

# Pokémon Go as a Persuasive Technology: Lessons Learned from an Acclaimed Mobile Game Experience

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The mobile game Pokémon Go has received great attention given its controversy and popularity worldwide. The main objective of this study is understanding, by the use of a player-based survey, the impacts on players' habits and behaviors, such as investigating its association with Captology concepts. Four interest axes unfold under this perspective: well-being, gameplay, franchising and technology. The major findings include the characterization of the game as a persuasive technology resulting from the identification of intentional behavior change in players. The analysis also leads to a discussion of its effectiveness from the perspective of persuasive technologies, thus obtaining relevant contributions for the development of new products, such as the importance of gamification and franchising.

Keywords: Persuasive Technology, Pokémon Go, Games.

## ***Pokémon Go como uma tecnologia persuasiva: lições aprendidas a partir de uma aclamada experiência de jogo para dispositivos móveis***

*O jogo para dispositivos móveis Pokémon Go recebeu grande atenção devido a sua controvérsia e popularidade em todo o mundo. O principal objetivo deste estudo é entender, a partir de um levantamento com usuários, os impactos nos hábitos e comportamentos dos jogadores, bem como investigar a sua relação com os conceitos de Captologia. Quatro eixos de interesse desdobram sob esta perspectiva: bem-estar, jogabilidade, franquias e tecnologia. Os principais resultados incluem a caracterização do jogo como uma tecnologia persuasiva, em virtude da identificação da mudança de comportamento intencional nos jogadores. A análise também leva a uma discussão de sua eficácia a partir da perspectiva de tecnologias persuasivas, obtendo, portanto, contribuições relevantes para o desenvolvimento de novos produtos, como a importância da gamificação e do franchising.*

*Palavras-chave: Tecnologia Persuasiva, Pokémon Go, Jogos.*

## 1. Introduction

For decades the association between technology and human behavior has been considered a relevant study subject by several fields, achieving greater relevance during the 1990s with the popularization of Internet. The establishment of persuasive technology as a field and the coinage of the term "Captology" in mid 1997 resulted in an increase of research approaching the impact of technology on behaviors and habits (Fogg, 1998; 2002). Although already consolidated, the production in this area decreased in 2011, while studies relating to gamification and behavior change grew (Hamari, Koivisto and Pakkanen, 2014). This shift of focus and interest regarding to gamification is an evidence of the potential future direction of persuasive technologies, as well as a strengthening of the interdisciplinary character of this field.

The recently launched mobile game Pokémon Go has received great attention given its popularity worldwide. The users pool at the height of its launching is estimated in millions, which makes it one of the most successful applications in the history of mobile gaming. The gameplay is based on hunting down animated characters spread across town. Since it is developed for mobile platforms and employs resources, such as augmented reality and geolocation, Pokémon hunting is accomplished through the active participation of users, who must geographically explore the city either individually or in groups. Regarding these gaming mechanics, some suggest that there are risks associated to the users' safety and inattention, while others claim that the game is related to positive stimuli leading to healthy habits, socialization and discovery. In addition to the range of popular, cultural and media issues raised upon its launching, the game has provoked debates concerning to the true impact it has on the players' behavior and habits. Therefore, some fields of knowledge have taken interest in approaching themes related to the game and its consequences. However, this topic hasn't been explored in the context of persuasive technology.

Assuming the principles of Captology, persuasive technology is based on the intentionality proposed (endogenous intention) – a planned effect, as distinct from an effect resulting merely from the use of a technology (exogenous intention) (Fogg, 1998). In the case of Pokémon Go, no explicit statements by the game developers were identified to the effect that the game was developed with the aim of changing the players' habits. Nevertheless, the study of its intentionality is regarded as relevant, as well as the elements used in the game and its association with a potential user behavior change. Three factors must occur simultaneously before behavior change can take place through a persuasive technology: the user must be sufficiently motivated and have the capacity of behaving as desired; in addition, a trigger is necessary for the occurrence of this behavior (Fogg, 1998).

