

Article

Uses and Gratifications on Augmented Reality Games: An Examination of Pokémon Go

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Abstract: Users are attracted by augmented reality games to fulfil their needs. Two objectives are proposed: (1) to research the motivations of those using augmented reality mobile games; (2) to define a structural model based on Uses and Gratifications Theory for the adoption of augmented reality mobile games. The present study examines the case of Pokémon Go. The model is composed of eight constructs: enjoyment, fantasy, escapism, social interaction, social presence, achievement, self-presentation and continuance intention. The SEM model was empirically assessed based on 1183 responses from Pokémon Go users around the world. Results clearly confirmed the positive influence of almost all the proposed constructs on continuance intention for Pokémon Go. First, these findings may be helpful for the online gaming industry in identifying the game functions that retain more gamers and improve the user experience. Second, the online gaming industry might use these results in order to classify those players with behaviours that favour the use of online games.

Keywords: augmented reality games; uses and gratifications theory; Pokémon Go

1. Introduction

Digital technologies are changing ways of working, studying, communicating and entertaining [1,2], among other things. During the past few years, the continuous growth of the use of mobile devices and media technologies has transformed traditional games [3–5]. In this context, mobile device gaming has opened up new dimensions for entertainment applications [6].

This article is focused on the use of Pokémon Go game, one of the most popular smartphone games of all time [7–10]. It was launched by the company Niantic Lab in July 2016 and immediately became a global phenomenon [11]. According to [12], this game has reached 1 billion downloads and it is available in more than 90 countries [13]. In addition, as stated in [14], based on December 2018 statistics, Pokémon Go dominates the location-based game category in terms of revenue.

Pokémon Go players must capture virtual characters (Figure 1) mapped to real-world locations [15–17]. At a certain point in the game, players have to join one of three teams and battle for the prestige and ownership of gyms [18], which can be found at real locations in the world, with their Pokémon. The objective of Niantic, a software development company specialized in augmented reality mobile games, was to develop a product that would encourage exercise, but not in a heavy-handed way [19]. Currently, Pokémon Go is included in the augmented reality mobile games category [4,8].

Considering that Pokémon Go pioneered more sophisticated software because of the need for location information [20,21], developers and game companies will be building this into future games. Thus, it is necessary for the online game industry to develop an understanding of the players' intentions [22–25].



Figure 1. Pokémon Go interfaces.

Two objectives are proposed: (1) to research the motivations of those using augmented reality mobile games; (2) to define a structural model based on the Uses and Gratification Theory [26,27] for the adoption of augmented reality mobile games. Indeed, this theory has been applied widely in Information and Communication Technologies (ICT) research due to its potential for analysing online activities [28,29].

The remainder of this article is as follows: the theoretical background and hypotheses are shown in Section 2. Section 3 then provides the details of the research methodology and preliminary analysis. Thereafter, Section 4 describes the model testing and Section 5 incorporates the discussion. Finally, Section 6 describes conclusions, implications, limitations and future research directions.

2. Theoretical background

2.1. Uses and Gratifications Theory

The Uses and Gratifications (U&G) Theory, which originated in [30], aimed to detect the motivational needs of the audience of a radio quiz programme. Thereafter, it has been widely used in research. Recent studies [31–34] legitimate the U&G approach as one of the most relevant communication theories for explaining the use of media based on the virtual environment.

The U&G approach originally focused on identifying why people choose one communication medium over another [35–40]. The theory has been used to explore a wide range of topics relating to recent ICT, such as virtual worlds [41–43], online social networking [44], web-based information services [45] and Internet news browsing [46]. However, there are few investigations in the field of augmented reality mobile games that apply the U&G theory [47].

U&G principles establish that people usually have a wide range of needs that can be gratified when they consume media [48,49]. For that reason, U&G Theory tries to explain the social and psychological reasons why people are motivated to use media to fulfil their needs [50–52]. In fact, U&G has the potential to examine personal motivations and persistent use of an augmented reality mobile game, specifically Pokémon Go.

