

Exploring the Factors Influencing Motivation and Satisfaction of Video Game Players

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The focus of the article is the user motivation and satisfaction from playing video games. It covers the basic information on the video game player types and the video game market. The aim of this work is to assess the factors influencing the motivation and satisfaction from playing video games. The purpose of this study is to examine what elements influence motivation and satisfaction in the video game players and what aspects of playing video games are influenced by the gamers' motivation. The study tested and applied a theoretical model in the context of video game players. To test the suggested research model, a structural equation modeling's partial least squares approach was used. Data from the 1,400 video game players were gathered through an online survey. SmartPLS 4 was used to analyze the data set. The results indicated that the most accurate predictor of the players' motivation is satisfaction, followed by openness of the world. Motivation predicted the users' achievements, competitiveness, and long-term goals. The video game producers are especially interested in this research because the findings help better understand the motivation and satisfaction of video game players.


Keywords: digital games, gamers, virtual community, structural equation modeling, PLS-SEM

The growing interest in video games, and the resulting demand for them, has made analyzing the video game market, or profiling the gamers as a target group, the subject of much work in the esports field (Taylor, 2012). According to data published by the Newzoo portal, more than 3.38 billion people identified themselves as gamers by the end of 2023, with a growth reaching 6.3% per year (Newzoo, 2023). In the same year, meanwhile, revenues flowing from the video game market reached more than \$184 billion, with half of the profits generated by the Asia-Pacific region (Clement, 2021). In 2023, the world's largest gaming markets included China, Japan, South Korea, the United States, and Germany (Newzoo, 2023). When evaluating the number of players by the geographic region, in 2023, the largest number of players was recorded in the Asia-Pacific region, followed by the Middle East and Africa, Europe, and Latin America, while the smallest number of players reside in the North American region (Clement, 2021; Newzoo, 2023).

There are four categories into which the video game market can be divided: browser games, console games, downloadable/boxed games, and mobile games (Newzoo, 2023), with 49% of the share from the market is generated by the mobile games, followed by the console games (29% share; Newzoo, 2023). Extensive analyses of the esports phenomenon and the video game market indicate their significant importance for both the game developers and their audiences (Marelić & Vukušić, 2019). The detailed analysis of the factors directly influencing the motivation and satisfaction derived from video games, undertaken in this article, is thus an attempt to provide additional information, expanding the knowledge related to the topic of video games (Przybylski et al., 2010; Ryan et al., 2006).

A player, also known as a gamer, is a person who plays video games, board games, or other types of games (Davis & Carini, 2005). The term "player" is generally used to refer to someone who is actively engaged in playing a game, whether as a hobby or as a professional (Sotamaa, 2010). In relation to the video games, a player typically refers to someone who is controlling a character or avatar within the game, working to complete the challenges, progress through the levels, and achieve the goals (Caroux et al., 2015). In this study, a gamer will be a person who consciously consumes the medium of video games. The gamers are a heterogeneous group, the division of which is necessary for further considerations. Research on how to divide the gamers into different groups is growing. "One of the best-known models of video game players" is considered to be the one from 1996, created by Richard Bartle (Bartle, 1996; Johnson & Gardner, 2010). The Bartle study described four primary categories of the players and until now has received substantial scientific attention by having more than 4,000 citations. However, the model proposed by Bartle's study has undergone modifications through subsequent research, which is why other typologies of esports players have become available. Player modeling has also been addressed by Bakkes et al. (2012). In 2019, Newzoo categorized players into types based on the listed characteristics (Newzoo, 2019). According to the research published by Newzoo, the players can be divided into as many as nine types with the universal profiles. Each describes gamers uniquely, while covering all the aspects of the consumer engagement with games, like playing, owning, and watching games. The model built is flexible enough to include all the people with a connection to popular gaming. Their inclusion in the analysis is important because they too have a real impact on the shape of current video games. These groups, which are not generally associated with a direct game consumption, in most cases have significant financial resources that drive the gaming market (Newzoo, 2019). A recent typology of esports players by Hedlund (2023) categorizes players into five types: competitive, casual, casual-social, casual-fun, and casual-competitive. This classification is based on psychographic

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factors like socialization, positive affect, competition, fantasy/escape, coping, and passing/wasting time, along with demographic and behavioral characteristics.

Research gaps in the motivation and satisfaction from playing video games often arise from rapidly evolving technology, changing player demographics, and the dynamic nature of the gaming industry. The gap is connected with the diverse player demographics. As the gaming audience becomes more diverse in terms of age, gender, and cultural background, there is a need to understand how these factors influence the motivation and satisfaction. Another gap is to study the long-term satisfaction. There is a lack of longitudinal studies that examine how satisfaction with the video games evolves over longer periods, particularly in the context of life changes, aging, or evolving gaming tastes. Addressing these gaps requires, in particular, technology studies. In this work, we propose the following research questions: “What factors influence motivation and satisfaction in video game players?” and “What aspects playing in video games are influenced by gamer’s motivation?” The aim is to provide insights into what drives the engagement and enjoyment in video games, with the goal of informing the design and the development of more engaging and satisfying the video games.

The study aims to bring novel insights into the relationship between the various elements of video game design and player motivation and satisfaction. By examining the independent variables such as long-term goals, Easter eggs and hidden content, difficulty balance and control of gameplay, mediators as motivation and satisfaction, dependent variables as competence, achievement, and the openness of the world, this study hopes to shed light on the complex interplay between the game design and player engagement. The results of this research have the potential to inform the game designers in their efforts to create more engaging and satisfying gaming experiences for the players. To the best of our knowledge, there has been a limited research conducted on this specific topic, making this study a valuable contribution to the field of the game design and player motivation.

Theoretical Background

The review is organized in the following form. It starts with the independent variables, “Openness of the world,” “Easter eggs and hidden content,” and “Difficulty balance and control of gameplay.” Then mediators are described as “Motivation,” and “Satisfaction,” followed by the dependent variables as “Achievements,” “Long-term goals,” and “Competitiveness.”

