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# Analysing the acceptation of online games in mobile devices: An application of UTAUT2

Patricio Ramírez-Correa[a], Francisco Javier Rondán-Cataluña[b], Jorge Arenas-Gaitán[b,*], Félix Martín-Velicia[b]

[a] Universidad Católica del Norte, Engineering School, Coquimbo, Chile
[b] University of Seville, Department of Business Management and Marketing, Seville, Spain

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ABSTRACT

The aim of this paper is to analyse the acceptance of online games, based on the unified theory of acceptance and use of technology 2 (UTAUT 2). The data analysed correspond to a sample of online players through mobile devices in Spain. A structural equation approach based on Partial Least Squares was used to assess the acceptance model. The result of the analysis indicates that UTAUT 2 explains 71% of the use of online games in mobile devices. The main conclusion of the study highlights the importance of habit in the use of online games. Specifically, the intention to play online is explained, in order of importance, by the variables habit, hedonic motivation and social identity. In addition, the use of an online game is determined by habit and intention to play. We proposed a simplified UTAUT2 model adapted to the online game scope.

## 1. Introduction

To play or not to play: this is not the question, because according to the Association for UK Interactive Entertainment (UKIE) there were between 2.2 and 2.6 billion players around the world in 2017. The critical question is: what are the key factors for the success of a specific online game? Hundreds of new video games are launched every month, but people accept only a few. Specifically, in the mobile market, 21.8 billion game apps were downloaded from Apple's APP store and Google Play in Q1 2017–2018, a 15.3% increase from the same quarter the previous year. For example, Niantic's Pokemon Go surpassed 65 million active monthly active users in April 2017 and made over $470 million in gross revenues in the first 80 days after its launch. Three games broke the billion-dollar mark: Mixi's Monster Strike, Supercell's Clash of the Clans and Clash Royal. Furthermore, games generated 90% of Google Play revenue (UKIE, 2017). The future of the sector is very optimistic, and the growth of this market will be unstoppable in the coming years. Despite the relevance of these figures, the scientific research about the acceptation of online games is limited.

Playing is a primary activity in human behaviour. While all mammals play, humans play more and throughout their lives (Schultz and Lavenda, 2005). Indeed, since humans are very social animals, as they grow they interact more with their age group and games become essential for learning (Nanda and Warms, 2010). For instance, games offer a unique class of mediation for the emergence of new mental functions in young children (Bodrova and Leong, 2015).

According to the above, games have been present throughout the history of humankind. The historian Johan Huizinga summed up the characteristics of play as “free activity standing quite consciously outside ‘ordinary’ life as being ‘not serious', but at the same time absorbing the player intensely and utterly. It is an activity connected with no material interest, and no profit can be gained by it. It proceeds within its own proper boundaries of time and space according to fixed rules and in an orderly manner. It promotes the formation of social groupings which tend to surround themselves with secrecy and to stress their difference from the common world by disguise or other means” (Huizinga, 1949, p. 13). In this line, the sociologist Roger Caillois proposed the widely accepted four fundamental features of games: agon (competition), alea (chance), mimicry (role-playing), and llinx (induce vertigo)(Caillois, 1961).

The advent of information technologies in our society and the personal use of smartphones and global communication networks inaugurated a new stage for the development of games. Online games have in recent years become a regular part of people's daily lives, (Hamari et al., 2015a). Estimates indicate that online games will achieve significant profits in the future and that this market will

* Corresponding author.
*E-mail addresses:* patricio.ramirez@ucn.cl (P. Ramírez-Correa), rondan@us.es (F.J. Rondán-Cataluña), jarenas@us.es (J. Arenas-Gaitán), velicia@us.es (F. Martín-Velicia).

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continue to grow as broadband Internet access becomes more popular (Merhi, 2016). And while models of individual acceptance of information technologies in different contexts have in the last decades been studied extensively, the study of system acceptance, such as of online games, is relatively recent (Chang et al., 2014; Hsiao and Chiou, 2012). User acceptance is the primary measure of the achievement of any information system (Dillon and Morris, 1996). But experimental research digging into the elements of game enjoyment and their influence on player acceptance has been deficient (Wang et al., 2016). The conclusions of this empirical study are valuable to scholars and managers in improving the knowledge of online video games.

There is a significant number of research works on online games. Most of the them have adopted a hedonic approach (Chang et al., 2014; Davis et al., 2013; Merhi, 2016; Ramírez-Correa et al., 2018) using the Theory of Use and Satisfaction (Li et al., 2015) and flow (Shin and Shin, 2011; Zhang and Fu, 2015). Few studies have addressed the use of online games from the point of view of the models of acceptance of information technologies. In this context, some works have addressed it based on the TAM models (Ha et al., 2007; Hamari et al., 2015b; Wang and Goh, 2017). The TAM and UTAUT models are specially indicated for technologies of obligatory use, such as in the workplace. There is an update of the UTAUT model to the context of technologies aimed at consumers; this is the so-called UTAUT2. We believe that this is the appropriate model to analyse the use and acceptance of online game technology by consumers. However, there are very few articles that have studied online games based on the UTAUT2 model (Brauner and Ziefle, 2015; Xu, 2014).

In this context, this study aims to analyse the acceptance of online games, based on the unified theory of acceptance and use of technology 2 (UTAUT 2), proposed by (Venkatesh et al., 2012b). To analyse the differential elements that affect user adoption of online games is hugely relevant for industry managers and developers in order to offer videogames that have a higher probability of success.

The findings of this study should make an essential contribution to the field of games, not only from the business point of view but from other social perspectives, such as healthy games, brain-training games, educational games, etc. Not all these types of games bring about a profit if they are not adapted to their targets. Most successful computer and online games have one main component in common: the ability to attract players (Zhang and Fu, 2015). And a necessary condition to achieve this immersion or telepresence is the adoption of the game.

The remainder of the paper is structured as follows. First, we present a theoretical framework for online games and UTAUT 2. Secondly, the methodology is described, and the results are presented. Finally, we put forward the discussion, conclusions, future research and limitations.

## 2. Theoretical framework

### 2.1. Online games

Over the past two decades, video games, especially online games, have become a common form of entertainment, and a regular part of people's daily lives around the world (Hamari et al., 2015b). Notwithstanding, the study of the acceptance of systems such as online games is relatively recent.