Prior research usually classifies gratifications into three categories [43,53,54]: (1) hedonic, (2) utilitarian, and (3) social. This last one is linked with the attainment of status. Among these three groups, perhaps the hedonic variables have received most attention in studies that try to analyse the

motivations of those using ICT for leisure and voluntary activities. In this sense, the U&G approach can be applied to online games as they are a relevant part of the Internet and the media [53,55].

2.2. Research Model

The study reported in [53] was identified as one of the few works that apply the U&G theory in an online game environment. Based on this work, a research model composed of eight constructs related to hedonic, social and utilitarian gratifications was defined (Figure 2). First, hedonic gratification is captured by: (1) enjoyment (ENJ), (2) fantasy (FAN) and (3) escapism (ESC). Second, it is assumed that (4) social interaction (SINT) and (5) social presence (SPRE) describe social gratification. Finally, (6) achievement (ACH) and (7) self-presentation (SELP) are proposed as capturing utilitarian gratification. All these constructs in turn influence (8) the continuance intention (CI) to use the Pokémon Go game.

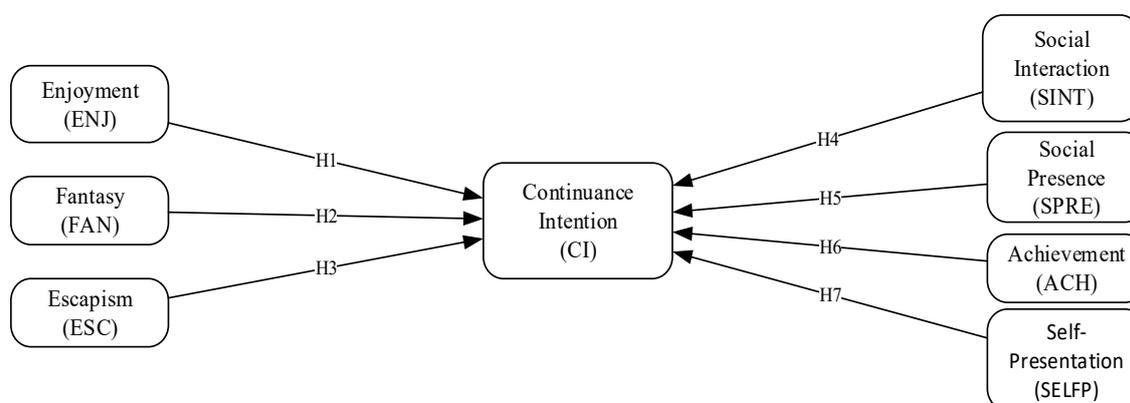


Figure 2. Proposed research model.

Considering this proposal, the present study contributes to an increase the points of view that identify the motivations of the users of Pokémon Go. In fact, the model provides a different perspective when compared with similar studies. For example, [21] analysed the motivations of those continuing to use Pokémon Go, applying the Motives for Online Gaming Questionnaire. In addition, [4] analysed the continued use of Pokémon Go by adopting the Theory of U&G, although the applied model focused on risks and social norms. Finally, [8] analysed the use of Pokémon Go as a tool that drives cognitive performance and emotional intelligence.

In a general way, online games are one type of hedonic ICT [23,53,56–59]. Users can alleviate boredom by playing games linked with mobile phones [60]. In this way, enjoyment is considered as a hedonic gratification [61], inasmuch as it is related to activities which are interesting or enjoyable [62]. Indeed, Prior ICT studies identify enjoyment as the main hedonic motivation [63]. In addition, [64] shows that continuance intention is predicted by enjoyment [64–67]. Based on the above reasoning, enjoyment should exert an influence on continuance intention, and the following hypothesis is posited:

Hypothesis 1 (H1). *Enjoyment impacts positively on continuance intention to play the Pokémon Go game.*

Moreover, the ICT literature identifies fantasy as one of the dominant dimensions of video game use [68,69] and it has been shown to be a strong predictor in determining user behaviour for online communities and gamers using the U&G approach [43,47,53,70,71]. According to [72] (p. 4), fantasy “refers to themes that engage users in a creative, imaginative, or even fantasized world of play”. Thus, fantasy could be seen in online games as allowing players to do things that they would not normally be able to do in real life [47,53,73], such as building cities or in this case, choosing an avatar with which to catch Pokémon. Hence, in this study, it is expected that fantasy obtained when playing Pokémon Go will increase the continuance intention to play it. Thereby, a hypothesis was established:

Hypothesis 2 (H2). *Fantasy impacts positively on continuance intention to play the Pokémon Go game.*

Escapism is another hedonic dimension related to the Internet [40,44,53] and mobile communications [74]. Augmented reality mobile games allow players to escape by removing themselves from the worries of everyday life [75–77]. In addition, many authors identified escapism gratification as one of the most consistent predictors of consumption behaviour [78–83]. Therefore, a hypothesis was suggested:

Hypothesis 3 (H3). *Escapism impacts positively on continuance intention to play the Pokémon Go game.*

Social interaction is a classical gratification in U&G studies [84,85]. This dimension includes meeting people with similar interests or keeping up with what is going on [86]. In particular, social interaction helps to sustain social gratification for players and relationships with friends [63,87]. When people socialize, they expect to increase their emotional satisfaction.

Therefore, in U&G studies [53,63,88,89], social interactions have long been considered a meaningful gratification associated with playing online games. Applying this to the present research, we expected that the social interaction gratification from playing Pokémon Go would have an effect on continuance intention to keep playing the game. Thereby this hypothesis was defined:

Hypothesis 4 (H4). *Social interaction impacts positively on continuance intention to play the Pokémon Go game.*

Social media is a practical context for examining social presence in online games. In a general way, users employ social media to share their experiences [90]. In this manner, social presence could show the need of users to interact with their peers using augmented reality mobile games [42,53,80].

In the case of Pokémon Go, players are prompted to be part of Team Instinct (Yellow), Team Mystic (Blue) or Team Valor (Red). Players usually select the same team as their friends in order to reach some common goals. In this sense, social presence could be a dimension associated with continuance intention. Thus, the following hypothesis is proposed:

Hypothesis 5 (H5). *Social presence impacts positively on continuance intention to play Pokémon Go.*

Achievement has been widely studied in U&G [43,53]. It was defined by [91] as the desire to gain advancement (power, progress, etc.) and to compete with others, and an interest in analysing the rules and the system. With reference to online games, it is seen as the “desire to gain power, to gather virtual game objects and valuable performance points, to compete with others and to generate a particular image of player-self” [53] (p. 263).

The authors of [92] stated that factors such as optimal experiences, personal interactions or pleasant social interactions determine the continuous use of online games. Moreover, improving status can be considered relevant by users worried about developing their cyber identity or image [42,47]. Applying this to Pokémon Go, players will be keen to gain prestige and a high trainer level. Based on this, it is expected that the relationship between achievement and continuance intention should be positively strong. The following hypothesis is suggested:

Hypothesis 6 (H6). *Achievement impacts positively on continuance intention to play the Pokémon Go game.*

Finally, self-presentation has been identified as an important aspect of relational development in interpersonal interactions [93]. Through self-presentation, players project an image of self in order to exert an influence on the perception and treatment of other online players [53], besides obtaining rewards and self-fulfilment [94]. Further, the information received from self-presentation is usually used by players to make comparisons with others in order to judge their own abilities [95].

Pokémon Go allows players to select their avatars and customise them with clothes and accessories to exhibit the image that players desire. In this manner, Pokémon Go has a huge range of styles and clothing options. Moreover, the use of an avatar maintains users’ privacy and gives them expressive freedom to an otherwise anonymous and static online presence [63,95,96]. Consequently, the following hypothesis is proposed:

Hypothesis 7 (H7). *Self-presentation impacts positively on continuance intention to play the Pokémon Go game.*

3. Research methodology and preliminary analysis

3.1. Data collection and Participants

A web-based survey was designed to collect data in order to test the research model. This included visiting different Facebook groups around the world to invite their members to participate in this research. Players could complete the online questionnaire using the hyperlink provided. A total of 1189 questionnaires were collected, of which six were incomplete. The collection period was between December 2018 and June 2019.

