
Leadership models in the gamification context – case study

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Abstract: The present paper addresses the association of leadership quality factors and gamification, and attempts to contribute for the business management area, which is typically focused in determining correlations between leadership factors framed by literature models and behaviour analysis of leaders in the different contexts. The present investigation comprehends the following objectives: analysis of leadership models and their framework in the scope of a management simulator, and the effectiveness of gamification for organisational learning. Such objectives are achieved through: correlating operational results with leadership styles for players managing a company, to understand how the management style can and will affect the game final results, and to identify prominent leadership styles during the game. The assessed sample of gamers consisted of 92 players. At the end of the game, each player answered a leadership survey to assess leadership factors. The results obtained suggest a stronger focus on a decision making scope of traits model.

Keywords: models; gamification; management game; organisational learning; leadership.

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1 Introduction

Human resources management now plays a decisive role in an organisation that wants to succeed. The strategy of strengthening the ties of entrepreneurial culture, bet on innovation, entrepreneurship, continuous learning, the form of internal work organisation, the ability to perform good leadership, vision and future orientation, support for all the employees at a certain strategic moment in the organisation are fundamental aspects for a good business management that contribute decisively to the strengthening of the image that the organisations can have in the global market.

Nowadays, unpredictable and unprecedented situations, with no action-orientating patterns, are becoming more frequent, with ever-increasing demands. In this context, one knows how to survive and find equilibrium in relative instability, or succumb to the setbacks and setbacks of the ever shaky global market. In this adverse context, we wonder how leaders in general can mobilise people in complex environments and in continuous change.

The truth is that the global phenomenon has forced companies to adopt a new type of adaptation and to adopt new rules and new growth strategies. Not being something new in the business context, the truth is that globalisation tends to intensify, which according to Barracho (2015) happens in the face of the “profound changes that occur and are recognized in the personal, professional, scientific and business environment.”

The new leaders appear in this context as an area that should give a greater role to human resources, their skills, personal and social qualities. The current leader needs to be creative, and meet the growing demands of employees so as not to be reduced to a simple role of passive and acéphalous manager.

A good decision making capacity requires a set of skills that need to be trained and improved over time, assuming the context of interactive play a determining role in this design as a way to test the decision making of the different players in different situations and conditions that may face in the future. Musshoff et al. (2011) argue that management games have been used as an analytical and pedagogical tool for some time in the management universities, in order to familiarise the students of the courses of economics and management with the different market dynamics.

Henriksen and Børgesen (2016) carried out a study, where they answered the following question: can good leadership be learned through business games? They were inclined to answer no. Good leadership cannot be learned through mere participation in the formal activities of a learning game. They propose that a business game may be seen as a formalised contribution to a wider adult learning system, which includes non-formal and informal learning processes that would not happen without the game. The game itself might provide an understanding of certain points, but not necessarily a deeper understanding, and maybe, the participants are allowed to engage in emergent non-formal and informal discussions, games might be able to contribute to the learning of good leadership.

In order to guarantee the pertinence of the previous themes described and in view of the little research on the topic of gamification when it is related to the domain of business leadership, it would be interesting to understand the type of leadership most frequently adopted by the players in the management game and its relation to the comparative results obtained in this study?

With this question, we set out to identify the theoretical substrate that constitutes the platform of analysis for the empirical work, namely explaining and defining the main concepts to be operationalised. We emphasise the analysis of gamification in a perspective of learning process, the analysis of the leadership models, in this case, following the classic approaches of leadership: traits, behavioural and contingencies, and analysis of the organisational learning process and respective unlearning. It was also intended to reinforce and deepen the research in the scope of gamification analysis, namely, to verify how gamification works in terms of applicability, and to verify the relationship between the final results of the management game and the leadership styles considered in the study-base.

For this investigation, the author resorted to two tools: a management game and an inquiry. The management game simulates a specific business organisation in which the player had to make operational decisions, and in the end, a survey was distributed to players. The two main purposes of this investigation are: to verify the relationship between the final results of the management game and the leadership styles and to understand how gamification works in terms of applicability.

However, some limitations to the study have been identified, one of the main ones being that the data collected from the sample is not representative of the population. In addition, it should be noted that the present study proposes, essentially as an exploratory study. Since this relationship is still little explored in the literature, it is also necessary to take into account that this game is virtual, in which the player plays against a machine, not having contacts or leading directly with people, never being exposed to the real situations that all days are placed to whoever is running businesses.

For the structure of this article, the following sections were defined: bibliographic review, methodologies and procedures, discussion of the results, and finally, the conclusions.