Within this literature, the study of Hans Van Der Heijden (Van der Heijden, 2004) stands out. From the consumer behaviour literature that distinguishes between utilitarian and hedonic products, the author classifies online games as a type of hedonic system. Hedonic systems aim to give self-fulfilling value to the user, in opposition to utilitarian systems, which intend to provide the user with instrumental value. In particular, the value of a hedonic system is a function of the degree to which users experience fun when they use this system. The study results support that both perceived enjoyment and perceived ease of use are strong determinants of the intentions of using a hedonic system (Van der Heijden, 2004).

Specifically, concerning online games, a significant result is presented in (Yee, 2006). Yee presented an empirical model about the motivation of online gamers in this study. The findings revealed ten motives that are categorised into three main components: achievement, social, and immersion (Yee, 2006).

After that study, several authors have emphasised the importance of intrinsic motivations to explain the use of online games. Based on a sample of users of online mobile video games (Ha et al., 2007), indicate the predominant effect of both perceived enjoyment and perceived ease of use on the individual's attitude towards the system. Meanwhile (Hsu and Lu, 2007), studied the motivational factors of players in an online gaming community. Their results infer that intrinsic motivation, such as perceived enjoyment, is a dominant factor in a hedonic system. Besides, these authors indicate that social norms and cohesion are determinants of consumer preference and loyalty, and perceived ease of use performs a significant role in the development of both customer preference and perceived enjoyment. Some years after, Shin and Shin applied an acceptance model to predict users' acceptance of online games. Their results indicate that the intention to play an online game is predicted by social norms, attitude, and flow experience. Moreover, perceived ease of use is a stronger predictor of attitude (Shin and Shin, 2011).

Recently, Hamari et al. presented an overview of studies that have examined the use of these systems in the context of video games. Their results indicate that the most reliable predictors for the use of video games are -in order of importance-: attitude, flow, satisfaction, perceived enjoyment, and perceived playfulness (Hamari et al., 2015b).

Specifically, two recent studies based on uses and gratifications theory are highlighted about online video games. In the first study, Li et al. indicate that the intention of using a social network game is explained by three types of gratification: hedonic gratification (enjoyment, fantasy, and escapism), utilitarian gratification (achievement), and social gratification (interaction and presence) (Li et al., 2015). In the second study, Merhi tested an integrated model of factors that have the potential to influence the behavioural intention to adopt online games. These results show that the intention to play online games is explained by enjoyment, achievement, and social interaction. Additionally, visual appeal and escapism positively affect the level of enjoyment (Merhi, 2016b).

Finally (Wang and Goh, 2017), presented that the principal research focus of game acceptance has been on explaining attitude and intention towards playing video games, while real usage has been avoided. Their literature review proposed that all the TAM constructs are quantified in cross-sectional studies, and no articles have been guided to examining the continued usage of video games. One of the main contributions of this work is that making available a pleasant experience is the primary emphasis for hedonic-oriented games. For utilitarian-oriented games, a clear perception of usability and usefulness among users is the standard for system achievement.

### 2.2. UTAUT 2

Fred Davis introduced the Technology Acceptance Model (TAM) in 1985 with the intention of both improving the understanding of user acceptance processes of information systems and helping in the evaluation of new systems before their implementation (Davis, 1985). TAM was established using as a conceptual framework the Stimulus-Organism-Response model (S-O-R), a conception proposed by the psychologist Robert Woodworth in 1954 as a functionalist extension of the behavioural formulation called Stimulus-Response (S-R) (Buxbaum, 2016). Functionalism refers to a psychological philosophy that considers mental life and behaviour in terms of active adaptation to the person's environment (Leahey, 2017). Particularly, TAM proposes that system usage is determined by the behaviour intention of system usage, and this intention is jointly determined by the person's attitude towards using the system and perceived usefulness. Moreover, the attitude is cooperatively determined by perceived usefulness and perceived ease of

use, and the latter determines perceived usefulness. Finally, both perceived usefulness and perceived ease of use are determined by external variables.

TAM has been the predominant model to understand user acceptance processes of information systems in many diverse settings in the last decades. Viswanathan Venkatesh and colleagues formulated the Unified Theory of Acceptance and Use of Technology (UTAUT), this model unified conceptual and empirical similarities from existing theories about the user acceptance processes of information systems (Venkatesh et al., 2003). Precisely, UTAUT emerged from the empirical comparison of seven models: the technology acceptance model, the theory of reasoned action, the motivational model, the theory of planned behaviour, the model of PC utilisation, the innovation diffusion theory, and the social cognitive theory. The empirical results indicated that UTAUT can explain approximately 70% of the variance in behaviour intention to use a new system. This score significantly exceeds the results delivered by the other models analysed, which ranged between 17% and 53%. By encompassing the combined exploratory power of individual models and key moderating influences, the UTAUT model progresses in cumulative theory while maintaining a parsimonious structure (Rondan-Cataluña et al., 2015).

In order to adapt UTAUT to a consumption context, instead of its professional framework, Venkatesh et al. proposed UTAUT 2 (Venkatesh et al., 2012b). UTAUT 2 attempts to explain on an aggregate basis why individuals use information technology that they have at their disposal. In particular, UTAUT 2 proposes that use behaviour (USE), defined as the frequency of information technology usage, is jointly determined by behavioural intention (BI), defined as the degree to which a person has formulated conscious plans to perform or not perform some specified future behaviour; facilitating conditions (FC), defined as the individual's perceptions of the resources and support available to perform a behaviour; and habit (H), defined as the extent to which people tend to perform a behaviour automatically because of learning. The BI construct is common for other backgrounds. However, the FC and H constructs are directly related to a context of consumption.

In the same way, BI is determined by two groups of antecedent variables. The first group is commonly used in other situations and is composed of performance expectation (PE), defined as the degree to which using a technology will provide benefits to individuals in performing certain activities; effort expectation (EE), defined as the degree of ease associated with an individual's use of technology; and social influence (SI), defined as the extent to which an individual perceives that people who are important to him/her believe that he/she should use a particular technology. The second group is associated with a consumption context, and it consists of FC, H, hedonic motivation (HM), defined as the fun or pleasure derived from using a technology, and price value (PV), defined as the individuals' cognitive trade-off between the perceived benefits of the applications and the monetary cost connected with using them. Therefore, this model is not only pertinent to analyse ICT adoption but also to predict future user behaviour.