This paper is structured around a survey performed with Pokémon Go players and former players in Brazil, with the main aim of understanding the impacts the game had on their habits and behaviors. Four interest axes unfold under this perspective: (i) well-being, (ii) gameplay and game mechanics (gamification), (iii) franchising and thematization, and (iv) technology and mobile platform. The authors investigate the intentional and non-intentional motivation of the users and their relation to the collateral benefits of the game, such as results from physical exercise, meeting new people and discovering new places. Understanding the game mechanics, the Pokémon franchise and mobile technology, as well as their relationship with user motivations, feature the research subject too. Based on the results, we analyze whether this game can be ranked as a persuasive technology by employing basic *Captology* concepts (Fogg, 1998). The analysis of the application also leads to a discussion of its effectiveness from the perspective of persuasive technologies, thus obtaining relevant contributions for the development of new products.

## **2. Related work**

Well-being may be related to subjective and psychological issues, such as self-acceptance, positive relationships with other people, autonomy, control over the environment, life purpose and personal growth (Keinonen, Vaajakallio and Honkonen, 2013). Therefore, aiming at helping the users in their search for well-being, mobile platform applications have been developed targeting not only their health, but also subjective and psychological issues that may lead to an effective behavior change. As examples, there are apps for improving well-being (van Wissen, Vinkers, and van Halteren, 2016; Beun *et al*, 2016), performing physical activities (Herrmann, Ziegler and Dogangün, 2016; Williamson, 2016; Matthews *et al*, 2016; Toscos and Faber, 2006), and reducing body weight through diets (Pagoto, 2013; Azar, 2013), among others.

In this context, smartphones can be considered an ally in behavior change, which have great persuasive potential (Fogg, 1998). Easy access provides convenience, and user-friendliness contributes to a certain loyalty between user and application. In this context, it is possible to offer suggestions at appropriate moments, which Fogg (2002) calls the “*kairos principle*”. This principle refers to gamification, which uses elements belonging to game design in a diverse context (Ilhan, Sener and Hacıhabiboğlu, 2016). Gamification can provide three fundamental feelings of motivation in the short term: autonomy (sense of willingness), competence (challenge and feeling of effectance), and relatedness (feeling of connection with other people) Ilhan, Sener and Hacıhabiboğlu (2016), contributing to the search for well-being. The study of this kind of strategy has grown within persuasive technologies research (Hamari, Koivisto and Pakkanen, 2014; Ilhan, Sener and Hacıhabiboğlu, 2016; Llagostera, 2012) and the outcome is greater user engagement in behavior-changing applications (Althoff, White and Horvitz, 2016). A

greater adherence of persuasive technologies is associated to the creation of triggers which are meaningful for the user (Fogg, 1998; 2002). In gaming, reward systems serve as motivation triggers. Eight reward categories are presented by (Wang and Sun, 2011): score system, experience point reward systems, item granting system, resources, achievement systems, feedback messages, plot animations and pictures, and unlocking mechanisms. These resources can be used either individually or combined. Rewards may also impact socialization among players due to the sharing of accomplishments, since rewards represent a symbol of personal achievement as they show how skilled the player is.

In this context, the Pokémon Go app has spurred interest as a discussion subject under different perspectives (Williamson, 2016; Quinn, 2016; Pimenta, 2016; Krüger, Möllers and Vogelgesang, 2016; Clark and Clark, 2016; Bhattacharyya, 2016; Baranowski, 2016; Ayers, 2016; Álvarez, 2016). Some of the topics include motivation issues the impact of on user's behavior; however, there are no studies targeting technology and persuasion. Regarding physical exercise, a 26% increase in daily walking has been ascertained among people who began playing Pokémon Go (Althoff, White and Horvitz, 2016). Also, the game has provided benefits related to socialization from the creation of teams for Pokémon Gym confrontation. This type of strategy builds elements of competition and identity within teams, thus encouraging people to play (Quinn, 2016).