2 Literature review

2.1 Concepts

The topic of leadership has been discussed in the last three decades as one of the important management elements of the business world, especially from the 1980s with the emergence of new contemporary movements such as globalisation, outsourcing, employment decline, definition employability and the expansion of the internet.

In this assumption, leaders assume a crucial vertex in creating commitments to the remaining organisational agents that drive the whole structure to higher standards of performance (Drucker, 1999). This concept of driving appears in itself linked to the original correlation of the word itself, originating in Latin and the term *ducere*, and later derived in the English term 'lead', broadening the concept for innumerable derivations centred today in conducting, directing, guiding, to command, to persuade, to direct, to lead, to captain or to cross.

In a broad reading, we can say that it will not be very easy to define the word leadership, as it is difficult to define democracy or freedom, although we intuitively know what these words mean, the truth is that they all do not have the same meaning for all (Stogdill, 1974).

In fact, about 65 different classification systems have been identified to define leadership dimensions (Fleishman et al., 1991). Among these, there are authors who read the domain of leadership:

- 1 From a process perspective a group whose leader functions as the centre of change and incorporates the group's will.
- 2 Looking at it from the point of view of personality, suggesting that leadership is a combination of traits or special characteristics that individuals possess and that allow them to induce.
- 3 Focusing on the leader's act or behaviour, the concept being read in terms of the power relationship that exists between leaders and followers.
- 4 Considering it as a process of transformation that moves followers to accomplish more than what is expected of them.
- 5 Those who view it as a perspective of skills and knowledge analysis that make the process of dealing regardless of the multiple ways in which it is conceptualised (Bass, 1990).

2.2 Traits

Trait approach is typical of studies conducted up to World War II (Pina et al., 2006). One of the underlying assumptions of this theory is that a person should have a set of particular traits that could confer a highly successful leader. Some of these traits would be intellectual, social (intelligence, charisma, enthusiasm and self-confidence) and even physical (strength or posture), and leaders should necessarily have higher scores on physical and psychological characteristics, noting that not all individuals were possessed of such qualities, and only those who met those attributes should be accepted, as a consequence of this view, preference was given to selection rather than to the formation of leaders (Jesuino, 2005). However, researches in this period did not prove the efficacy of such traits, which are not exclusive to supposed leaders, although Rouco and Sarmiento (2013) say, for example, that personality traits of leaders are among the most investigated in charismatic leadership.

But this approach was largely abandoned when, according to Stogdill (1974), 124 studies were conducted and concluded that individuals do not immediately become leaders due to the possession of a certain combination of traits, since the same trait could be effective in a given situation and less effective in another. The same researcher also concluded that one cannot support the premise that certain traits are absolutely necessary for the success of the leader, i.e., that an individual with certain traits is more likely to be an effective leader than the people who lack them (Pina et al., 2006).

2.3 Behavioural model

Behaviour style theories emerged as a response to the weaknesses presented by trait theory in the mid-1940s. If trait theory emphasises what the leader is, the approach to leadership styles refers to everything the leader does. The leadership style of behaviour is now the main factor to be taken into account in leadership studies, that is, to identify how leaders can influence their subordinates, or what effective leaders actually do.

White and Lippitt (1960) subjected task-oriented groups of children to three different leadership styles (autocratic or authoritarian, liberal and democratic) over a period of time. The autocratic leader established all the actions of the group, stipulated the methods, phases of execution, procedures to be operationalised, distributed rewards and punishments. According to Sousa and Rocha (2019), autocratic leaders make decisions without consulting their team members. This can be appropriate when decisions need to be made quickly.

The democratic leader encouraged the group members to make decisions describing in broad strokes the generic steps to achieve the goals. As a result, team members tend to have high job satisfaction and high productivity (Sousa and Rocha, 2019). To the group is allowed to form work teams and the leader has in charge, rigor and objectivity. Finally, the liberal leader was defined by his non-participant attitude in the tasks and activities carried out, remaining detached and indifferent allowing the group to act freely. The results of the observations made by these authors showed different patterns of behaviour depending on the leadership styles applied by the leaders.

Gelfand et al. (2007, p.493) define paternalism as a “hierarchical relationship in which a leader guides professional and personal lives of subordinates in a manner resembling a parent, and in exchange expects loyalty and deference.” Paternalistic leadership suggests people in authority assume the role of parents. And relationships are also based on the assumption of power inequality between the leader and subordinates, in exchange, the leader expects loyalty and trust from employees, as well as obedience. Pellegrini et al. (2010) did a study and concluded that paternalistic leadership may significantly influence organisational commitment across diverse cultural contexts.