The proposed model emerges from UTAUT (Venkatesh et al., 2003), as was discussed previously. This model explains the use and adoption of technology from Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions that influence Behavioural intention and use behaviour. On the other hand, the Facilitating Conditions also affect use behaviour. Recently, the UTAUT2 (Venkatesh et al., 2012a) incorporated the variables Hedonic motivation, Price-value, and Habit as antecedents of the Behavioural Intention. Similarly, the Habit variable is also directly related to the use of a particular technology. The relationships mentioned above are specified in the following set of hypotheses:

**H1.** Performance expectancy is positively related to behavioural intention in the adoption of online games.

**H2.** Effort expectancy is positively related to behavioural intention in the adoption of online games.

**H3.** Social influence is positively related to behavioural intention in the adoption of online games.

**H4.** Facilitating conditions are positively related to use behaviour in the adoption of online games.

**H5.** Facilitating conditions are positively related to behavioural intention in the adoption of online games.

**H6.** Hedonic motivation is positively related to behavioural intention in the adoption of online games.

**H7.** Price value is positively related to behavioural intention in the adoption of online games.

**H8.** Habit is positively related to behavioural intention in the adoption of online games.

**H9.** Habit is positively related to use behaviour in the adoption of online games.

**H10.** Behavioural intention is positively related to use behaviour in the adoption of online games.

The proposed UTAUT2 model including ten hypotheses is shown in Fig. 1. Behavioural/behaviour:

There are few studies that have applied the UTAUT model to the use of online games. Conversely, Oh and Yoon (2014) developed a model based on the original UTAUT, to which they added some variables, and applied it successfully to online games. Their results offer a high explanatory level. They found that Effort Expectancy and Social Influence have a high relationship with the intention of playing online games. In the same way, the intention to play is strongly related to effective use. For our part, we have not found in our review other works that have applied the UTAUT2 model to online games. The closest works are those of Xu (2014) and (Guo and Barnes, 2011, 2012). In addition, Xu (2014) bases his/her study on the UTAUT2 model by applying it to games accessible through social networks. However, it introduces significant differences over the original model. First, it does not incorporate the use variable, trying only to explain the behavioural intention. Second, it introduces some new variables, such as Fantasy or Achievement. And third, it eliminates some variables from UTAUT2, such as Facilitating Conditions or Hedonic Motivations. On the other hand, although the articles of (Guo and Barnes, 2011, 2012) they do not manifestly apply UTAUT2, when analysing their models we see a great similarity. The differences come from not including the Facilitating Conditions and adding a variable related to Achievement. In the case of Guo and Barnes (2011), they analyse purchases in the virtual world of Second Life. Their results indicate that the extrinsic motivations (Effort Expectancy, Performance Expectancy, and Perceived Value) and Social Influence affect the Purchase Intention, while Habit is the largest antecedent of the purchase, both directly and indirectly. On the other hand, Guo and Barnes (2012) analysed the purchases within the World of Warcraft game, with a model very similar to the previous one. Their results are similar. They also find that Effort Expectancy, Performance Expectancy, and Perceived Value affect Purchase Intention, and that habit is the biggest influence on effective purchases. In summary, the UTAUT and, specifically, UTAUT2 models have been successfully used previously in the online games sector. However, we have not found studies that apply the model without making changes, and we understand that its application to new platforms (mobile and tablets) can offer significant differences.

## 3. Methodology

This section first presents the sample and the method of collection of the data and, second, the statistical tool used for the analysis.

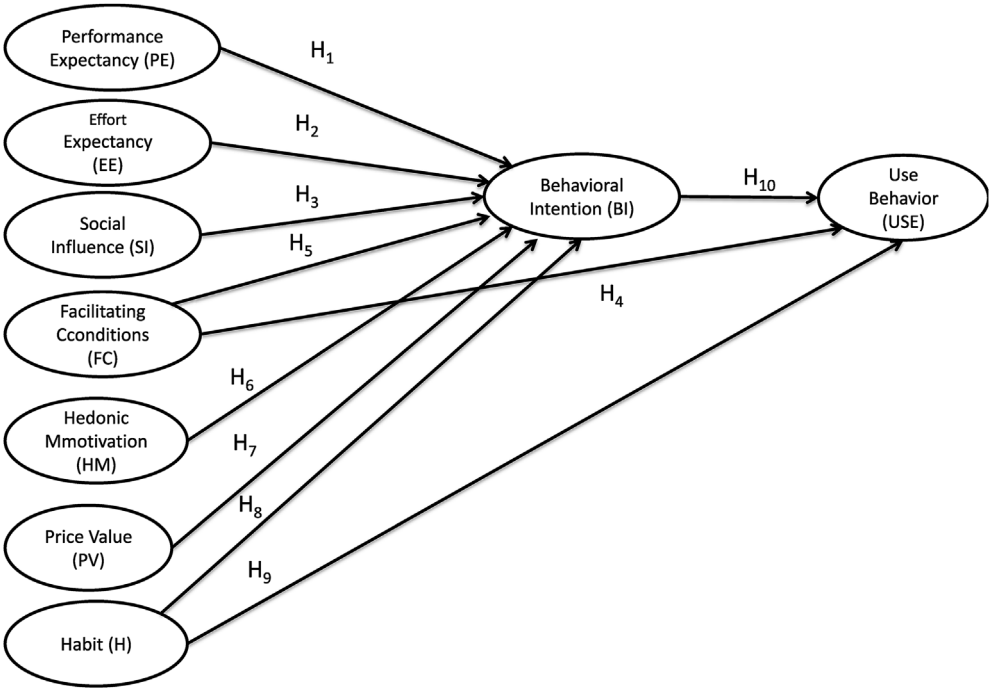


**Fig. 1.** UTAUT 2 model.

### 3.1. Sample and data collection

The empirical research is based on a non-probabilistic sampling method. Specifically, the data set was collected in the south of Spain from a sample of face-to-face questionnaires (from March to June 2016). A pre-test was carried out and the correct translation of the items and their reliability was ensured. In total, 373 usable questionnaires were obtained. The answers come from young people between 18 and 27 years old. This is the segment with the highest penetration of video games in Spain (de Videojuegos, 2015). 45.72% were answered by women. All the respondents use mobile devices for gaming, specifically 78.61% of the sample used a mobile phone as a device to play, and 21.39% used a tablet. The most used operating system was Android 69.3%, followed by iOS 25.0% and other operating systems represented 5.7%. The average experience of the respondents in the use of online games was 20 months.

We have used the same scales as the original work of (Venkatesh et al., 2012b), adapted to the particular context of online games for all the constructs except USE. For this latent variable, we adapted the scale of (Kwon and Wen, 2010). A 7-point Likert scale measured all the items.