Openness of the World

Openness of the world is most often dealt by the games of the open world’ genre, or sandbox games, whose name refers to a child’s sandbox game (Denham & Spokes, 2021). Video games based on open world focus primarily on open locations, where the plot and story of the game can take place in multiple branches (Van Ooijen, 2018). This is where curiosity among players is stimulated, as it “plays a key role in many aspects of human life. It is a sign of intrinsic motivation to learn and explore” (Gómez-Maureira & Kniestedt, 2019). In open-world games, the story is not linear and narrow-minded, and thus the player has more options (Elias et al., 2021). The research also confirmed that open-world games stimulate the player’s curiosity (Gómez Maureira & Kniestedt, 2018). It was also found that playing with sand is something most of us associate with childhood (Rushton et al., 2010). This unstructured

play provided ample room for experimentation, cooperation, and exploration (Fröhlich et al., 2018).

Easter Eggs and Hidden Content

Hidden content in video games can be graphical bugs, glitches, or some form of underdevelopment, such as leaving the developer’s console in the game’s clean code so that the player can use it himself (Uribe-Jongbloed et al., 2015). Most common, however, are “Easter eggs” (Mago, 2019). This is a hidden message that can appear in generally accepted media, books, movies, or also games (Bogost, 2011). At the same time, it is a reference to other content related to generally accept pop culture (Berger, 2002). They have a certain touch of humor or overtly refer to other well-known products (Lesner, 2017). The history of Easter eggs goes back to 1979 and the game “Adventure,” where it could be found a hidden message “Created by Warren Robinett” in a secret room (Salvador, 2017). An Easter egg could be a small figurine of a “Mortal Kombat” hero in the room of the main character of the game “Cyberpunk 2077” (Kłosiński, 2022) or something bigger like an entire room themed around the popular sandbox “Minecraft” in the game “Borderlands 2” (James, 2018). The larger the game world, the more there are opportunities for hiding a simple joke, or reference to another series. Using hidden content as a form of some self-promotion can also be an interesting example. Rage 40 offers players with three room-related secrets relating to Quake, Doom, and Wolfenstein 3D. These are all games owned by ID Software, for which such an Easter egg was intended to maintain the associations with the studio’s previous successes (Mago, 2016).

Difficulty Balance and Control of Gameplay

Not every gamer feels a great need for control in the games, but nevertheless such a group also exists, and power over a character or events is of great importance to them (Grofal, 2000). An outstanding example of how gamers love to control the characters is the entire series of “The Sims” games (Nutt & Railton, 2003), which currently has four versions, with the latest version having 38 content expansions that include 10 gameplay packs, 18 accessory packs, and 10 full-fledged add-ons. In 2018, it was reported that a total of as many as 30 million copies of the game have been sold. The game itself relies on a fairly simple premise (Glass et al., 2013). The player can create certain characters, then creates their home, and then controls their fate. The player can influence many factors of the game (Prugl & Schreier, 2006) and can choose exactly where the characters should go, what activities they should do, what they are interested in, or with whom they will have the social relations (Granic et al., 2014). The very premise of controlling the lives of virtual people is something that the players derive pleasure and satisfaction from (Bogost, 2011).

Motivation

Motivation is an enthusiasm for doing something and the need or reason for doing something. Motivation means prompting a person to make certain choices or undertake all sorts of actions. Simple questions related to persistence in action have been found to be the basis of the motivation theory and research (Dörnyei & Ushioda, 2013). Motivation should be understood as a psychological construct, dealing with the fact that in some way people are compelled to perform a certain activity (Reid, 2012). In other words, it is a set of factors designed to stimulate a person to act. The sources of

motivation can be many. The most commonly cited are positive and negative motivation (Lockwood et al., 2002). The most important part of the definition should be that the motivation can be an unsatisfied desire. Motivation is inherent in competing with others or/and pursuing a certain goal (Mainemelis, 2010). Whether it is self-motivation or forced through other factors, it is a kind of driving force for people. Considering that human life consists of a constant flow of activity, the motivation is a very important element in all these (Rheinberg & Engeser, 2018).

Motivation is primarily divided into intrinsic and extrinsic. An intrinsic motivation, although strongly linked to an individual, can be easily changed due to the external factors (Shang et al., 2005). Additionally, it can be bolstered by the positive factors such as curiosity, control, cooperation, or recognition (Ciampa, 2014). Positive feedback messages are also able to bolster an individual's intrinsic motivation to work (Kuvaas & Dysvik, 2009). Accordingly, intrinsic motivation built in a supportive and family environment will be far stronger than that built solely through extrinsic factors (Reid, 2012). An extrinsic motivation is the type of motivation that treats the fact that the individuals are motivated to perform a selected task, solely for the purpose of obtaining a potential reward for their performance or achievement (Reiss, 2012). At the same time, when talking about the reward, one should have in mind the desire to potentially avoid consequences or sanctions for not performing it (Reid, 2012).

Satisfaction

Satisfaction is understood as one of the feelings, synonymous with contentment or feeling pleasure (Veenhoven, 2012). In recent studies, the focus was on a definition related to pleasure and satisfaction with something (Carlquist et al., 2017). A study conducted in 2009 noted that advanced gamers find other tasks more difficult than novice gamers (Klimmt, Blake, et al., 2009). Thus, it is difficult to predict the specific optimal level of task satisfaction. At the same time, it has been found that an important mechanism linking satisfaction with one's own achievements in the context of games is the link to self-esteem (Klimmt, Blake, et al., 2009).

A particularly important is consumer satisfaction (Giese & Cote, 2000). As defined previously, a gamer is a person who consciously consumes the medium of video games and is therefore a consumer (Sherry et al., 2012). The literature has also pointed out that the behavior of employees in an industry (in this case, the video game industry) plays an important role in shaping the customer perceptions (Jeon & Choi, 2012). Accordingly, it can be assumed that certain practices of the game distributors or owners of large gaming platforms will be realistically reflected in the customer satisfaction (Wang et al., 2020). Factors influencing satisfaction will include those relating to the product itself (here video games), the method of purchase, and the form of the product purchased (Marchand & Hennig-Thurau, 2013).

