories, which would facilitate the categorization of these products elaborated through the idea of innovation, perceiving the design process and being able to cause divergences, since few innovations can impact social relations that cause great transformations changing the reality of individuals involved. In his theories, the author presents the comparison between innovation and unexpected success, with no area obtaining less risky or easier opportunities. Thus, to take advantage of these opportunities that innovation brings, it is necessary to expand our vision, our knowledge and our understanding.

It should be noted that failures and errors during processes that can enhance the achievements of entrepreneurs are normal (SCHUMPETER, 1988).

Entrepreneurial behavior, linked to the ability to appropriate the purposes and foundations of generating innovation through this new activity, can be understood as a specific tool for entrepreneurs, compared to a theoretical/practical, tested and validated discipline (TIDD; BESSANT, 2015).

Innovation emerges as a concept in the management area with the studies of the economist Joseph Schumpeter, who takes a first look at how innovation would be fundamental for the development of a new economic model, responsible for transforming entrepreneurs into trendsetters and pioneers of new horizons (TIDD; BESSANT, 2015). This way, the evolutionary processes have been gaining more support and space within management areas, considering the improvement of the theories presented and implemented over the years, making people think and act in an innovative way, being moved by competition and by desire to always win, transforming them into agents of intense competitiveness and innovativeness (TIDD; BESSANT, 2015).

For Porter (1990), innovation is characterized not only as a way to negotiate major advances in the technology area, but also as the use of changes in small productive scales of technology implementation, in which organizations generate competitive advantages through innovative actions that seek to make possible innovations in a broad and open sense.

The characteristics of an innovative business are presented by its leaders, who must be ahead, thinking outside the common line, because in today's world, good ideas are not enough, demanding a motivated and prepared team along with a leader who is capable of generating knowledge about what the target audience needs (LEMOS, 2016).

2.2 Gamification

A modern model of organizing people in order to achieve a goal is the use of games. According to Kapp (2012), the structure and operational models of companies are still the same as in the 19th century, based on hierarchy, bureaucracy and specialization of work with the aim of achieving scale and efficiency of results. This model requires clearly defined roles and responsibilities, exact processes and management based on command and control, as seen in military organizations (BORGES et al., 2013). In the modern world, however, such premises limit individual capacity, the way in which it is charged and the commitment to professional goals. Information Technology (IT) has created the possibility of organizing

work differently - through the social aspect - and games are the platform that best fits as an instrument of this new order (TANAKA *et al*., 2013).

Gamification is the use of game mechanisms aimed at solving practical problems or arousing engagement among a specific audience. With increasing frequency, this set of techniques has been applied by companies and entities from different segments as alternatives to traditional approaches, especially with regard to encouraging people to adopt certain behaviors, to become familiar with new technologies, to streamline their learning or training processes and making tasks considered tedious or repetitive more enjoyable. In recent years, game designers from different parts of the world have been dedicated to applying principles of games in a variety of fields, such as health, education, public policies, sports or increased productivity (DETERDING *et al*., 2011).

The development of Gamification comes from a somewhat obvious finding according to Mattar (2018): human beings are strongly attracted to games. Over the centuries, practically all known civilizations have been associated with some type of important competition for the social structuring of the community to which they belonged. In addition to the most predictable examples, such as Greeks (Olympic Games of Antiquity), Romans (gladiator duels, chariot races) and Aztecs (Mesoamerican ball game), there is still surprising evidence of this fact, which occurred about 3,000 years ago in Libya, a region located in the former Asia Minor (GREGORY *et al.*, 2015).

Zimmerling et al. (2019) argue that Gamification is the process of applying game elements in non-game contexts. The game elements are varied, ranging from gamified systems, missions, social graphics, content unlocked by levels, among others (BARATA *et al.*, 2017; BUCKLEY; DOYLE, 2017). These mechanisms are known in gamification as "elements", which encourage students to achieve greater goal orientation, promoting increased persistence, learning, participating in collaborative activities and promoting a fun and friendly competition with colleagues (DING, 2019).

For Marczewski (2013), gamification is a process composed of motivation, game elements, types of users and rewards. Gamification is in the process of expanding and consolidating the concepts that lead to studying the applications of this theme as a methodology for generating innovation, so that new business can be generated through the analysis of studies already presented on the subject. Rossato, Neckel, Mozzato (2018), consider Gamification as the application of game metaphors for real life activities in order to influence behavior and thus increase motivation, consequently generating innovation through the methodology of games in events like Startup Day UPF.