2.4 Contingency model

Chiavenato (2010) states that the contingency model represents the broadest and most complex approach by considering three variables simultaneously: people, organisation and tasks. This approach argues that there is no effective and universal leadership style, but that there is a style of leadership that is more appropriate for each concrete situation, which is not necessarily the most appropriate for a different situation, and this is a determining factor. Situational factors such as the personal characteristics of the leader, the nature of the job, the nature of the organisation, and the characteristics of the leader will influence the effectiveness of leadership, thus forcing the leader to have the ability to adapt to the imposed circumstances. Also for Ramalheira (2013), contingency theories consider not only personality traits and behaviours of the leader, but also the circumstances in which leadership takes place.

Fiedler’s theory (Boddy, 2012) describes the moderating effect of the situation, between the personality of the leader and the effectiveness of the group. Fiedler (1967) tested his theory in several professional groups and in numerous cultures. This theory is based on three variables: the definition and construction of the situational variable, the measurement of leadership and the description of the relationship between the traits of the leader in relation to the effectiveness of the team.

However, the model has some limitations. Jesuino (2005) states that the model focuses too much on motivational factors to the detriment of situational factors. We must not forget, however, that this model motivated the researchers in the perception of situational factors that can disturb the efficiency of the leadership.

2.5 Gamification

Games have always been a vital part of our society. People enjoy the feeling of winning points, having rewards and receiving autonomy, overcoming challenges and obstacles as an element of fun. The term gamification thus arises, being in recent years, a widely used technique to complete specific training levels, namely in the area of management. According to Musshoff et al. (2011), management games are used as pedagogical means in universities to familiarise students of economics and management courses on market dynamics and to evaluate the impact of such decisions on the results in the organisation concerned and on the other a great tool for analysing results in various conditions where economic agents intervene. Kolb (1984) and Pillay and James (2012) add that experiential learning is a process by which concepts are formed and modified by experience. In another definition given by Bajdor and Dragolea (2011), ludification is a process in which artificial intelligence is applied to solve an objective problem of users.

Gamification is clearly a new learning tool that draws on the particular elements of games to motivate the elements involved in learning and sharing knowledge in innumerable areas, and encourage players to carefully plan their course of action based on individual strengths and weakness (Despeisse, 2018). The process of gamification with virtual games in the classroom has as an objective to arouse students' interest in the several curricular contents, in addition to making the process of teaching and learning an even richer and more concrete experience for educators and students. Cardador et al. (2016) suggests that work gamification should affect work effectiveness via enhanced opportunities for employee learning and adaptation.

Gamification can also allow a company, for example, to gather information about the behaviour and trends of its customers. With this information, the company can use the data collected to determine what content and value creation experiences and see how their customers' actions/reactions correlate later with the success of their business. But not only within organisations, does gamification allow to create better employee engagement, refine productivity and efficiency, and also create innovation. Innovation is a centrepiece of any organisation that wants to succeed in the global marketplace. Several organisations are currently using the mechanics of gamification to lead to innovation initiative. For example, the concept of the market as stock market can help and encourage all stakeholders to create a reward and motivation platform to incubate, share and execute ideas from all business domains (Maan, 2013). A very interesting point of gamification is that, games allow us the freedom to fail with only minor personal and social consequences (Sousa and Rocha, 2019).

In short, gamification has great potential but requires an adequate professional framework within the scope of a strategic human resources management aimed at training individuals and gradually increasing their skills. In parallel, it is necessary to take into account adequate systems of involvement of all employees in order to increase their motivation, for example, there is evidence that computer games provide an immensely compelling and rewarding experience for younger workers (Cardador et al., 2016). Such a direction allows the exercise of new professional practices and engenders new cultural contours for the organisation by approaching cultures based on a qualitative and quantitative development of the activities generating feelings of organisational adhesion. Only an organisation willing to learn and develop its employees can aspire to the proper implementation of gamification.

2.6 *Identified theory gaps*

Research on social realities requires methodologies by which work tools are best tailored to the development of research. Thus, the research model of this study was constructed from the reading of several publications that address the problem of leadership, organisational learning and gamification, making possible the necessary knowledge on the subject to be addressed. In the end, it was found that there was a lack of studies in this area of business management, outside the spectrum of the normal connection between the domain of leadership and the application of models, to the analysis of leaders' behaviours in the most diverse contexts or business sectors or to the connection of these assumptions to performance issues (Taylor and Robertson, 2007), this study aims to contribute to academic knowledge by associating the leadership domain with the gamification context, defining the characteristics of leaders from the point of view of the quality of their decision making, their creative development, the identification of their options, the clarity of their judgement, the firmness of their decisions and the effective implementation of their strategic moves in the context of the game.

3 **Methodologies and procedures**

This study was divided into two stages, between 2016 and 2017. The first phase started with a management game, built by the lead author of this study in partnership with a Portuguese consultancy company (Polivalor). The game has been validated by experts, and specialists in that area of business.