3.2. Questionnaire Design

The survey instrument for this study was based on the theoretical background regarding U&G theory and online games. Concretely, the measurement scales (Appendix A) were extracted from previous studies [31,53,60]. A five-point Likert-type scale allowed participants to express their agreement or disagreement with the proposed statements, ranging from not at all/strongly disagree (1) to exactly/strongly agree (5). Additionally, some demographic data were collected in an introductory section (Table 1).

Table 1. Demographic Profile.

Dimension	Characteristic	Statistic (%)
Gender	Male	581 (49.11%)
	Female	602 (50.88%)
Age	Less than 20 years old	321 (27.2%)
	Between 21 and 25	394(33.38%)
	Between 26 and 30	226 (19.15%)
	Between 31 and 40	144 (12.20%)
	Between 41 and 50	78 (6.61%)
	More than 50 years old	20 (1.44%)
Pokémon Go use frequency	Several times a day	627 (53%)
	Once a day	311 (26.28%)
	Once a week	101 (8.53%)
	Rarely	144 (12.17%)
Online Games use frequency	<5 hours a week	363 (34.12%)
	Between 5 y 10 hours	345 (32.42%)
	Between 11 y 15 hours	111 (10.43%)
	>20 hours a week	247 (23.03%)

4. Data Analysis and Results

4.1. Structural Model Test

A structural equation model (SEM) was proposed. Lisrel 8.51 and SPSS 25.0 software were used for the data analysis. On the one hand, Cronbach’s α coefficient exceeded the minimum acceptable level of 0.70 [97], affirming the reliability of every construct (Table 2).

On the other hand, the convergent validity of the items was evaluated using two indicators [98]: (1) composite reliability for each construct and (2) average variance extracted (AVE). In this manner, an exploratory factor analysis (EFA) for each construct was developed [99] in order to assess its unidimensionality (Table 2). The results of this analysis show that all constructs widely surpassed the threshold of 0.50 for AVE [100], affirming the convergent validity in all cases.

In addition, the discriminant validity was evaluated. Table 3 shows that the square roots of the AVEs are higher than the absolute values of the off-diagonal values in the corresponding rows and columns of the correlation matrix. These findings indicate that each construct is more strongly correlated with its own indicators than with the other constructs in the model [101]. Finally, the model fit indices have been incorporated into Table 4 along with their recommended values. These indicate that the research model has a good fit considering the maximum thresholds proposed by [99].

Table 2. Measurement scales.

Construct		Mean	Std. D.	Factor Loading	Lambda Stand.	Composite Reliability	AVE	Cronbach's α
ENJ	EN1	4.26	0.950	0.942	0.923	0.912	0.777	0.925
	EN2	4.26	0.954	0.960	0.953			
	EN3	4.13	0.980	0.796	0.756			
FAN	FA1	2.77	1.30	0.826	0.832	0.885	0.720	0.883
	FA2	2.18	1.32	0.868	0.854			
	FA3	2.75	1.32	0.842	0.860			
ESC	ES1	3.05	1.33	0.829	0.841	0.918	0.736	0.914
	ES2	2.50	1.33	0.869	0.870			
	ES3	2.70	1.32	0.898	0.897			
	ES4	2.82	1.32	0.816	0.821			
SINT	SIN1	2.27	1.36	0.866	0.865	0.956	0.843	0.955
	SIN2	2.59	1.38	0.931	0.931			
	SIN3	2.42	1.36	0.952	0.955			
	SIN4	2.36	1.32	0.919	0.92			
SPRE	SOP1	2.78	1.32	0.827	0.815	0.877	0.705	0.874
	SOP2	2.35	1.32	0.810	0.813			
	SOP3	2.95	1.36	0.869	0.888			
ACH	ACH1	3.47	1.34	0.815	0.809	0.922	0.748	0.919
	ACH2	3.02	1.4	0.910	0.933			
	ACH3	2.96	1.39	0.876	0.904			
	ACH4	3.20	1.34	0.840	0.807			
SELP	SEP1	2.58	1.31	0.948	0.954	0.935	0.827	0.928
	SEP2	2.66	1.32	0.957	0.951			
	SEP3	2.73	1.36	0.803	0.817			
CI	CI1	3.49	1.23	0.864	0.837	0.856	0.749	0.853
	CI2	3.96	1.13	0.864	0.893			

Table 3. Discriminant validity.