We have applied the Harman test to analyse the Common Method Bias (Harman, 1976). The results of Harman's one-factor test showed that principal component of one fixed factor explains less than 50% of the variance (13.2%). In addition, following Bagozzi's method, the highest correlation between constructs is 0.780 (see Table 2), which should be below 0.9 (Bagozzi and Yi, 1991). Therefore, there is no common method bias nor common method variance in the collected data.

### 3.2. Statistical methodology

The proposed general model shown in Fig. 1 was tested using a structural equation modelling (SEM) technique with Partial Least Squares (PLS), a variance-based approach, using software Smart PLS 3.2.7 (Ringle et al., 2015). In comparison to other covariance-based models (CBM) such as Lisrel or Amos, PLS is a powerful analytical method (Lohmöller, 1989). Its advantages over CBM include lesser assumptions for the measurement scales, sample size, and data distribution (Chin, 1998). The objective of PLS is to predict dependent variables, maximising their explained variance. In our case, a bootstrapping was performed with 5000 subsamples.

## 4. Results

A PLS model is defined by two steps: (1) a measurement model connecting the manifest variables (MVs) or items to their own latent variables (LVs) and (2) a structural model linking some endogenous LVs to other LVs.

### 4.1. Measurement analysis

Before examining the structural model, the reliability and validity of the measurement models were calculated according to the procedures from the previous literature, e.g. (Fornell and Larcker, 1981). The measurement properties are described in Table 1. The individual reliability was evaluated examining the loads ($\lambda$) or simple correlations of the indicators with their respective LVs. The reliability of the LV specifies how precisely observed variables are measuring the same LV, Cronbach's $\alpha$ coefficient was employed as the index of LV reliability (LVs with $\alpha > 0.7$ were accepted). Furthermore, composite reliability was estimated. The LV convergent validity was evaluated by inspecting the average variance extracted (AVE $> 0.5$ were accepted). Table 2 shows Cronbach's $\alpha$ coefficient, composite reliability, and AVE per LV.

The LV discriminant validity was verified evaluating if the square root of the AVE from each LV is larger than the correlations with the rest of the LVs, using the Fornell-Larcker test. The Heterotrait-Monotrait (HTMT) ratio shows good scores, almost all below 0.9 (Table 3). There is only one value greater than 0.9 that occurs in the relation between USE and Habit. In this case, we have performed a bootstrapping with 5000 subsamples to ensure discriminant validity, and to verify that the value of HTMT is different from the unit. The results show that the values vary between 0.871 and 0.965. As the unit is outside this range, we can confirm the discriminating validity of this case too (Henseler et al., 2015).

In summary, the results ensure that the measurement model is adequate. Having assured this first step, we can assess the structural

**Table 1**
Loadings, AVE, composite reliability, and Cronbach's Alfa.

| | Loadings |
|---|---|
| Performance Expectancy | |
| AVE: | .708 |
| CR: | .906 |
| CA: | .862 |
| I find mobile Internet useful in my daily life. | .818 |
| Using online games increases my chances of achieving things that are important to me. | .880 |
| Using online games helps me accomplish things more quickly. | .857 |
| Using online games increases my productivity. | .808 |
| Effort Expectancy | |
| AVE: | .684 |
| CR: | .896 |
| CA: | .848 |
| Learning how to use online games is easy for me. | .807 |
| My interaction with online games is clear and understandable. | .881 |
| I find online games easy to use. | .796 |
| It is easy for me to become skilful at using online games. | .716 |
| Social Influence | |
| AVE: | .864 |
| CR: | .949 |
| CA: | .920 |
| People who are important to me think that I should use online games. | .911 |
| People who influence my behaviour think that I should use online games. | .943 |
| People whose opinions I value prefer that I use online games. | .931 |
| Facilitating Conditions | |
| AVE: | .643 |
| CR: | .878 |
| CA: | .815 |
| I have the resources necessary to use online games. | .807 |
| I have the knowledge necessary to use online games. | .881 |
| Online games are compatible with other technologies I use. | .796 |
| I can get help from others when I have difficulties with online games. | .716 |
| Hedonic Motivation | |
| AVE: | .822 |
| CR: | .933 |
| CA: | .892 |
| Using online games is fun. | .926 |
| Using online games is enjoyable. | .918 |
| Using online games is very entertaining. | .875 |
| Price Value | |
| AVE: | .642 |
| CR: | .840 |
| CA: | .759 |
| Online games are reasonably priced. | .642 |
| Online games are a good value for the money. | .917 |
| At the current price, online games provide a good value. | .820 |
| Habit | |
| AVE: | .743 |
| CR: | .921 |
| CA: | .885 |
| The use of online games has become a habit for me. | .858 |
| I am addicted to using online games. | .867 |
| I must use online games. | .836 |
| Using online games has become natural to me. | .887 |
| Behaviour Intention | |
| AVE: | .814 |
| CR: | .929 |
| CA: | .885 |
| I intend to continue using online games in the future. | .874 |
| I will always try to use online games in my daily life. | .906 |
| I plan to continue to use online games frequently. | .925 |
| Use | |
| AVE: | .798 |
| CR: | .922 |
| CA: | .874 |
| I tend to use online games frequently. | .886 |
| I spend a lot of time on online games. | .920 |
| I get involved a lot in online games. | .874 |

**Table 2**
Discriminant validity: Fornell-Larcker criterion.

| | BI | EE | FC | H | HM | PE | PV | SI | USE |
|---|---|---|---|---|---|---|---|---|---|
| BI | .902 | | | | | | | | |
| EE | .413 | **.827** | | | | | | | |
| FC | .352 | .564 | **.802** | | | | | | |
| H | .780 | .284 | .218 | **.862** | | | | | |
| HM | .580 | .554 | .522 | .448 | **.907** | | | | |
| PE | .447 | .235 | .115 | .479 | .323 | **.841** | | | |
| PV | .432 | .309 | .286 | .433 | .448 | .393 | **.801** | | |
| SI | .462 | .260 | .211 | .455 | .305 | .391 | .372 | **.928** | |
| USE | .780 | .299 | .255 | .815 | .469 | .457 | .389 | .453 | **.893** |

**Table 3**
Discriminant validity: Heterotrait-Monotrait ratio (HTMT).

| | BI | EE | FC | H | HM | PE | PV | SI | USE |
|---|---|---|---|---|---|---|---|---|---|
| BI | | | | | | | | | |
| EE | .464 | | | | | | | | |
| FC | .406 | .673 | | | | | | | |
| H | .873 | .310 | .240 | | | | | | |
| HM | .656 | .635 | .601 | .497 | | | | | |
| PE | .507 | .252 | .154 | .549 | .361 | | | | |
| PV | .439 | .313 | .323 | .456 | .489 | .424 | | | |
| SI | .510 | .290 | .226 | .497 | .333 | .438 | .397 | | |
| USE | .880 | .335 | .287 | .923 | .526 | .527 | .417 | .502 | |

model.