The kick-off starts on a computer platform, all players start under the same circumstances (last year's operating results are negative), i.e., the company's management history is the same for everyone. Thus, the participants have to make operational decisions that lead to the good functioning of the organisation, in successive periods of time, that is, each move has a certain time to be fulfilled and is equivalent to a certain period of operation of the company. The equality of the circumstances imposed is identical for the whole sample. With each move, players are informed about the obtained results and can, reorienting the company's destiny for the following periods. In the proposed model by a company game, as well as in the activities performed by the participants, the various functions of organisations such as marketing, production, human resources, research and development, logistics, accounting, among others, are present. The simulated company is an integral part of a national economic sector.

The management game simulates the management of a business unit during a fictional year and recreates an environment very similar to reality. The real playing time does not exceed one month. The player will be confronted with four specific scenarios, which are the same for everyone. From there, you will have to make management decisions at the operational level in order to achieve the best possible financial results. The management game unfolds between teams, competing with each other, having been selected in university environments on a voluntary basis.

3.1 *Questionnaires*

The second stage is composed by a survey, structured in four parts: the first with the general data about the respondent, the second composed by the identification of the most

relevant traits (seven variables) arising in the game, the third by the leadership styles (five variables), and finally the fourth by the moderating effects (six variables) between the personality of the leader and the performance obtained in the game. The scale adopted for the domains of traits and moderating effects between the respondent's personality and the efficacy of the game are Likert scale, and we have seven levels of intensity in which the respondent's action can be graded in several dimensions (1 disagree absolutely and 7 agree absolutely). In leadership style, the measurement basis is hierarchy with ordering (1 is the least important and 5 the most important). After the evaluation of the 92 responses, the statistical treatment of the data was performed. In the data processing, the MATLAB tool was used (integrative data processing software, with numerical computation, data analysis, and programming and algorithm development). Finally, the questionnaire was administered at the end of the game to the team leader.

3.2 Structure and contents of the survey

The variables in the leadership study were analysed from the literature review and adapted. Analysing the assessed skills in the field of Kirkpatrick et al. (1991) traits, Gregerson et al. (1998), Yukl (1998) and Mumford et al. (2000a), quoted by Pina et al. (2006), we evaluate:

- 1 Energy and stress tolerance with which one tries to perceive the respondent's reaction in less favourable situations.
- 2 Self-confidence, trying to understand how the respondent reacts at the most critical moments.
- 3 In the internal control locus, we want to understand if the respondent has orientations for the future, believes that it can change.
- 4 Emotional maturity encompasses the part of the consciousness of the respondent's strengths and weaknesses.
- 5 Honesty and integrity, what are the values and responsibility of actions.
- 6 Motivation for success, we seek to check the standards of excellence and search for opportunities.
- 7 Motivation for social power encompasses behaviours of assertiveness in the face of decisions involving employees.

As for leadership style, we adapted the following from Blake and Moutan (1964):

- 1 Paternalism seeks to emphasise people, their needs and relationships leading to a rewarding organisational climate and a cordial and consequent.
- 2 Democratic, it is sought to verify if there is a high synergy by the commitment of the people in the corporate objectives considered of common interest. With these characteristics, we intend to identify behaviours of trust and mutual respect (Likert, 1967).
- 3 Liberal, encompasses performance behaviours characterised by an effort in execution and integration, just enough to be still considered a member of the organisation (White and Lippitt, 1960).

- 4 Authoritative, contains efficiency in defining procedures and organisation and working conditions. Once these conditions are created, people are supposed to produce (White and Lippitt, 1960).
- 5 Balanced, covers the situation of commitment tendentially high. The balance between production and the need for a satisfactory organisational climate are both key concerns (Blake and Moutan, 1964).

In the context of the moderating effect between the personality of the leader and the effectiveness of the group, we have:

- 1 Concerns about issues of tolerance include organisational cooperation and affability in context (Stoner and Freeman, 1985).
- 2 Concerns about member-leader relationships, i.e., the interaction between group leader and the remaining Fiedler (1967) elements.
- 3 Concerns about the structuring of tasks, it is sought to see if the leader performs his tasks effectively (Fiedler, 1967).
- 4 Concerns about the hierarchical position, which is recognition (Syroit, 1996).
- 5 Guidance for the tasks, I set myself without deviations in the accomplishment of the tasks delineated (Rouco, 2012).
- 6 Orientation to relationships, the identity of the leader is a direct result of their relationship with the followers (Rouco, 2012).

The 18 variables contained in the three dimensions (traits, styles and leadership effects), therefore provide a broad range of behavioural records.