Nostalgia is mentioned as one of the factors contributing to the success of Pokémon Go (Bhattacharyya, 2016), stimulating mass adoption. The feeling of nostalgia becomes a strong tool to create the notion of groups (Wildschut, 2014). This means that people who at one time or another experienced the Pokémon animated television series in a positive way tend to interact and cooperate with the game. Several aspects related to the game mechanics are highlighted as reasons for the game popularity: gameplay, interaction between players, augmented reality and the use of geolocation, the reward system, and the evergreen game model; and yet, franchising is seen as the key point (Bhattacharyya, 2016).

### 3. Study Design

This study featured a survey undertaken in order to understand numerous aspects, such as: profile, motivation for playing, potential benefits, problems, and how the users interacted with Pokémon Go. The exploratory nature of the study is to a large extent due to the wide-ranging success and repercussion of the game, and the debate about its potential impact on habits and behavior change. The focus and the design of the data collection tool centered on four main axes of interest: (i) well-being, (ii) gameplay and

game mechanics, (iii) franchising and thematization, and (iv) technology and mobile platform. The study was then established on five hypotheses:

- H1. The game provides a positive impact on the players' habits.
- H2. The game's potential collateral benefits motivate the users to play.
  - H2.1. The game mechanics and technology motivate the users to play.
  - H2.2. The Pokémon franchise motivates the users to play.
  - H2.3. Being a mobile platform motivates the users to play.

The main research axis of this paper, and its relationship with technology, behavior and persuasion, is related to well-being (i). Hypothesis H1 proposes that the game Pokémon Go has a potential to impact positively and to contribute to user behavior change through the encouragement of healthy habits related to socialization and physical exercise. Additionally, assuming the potential collateral benefits proposed in H1, H2 proposes that the latter are important motivations for the players. Even though the novelty, the game presents (ii) geolocation and augmented reality as the foundation of its gameplay and mechanics – well-known resources which are already used in similar games and applications. Nonetheless, H2.1 admits that the manner in which the gameplay and game mechanics features are combined converge significantly to the players' adoption and motivation. Yet the similarity of resources in comparison to other games and applications which do not count with the same franchising and thematization investment (iii) as Pokémon exposes a great discrepancy in terms of number of users, repercussion and speed of adoption. H2.2 therefore suggests that the Pokémon franchise and theme have a strong impact on user motivation, mainly through aspects such as nostalgia and previous relationship with the brand. The relevance and importance of mobile devices such as cell phones for the process of behavior change and persuasive technology has been widely discussed and accepted in the last few years (Matthews, Win, Oinas-Kukkonen and Freeman, 2016). Particularly in the present study, however, the interest lies on the importance of the platform as a motivation factor for adoption (iv). Finally, H2.3 proposes that the fact that the game is played exclusively on cell phones is one of the motivations behind its use.

The survey was built based on the crossing of the interest and hypotheses axes (Table 1), using the online platform TypeForm. This choice was due to its performance, interface resources and responsivity in comparison to other desktop and mobile systems.

**Table 1. Summary of main questions and association with hypotheses**

S.	Q.	Questions	H.
I	1	Playing situation	1/2
	2	Gender	1
II	3	Age group	1/2
	6	Did you know Pokémon before playing Pokémon Go?	2.2
III	7	Where did you originally learn about Pokémon?	2.2
	8	How often do you play?	1/2
	9	For how long do you usually play each day?	1/2
	12	What motivates you to play Pokémon Go?	2/2.1.2.3
	13	Why did you stop playing?	2.3
V	24	I believe that the game has a positive impact on my habits.	1/2
	25	I believe that the game impacted negatively my academic/professional life.	1
	26	Playing makes me discover new places.	1
	27	Playing makes me interact more with my friends.	1
	28	Playing makes me meet new people.	1
	29	Playing makes me feel less safe.	1
	30	Playing makes me exercise more.	1

It was composed of 31 mandatory (multiple choice [mc], and 5 point Likert scale [L5]) items grouped under five sections: I. Classification [mc], II. Demographics [mc], III. Profile [mc], IV. Emotions [L5] and V. Habits and behaviors [L5].