Achievements

Achievements in video games are certain goals to be earned, created as part of the gameplay world (Skoric et al., 2009). In a way, they extend the lifespan of games and, at the same time, give players a good reason to go through the games in multiple variations (Bailey & Miyata, 2019). Simultaneously, achievements are the most thoroughly researched motive in terms of motivation (Rheinberg & Engeser, 2018). Achievements can be geared toward

unlocking the additional characters, finding the hidden content, or completing the game at the appropriate difficulty level (Montola et al., 2009). Currently, the most popular platforms where the trophy and achievement system can be encountered are Microsoft and Sony consoles, as well as Steam within PC (Cruz et al., 2017). Achievements can also be noticed as implemented through the proprietary systems in certain browser games (Klimmt, Schmid, et al., 2009).

Long-Term Goals

Long-term goals are defined as an event that players want to pursue over a certain period of time (Buckley & Anderson, 2006). There is no specific scheme for what can be a goal in the game (Gabbadini & Greitemeyer, 2017). It could be simply completing a story thread, earning an achievement pack, or getting a legendary item in a massively multiplayer online (Gazzard, 2011). Research has also shown that not every category of game lends itself to long-term challenges. Although puzzle games are intended for brief and irregular play, research has shown that they can elicit positive emotions (Franceschini et al., 2022); however, not all games are designed for long-term engagement (Granic et al., 2014).

Competitiveness

Competition in video games is an important factor for gamers (Anderson & Carnagey, 2009). That is why special content geared only to ranked games is being created (De Prato et al., 2010). These can be entire games or one single mode (Trepte & Reinecke, 2010). A popular genre that focuses on rivalry are games like Battle Royal, in which up to several hundred players fight each other until only one team or player is left on the battlefield (Fernandez de Henestrosa et al., 2022). At the same time, popular games that rely on rivalries are those in the Fédération Internationale de Football Association (FIFA) series (Pomikło & Strzelecki, 2022; Zagała & Strzelecki, 2019). This is where players take control of their favorite soccer teams competing in realistic simulations against the teams that can be controlled by a second player or artificial intelligence (Granic et al., 2014). Competition is also emerging as a separate gameplay mode or simply one of its offshoots. An example is the game League of Legends, whose main premise is based on the competition between two teams, and one of the modes further cranks up the competition by introducing ranking (Donaldson, 2017). With League of Legends ranked games, the players are matched to particular divisions, indicating their level of play (Monge & O'Brien, 2022). Of course, there are situations where a player who is in the diamond division does not have the necessary skills to stay in it for long. However, not everyone cares about a high enough division. This is evidenced by a statistical study conducted by Clanaria (2020), a player on the Europe-West server, on the competency of League of Legends players, where 3,784 players participated (Clanaria, 2020).

Method

The main objective was to demonstrate the relationship of factors affecting the motivation and satisfaction of video game players. The subject of the study was the opinion of the people associated with video games on satisfaction, motivation, competence, achievement, Easter eggs, balance and control of gameplay, openness of the world, as well as long-term goals accompanying respondents while consuming video games. The survey was

conducted in the form of a questionnaire through the Google Forms platform. For all the questions, a 7-point Likert scale was used.

The respondents belonged to different groups of gamers, which were also verified through the survey question. The groups and servers that allowed the survey to be posted did not belong to a single community. Nor did they pertain to one type of game. The selection of potential research groups was guided by the fact that they should reach a very wide range of players, and not focus on just one game genre. The survey lasted from January 14, 2022, to March 9, 2022.

Hypotheses Development

Openness of the World

“Openness of the world” refers to the degree to which a video game allows the players to explore and interact with the game’s environment and nonplayer characters (Dale & Shawn Green, 2017). A game with a high degree of openness may allow players to roam freely and make choices that significantly impact the game’s story and outcomes, while a game with low openness may have more linear progression and limited player choices (Atkinson & Parsayi, 2021). Some research suggests that a high level of openness in a game can increase player motivation, as it allows for greater freedom and agency in the game experience. On the other hand, a game that is too open or overwhelming in its freedom may decrease motivation by causing confusion or a lack of direction for the player. The appropriate level of openness in a game may depend on the preferences and goals of the individual player.

Hypothesis 1 (H1): The openness of the world in games positively affects the player motivation.

Hypothesis 1a (H1a): The openness of the world in games positively affects player satisfaction.

Easter Eggs and Hidden Content

“Easter eggs” are hidden or unexpected references or in-jokes within a video game, often included for the enjoyment of dedicated players who take the time to discover them (Jannidis, 2009). “Hidden content” refers to any game elements that are not immediately visible or accessible to the player but can be discovered through exploration or special actions (Nam & Han, 2022). The inclusion of Easter eggs and hidden content in a game can potentially increase player satisfaction by providing an extra layer of discovery and reward for dedicated players. However, the impact of Easter eggs and hidden content on player satisfaction may vary depending on the player’s preference for exploration and the extent to which they are able to discover and access the hidden elements. Some players may find the process of searching for and discovering hidden content to be a rewarding aspect of the game, while others may not be interested in this aspect or may become frustrated if the hidden elements are too difficult to access.

Hypothesis 2 (H2): Easter eggs and hidden content in the games positively affect player satisfaction.

Difficulty Balance and Control of Gameplay

“Difficulty balance” in a video game refers to the relative ease or challenge of the game’s content and progression (Zohaib, 2018). A game with the good difficulty balance may provide a sense of accomplishment for the player without being overly frustrating or impossible to complete (Ang & Mitchell, 2017). “Control of

gameplay” refers to the player’s ability to affect the events and outcomes within a game, including their character’s actions and abilities (Yu et al., 2022). Both difficulty balance and control of gameplay can potentially impact player motivation in a video game. A game that is too easy may not provide sufficient challenge to keep the player motivated, while a game that is too difficult may cause frustration and a lack of enjoyment for the player. Similarly, a game that does not give the player a sufficient control over their gameplay experience may not be engaging or satisfying, while a game that gives the player too much control may not provide a sense of challenge or accomplishment. Striking the right balance of difficulty and control can help maintain players’ interest and motivation in the game.

Hypothesis 3 (H3): A good difficulty balance of gameplay and ability to control it has a positive impact on player motivation.

Hypothesis 3a (H3a): A good difficulty balance of gameplay and ability to control it has a positive impact on player satisfaction.