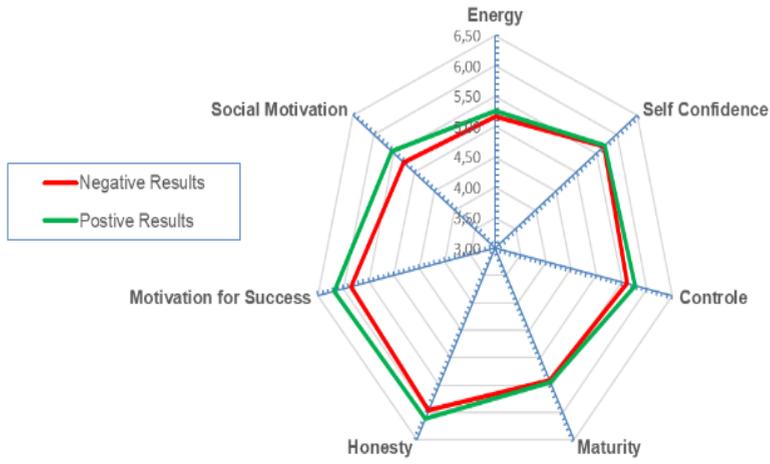
4 Results discussion

Initially, the study was prepared to be performed in a specific business universe (car repair), but unfortunately the number of responses was very small and it was decided to apply the study to a random group of individuals. Thus, the management game was applied to a non-probabilistic sample of 92 individuals composed of 21% female and the remaining 79% male.

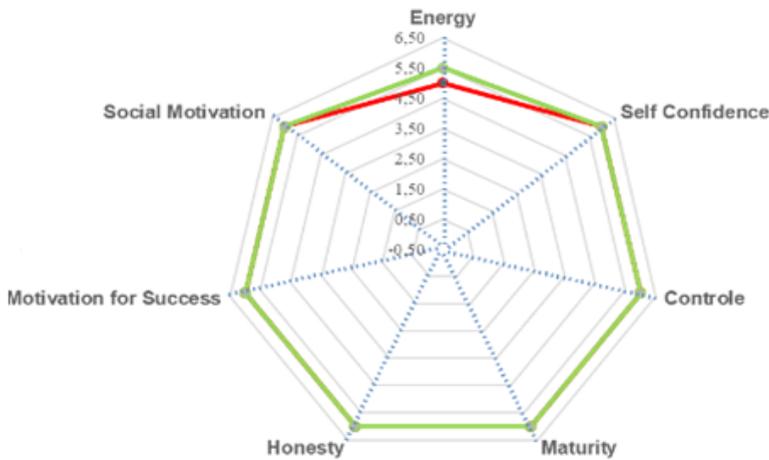
It was verified that 41% of the elements are between 18 and 25 years old, this situation is justified by the fact that university environments are used, namely at Academia Militar in a military setting with students of mechanical engineering, at University Institute of Lisbon (ISCTE) in a civic framework with undergraduate and graduate students, and master students of Institute of Management and Administration in Santarém (ISLA). The age group is from 26 to 35 years of age, 23% were obtained, from 36 to 45 years, 24%, and from 46 years, up 12%.

As for the variables, we can quickly see in Figure 1 that the means of the variables in the leadership traits are between 5.5 and 6.0. We also found that the mean of all traits is always lower, for those who had negative results. Where the best scores stand-out and for those who have had positive results in the game, they are in the traits of motivation, of the social, for success, control and finally for honesty. As for the median [Figure 1(b)], the only feature that stands-out is energy.

Figure 1 Leadership traits versus game results, (a) mean (b) medium (see online version for colours)