	ENJ	FAN	ESC	SINT	SPRE	ACH	SELP	CI
Enjoyment (ENJ)	0.88							
Fantasy (FAN)	0.245	0.94						
Escapism (ESC)	0.357	0.397	0.96					
Social Interaction (SINT)	0.183	0.300	0.339	0.98				
Social Presence (SPRE)	0.334	0.417	0.466	0.616	0.93			
Achievement (ACH)	0.383	0.321	0.446	0.307	0.433	0.96		
Self-Presentation (SELP)	0.185	0.444	0.337	0.479	0.666	0.321	0.96	
Continuance Intention (CI)	0.526	0.215	0.338	0.277	0.386	0.352	0.229	0.92 ¹

¹ Diagonal elements are the square root of the shared variance between the constructs and their measures.

Table 4. Overall fits of the models

Fit Index	Results	Recommended Value
$\chi^2/\text{grade of freedom}$	0.295	≤ 3.00
Normed Fit Index (NFI)	0.960	≥ 0.90
Non-normed Fit Index (NNFI)	0.964	≥ 0.90
Comparative Fit Index (CFI)	0.970	≥ 0.90
Adjusted Goodness-of-Fit Index (AGFI)	0.915	≥ 0.80
Root Mean Square Error of Approximation (RMSEA)	0.050	≤ 0.05
Goodness-of-Fit Index (GFI)	0.934	≥ 0.90
Incremental Fit Index (IFI)	0.970	≥ 0.90

4.2. Test of the Structural Model

SEM was used to test the significance for each hypothesised path (β) and the explained variance (R²) for each dependent variable, adopting the maximum likelihood estimation method. As shown in Table 5, five of the seven hypotheses are supported.

Table 5. Results of hypothesis testing.

Hypothesis (Path)	Path Coefficient	t-Value ²	Supported
H1: ENJ→CI	0.484	12.065 ***	Yes
H2: FAN→CI	-0.0145	-0.442	No
H3: ESC→CI	0.0647	1.975 **	Yes
H4: SINT→CI	0.0627	1.968 **	Yes
H5: SPRE→CI	0.155	3.166 **	Yes
H6: ACH→CI	0.0814	2.515 **	Yes
H7: SELFP→CI	-0.0284	-0.848	No

² Significant at: * $p < 0.05$ $t(0.05;\infty) = 1.9670$; ** $p < 0.01$; $t(0.01;\infty) = 2.5904$; *** $p < 0.001$; $t(0.001;\infty) = 3.3195$.

The results displayed in Table 5 show that the model explained 34.2% of the variance in intention to continue to playing Pokémon Go. As expected, social interaction ($\beta = 0.0627155$, $p < 0.01$), social presence ($\beta = 0.155$, $p < 0.001$), achievement ($\beta = 0.0814$, $p < 0.01$), enjoyment ($\beta = 0.484$; $p < 0.001$) and escapism ($\beta=0.0647$, $p < 0.01$) have a positive impact in Pokémon Go continuance intention. However, fantasy and self-presentation do not obtain a significant path coefficient, hence these relationships are not supported.

5. Discussion

The present work has investigated the connections between continuance intention of playing Pokémon Go and a set of constructs: enjoyment, fantasy, escapism, social interaction, social presence, achievement and self-presentation. The U&G perspective was adopted.

The findings indicate that U&G theory comprises an appropriate framework, because (1) it broadly explains the voluntary use of ICT for hedonic purposes and (2), specifically, it has enough potential to examine motivations for the continuous use of augmented reality mobile games, such as Pokémon Go. Based on these U&G principles, people will consume augmented reality mobile games to gratify a wide set of needs.