Satisfaction

Satisfaction is generally understood as a feeling of contentment or fulfillment that results from the achievement of a goal or the attainment of a desired outcome. In relation to video games, satisfaction can refer to the enjoyment or amusement that a player gets from playing the game (Klimmt, Blake, et al., 2009). It is possible that high levels of satisfaction with a video game can increase player motivation to continue playing and make progress in the game. If a player is having a positive experience and finding the game to be enjoyable, they may be more motivated to keep playing and try to achieve more in the game (Chang & Lee, 2022). On the other hand, if a player is not finding the game to be satisfying, they may lose motivation to continue playing or may become more likely to stop playing the game altogether. Therefore, satisfaction can potentially act as a factor moderating motivation in video game players.

Hypothesis 4 (H4): An increase in players’ satisfaction during an activity positively moderates an increase in their motivation.

Motivation

Motivation refers to the driving force that inspires people to take action and pursue their goals. In relation to video games, motivation can refer to the factors that inspire a person to play and engage with video games (Ryan et al., 2006). The following study focuses on showing motivation a certain way to make a person make certain choices or undertake actions (Dörnyei & Ushioda, 2013). The construct of motivation is based on the players’ feelings and their level of determination to perform an activity. Within this construct, three questions were developed. In developing the model, it was determined that motivation would be the main factor influencing the other items.

Achievements

Achievements in video games refer to milestones or accomplishments that a player can achieve while playing the game. These achievements may be related to the game’s story or objectives, or they may be more optional challenges that the player can choose to pursue. Some examples of achievements in video games might include completing all the levels, unlocking new content or

abilities, or achieving high scores or rankings (Bailey & Miyata, 2019). Achievements in video games encourage players to approach the situations in new and interesting ways, motivating the students to stretch into new experiences (Gestwicki & Largent, 2022).

Hypothesis 5 (H5): Player motivation has a positive impact on earning achievements in games.

Competitiveness

Competitiveness refers to the desire to outperform others or be the best at something. With regard to video games, competitiveness can refer to a player's desire to win or achieve high scores and rankings, either against other players or against their own personal bests. Some players may be highly competitive and motivated to perform well in order to win, while others may be less concerned with competition and more focused on enjoying the game itself (Harris et al., 2022). The players not only recognize the impact of randomness on their chances of winning, but also believe that their skills influence their chances to a comparable extent (Gałka & Strzelecki, 2021).

Hypothesis 6 (H6): Players' motivation positively influences their competence and willingness to compete.

Long-Term Goals

Research has suggested that long-term goals can be affected by a motivation in video game players (Staewen et al., 2014). For example, a player who has a clear set of long-term goals in mind

while playing a game may be more motivated to continue playing and making progress toward those goals (Gabbadini & Greitemeyer, 2017). On the other hand, a player who does not have a clear sense of long-term goals or lacks motivation to achieve them may not be as motivated to continue playing. The impact of player motivation on long-term goals may depend on the individual player's goals and interests, as well as the design of the goals themselves (e.g., whether they are challenging but attainable, or whether they are too easy or too difficult). The motivation, particularly the expectation of winning, might sometimes significantly influences players' long-term commitment in terms of time and money engagement in the game (Pomikło & Strzelecki, 2022).

Hypothesis 7 (H7): Player's motivation positively influences the long-term goals.

Research Model

Figure 1 shows the model for a study that aimed to test the relationships between factors affecting the motivation and satisfaction among players. During the development of the first draft of the model, it was recognized that such a path probably best reflected the connections between the constructs. Motivation, which affects the acquisition of achievements, or discovery of content, appeared to be the first natural choice in developing the model. Assumptions also emerged related to the fact that the openness of the world could have an impact on player motivation. Table 1 presents the constructs along with abbreviations and survey questions.