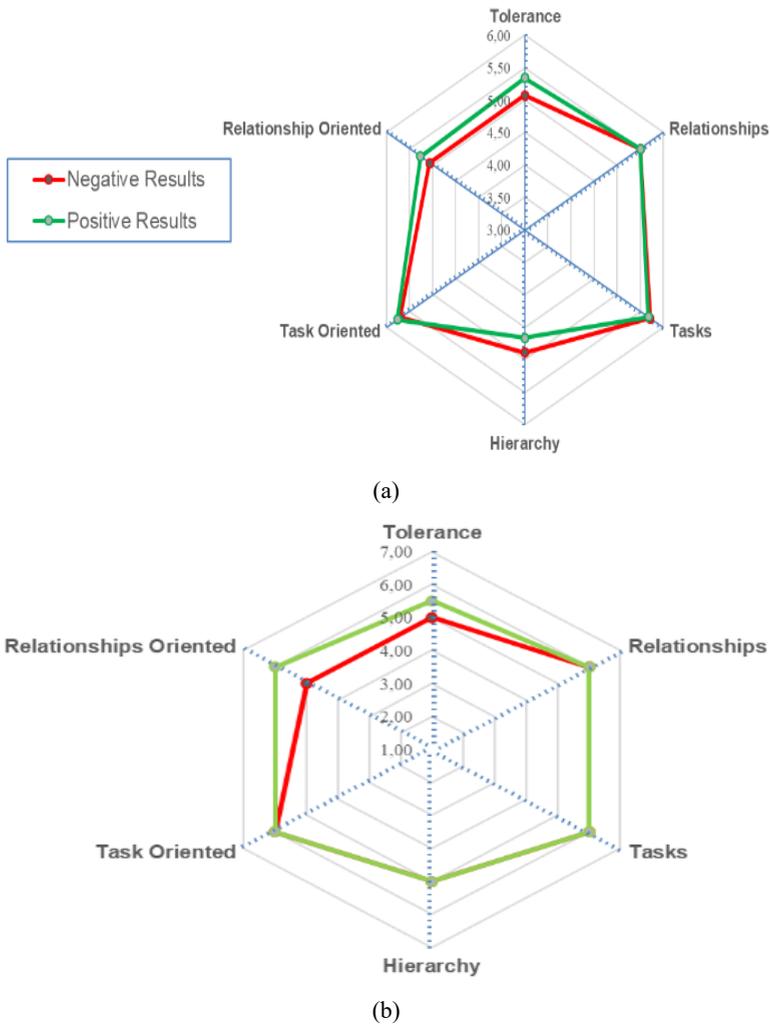
(a)



(b)

For the moderating effects presented in Figure 2(a), we find again that the means of those who obtained positive results are slightly higher, except in the moderating effect of the hierarchy, and in the tasks. The most relevant finding taken from Figure 2(b) is the relationship between individuals with negative results and below-average values in terms of relationship-oriented and tolerance-related effects. In the hierarchy effect, the value obtained was identical for both negative and positive results, with only one point lower than that of relationships and tasks. The most relevant finding taken from Figure 2(b) is the relationship between individuals with negative results and below-average values in terms of relationship-oriented and tolerance-related effects. In the hierarchy effect, the value obtained was identical for both negative and positive results, with only one point lower than that of relationships and tasks.

Figure 2 Moderators versus game results, (a) mean (b) medium (see online version for colours)



If we now look at the central tendency of the data, or the median of the various variables, we can confirm in Figure 3 that the most obvious leadership style for those who have scored positive results in the game is the paternalistic one. For those who took negative results, the styles that stood-out were the authoritarian and the balanced.

Regarding the styles of leadership evaluation during the game, we can observe on Figure 4: leadership style for negative results and Figure 5: leadership style for positive results, the results shows a certain homogeneity in the evaluations between the two. The paternalistic and balanced, are the styles that more importance (score 5) the respondents gave.

On the other hand, in Figure 5, we can see that although the paternalist and balanced styles also remain the most selected as score 5 (very important), in the democratic emphasises the score 4 of importance, and the score 1 (not important) in the balanced.

Figure 3 Leadership styles vs. game results: median in evaluations (see online version for colours)

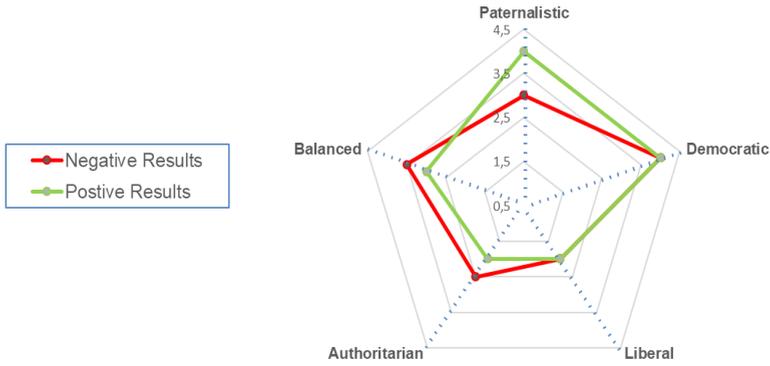


Figure 4 Leadership styles: sum of the evaluations (negative results) (see online version for colours)