### 3.1 Participants and Procedures

The study included the participation of 2,189 respondents (n=1968 valid; 89,9%), all of them Brazilian players or former players of Pokémon Go (Table 2). The exclusion criteria were incomplete surveys and disqualified participants (respondents without prior contact with the game and non-Brazilian residents). The participants were chosen by convenience and recruiting took place through social media communities associated to the game on Facebook and Twitter. Upon redirection to the online survey, the participants were asked to qualify their situation towards the game as: current players, former players or either.

**Table 2. Participant demographics**

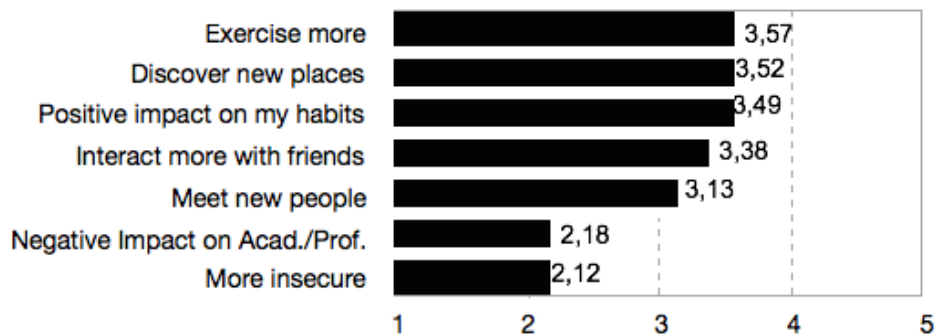
Number of participants.	
Player	Players (1707) 86.7%; Former players (261) 13.3%
Gender	Male (1287) 65.4%; Female (681) 34.6%
Age group	-17,(142) 7.2%; 18 – 24 (1006) 51.1%; 25 – 34 (720) 36.6%; 35 – 44 (87) 4.4%; 45 – 64 (13) 0.7%; +64 (0)

Also, the respondents were asked to agree with an authorization of disclosure allowing the research to use their information. Individuals who failed to agree entailed disqualification. Surveys for both players and former players were identical, except for the fact that the question strain for the second was cast in the past tense and included Q13. After completing the survey, the respondents were redirected to a screen acknowledging their participation. The average completion time was 5 minutes, the same time estimated during pre-testing.

#### 4. Results

The means and frequencies obtained throughout a descriptive analysis revealed that most participants identified a positive impact on their habits from playing the game (Fig.1). Furthermore, a significant correlation (Spearman-rho) was identified with the general perception of positive impact on habits such as discovering new places ( $r_s=.435$ ,  $p<.001$ ), more interaction with friends ( $r_s=.378$ ,  $p<.001$ ), meeting new people ( $r_s=.398$ ,  $p<.001$ ) exercising more ( $r_s=.526$ ,  $p<.001$ ). Similarly, significance (albeit with a negative coefficient) was noted in the negative impact on academic and professional aspects ( $r_s= -.210$ ,  $p<.001$ ).