Most of the studies carried out by the researchers of the gamification theories are focused on the education, training and development of the behaviors of individuals, mainly in the business environment (ORLANDI *et al*., 2018). The studies of themes involving gamification have had a dizzying growth, leading to the discovery of new paths for the development of new businesses through the generation of innovation as a consequence of gamification (ROSSATO; NECKEL; MOZZATO, 2018). Zainuddin *et al*. (2020) complement that studies involving gamification have identified improvements not only in students' motivation and engagement, but also in their learning results. Several strategies describe the adaptation of gamified concepts to improve the positive results of learning.

2.3 DESIGN THINKING

The revolution in the concepts of entrepreneurship and how to make entrepreneurship happen permeates the themes around the concepts of design thinking as a methodology to foster entrepreneurship and innovation. According to Lockwood (2010), design thinking is a man-centered innovation process that emphasizes observation, collaboration, rapid learning, idea identification, rapid concept prototyping and simultaneous business analysis. The design process highlights work based on observation, identification of ideas and prototyping. Design thinking is also considered a process of interactivity and active methodology that is characterized by the high degree of creativity that it involves, as well as the generation of a practical and viable solution to the problems raised for design, which meets and can exceed customer expectations (AMBROSE; HARRIS, 2011).

Within the design development process, it is possible to identify the stages for development. First, the design must diagnose the problem and the target audience defined, having a detailed understanding of the paths to be taken until the final product is prepared. The generation of the idea in which the motivations and needs of the end consumers are identified, in many cases, occurs through a brainstorming. The prototype test deals with the resolution and development of these ideas that are presented to the group of users and stakeholders before the final presentation to customers (AMBROSE; HARRIS, 2011). The selection deals with the proposed and analyzed solutions in relation to the briefing's design objective. Some solutions may be feasible but may not be the best options. The implementation deals with the development of the design and its final delivery to the customer.

Kumar, Zindani and Davim (2020) understand that the ideas of design can be generated with the use of different methods and starting points to allow the creativity to flourish and produce consistent results with an economic activity. Brainstorming is a group creation approach that seeks to develop ideas and create solutions during the stage for generating ideas. It seeks to generate several ideas that are then edited until there are a few options for development based on a problem (BONNARDEL; DIDIER, 2020).

Learning helps the designer to improve the performance and, for this reason, they must seek feedback from the customer and the target audience, determining whether the solution really met the objectives proposed in the briefing, always looking to identify improvements that will be implemented in the future (BATISTA, 2018). Creativity carries a certain notion of pure innovation. In design, however, creativity needs to be applied and directed towards a specific purpose, which is communicated or controlled by the requirements of the briefing and by the quantitative and qualitative information produced during the research stage.

Therefore, as raised by Micheli *et al*. (2019) Design Thinking has attributes that differentiate it from other approaches. Its attributes include creativity and innovation, focused on the individual, problem solving, interaction and experimentation, interdisciplinary collaboration, ability to identify ideas, interactive approach, addictive reasoning, ambiguity and fault tolerance. These attributes give Design Thinking a particular and unique character compared to other active approaches and methodologies.

3 METHODS

After the presentation of the literature review of the present study, the research methodology is arranged between the qualitative and quantitative types, previously classified to achieve the objective of evaluating the effectiveness of Gamification as a tool for innovation in the process of developing new businesses. In addition to the qualitative analysis, in which the event was analyzed through non-participant observation, quantitative analysis was carried out through the formulation of online questionnaires.

It is a case study in which the main bases that form StartUP Day UPF event were verified. For this, the three hundred (300) competitors were mapped as the target audience of the research. During the event, non-participant observation was performed, making notes in a notebook to later complete with qualitative analyzes. After that, the main concepts, Gamification and Design Thinking were explained during the event after the questionnaire

was launched for the three hundred (300) participants, where we received eighty-five (85) valid responses. After that, data were tabulated from Excel and later the relevant analyzes were made to the sample.

In a qualitative way, for a better understanding of the themes portrayed in the research, the non-participant observation of the researchers was carried out during the event, in order to understand the relationship of the competitors with the gamified proposal during the 24 hours of the event. It was analyzed using content analysis.