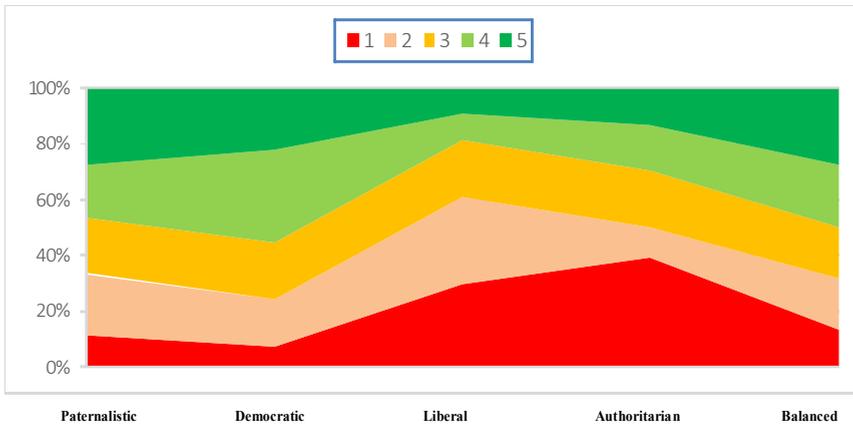
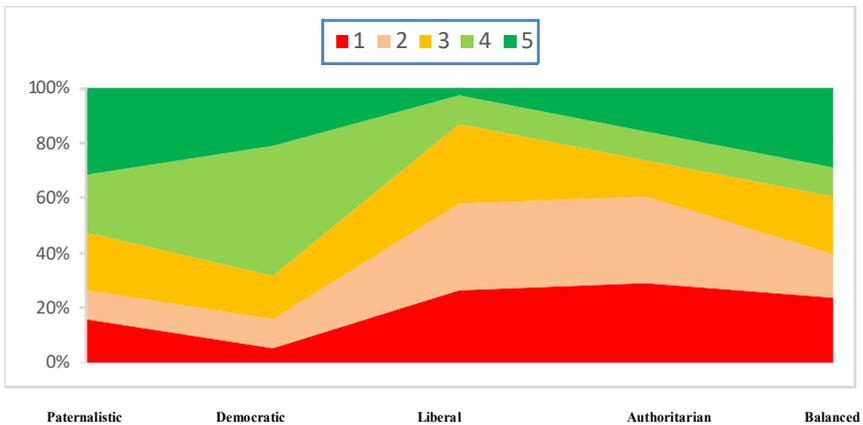


Figure 5 Leadership style: sum of the evaluations (positive results) (see online version for colours)



5 Conclusions

Leaders and the thematic of leadership assume in this presupposition a crucial role, being indispensable the study of this subject outside the spectrum of the normal connection of the domain of the leadership to the application of models or the analysis of behaviours of leaders in the most varied contexts of the day-to-business day. This study aimed to bring to the academic field the association of the domain of leadership to the context of gamification by defining the characteristics of leaders from the point of view of the quality of their decision making and the effective implementation of their strategic plays in the context of the game. The 'leadership models' variable and its framework within a management simulator, and the theme of 'organisational learning' framed in the light of the domain of gamification, in this case, through the application of a management game whose objective was the to simulate a virtual year in a company by dividing it by four quarterly decisions, it was found that the average of all the traits of the decision makers at stake was always lower for those who had negative final results. It is also emphasised in this area that the best scores for those who had positive results in the game were linked to the characteristics of motivation, social characteristics, success, control and honesty. It was also verified that the leadership style with greater relevance for the respondents who obtained positive results in the game, was that of *democratic leader*. It was also important to observe and emphasise, given the central tendency of the data, which the highest value in terms of the median of the various variables was obtained by the style of paternalistic leadership, being this type of leadership in which the most positive results stood-out. In the opposite direction, the negative results were mainly related to the *authoritarian* and *balanced styles*. It is important to bear in mind that the findings presented in this study are the result of limitations inherent in an exploratory investigation, where the sample size (respondents) is relatively small, and of reproducing results in a particular game context. In this sense, in terms of external validity, that is, of the possibility of generalising the results found to other contexts or samples, we cannot do it. Thus, although this research aims fundamentally to combat the lack of studies on the topic of leadership in a gamification perspective, it is necessary to continue the integrated research in these two themes, producing original and relevant scientific knowledge, contributing in a concrete way to the development of these areas of investigation.

References

- Bajdor, P. and Dragolea, L. (2011) 'The gamification as a tool to improve risk management in the enterprise', *Annales universitatis apulensis series economica*, Vol. 13, No. 2, pp.574–583.
- Barracho, C. (2015) 'Os recursos humanos e os desafios da atual gestão num contexto global em constante mudança', *Economia & Empresa*, Vol. 18, No. 1, pp.173–184, Universidade Lusíada.
- Bass, M. (1990) *Bass and Stogdill's Handbook of Leadership: A Survey of Theory and Research*, Free Press, New York.
- Blake, R. and Mouton, J. (1964) *The Managerial Grid*, Gulf Publishing, Houston.
- Boddy, D. (2012) *Management – An Introduction*, 6th ed., Pearson Education Limited.
- Cardador, M., Northcraft, G. and Whicker, J. (2016) 'A theory of work gamification: something old, something new, something borrowed, something cool?', *Human Resource Management Review*, Vol. 27, No. 2, pp.4–5.
- Chiavenato, I. (2010) *Gestão de Pessoas*, 3rd ed., Editora Campus, Rio de Janeiro.