### 4.2. Structural model analysis

Assessment of the structural model involves estimating the path loadings and the $R^2$ values. Path loadings indicate the strengths of the relationships between the independent variables and the dependent variable, while $R^2$ values measure the predictive power of the structural models. Interpreted as multiple regression results, the $R^2$ indicates the amount of variance explained by the exogenous variables. Using a bootstrapping technique, we calculated path loadings and t-statistics for hypothesised relationships. The results are shown in Fig. 2. In this sense, we observe that the values of $R^2$ have been particularly high: 0.690 for BI and 0.717 for USE.

Finally, SRMR is an approximate measure of overall model fit. In our case, the SRMR Composite Factor Model is 0.066, this value indicating a good overall model fit (Henseler et al., 2014; Henseler et al., 2016).

Five of the ten proposed hypotheses have been confirmed (H3, H6, H8, H9, and H10). The results indicate that use of online games is mainly explained by habit to play with them (0.529) and by the intention of doing so (0.362). The former variable has a stronger effect than the latter. Likewise, the intention to play online games is explained by the habit (0.601) that players have already acquired due to the hedonistic sense (0.210) of this behaviour and, to a lesser extent, by the social influence of their environment (0.082). No significant relationships were found with the rest of the constructs (PE, EE, FC, and PV).

Table 4 and Fig. 3 offer the Importance-Performance Map Analysis (IPMA) for the USE variable. The goal is to identify predecessors that have a relatively high importance for the target construct, but also have a relatively low performance (Ringle and Sarstedt, 2016). In our case, the variable Habit has much greater importance than the average and low performance. That is, it has a great effect on the use while offering an important capacity to increase its performance. To a lesser extent, this occurs with the variable Behavioural Intention. The variables Perceived Value, Performance Expectancy, and Social Influence present a performance lower than the average, but their capacity to affect the use is low. Another group is made up of the variables Facilitating Conditions, Effort Expectancy and Hedonic Motivation that present a

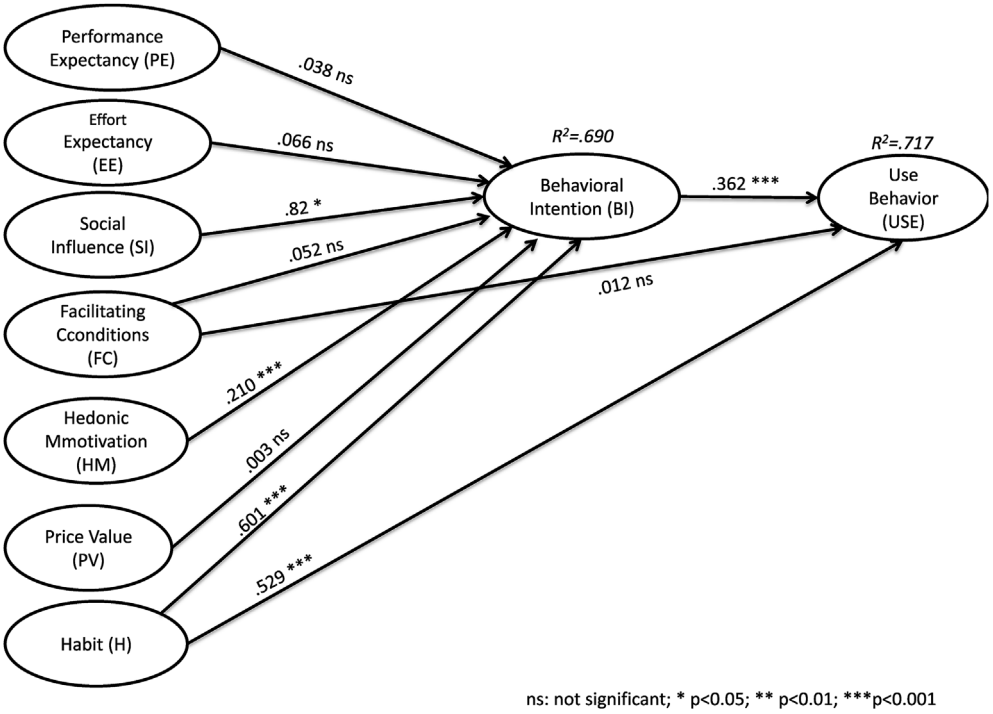


**Fig. 2.** Structural model analysis results.

**Table 4**
Data of the importance-performance map for USE.

| | Importance | Performance |
|---|---|---|
| BI | 0,362 | 39,399 |
| EE | 0,024 | 67,589 |
| FC | 0,032 | 71,633 |
| H | 0,747 | 25,487 |
| HM | 0,076 | 69,056 |
| PE | 0,014 | 25,044 |
| PV | −0,001 | 43,181 |
| SI | 0,030 | 26,480 |
| Mean Value | **0,160** | **45,984** |

performance above the average, but their level of importance is also less.

## 5. Discussion

The aim of this study is to analyse the acceptance of online games, based on the unified theory of acceptance and use of technology 2 (UTAUT 2), proposed by (Venkatesh et al., 2012b) and adapted to the online game framework. To examine the differential foundations that affect user adoption of online games is tremendously relevant for industry managers and developers in order to offer online games that have a higher probability of success. Next, we examine some aspects of the results obtained.

First, in general, the results indicate that UTAUT2 is an acceptable model to analyse online game use, although with certain changes. A good $R^2$ is obtained, though several constructs have no significant effects, i.e., the model could be reduced by removing 4 constructs and, in fact, more than 71% of the variance is explained. In this sense, it would be appropriate to review the proposed changes. These results are better than those obtained by Li et al. (2015) when using the Theory of Use and Gratifications, or by (Oh and Yoon (2014) when using an original UTAUT model with some modifications.