Also, during the 24 hours of the event, the quantitative step took place through the application of electronic questionnaires to the participants of the event. The universe of the study was 300 people, composed of students, who played the role of mentors, facilitators and competitors. The electronic questionnaire, sent to all participants, was developed based on the theories studied about gamification and innovation for all participants. Of the 300 participants, 85 responses were obtained.

Mentors are the most experienced or knowledgeable people who help guide a less experienced or less knowledgeable person. The facilitators are those who have already participated in the event previously and entrepreneurs who are invited to facilitate the phases of the event. The competing participants are those who actively participate in something, member, member, which comprises the people who sign up to participate in the event.

In this quantitative and qualitative study, the foundations of both positivist and phenomenological views were applied through the survey and non-participant observation, respectively. Data resulting from the questionnaires were analyzed statistically using the Excel® software. The results of standardized questionnaires for better tabulation of data to qualify the theme of that work, and through the statistical formulas for obtaining this data.

4 RESULTS

In this step, the characteristics of the sample and the procedures performed for the analysis of the statistical data are first pointed out. Then, the results of the main pillars are described: Gamification, innovation and new business development. The survey was applied at the event (StartUp Day UPF 2019), with its participants, obtaining 85 responses. Table 1 shows the profile of the 85 respondents, with the respondents' age and education.

Table 1 – Respondents´ Profile

Variables	Alternatives	Frequences (N)	(%)
Age	From 16 to 25 years old	65	76.50%
	From 26 to 30 years old	19	22.40%
	From 31 to 35 years old	0	0
	From 36 to 40 years old	0	0
	From 41 to 45 years old	0	0
	From 46 to 50 years old	1	1.20%
	More than 51 years old	0	0
Total		**85**	**100%**
Level of education	High School	1	1.20%
	Undergraduate	70	82.4
	Graduated	1	1.20%
	Postgraduate	7	8.30%
	Master´s degree	6	7.10%
Total		**85**	**100%**

Source: Research data (2019).

According to Table 1, the participation in the StartUp Day UPF 2019 event was mainly of students between 16 and 30 years old, most of whom are undergraduate (82.40%), followed by those who are in postgraduate courses (8.3%), master's degrees (7.1%), while the others studying at high school level or with graduation course completed. Of this total of 85 participants, 3 are team captains and 4 correspond to the facilitators who assist the teams during the 24h event. This leads us to conclude that the event is well received by the young academic population and encouraged by the various areas of undergraduate courses, arousing interest in young people, due to its instigating characteristic, which stimulates creativity and innovation.

Finally, Table 2 presents a summary of the indicators that represent the importance of Gamification for the development of new businesses. Questions 1 – 5 intended to check the if the gamification motivated the participants in participating in the event. Questions 6 – 8 intended to understand the elements of games in the event, while question 9 intended to link gamification and the creation of new businesses. Respondents were asked to check in a 5-point Likert scale if they 1 (totally disagree) to 5 (totally agree).

Table 2 – Gamification for new businesses

Variables	Means	Standard Deviation
1. The connections with professionals from other areas motivated me to participate in Startup Day!	3.87	1.14
2. The possibility to develop creativity motivated me to participate in Startup Day!	4.58	0.68
3. The possibility of developing new businesses motivated me to participate in Startup Day!	4.31	0.92
4. The possibility of developing learning in the areas of entrepreneurship and innovation motivated me to participate in Startup Day!	4.53	0.85
5. During the activities I felt totally motivated by the reward!	3.91	1.05
6. The possibility of an award increased my level of engagement with my team!	3.80	0.97
7. The score kept me fully involved in the group's activities!	3.89	1.08
8. My team had a higher performance due to the possibility of a prize!	3.68	1.05
9. The Gamification process made it easier for me to develop new businesses!	3.95	1.04