- Despeisse, M. (2018) *Teaching Sustainability Leadership in Manufacturing: A Reflection on the Educational Benefits of the Board Game Factory Heroes*, p.626, ScienceDirect, Copenhagen.
- Drucker, P. (1999) 'Knowledge-worker productivity: the biggest challenge', *California Management Review*, Winter, Vol. 41, No. 2, pp.79–94.
- Fiedler, E. (1967) *The Contingency Model: A Theory of Leadership Effectiveness*, in Backman, C.W. and Second, P.F. (Eds.), McGraw-Hill, New York.
- Fleishman, A., Mumford, D., Zaccaro, J., Levin, K., Korotkin, L. and Hein, B. (1991) 'Taxonomic efforts in the description of leader behaviour: a synthesis and functional interpretation', *Leadership Quarterly*, Vol. 2, No. 4, pp.245–287.
- Gelfand, M.J., Erez, M. and Aycan, Z. (2007) 'Cross-cultural organizational behavior', *Annual Review of Psychology*, Vol. 58, pp.479–514.
- Henriksen, T. and Børjesen, K. (2016) 'Can good leadership be learned through business games?', *Human Resource Development International*, Vol. 19, No. 5, pp.388–405.
- Jesuino, J. (2005) *Processos de liderança*, 4th ed., Livros Horizonte Lda., Lisboa.
- Kolb, D.A. (1984). *Experiential Learning: Experience as the Source of Learning and Development*, Vol. 1, Prentice-Hall, Lisbon.
- Likert, R. (1967) *The Human Organization: Its Management and Value*, McGraw-Hill, New York.
- Maan, J. (2013) 'Social business transformation through gamification', *International Journal of Managing Information Technology*, Vol. 5, No. 3, pp.9–16.
- Musshoff, O., Hirschauer, N. and Hengel, P. (2011) 'Are business management games a suitable tool for analyzing the boundedly rational behavior of economic agents?', *Modern Economy*, Vol. 2, pp.468–478.
- Pellegrini, E., Scandura, T. and Jayaraman, V. (2010) 'Cross-cultural generalizability of paternalistic leadership: an expansion of leader–member exchange theory', *Group & Organization Management*, Vol. 35, No. 4, pp.391–420.
- Pillay, S. and James, R. (2012) *Gaming Across Cultures: Experimenting with Alternate Pedagogies*, Monash University, Churchill, Melbourne, and Swinburne University of Technology, Australia.
- Pina, C., Rego, A. and Cunha, R. (2006) *Manual de Comportamento Organizacional e Gestão*, 5th ed., Editora RH, Lisboa.
- Ramalheira, P. (2013) *O Impacto da Cultura Portuguesa e da Proactividade na Liderança: Um Estudo Exploratório*, Tese de mestrado em Planeamento e Gestão Estratégica, Universidade de Aveiro, Aveiro.
- Rouco, C. and Sarmento, M. (2013) 'Liderança carismática: um fator estratégico para o sucesso organizacional', *Proelium*, Vol. 7, No. 13, pp.81–111.
- Rouco, J.C.D. (2012) *Management Model of Leadership Skills Development in a Military Context*, Doctoral dissertation, College of Economics and Business Sciences, Universidade Lusíada de Lisboa, Lisbon.
- Sousa, M. and Rocha, Á. (2019) 'Leadership styles and skills developed through game-based learning', *Journal of Business Research*, Vol. 94, No. 94, pp.360–366.
- Stogdill, M. (1974) *Handbook of Leadership: A Survey of Theory and Research*, Free Press, New York.
- Stoner, F. and Freeman, C. (1985) *Administração*, 5th ed., Prentice-Hall do Brasil, Rio de Janeiro.
- Syroit, J. (1996) 'Liderança organizacional', in Marques, C.A. and Cunha, M. (Eds.): *Comportamento organizacional e gestão de empresas*, Publicações dom Quixote, Lisboa.
- Taylor, J. and Robertson, T. (2007) 'Leader's impact on well-being and performance: an empirical test of a model', *British Psychological Society, Division of Occupational Psychology, Annual Conference*, Bristol.
- White, R. and Lippitt, R. (1960) *Autocracy and Democracy: An Experimental Inquiry*, Harper and Row, New York.