Second, we have found that the main antecedents of the intention to use online video games are habit, hedonistic motives and social influence, in this order. Regarding Hedonic Motivations, readers would think that despite the hedonic character of this construct, the predictive power of habit is much higher than Hedonic Motivations. This could be because of the use of smartphones to play online games. The continuous use of smartphones and the routine of playing with them is more important for respondents than the hedonic character of online gaming. These are similar results to those obtained by (Xu, 2014) who studied Network online Games. In this case, the social influence caused the greatest explanation of use, followed by the habit and perceived enjoyment. The differences in order, in relation to our work, could be explained by the type of games analysed; logically, the social aspect is more important in Social Network Games.

In the same way, habit and intention to use act as the main antecedents of use. No significant relationships have been found in the case of performance expectations, effort expectations, facilitating conditions and the price-value of online video games. Nor did Guo and Barnes (2012) find a relationship between performance expectancy and purchase intention. This is a leisure activity, so performance or effort expectations are not required by a boss or supervisor. Facilitating conditions are quite easy to have, only a mobile phone, a tablet or a computer connected to the Internet are the tools needed to play online. In addition, there is a huge quantity of free online video games, and this causes price-value to lose importance for many players.

The advanced experience of the respondents in the use of online games can explain the non-effects of both performance expectancy and effort expectancy on the intention of use. Other authors (Patricio Esteban Ramírez-Correa et al., 2018) report that experience negatively moderates the influence of these two variables in hedonic information systems. On the other hand, the non-significance of these relations could be due to the addition of habit as a new variable in the explanatory model if we consider the potential endogeneity caused by an omitted variable in previously reported research models (Hamari, 2015; Van der Heijden, 2004). Endogeneity refers to the violation of the key causal modelling assumption that the independent variables are uncorrelated with the error term and it causes the estimated parameters to be inconsistent (McIntosh et al., 2014).

Venkatesh et al. (Venkatesh et al. (2012b)) define PE as “the degree

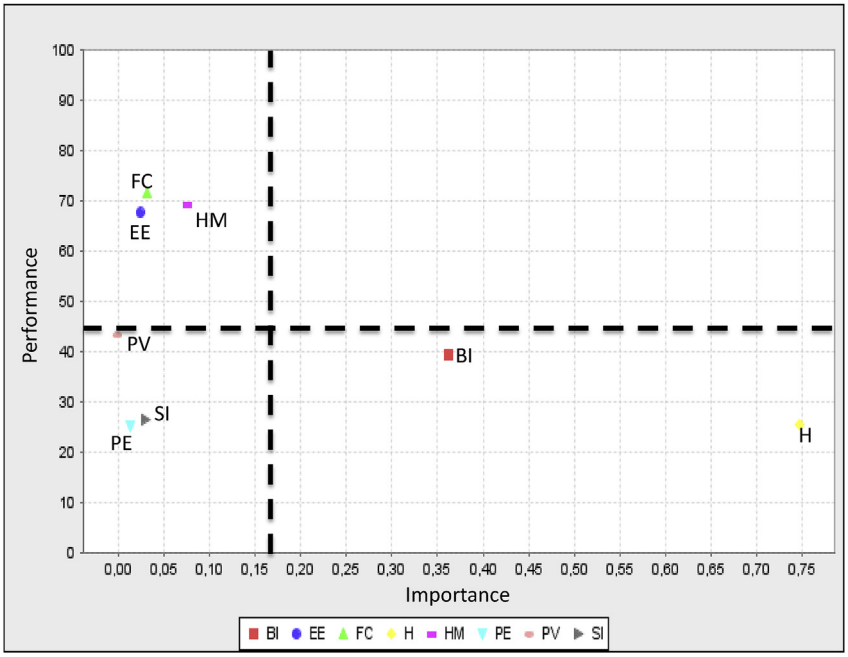


**Fig. 3.** Adjusted importance-performance map of USE

to which using technology will provide benefits to consumers in performing certain activities". The main benefit that can be used for a person has a hedonic character. If we were analysing another type of players, such as professional e-gamers or professional online poker players, PE would probably have relevant importance. In the context analysed, PE presents a non-significant relationship with behavioural intention. This explains why neither Guo and Barnes (2012) nor Oh and Yoon (2014) found that significant relationship in their research on online games.

In the same way, effort expectancy "is the degree of ease associated with consumers' use of technology". In the population analysed, Generation Z, not only has there been a process of accepting the technology of online video games, but this has proceeded to a routinisation of this technology, video games being part of their lives. At any moment of time or in any place, they can access online games through their mobile phones, which install the applications with great simplicity. These reasons could explain the lack of relationship between performance expectancy and behavioural intention.

Facilitating conditions are quite easy to have, only a mobile phone or a tablet connected to the Internet are the tools required to play online. Most members of the sample tend to use mobile phone devices (78.61%). Spain is one of the countries with the highest Smartphone penetration in the world. According to (IAB, 2017), the penetration of smartphones between 18 and 65 years old is 97% (100% between 18 and 24 years old). Access to technology for young people from our sample is very simple, since they are digital natives and have a vast experience with these devices. We understand that these reasons have led us not to find significant relationships between facilitating


**Fig. 4.** Simplified model.

conditions and behavioural intention or use behaviour. In any case, our results are consistent with those of Oh and Yoon (2014), who did not find a significant relationship between Facilitating Conditions and Use of online games.

In relation to price value, most online video games are free, and this fact would reduce the importance of this construct in the model. Although many online games require payments in the development of the game, most users perceived these games as free, and this is a big difference regarding other applications of the UTAUT2 model.

One of the main findings of this work is that habit becomes a fundamental element that explains both behavioural intention and use behaviour in the case of online games. This idea has been corroborated by the IPMA analysis in which the habit variable is shown as the most important and with the greatest potential to increase performance. This construct has been defined as the extent to which people tend to perform behaviours automatically because of learning (Limayem and Cheung, 2007). Players have a greater intention to play online games when playing with them becomes a habitual activity (Xu, 2014). Any time or anywhere they can access online games through their smartphones. Young people take advantage of any break to play a game on their devices and this serves as leisure time under any circumstances. Our results are also consistent with those of other investigations (Lee et al., 2015; Guo and Barnes, 2011, 2012). Guo and Barnes (2011, 2012) found that habit was the biggest influencer of purchases within the Second Life and World of Warcraft platforms. Also, for Lee et al. unconscious elements, among those who cite habit, are the main determinants of the use of online games (Lee et al., 2015).

Playing online video games is a leisure activity, in addition, young people have fun using online games. Therefore, perceived enjoyment is an important determinant of behavioural intention in the context of hedonic environments (Van der Heijden, 2004). In our research the relationship is significant.