Figure 1. Impact on habits



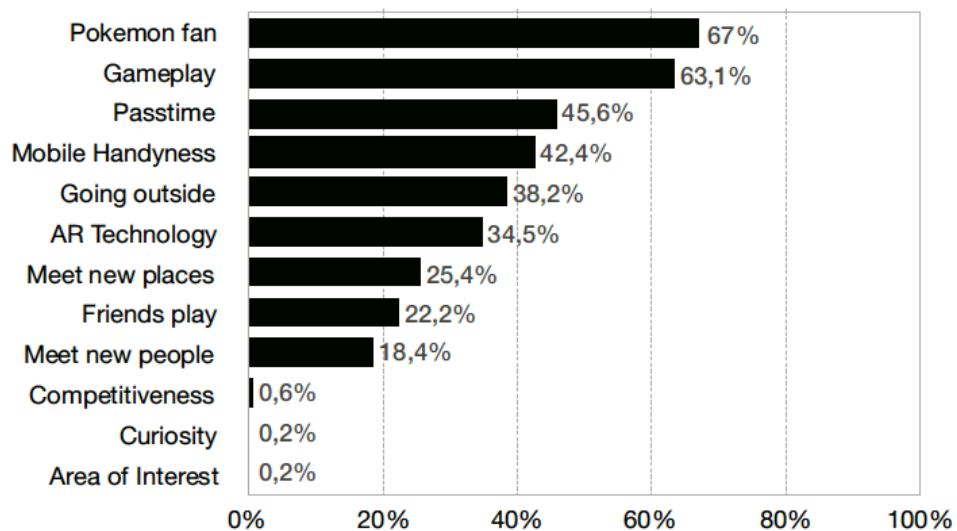
A Chi-square test of independence was carried out in order to verify the association between the perceived positive impact on habits and the age group of the participants. The association between the variables was significant,  $X^2 (2, N=1968) = 26.19$ ,  $p<.001$ , implying higher perceived impacts on lower age groups. The association between the perceived impact and the respondent profile (players or former players) was also proved to be significant:  $X^2 (2, N=1968) = 149.94$ ,  $p<.001$ , indicating a higher perception from current players. A higher usage frequency and time, positively correlated ( $r=.427$ ,  $p<.001$ ), were both proved to be significantly associated to a greater perception of

positive impact on habits while tested:  $\chi^2 (6, N=1968) = 94.23, p<.001$ ,  $\chi^2 (8, N=1968) = 124.22, p<.001$ .

The incidence of benefit related motivations such as going outside (n=752, 38.2%), discovering new places (n=636, 25.4%), and meeting new people (n=500, 24.4%), show that they do not stand out individually (Fig. 2). Although, while grouped as a category and tested for the incidence of at least one of the items, the frequency was raised to 48.8% (n=960).

When analyzing the benefit motivation as related to age groups, the association between variables was found to be significant:  $\chi^2 (3, N=1968) = 14.54, p=.002$ . The outcome was that the age groups behaved much like the figures found in the previous crossing between perceived impact and age groups, where lower ages perceived more impact than higher ages. Likewise, group ages had a strong influence on benefit motivation. Moreover, an attempt was made to find out whether usage frequency and time were associated to benefit motivation. Significance between variables was found: for frequency:  $\chi^2 (3, N=1968) = 30.01, p<.001$ ; for playing time:  $\chi^2 (4, N=1968) = 84.57, p<.001$ .

Figure 2. User Motivations



The relationship between benefit motivation and perceived impact on habits proved to be significant:  $\chi^2 (2, N=1968) = 228.96, p<.001$ . Furthermore, a significance  $\chi^2 (1, N=1968) = 54.09, p<.001$  was found when testing for the association between player profile and benefit motivation. While players displayed a higher benefit motivation (52%), former players averaged a lower rate of 27,6%. For the analysis of H2.1, the following variables were considered as fun motivation: passtime (n=898, 45.6%); game mechanics



(n=1241, 63.1%); and augmented technology resource (n=684, 34.8%). Individually assessed, game mechanics is the most impacting among the fun features. Nevertheless, when we look at the grouped incidence of at least one of the variables related to fun among the respondents, we reach a figure of 82.1% (n=1616).

Analyzing descriptively the features related to the number of game theme, almost the whole sample (n=1927, 97.9%) stated they knew the Pokémon franchise prior to playing the game. From those who knew the franchise, 93.7% remembered the brand from the anime series; 66.9% from video games; 43.2% from card games; 36,4% from tazos; and 2.2% from licensed products, among others. Regarding the theme as motivation, 67% (n=1318) of all respondents stated that the fact that they were fans of the franchise was one of the reasons for playing.

Only 42.4% (n=834) of the respondents reported mobility and accessibility features as motivations for playing. On the other hand, analyzing the causes informed by former players as to why they stopped playing, evidence was found pointing to the relevance of the platform. Among the reasons related to technical issues are: the game does not work well where I live (27.97%), device limitations (6.13%), battery issues (1.15%) and Internet issues (1.15%). We observed that 36.78% of the technical issues involving the cell phone were reported as reasons responsible for quitting the game.