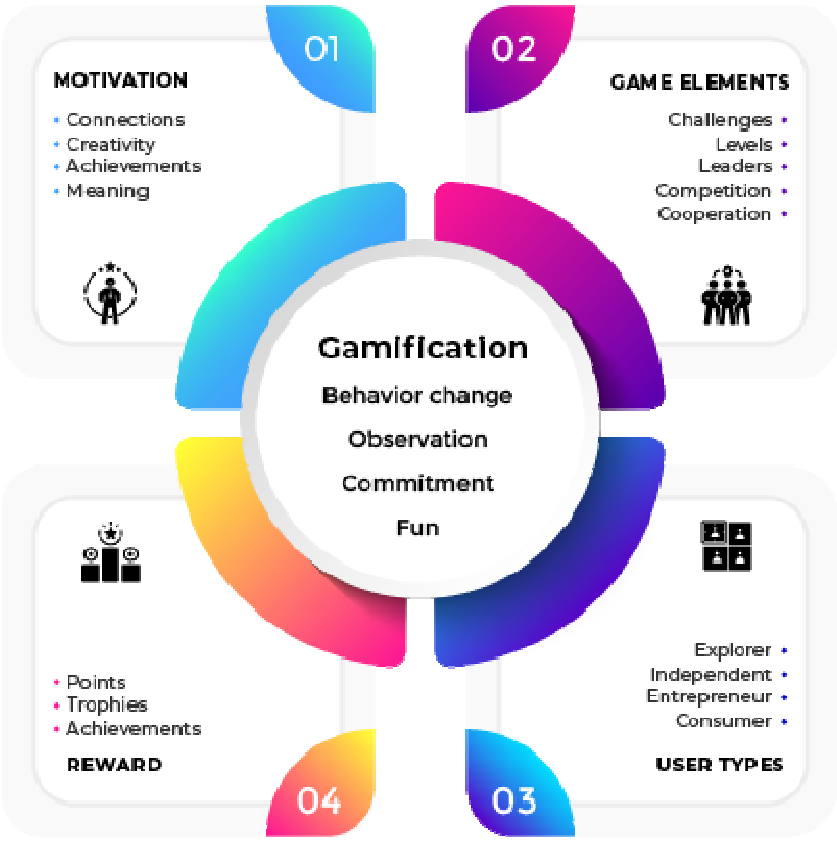
Source: Research Data (2019).

Table 2 shows that the research through the event has great acceptance among the interviewed population considering that the indexes shown in the table are between 3.68 and 4.58, which leads to the interpretation that the participants agree with the items presented, especially in the variables that present the motivation which led them to participate in the event, where the development of creativity, the possibility of developing an entrepreneurial vision and innovation, and the possibility of developing new businesses, confirm the importance using the Gamification tool to develop new businesses.

Still on Table 2, regarding to motivation, it is evident that the participants were motivated to participate in the event, due to possible connections with professionals from other areas and the possibility of developing creativity. Design Thinking involves a high degree of creativity, together with the generation of a practical and viable solution to the problems raised (AMBROSE; HARRIS, 2011). Questions 5, 6, 7 and 8 show that the reward or award as an important element of gamification (TANAKA *et al*., 2013).

From the non-participant observation, it was possible to describe all elements of games, belonging to the event, as well as to evaluate the level of interaction of the participants and the methodologies used. Figure 1 shows the Marczewski (2013) model redesigned according to the game elements found in the event (StartUp Day UPF 2019).

Figure 1 – Gamification elements from Startup Day UPF 2019.



Source: Developed by the authors (2020), adapted from Marczewski (2013).

Figure 1 was constructed from the non-participant observation, based on the model of Marczewski (2013), which presents gamification as a process composed of motivation, game elements, user types and rewards. In the motivation quadrant, which corresponds to connection, creativity, achievements and their meanings, it was found that all indicators are present in the gamification model proposed by the Startup Day UPF, as the methodology used ensures full integration between the participants, which significantly impacts the result of the ideas developed, expanding the degree of creativity, as it allows the integration of participants with backgrounds in the most varied areas of knowledge. Achievements are also present, as Startup Day is divided into phases, where each phase has an evaluative activity that allows each team to evolve in the ranking of scores according to their deliveries, which provides greater meaning for the development of activities. In this context, each participant starts to view the gamification process with a more competitive look, expanding their level of engagement, as according to Mattar (2018) human beings feel more committed in any game structure.

In the quadrant that represents the game elements, characterized by the challenges, levels of competition, leaders, competition and collaboration, it was possible to identify that the gamified structure of the Startup Day UPF is composed of 10 phases, where each phase has a challenge and which requires each team to choose a leader, who is responsible for all deliveries of the activities proposed in each phase and also receives all the guidelines to pass on to the team. There is a very well structured competition process that generates collaboration between participants from the first activity to the last, which can be seen in the quality of the projects developed during the event and the level of innovation proposed by each team to have a multidisciplinary group of participants, which proves that the use of gamification, as well as elements of the game can positively influence the development of new businesses. Zichermann and Cunningham (2011) describe that a gamified system can use innumerable elements of games, to enhance the engagement of competitors.