The third key element according to the results is the Social Influence of relevant people for respondents. Sharing with friends the results and comments on the games both in social networks and in the real world has a significant relationship with the intention of use of this ICT, although this relationship is not intense. Similarly, Guo & Barnes (2011) found a strong relationship between Social influence and the intention to buy within the Second Life platform. On the other hand, following the Social Influence, Li et al. (2015) did not find significant relationships between the social elements and use of these games. Nor did Guo and Barnes (2012) find this relationship in the case of purchases in World of Warcraft. We believe that an explanation for these results is that the passage of time has had a powerful influence on developing social issues through mobile technologies. Similarly, Guo & Barnes (2011) found a strong relationship between Social influence and the intention to buy within the Second Life platform.

The results obtained successfully support the objective proposed in the paper, to analyse the acceptance of online video games using the UTAUT2 model. We would like to go deeper into some aspects of the results obtained.

As we have mentioned, in general, the results indicate that UTAUT2 is an adequate model to analyse the power of video game acceptance, although with certain adaptations. A good $R^2$ is obtained, though several constructs have no significant paths, i.e., the model could be reduced by removing 4 constructs and even more than 71% of the variance would be explained. In this sense, it would be appropriate to review the adaptation. We have accordingly proposed an adapted UTAUT2 model for the online game scope in Fig. 3.

This simplified UTAUT2 model adapted to the online game scope would be more useful for future studies in this sector than the full UTAUT2 model. We can observe that the $R^2$ of BI and USE are practically the same using a more parsimonious model. Therefore, this adaptation fits the particularities and features of online games better than the full model.

## 6. Conclusions

Finally, we must highlight the high explanatory power of the endogenous variables, considering the explained variance. In the case of use, having used a reflective scale may have improved the results obtained.

Focusing on Generation Z, we have investigated the acceptance of online games, based on the unified theory of acceptance and use of technology 2 (UTAUT 2). When applying and adapting UTAUT2 to study the intention to continue playing and use of online games, we find that it is an adequate theoretical model. However, having been applied in a context of technology very different from that initially proposed by (Venkatesh et al., 2012b), some of the paths suggested are not significant. Even so, UTAUT2 has a high power of explanation both for the intention to use, $R^2 = 0.690$, and for the use, $R^2 = 0.717$.

In order to improve the parsimony of the model, a reduced model of UTAUT2 is presented, in which those constructs that were not significant are eliminated. The reduced model continues to have a high explanatory power of both use and intention to use online games. These findings are of great interest to understand the intention to continue playing online games and they can be very useful for both game developers and the industry.

This research presents some limitations. On the one hand, the sample could be extended to individuals of other ages - we have focused on Generation Z - as well as to other cultural contexts, the sample coming from Spain. It would be interesting to use other game contexts. Carrying out a longitudinal study would enable verifying if the relations found continue being significant at different moments of time. Other future research lines would be to analyse the influence of personality traits on the habit and the intention and use of online games. In addition, to research the likely problem of addiction to online games of many youngsters and the influence on the industry would be interesting.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jretconser.2019.04.018.

## References


Bodrova, E., Leong, D.J., 2015. Vygotskian and post-Vygotskian views on children's play. Am. J. Play 7 (3), 371.

Brauner, P., Ziefle, M., 2015. Serious Games for Cognitive Training in Ambient Assisted Living Environments. pp. 1–18. submitted for publication. https://doi.org/10.1007/978-3-319-22701-6_34.

Buxbaum, O., 2016. Key Insights into Basic Mechanisms of Mental Activity. Springer.

Caillois, R., 1961. Man, Play, and Games. University of Illinois Press.

Chang, I.-C., Liu, C.-C., Chen, K., 2014. The effects of hedonic/utilitarian expectations and social influence on continuance intention to play online games. Internet Res. 24 (1), 21–45.

Chin, W., 1998. The partial least squares approach to structural equation modeling. Mod. Methods Bus. Res. 295 (2), 295–336. https://doi.org/10.1016/j.aap.2008.12.010.

Davis, F.D., 1985. A Technology Acceptance Model for Empirically Testing New End-User Information Systems: Theory and Results. Massachusetts Institute of Technology.

Davis, R., Lang, B., Gautam, N., 2013. Modeling utilitarian-hedonic dual mediation (UHDM) in the purchase and use of games. Internet Res. 23 (2), 229–256. https://doi.org/10.1108/10662241311313330.

Dillon, A., Morris, M.G., 1996. User acceptance of new information technology: Theories and models. In: Annual Review of Information Science and Technology. Information Today, Medford, NJ.

de Videojuegos, Asociación Española, 2015. ESTUDIO "VIDEOJUEGOS Y ADULTOS. Retrieved from. https://docs.google.com/viewer?url=http%3A%2F%2Fwww.aevi.org.es%2Fweb%2Fwp-content%2Fuploads%2F2015%2F12%2FEstudio-Videojuegos-y-adultos_presentaci%25C3%25B3n.pdf.

Fornell, C., Larcker, D.F., 1981. Structural equation models with unobservable variables and measurement error: Algebra and statistics. J. Mark. Res. 18 (3), 382. https://doi.org/10.2307/3150980.

Guo, Y., Barnes, S., 2011. Purchase behavior in virtual worlds: An empirical investigation in Second Life. Inf. Manag. 48 (7), 303–312. https://doi.org/10.1016/j.im.2011.07.004.

Guo, Y., Barnes, S., 2012. Exploring purchasing behavior within world of Warcraft. J. Comput. Inf. Syst. 52 (3), 18–30. https://doi.org/10.1080/08874417.2012.