## 5. Discussion

This study found that the game's positive impact on habits was widely identified and acknowledged by the participants, thus supporting H1. Additionally, the respondents identified concrete impacts associated to specific behaviors related to collateral benefits and well-being (Keinonen, Vaajakallio and Honkonen, 2013) – here, those pertaining to physical activity and socialization. The habit reported as the most influenced was the increase in physical exercise. This feature agrees with findings previously discussed in (Althoff, White and Horvitz, 2016; Clark and Clark, 2016; McCartney, 2016) providing important perspectives in contexts where behavior changes motivated by digital platforms is questioned (Krüger, Möllers and Vogelgesang, 2016; Baranowski, 2016; Ayers, 2016). It can be observed that the respondents also claimed that the game drove them to know new places, interact more with their friends, and meet new people. It was also confirmed that the expectation in which the improvement of socialization aspects is linked to benefits resulting from the game. It is believed that part of the social aspect originates from the logics of tribe establishment and the building of a sense of community around a common activity or culture (Quinn, 2016). One of the main characteristics associated to a perception of positive impact on habits was the participants' age group. Although all age groups showed relevant impact rates, younger users (24 years or less) were more likely

to perceive positive impact on habits than older users. Contrary to what was expected, the -17 years age group showed the highest impact on habits due to the game.

Apart from perceived impact on habits, we sought to deepen the investigation of motivations and stimuli leading to the players' engagement with the game. A relevant portion of players claimed that at least one of the collateral benefits mentioned (physical exercise, socialization and discovery) is included among their motivations and stimuli to play. This fact both supports the H2 hypothesis and allows a direct relationship between Pokémon Go and the intentionality of its players as they seek a stimulus for behavior change in the game. Therefore, this feature assumes relevance in the configuration and discussion of the game Pokémon Go as an actual persuasive technology (Fogg, 1998; 2002) reinforcing perceptions and expectations about the interface between this field and gamification (Hamari, Koivisto and Pakkanen, 2014; Llagostera, 2012). As a result, a large portion of the individuals who considered the benefits a motivation for playing, perceived positive impacts on their habits, which suggests an association between both variables. Such feature is reinforced by the association between the perceived positive impact and higher usage frequency and time. According to this study, as the weekly frequency of playing and the daily amount of playing hours rise, the perception of positive impact on habits grows too. Another feature observed was that individuals who still play the game perceive a higher impact on their habits when compared to former players. This suggests a relationship between benefit motivation, perception of impact on habits and game adoption.

The H2.1 hypothesis was confirmed based on the observation that a sizeable portion of the participants classified fun and entertainment features provided by game mechanics and augmented reality as strong motivations for playing. Game mechanics was a motivation mentioned by the users because it is composed of features and stimuli linked to socialization (Quinn, 2016), competitively and reward (Wang and Sun, 2011; Llagostera, 2012; Bhattacharyya, 2016). The geolocation resource played a key role in the motivation of people who left their homes to play. Since it is required that the players roam the streets and visit new places, many of them chose gathering in groups (H1, H2). In certain cases, these groups are formed in a spontaneous, unexpected fashion, thus being demographically diversified. The augmented technology feature was considered both for the novelty of the resource and for its contribution to the game mechanics through cognitive and learning benefits (Godwin-Jones, 2016; Zachary, 2016; Biseria and Rao, 2016). It is important to point out that fun and entertainment still exceed the benefits in terms of motivation.

Maybe one of the most conspicuous features mentioned by the participants was the influence of the Pokémon franchise as a motivating factor to play, therefore supporting H2.2. Moreover, a large majority of respondents claimed having a previous relationship

with the game theme. We believe that this is not only related to fun and entertainment aspects present in gamification, but also shows a strong component of attachment, affection, memory, and nostalgia as discussed earlier (Bhattacharyya, 2016; Wildschut, 2014). In addition to the nostalgic relationship with the franchise, the thematization present in characters, storytelling, and rewards is considered a key ingredient to the success of the platform and game mechanics (Wang and Sun, 2011). The importance of the franchise is reinforced by the fact that prior to the launching of our study subject, Niantic had developed Ingress – a game based on augmented reality whose functioning was very similar to that of Pokémon Go; yet, as it did not count with a franchise, it never attained the same level of success and repercussion.