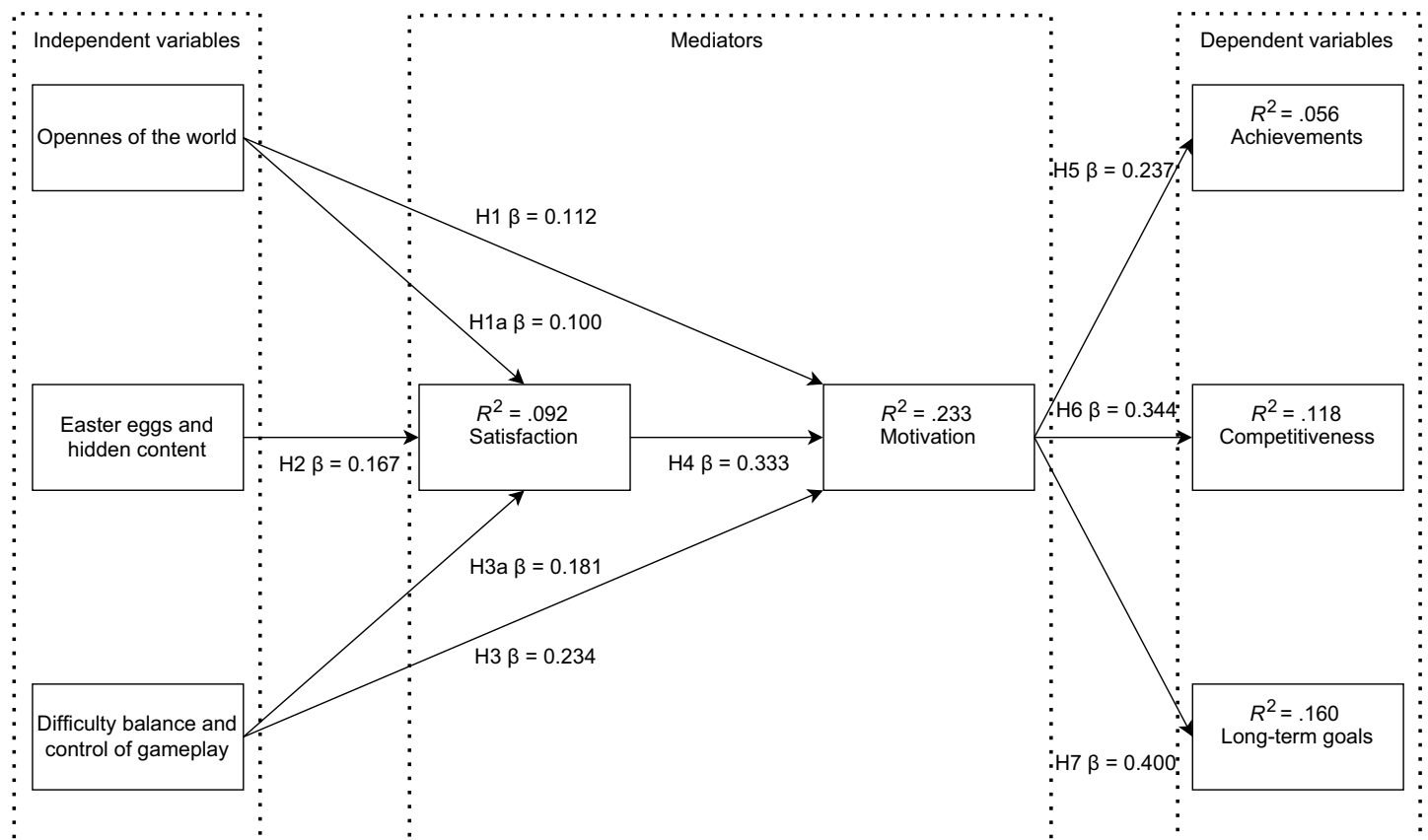


Figure 1 — Model of satisfaction and motivation of video game players.

Table 1 Constructs with Acronyms and Survey Questions

Construct	Item	Question
Satisfaction (adapted from Sherry et al., 2012)	SA1	I enjoy playing video games
	SA2	I feel satisfaction when I play games
	SA3	Playing games makes me happy and satisfies me
Motivation (adapted from Sherry et al., 2012)	MO1	I feel that when I play games my motivation level increases
	MO2	I am more motivated when I play games
	MO3	Motivation is an important element for me in the games
Competitiveness (adapted from Greenberg et al., 2010)	CO1	I like to improve my previous score
	CO2	I like to feel that I have mastered the game to the maximum extent
	CO3	I change the game if my performance stops improving
	CO4	I like to beat other players
	CO5	Getting a bad score in a game bothers me
	CO6	I like games where I have to try hard to win
Achievements (adapted from Abbasi et al., 2019)	AC1	I like getting achievements in the games
	AC2	I feel the pressure of getting a lot of achievements in a game
	AC3	I am interested in achievements in the games
	AC4	Achievements are an important goal for me in the game
	AC5	I consider myself an "Achievement hunter" and strive to finish games at 100%
	AC6	I feel that the advent of achievements has changed my way of playing games
Easter Eggs and hidden content (Sherry et al., 2012)	EE1	I feel the pleasure when I find an Easter Egg in a game
	EE2	I like it when a game has hidden content to find
	EE3	I enjoy searching for hidden content in the game
	EE4	Easter eggs are an interesting form of information for me
	EE5	Easter eggs increase the dynamics of the game and enrich the linear storyline
	EE6	I think Easter eggs are an attractive addition to the game
Long-term goals (adapted from Sherry et al., 2012)	GO1	In the games, I set long-term goals that I pursue
	GO2	I believe that the goal in a game is important
	GO3	Pursuing a goal in a game does not kill the enjoyment of the game
	GO4	I like to achieve the goals I set in the game
	GO5	The long-term goals imposed by the game help me
	GO6	I feel the need for the game to offer me goals to achieve
Openness of the world (adapted from Sherry et al., 2012)	OW1	I like to play games with an open world
	OW2	I feel good when the maps in the game are extensive
	OW3	I like having the freedom to direct the gameplay
	OW4	An open world in a game does not make me embarrassed
	OW5	I rarely get lost in open-world games
	OW6	Open-world games stimulate my creativity
Difficulty balance and control of gameplay (adapted from Greenberg et al., 2010)	DI1	I like when a game is well balanced
	DI2	I like to set the bar high for myself when it comes to video games
	DI3	Games that are too easy do not give me pleasure
	DI4	I feel satisfaction when I can control the fate of a character in a game
	DI5	I like to feel that the game's difficulty level is appropriate to my skills
	DI6	I think the difficulty level should be adapted to the average (Sunday/casual) player

Data Collection

Procedure

The partial least squares structural equation modeling (PLS-SEM) method was selected because it offers several advantages for model calculation, which were utilized in this study. One key benefit is its emphasis on prediction and maximizing the explained variance of dependent variables. Additionally, PLS-

SEM is capable of handling more complex models that include multiple constructs and paths, and it is less prone to the estimation problems in such complex models. Finally, the proposed theoretical contribution of this study is still in the developmental stage. PLS-SEM facilitates the exploration of relationships in models where the theoretical foundations are not yet fully established ([Cepeda-Carrion et al., 2019](#); [Hair et al., 2019](#)).

The study was fully conducted in the SmartPLS 4 program using the PLS algorithm, where the weighting scheme was centroid, and the stopping criterion was 10^{-7} . The maximum number of iterations was 300. A bootstrap measurement was also carried out with 5,000 samples, along with adjusted variance and bias-corrected (BCa) and accelerated bootstrapping at a significance level of .5, and blindfolding was set to omit six distances. Blindfolding could not be carried out with seven distances omitted due to the fact that the number of respondents was 1,400. Therefore, the decision was made to omit six distances.

Participants

The survey was conducted through Google Forms. However, it was distributed inside the closed groups on the Facebook platform and private Discord servers. The participants were mainly from Poland, since the survey was created in the Polish language. The gamers who took part in the survey came from very different segments of the gaming market, and the survey group consisted of people directly involved in video games. One thousand four hundred people in all participated in the survey where the vast majority were men (82.7%). The largest group of respondents was between the ages of 25 and 34 (45.7%). The second largest group was made up of people between the ages of 18 and 24 (35.9%). In third place were those between 35 and 44 (12.7%). Only 67 respondents in the above group described their age as below 18 (4.8%). The 45–55 age group included 12 respondents (0.9%) (Table 2).