The quadrant that characterizes the user types as explorer, independent, entrepreneur and consumer, it was possible to identify that all participants can be characterized as explorers, because in addition to impacting the knowledge about entrepreneurship, the gamified proposal of Startup Day UPF allows that the competitors use all their knowledge to search for new solutions that match the challenge proposed by the game, which was solutions for health in the 2019 edition. For this methodology it was also identified that at the same time that everyone becomes an entrepreneur, everyone becomes a consumer of solutions that aim to qualify their ideas, in order to have an even more positive result for their ventures.

Rewards, present in the final quadrant, is characterized by points, trophies and achievements. It was identified that in addition to the score that each team acquired in each phase, there was also a final award, in which the three winning teams, in addition to receiving first, second and third medals, were invited to participate in the pre-incubation project, with UPF Parque Incubator (IUP), where they received specialized mentoring to develop the business plan and support for the search for investors and business rounds, carried out by incubator. Marczewski (2013) defines that the reward is one of the main motivators of the gamification process, but at the same time these rewards may vary according to the proposal or the objective of the gamified structure.

The gamification process, as presented in the model, is surrounded by several aspects, so it is necessary to emphasize, as already mentioned, that this composition represents the quality of the gamification process, and it is not recommended to only value the reward elements that end up restricting a tool rich in new possibilities (NICHOLSON, 2012).

After completing the research, it appears that gamification has a highly impacting power on users, which can be seen in the methodology of Startup Day UPF, having a gamified platform with the objective of creating possibilities for new business, which in fact, occurs because most of the projects developed during the application of the tool have potential for market scale. As an example, “Click Profissional”, a company that emerged at the first event and is now in the process of consolidating itself in the market. Thus, the importance of using gamified processes for the development of new business ideas is positively proven (ROSSATO; NECKEL; MOZZATO, 2018).

In conclusion, by considering all dimensions together, it is possible to identify that the elements of the game, motivation and reward are directly related with regard to the efficiency of gamification, with respect to the engagement of participants. By developing a scenario that integrates professionals from different areas of knowledge, as well as different levels of education, and consecutively the level of involvement with the proposed activity will be directly expanding. Therefore, the challenge also plays an important role in the gamification activity, enabling participants to achieve unexpected results, since according to Schumpeter (1988), innovation is an ally in the development of new businesses, so it is necessary to have an open mind for new processes and new methodologies.

5 CONCLUDING REMARKS

This paper aimed to evaluate the effectiveness of Gamification as a tool for innovation in the process of developing new businesses, using the StartUp Day UPF 2019 event as an object of study. The event, which uses gamification, has the design thinking process to establish a series of 10 activities to solve the proposed challenge, which, in this edition, were innovative business solutions in the health area.

The research was carried out in a qualitative and quantitative way. Firstly, through non-participant observation during the 24 hours of the aforementioned event to observe the elements of gamification present in the event: motivation, game elements, types of users and rewards. In addition, data was collected from the participants using an electronic questionnaire. Of the 300 participants, 85 completed the questionnaire.

As a main result, it was identified that Gamification can be a valuable tool for the development of new businesses, as it allows greater interaction and commitment on the part of users. It can be characterized as an effective process, as long as it is structured for a certain purpose, because today gamification can act in different contexts effectively, and can also be

adapted for a specific purpose, being it playful, for entertainment, or even for professional purposes. In this sense, the application of gamification at the business level still needs to be better explored, as it offers numerous possibilities that can impact not only on the engagement of workers, but also on the final results of organizations.

The limitations of this study are characterized by the scope of the chosen theme with the targeting for games and by its emerging issues in the areas of management, as the literature that involves real experiments at the management level is still scarce, especially with regard to a gamified process. As suggestions for future research, it is suggested to investigate the individually way the methodology is used in gamified processes, to assess the real engagement of the participants, as well as the possibility of creating new work fronts.

Finally, it can be said that the gamification process has a positive influence on the development of new businesses, as long as the entire development and application process is well structured and focused on this segment, always with the objective of solving a certain problem, as Gamification can also be directly linked to innovation.

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1) concepção e planejamento.	X	X	X	X	X
2) análise e interpretação dos dados.	X	X	X	X	X
3) elaboração do rascunho ou na revisão crítica do conteúdo.	X	X	X	X	X
4) participação na aprovação da versão final do manuscrito.	X	X	X	X	X