According to [50,51], U&G is a useful framework to identify social and psychological needs, and in this way to answer to key questions in the motivational field. In fact, the U&G approach considers that continuance intention of ICT use depends largely on cognition-oriented behaviour [30–32]. From a theoretical point of view, this study makes a number of contributions. First, it has improved understanding of the essential dimensions that incentive the use of online games. The results confirm the variables that determine continuance intention of online games. Second, results contribute to the

existing literature by highlighting the impact of gratifications on online game use. In this respect, the structural model, based on prior literature [49,53,59], received strong support from the dataset.

Overall, the model supports almost all relationships as expected. In this respect, the dataset indicates that the proposed model offers an appropriate fit for the defined connections, as the positive influence of enjoyment, escapism, social interaction, social presence and achievement on the CI of playing Pokémon Go are clearly confirmed. These results share some similarities with the previous literature [53,57–59]. However, contrary to what was expected, the hypotheses relating to fantasy and self-presentation were not supported, and so do not seem to be relevant to Pokémon Go. Overall, however, it can be concluded that users achieve gratification when they use augmented reality mobile games.

Finally, this is one of the first studies to examine the intentions of people using an online game with three basic features: it is (1) free-to-play (players do not need to pay to use it), (2) location-based (the progress of the game depend on the player's location) and (3) an augmented reality game.

6. Conclusions

This study has been an attempt to test the intention to use augmented reality mobile games, and more specifically Pokémon Go. Concretely, this research extended the U&G framework and demonstrated the impact of gratifications on players' intentions to continue using Pokémon Go.

Based on the results, some implications have been identified. First, this article has enlarged knowledge about the use and adoption of online games. In this manner, the present study has provided some empirical evidence for subsequent investigations to assess the continuance intention of use of augmented reality mobile games. In contrast, from a managerial perspective, understanding the perceived gratifications associated with online games applications is useful for the online games industry. Some practical implications can be extracted from the results.

First, the findings may be helpful for the online gaming industry in identifying the game functions which retain more gamers and improve the user experience. The results of the present study lay the foundations for incorporating potential gratifications into the design of online games. Second, the online gaming industry might use these results in order to classify those players with behaviours that favour the use of online games, and thus can anticipate the success for this type of online entertainment.

This research is not without limitations. First, this study has not applied stratified sampling, which makes it possible to recruit equal sizes of age groups, and age groups that mirror the current population. The second limitation is related to the explanatory capacity of the model. In this respect, the percentage of the explained variance for continuance intention could have improved if other variables linked to gratifications and players' behaviour had been considered. Finally, the findings from this study are limited to the case of Pokémon Go. To address this, it would be convenient to develop similar studies that encompass other augmented reality mobile games.

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Appendix A Questionnaire

Construct	Indicator	
		I play Pokémon Go because ...
ENJ	ENJ1	... it is entertaining
	ENJ2	... it is enjoyable
	ENJ3	... it kills time
FAN	FAN1	... it lets me experience things I do not experience in daily life
	FAN2	... it lets me pretend I am someone else
	FAN3	... it allows me to immerse myself in the lives of the game world
ESC	ESC1	... I can forget about school, work, or other things and relax
	ESC2	... it is the best way to block off the world
	ESC3	... it lets me vent and relieve stress from the day
	ESC4	... it lets me relax from gaming
SINT	SINT1	... I have a network of friends I made via playing Pokémon Go
	SINT2	... it enables me to connect with friends in my real life
	SINT3	... it enables me to keep in touch with friends in my real life
	SINT4	... it permits me have a closer relationship with friends
SPRE	SPRE1	... I feel connected to other players
	SPRE2	... in it I am able to be myself and show what kind of player I really am
	SPRE3	... I feel like a member of the Pokémon Go community during the game
ACH	ACH1	... to achieve a higher level in the game
	ACH2	... to have more power/experience than others in the game
	ACH3	... to have Pokémon/objects, which give me a higher status than other players of the game
	ACH4	... to enjoy the feeling of winning
SELFP	SELFP1	... I want other players in this game to perceive me as likable
	SELFP2	... I want other players in this game to perceive me as friendly
	SELFP3	... I want other players in this game to perceive me as skilled
		Indicate how much you agree ...
CI	CI1	It will be worth playing Pokémon Go in the future
	CI2	I am willing to play Pokémon Go in the near future

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