In the survey, respondents who identified themselves as gamers were asked to categorize their type of gaming based on the Newzoo's classification (Newzoo, 2019). During the data collection process, the player types were explained to the participants. For each response, the short definition of the player type was placed. The largest group, comprising 556 respondents (39.9%), identified as "The All-Round Enthusiast." The next largest category was "The Conventional Player," accounting for 24.9% of the participants. "The Ultimate Gamer" was the label for 16.7% of the surveyed. "The Time Filler" was a category chosen by 98 respondents (7%). Other player types had similar but significantly lower representation in the survey. 3.4% identified as Popcorn Gamers, 3.2% as Backseat Viewers, and 1.1% as Hardware Enthusiasts. The smallest group was "The Subscriber," with only 11 respondents (0.8%) identifying as such (Table 2).

The study was fully conducted in SmartPLS 4 software, which allowed modeling in several stages (Ringle et al., 2022). The first focused on determining the types of variables (reflective or formative). This was followed by the tests on data quality. In the final stages, when quality measurements were found to be sufficient, hypotheses were tested (Sarstedt et al., 2017).

Results

In Table 3, it can be seen that not all items met the condition for a load greater than 0.7. In the subsequent modeling, these elements of the constructs were removed. The next model was created with GO6, EE5, OW5, CO3, CO4, CO5, DI1, DI4, and DI6 omitted. Cronbach's alpha for almost all the variables was above the accepted .7; also all these variables were considered acceptable for further parts of the study. The construct of "difficulty balance and gameplay control" was found to have the Cronbach's alpha of .675, which is below the conservative threshold. However, the other reliability metrics, such as reliability (ρ_A ; rho_A), composite reliability (ρ_c), and average variance explained, are considered

Table 2 Summary Data on the Characteristics of the Study Group

	<i>n</i> respondents	%
Gender		
Male	1,158	82.7
Female	233	16.6
I do not want to say	9	0.6
Age (years)		
Under 18	67	4.8
18–24	502	35.9
25–34	640	45.7
35–44	178	12.7
45–54	12	0.9
55 or older	1	0.0007
Size of residence		
A city with a population of more than 500,000	535	38.2
City from 150,000 to 500,000 inhabitants	288	20.6
City from 50,000 to 150,000 inhabitants	176	12.6
City of up to 50,000 residents	205	14.6
Village	196	14
Are you a video game player?		
Yes	1,392	99.4
No	8	0.6
Gamer type		
The Ultimate Gamer	233	16.7
The All-Round Enthusiast	556	39.9
The Conventional Player	347	24.9
The Subscriber	11	0.8
The Lapsed Gamer	40	2.9
The Backseat Viewer	45	3.2
The Popcorn Gamer	47	3.4
The Hardware Enthusiast	15	1.1
The Time Filler	98	7

reliable, reaching the value above the lower bond; thus, we decided to leave the variable in the model. The model was recalculated again, without the variables that did not meet the condition of having a loading value above 0.7 (or borderline). Table 4 presents a table of reliability and relevance of the constructs.

After removing the variables and recalculating the model again, all the variables had a loading value above the accepted level of 0.7. The data after eliminating the problematic items had adequate reliability and validity. This can be seen from the reliability index (rho_A) and composite reliability values. All these values are above the accepted levels, so they also met the condition. The values of average variance explained were also taken into account. For all the constructs, the average variance explained values exceeded the value of 0.5. With such results, the model has acceptable convergent relevance of items and constructs. Table 5 shows the results of the bootstrap algorithm, which resulted in an assessment of differential relevance using the Heterotrait–Monotrait ratio criterion (Henseler et al., 2015). The threshold value, taken into account, is 0.85. It is important that the values for the

Table 3 Summary of Data on Relevance of Reflective Variables

Construct	Variable	Test of relevance		
		Loading (>0.7)	Cronbach's alpha (>.7)	Average variance extracted (>0.5)
Motivation	MO1	0.911	.865	0.789
	MO2	0.922		
	MO3	0.828		
Satisfaction	SA1	0.822	.844	0.762
	SA2	0.895		
	SA3	0.901		
Competitiveness	CO1	0.827	.699	0.415
	CO2	0.802		
	CO3	0.253		
	CO4	0.638		
	CO5	0.457		
	CO6	0.695		
Achievements	AC1	0.806	.915	0.704
	AC2	0.782		
	AC3	0.880		
	AC4	0.905		
	AC5	0.818		
	AC6	0.835		
Easter Eggs and hidden content	EE1	0.855	.903	0.677
	EE2	0.882		
	EE3	0.798		
	EE4	0.875		
	EE5	0.668		
	EE6	0.838		
Long-term goals	GO1	0.789	.830	0.545
	GO2	0.809		
	GO3	0.715		
	GO4	0.815		
	GO5	0.750		
	GO6	0.505		
Openness of the world	OW1	0.815	.871	0.607
	OW2	0.825		
	OW3	0.794		
	OW4	0.767		
	OW5	0.628		
	OW6	0.826		
Difficulty balance and control of gameplay	DI1	0.444	.492	0.309
	DI2	0.803		
	DI3	0.578		
	DI4	0.522		
	DI5	0.637		
	DI6	-0.049		

paths are below this level. In Table 5, no value of the original sample exceeds 0.85. With these results, it was determined that the differential validity was present and had been established.

In the final evaluation of the structural model, the path coefficients and predictive power of the model were taken into account. Figure 1 shows the final version of the model with the

calculated coefficients and weights. For this model, the strongest relation exists between the motivation and long-term goals. The smallest path coefficient value is found for the relation between the variables of openness of the world and motivation.

Table 6 shows the results for path coefficients, *SD*, *t*-statistic values, and *p* values. The following results are satisfactory. The

Table 4 Reliability Analysis of Reflexive Variables

Variable	Cronbach's alpha	Reliability, ρ_A (rho_A)	Composite reliability, ρ_c	Average variance extracted
Long-term goals	.841	0.852	0.887	0.611
Easter Eggs and hidden content	.908	0.912	0.931	0.731
Competitiveness	.728	0.741	0.847	0.650
Motivation	.865	0.866	0.918	0.789
Achievements	.915	0.917	0.934	0.704
Openness of the world	.881	0.949	0.910	0.670
Satisfaction	.844	0.851	0.906	0.762
Difficulty balance and control of gameplay	.675	0.701	0.814	0.595

Table 5 Heterotrait–Monotrait Ratio Values

	AC	CO	DI	EE	GO	MO	OW
AC							
CO	0.418						
DI	0.248	0.692					
EE	0.429	0.269	0.305				
GO	0.415	0.522	0.471	0.434			
MO	0.443	0.555	0.466	0.573	0.521		
OW	0.381	0.545	0.388	0.346	0.400	0.405	

Note. AC = achievements; CO = competitiveness; DI = difficulty balance; EE = Easter eggs; GO = long-term goals; MO = motivation; OW = openness of the world.