Although it is a key property for the functioning of the game mechanics, the accessibility and mobility provided by the cell phone was not expressly mentioned as a motivation by the participants. Yet mobility is of obvious importance and bears an undeniable potential for persuasive technology (Fogg, 2002), it is believed that certain generations consider it so essential, all-pervasive and, in this context, even taken for granted (Telefónica S.A, 2013) that it barely occurred to them as a direct motivation for playing, thus leading to a dismissal of the H2.3 hypothesis. In spite of its underestimation, however, the study pointed to relevant evidence of the importance of mobility resources, especially as they were mentioned as a cause for quitting the game in virtue of technical shortcomings and operational issues. In other words, technology is usually perceived when it does not work or presents issues.

Even though technical features such as intentionality in seeking behavior change and impact perception by the user are key components in developing products with persuasive technology approaches, it is necessary to expand our perspective and consider other elements aiming at user attraction and adoption. Several persuasive technology initiatives neglect issues such as playfulness, entertainment and fun. The case of Pokémon Go lays bare an opportunity for this field to benefit widely from gamification resources and support from marketing tools such as licensing and thematization in order to encourage greater adoption and engagement. Such resources typically require a specific profiling of population and target market, since some volatility is found in the order of preference, mainly considering age groups.

We believe that the aspects related to age group are specially due to the generation gap in technology usage (Deal, Altman and Rogelberg, 2010). The presence of technology in the life of young individuals and their proficiency in its usage affirm mobile devices and other digital platforms as essential tools in their day-to-day activities (Telefonica S.A, 2013). This fact points to the massive influence and reliability that technology enjoys in the decision-making process in areas involving health and well-being, socialization and entertainment. The fact that younger age groups are more likely

to seek behavior change through technology support, as well as greater perception of the impact on their habits, exposes this inseparable relationship between behavior and technology. At the same time, we observe that the motivations of older age groups are linked to fun and entertainment.

## 6. Conclusions

In this paper, we sought to investigate and discuss the repercussion of the game Pokémon Go based on its features related to motivations, intentions and perceived impacts on the behavior change of its players. These issues were approached in an attempt to establish a relationship with gamification and persuasive technology, in order to provide valuable input to future projects by observing which features are successful. The game proved effective in promoting an impact on the physical and social habits of its players. This finding affirms the capacity that technology has to influence and persuade the habits of a population in a collective way. Still, this association evidences how closely related these areas are and how necessary it is to approximate persuasive technology to gamification, which in this instance is responsible for greater user attraction and adoption.

We also found that the intentionality of the participants as they seek behavior change as a motivation for playing entitles the platform to claim the status of persuasive platform (Fogg, 1998). The search for benefits associated to physical and social well-being notwithstanding, playfulness aspects such as fun and entertainment provided by the game mechanics and embedded technological resources were also important features accounting for player motivation. One of the most remarkable aspects related to stimulus, motivation and game adoption was the presence of the Pokémon theme and franchise in the game. Although intention is a key component of persuasion, the playfulness fostered by the platform is also a crucial influence on adoption and engagement. Variables such as frequency and pace of game use, and age group also influence significantly aspects such as impacts and perceived behavior change, motivation, and game adoption. We thus conclude that differences in the generation profile of users and technology usage intensity are factors deserving attention.

For all the relevance of its findings, this study has limitations. The sample takes into consideration only a selected portion of the Brazilian population; we therefore suggest the expansion of the respondent universe to other contexts and populations. Specific sociocultural patterns, such as access to mobile technology, urban safety and late availability of the game in certain regions are likely to influence the results. The short lifetime of the game can also be seen as a limitation since the results of the study are based on perceptions and impacts observed only a few months after its launching. We

believe that future longitudinal studies incorporating specific indicators will be able to contribute with more accurate data on the adoption of this game and its benefits.

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