11645555.
Ha, I., Yoon, Y., Choi, M., 2007. Determinants of adoption of mobile games under mobile broadband wireless access environment. Inf. Manag. 44 (3), 276–286. https://doi.org/10.1016/j.im.2007.01.001.
Hamari, J., 2015. Why do people buy virtual goods? Attitude toward virtual good purchases versus game enjoyment. Int. J. Inf. Manag. 35 (3), 299–308.
Hamari, J., Keronen, L., Alha, K., 2015a. Why do people play games? A review of studies on adoption and use. System Sciences (HICSS), 2015 48th Hawaii International Conference on System Sciences Vol. 2015–March. IEEE, pp. 3559–3568. https://doi.org/10.1109/HICSS.2015.428.
Hamari, J., Keronen, L., Alha, K., 2015b. Why do people play games? A review of studies on adoption and use. Proceedings of the Annual Hawaii International Conference on System Sciences Vol. 2015–March. IEEE, pp. 3559–3568. https://doi.org/10.1109/HICSS.2015.428.
Henseler, J., Dijkstra, T.K., Sarstedt, M., Ringle, C.M., Diamantopoulos, A., Straub, D.W., et al., 2014. Common beliefs and reality about PLS: Comments on Rönkkö and Evermann (2013). Organ. Res. Methods 17 (2), 182–209.
Henseler, J., Ringle, C.M., Sarstedt, M., 2015. A new criterion for assessing discriminant validity in variance-based structural equation modeling. J. Acad. Mark. Sci. 43 (1), 115–135.
Henseler, J., Hubona, G., Ray, P.A., 2016. Using PLS path modeling in new technology research: Updated guidelines. Ind. Manag. Data Syst. 116 (1), 2–20.
Hsiao, C.-C., Chiou, J.-S., 2012. The impact of online community position on online game continuance intention: Do game knowledge and community size matter? Inf. Manag. 49 (6), 292–300.
Hsu, C.-L., Lu, H.-P., 2007. Consumer behavior in online game communities: A motivational factor perspective. Comput. Hum. Behav. 23 (3), 1642–1659.
Huizinga, J., 1949. Homo Ludens: A Study of the Play-Element in Our Culture. Routledge & Kegan Paul.
IAB, 2017. Estudio Anual Mobile Marketing, vol. 2017 IAB.Spain.
Kwon, O., Wen, Y., 2010. An empirical study of the factors affecting social network service use. Comput. Hum. Behav. 26 (2), 254–263.
Leahey, T.H., 2017. A History of Psychology: from Antiquity to Modernity. Routledge.
Lee, J., Lee, J., Lee, H., Lee, J., 2015. An exploratory study of factors influencing repurchase behaviors toward game items: A field study. Comput. Hum. Behav. 53, 13–23. https://doi.org/10.1016/j.chb.2015.06.017.
Li, H., Liu, Y., Xu, X., Heikkilä, J., Van Der Heijden, H., 2015. Modeling hedonic is continuance through the uses and gratifications theory: An empirical study in online games. Comput. Hum. Behav. 48, 261–272. https://doi.org/10.1016/j.chb.2015.01.053.
Limayem, Hirt, Cheung, 2007. How habit limits the predictive power of intention: The case of information systems continuance. MIS Q. 31 (4), 705. https://doi.org/10.2307/25148817.
Lohmöller, J.-B., 1989. Predictive vs. structural modeling: PLS vs. ML. In: Latent Variable Path Modeling with Partial Least Squares, pp. 199–226. https://doi.org/10.1007/978-3-642-52512-4_5.
McIntosh, C.N., Edwards, J.R., Antonakis, J., 2014. Reflections on partial least squares path modeling. Organ. Res. Methods 17 (2), 210–251.
Merhi, M.I., 2016. Towards a framework for online game adoption. Comput. Hum. Behav. 60 (September), 253–263. https://doi.org/10.1016/j.chb.2016.02.072.
Nanda, S., Warms, R.L., 2010. Cultural Anthropology. Cengage Learning.
Oh, J.-C., Yoon, S.-J., 2014. Predicting the use of online information services based on a modified UTAUT model. Behav. Inf. Technol. 33 (7), 716–729. https://doi.org/10.1080/0144929X.2013.872187.
Ramírez-Correa, P.E., Mello, T.M., Mariano, A.M., 2018a. A aceitação da Netflix: um estudo utilizando equações estruturais. Rev. Tecnolog. e Soc. 14 (30).
Ramírez-Correa, P.E., Rondán-Cataluña, F.J., Arenas-Gaitán, J., 2018b. A posteriori segmentation of personal profiles of online video games' players. Games Cult. https://doi.org/10.1177/1555412018766786.
Ringle, C.M., Sarstedt, M., 2016. Gain more insight from your PLS-SEM results. Ind. Manag. Data Syst. 116 (9), 1865–1886. https://doi.org/10.1108/IMDS-10-2015-0449.
Ringle, C., Wende, S., Becker, J., Ringle, Christian M., Wende, Sven, Becker, Jan-Michael, 2015. SmartPLS 3. Bönningstedt: SmartPLS. 2015. Retrieved from. http://www.smartpls.com.
Rondan-Cataluña, F.J., Arenas-Gaitán, J., Ramírez-Correa, P.E., 2015. A comparison of the different versions of popular technology acceptance models a non-linear perspective. Kybernetes 44 (5). https://doi.org/10.1108/K-09-2014-0184.
Schultz, E.A., Lavenda, R.H., 2005. Cultural Anthropology: A Perspective on the Human Condition, vol. 1 Oxford University Press, USA.
Shin, D.-H., Shin, Y.-J., 2011. Why do people play social network games? Comput. Hum. Behav. 27 (2), 852–861.
UKIE, 2017. The Games Industry in Numbers.
Van der Heijden, H., 2004. User acceptance of hedonic information systems. MIS Q. 695–704.
Venkatesh, V., Morris, M.G., Davis, G.B., Davis, F.D., 2003. User acceptance of information technology: Toward a unified view. MIS Q. 27 (3), 425–478.
Venkatesh, V., Thong, J., Xu, X., 2012a. Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. MIS Q. 36 (1), 157–178. Retrieved from. https://www.jstor.org/stable/41410412.
Venkatesh, V., Thong, J.Y.L., Xu, X., 2012b. Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. MIS Q. 36 (1), 157–178.
Wang, X., Goh, D.H.-L., 2017. Video Game Acceptance: A Meta-Analysis of the Extended Technology Acceptance Model. Cyberpsychology, Behavior, and Social Networking. https://doi.org/10.1089/cyber.2017.0086.
Wang, X., Goh, D.H.-L., Lim, E.-P., Vu, A.W.L., 2016. Understanding the determinants of human computation game acceptance: the effects of aesthetic experience and output quality. Online Inf. Rev. 40 (4), 481–496.
Xu, X., 2014. Understanding Users' Continued Use of Online Games: An Application of UTAUT2 in Social Network Games. MMEDIA 2014.
Yee, N., 2006. Motivations for play in online games. Cyberpsychol. Behav. 9 (6), 772–775. https://doi.org/10.1089/cpb.2006.9.772.
Zhang, J., Fu, X., 2015. The influence of background music of video games on immersion. J. Psychol. Psychother. 05 (04). https://doi.org/10.4172/2161-0487.1000191.