Table 6 Values for Direct Path Coefficients

Hypothesis	Path	Coefficient	SD	t-Statistics	$p < .05$
H1	OW → MO	0.112	0.025	4.511	.000
H1a	OW → SA	0.100	0.028	3.585	.000
H2	EE → SA	0.167	0.027	6.092	.000
H3	DI → MO	0.234	0.023	9.999	.000
H3a	DI → SA	0.181	0.029	6.223	.000
H4	SA → MO	0.333	0.024	13.777	.000
H5	MO → AC	0.237	0.026	9.189	.000
H6	MO → CO	0.344	0.024	14.229	.000
H7	MO → GO	0.400	0.024	9.189	.000

Note. SA = satisfaction; MO = motivation; CO = competitiveness; AC = achievements; EE = Easter eggs; GO = long-term goals; OW = openness of the world; DI = difficulty balance.

values for the t -statistic are between 3.585 and 14.229 and are not significantly different from each other. Since each path's p -value is $<.05$, it can be said that the paths are significant. The path between the motivation and long-term goals shows the highest significance. Table 7 presents the indirect effects of the model. All the direct and indirect effects are positive and significant.

When analyzing the path coefficients, attention was also paid to additional coefficients to determine whether the constructs were significant. This was achieved using blindfolding with distance omitted at Level 6. Table 8 shows the results of these calculations. Q^2 values for all constructs are positive, so acceptable predictive accuracy was found. R^2 values are in the range of .092–.235. Despite the low R^2 values, the constructs were found to be significant due to the corresponding values of the t -statistic. Considering all the above results, the hypotheses were found to be correct. Due to the high

significance of the data, good fit and p -values $<.05$, the following relationships were found (Table 9).

Discussion

The results of this study suggest that there is a strong relationship between the motivation and long-term goals among video game players, as well as a positive effect of Easter eggs and hidden content on player satisfaction. However, the relationship between openness of the world and motivation was found to be weaker. These findings align with previous research on the impact of exploration and discovery on player satisfaction, but the specific role of long-term goals in motivation warrants further investigation (Dalisy et al., 2015; Johnson et al., 2013). One potential explanation for the strong relationship between the motivation and

long-term goals is that having a clear objective can provide a sense of purpose and drive for players. Additionally, the process of achieving long-term goals may itself be motivating, as it allows players to track their progress and see their own improvement. This finding is consistent with the previous research on motivation and suggests that setting clear goals for oneself can be a powerful motivator for video game players (Rigby & Ryan, 2011; Ryan et al., 2006).

The positive effect of Easter eggs and hidden content on player satisfaction is also consistent with prior research on the role of discovery in the enjoyment of video games (Lyons et al., 2011; Quick et al., 2012). These elements can provide a sense of surprise

and reward for players who take the time to seek them out, enhancing the overall game experience. The weaker relationship between openness of the world and motivation is an interesting finding that could be further explored in future research. It may be that the impact of openness on motivation varies depending on the specific game and the preferences of individual players. For example, some players may enjoy the freedom and agency provided by a highly open world, while others may find it overwhelming or confusing (Hilgard et al., 2013).

The study found that competitiveness and achievement are significantly related to both the motivation and satisfaction in video game players. This suggests that feeling competent and achieving goals in a game can be powerful motivators and sources of satisfaction for players (Sepehr & Head, 2018). The study’s results also showed that difficulty balance and control of gameplay is significantly related to motivation in video game players. Previous research has suggested that a sense of control and a balance of difficulty can be important factors in motivation and satisfaction in games. However, low values of reliability and validity may suggest that the relationship between these factors and motivation may depend on other factors, such as the player’s skill level or the type of game being played. Such a large discrepancy in survey responses within this section may have occurred due to the lack of a specified group of players. The assumption is that gamers who are clustered around esports will pay more attention to the level of difficulty than so-called “Sunday gamers.”

In the study, the main sample was divided into several sub-samples to check whether some differences among groups occurred. The model was calculated for the three major types of players based on the sample: The Ultimate Gamer (1), The All-Round Enthusiast (2), and The Conventional Player (3). It was also divided taking into account gender. Unfortunately, there were no identified significant differences in the model between the samples.

The study underlines that player motivation and satisfaction in video gaming hinges on long-term goals, hidden content, mastery, and accomplishment, as well as an expansive gaming world. These insights carry significant weight for the video game design and development, serving as a foundation for creating games that maximize player engagement and satisfaction. Our comprehension of player motivation and satisfaction is further enhanced by the investigation, which highlights a broad spectrum of motivational factors, including social interaction, escapism, competition, and the quest for challenge and achievement. The study also revealed diverse sources of satisfaction, among them the sense of progress and attainment, immersion and flow, and the social aspect of gaming.

Table 7 Values for Indirect Path Coefficients

Path	Coefficient	SD	t-Statistics	p < .05
DI → AC	0.055	0.009	6.409	.000
DI → CO	0.080	0.012	6.626	.000
DI → GO	0.093	0.012	7.812	.000
EE → AC	0.017	0.003	4.976	.000
EE → CO	0.025	0.004	5.763	.000
EE → GO	0.029	0.005	5.627	.000
EE → MO	0.072	0.011	6.272	.000
OW → AC	0.028	0.007	4.031	.000
OW → CO	0.041	0.009	4.810	.000
OW → GO	0.048	0.010	4.784	.000
SA → AC	0.079	0.011	7.328	.000
SA → CO	0.115	0.011	10.367	.000
SA → GO	0.134	0.014	9.888	.000

Note. SA = satisfaction; MO = motivation; CO = competitiveness; AC = achievements; EE = Easter eggs; GO = long-term goals; OW = openness of the world; DI = difficulty balance.

Table 8 Q² and R² Indicators

Construct	Q ²	R ²
Long-term goals	0.095	.160
Competitiveness	0.075	.118
Motivation	0.185	.235
Achievements	0.038	.056
Satisfaction	0.078	.092

Table 9 Hypothesis Compatibility

Path	Path coefficient	Hypothesis	Confirmed?
OW → MO	0.120	Hypothesis 1 (H1): The openness of the world in the games affects player motivation.	Yes
EE → SA	0.215	Hypothesis 2 (H2): Easter eggs and hidden content in the games, affect player satisfaction.	Yes
DI → MO	0.232	Hypothesis 3 (H3): A good balance of the gameplay difficulty and freedom to control it has an impact on player motivation.	Yes
SA → MO	0.335	Hypothesis 4 (H4): An increase in the players’ satisfaction during an activity positively influences an increase in their motivation.	Yes
MO → AC	0.237	Hypothesis 5 (H5): Players’ motivation has an impact on earning achievements in the games.	Yes
MO → CO	0.344	Hypothesis 6 (H6): Players’ motivation affects their competence and willingness to compete.	Yes
MO → GO	0.400	Hypothesis 7 (H7): Motivation has an impact on long-term goals.	Yes

Note. SA = satisfaction; MO = motivation; CO = competitiveness; AC = achievements; EE = Easter eggs; GO = goals; OW = openness of the world; DI = difficulty balance.

Emphasizing the role of social interaction, the findings align with earlier research on the social dimensions of gaming (Marelič & Vukušić, 2019). The study suggests that the ability to connect with friends and other players profoundly influences the player motivation and satisfaction. Thus, the developers and marketers must recognize the impact of social connectivity when designing the games and strategizing the marketing. Furthermore, the challenge and accomplishment contribute significantly to player satisfaction. This correlation has been consistently proven in earlier studies (Przybylski et al., 2010; Ryan et al., 2006); thus, games offering a sense of progression and reward are more likely to engage and satisfy players. Finally, the study underscores the paramount importance of immersion and flow in gaming, corroborating with previous research (Caroux et al., 2015). Players express maximum enjoyment when they experience a sense of being fully engaged or “lost in the game.”

Theoretical Implications

The study found a strong relationship between the player motivation and the pursuit of long-term goals in video games. This implies that having clear, achievable objectives in a game can significantly drive player motivation. The process of working toward and achieving these goals is itself motivating, as it allows players to track their progress and recognize their own improvement. This finding aligns with an existing research, underscoring the importance of goal-setting in enhancing the player engagement and motivation.

The research also highlights the positive effect of Easter eggs and hidden content on player satisfaction. These elements, which provide players with a sense of discovery and surprise, enhance the overall gaming experience by offering reward for exploration. This suggests that incorporating hidden elements and surprises in game design can significantly contribute to player satisfaction, resonating with prior research on the role of discovery in video game enjoyment.

The study suggests that competitiveness and the achievement of goals in video games are strongly related to both the player motivation and satisfaction. The sense of competence and the accomplishment of goals are the potent motivators and sources of satisfaction for players. This implies that game designs that foster a competitive environment and provide clear achievement markers can effectively enhance player engagement and satisfaction.

Practical (Managerial) Implications

The strong correlation between the player motivation and the pursuit of long-term goals suggests that game developers should focus on creating clear, achievable objectives within their games. Managers overseeing the game development can encourage their teams to design quests, missions, and challenges that provide a sense of purpose and progression, thereby enhancing the player engagement and retention.

Given the positive impact of Easter eggs and hidden content on player satisfaction, the game designers should consider integrating these elements into their games. This could involve hidden levels, secret items, or unexpected events that reward exploration and curiosity. Managers in the game development can allocate resources and creative time to ensure that these features are well-implemented, providing a richer and more engaging gaming experience for players.

The research indicates that the competitiveness and achievement are the significant motivators for players. Managers should

guide their teams to create balanced competitive environments and achievement systems in their games. This can involve leaderboards, achievement badges, and reward for in-game accomplishments. Ensuring that these systems are fair and accessible to various skill levels can help cater to a broader player base, thereby increasing the player satisfaction and loyalty.

Limitations and Future Research Suggestions

Despite these critical insights, the study’s limitations merit attention. With a sample size of 1,400 participants, the results may not represent the larger gaming population. The study’s reliance on self-reported measures may be prone to bias, such as social desirability or recall errors. Furthermore, the study focused solely on members of closed Facebook groups and private Discord servers, which may not reflect all the player types. The temporal scope of the study was limited to a single point, neglecting potential changes in motivation and satisfaction over gameplay. Additionally, the study overlooked other potential influencing factors like individual differences or contextual variables. Finally, the research focused on a limited set of games, restricting the applicability of the results to other game genres. Despite these limitations, this study offers valuable insights into the complex web of motivations and satisfactions in the gaming experience.

Future studies could explore the effects of other factors that may influence the motivation and satisfaction among video game players, such as the role of social interactions and competition, the influence of in-game reward and microtransactions, and the impact of personal characteristics and preferences on player engagement. It would also be interesting to examine how the effects of different motivation and satisfaction factors vary across different types of games, genres, and player demographics. Additionally, further research could investigate the long-term impact of these factors on player retention and loyalty.

In future research on “difficulty balance and control of gameplay,” the modifications to the questions used to define this variable could be considered. The study employed six questions. However, findings suggest a need for reevaluation to achieve the expected reliability index for this variable. A pilot study aimed at refining the measurement of this variable could be conducted. Future studies could also cover the different types of players. Although our results neither showed difference between the three major groups, nor the gender it is a promising direction for further exploration.

Conclusions

In conclusion, the purpose of the current study was to examine the connection between factors affecting the motivation and satisfaction among video game players. The results indicated that the satisfaction had a positive influence on the motivation. Additionally, the long-term goals were found to have the strongest relationship with motivation, while the openness of the world had the weakest relationship with the motivation. These findings suggest that video game designers should focus on providing intrinsic reward and long-term goals for players in order to enhance motivation and satisfaction.

References

- Abbasi, A.Z., Ting, D.H., Hlavacs, H., Costa, L.V., & Veloso, A.I. (2019). An empirical validation of consumer video game engagement:

- A playful-consumption experience approach. *Entertainment Computing*, 29, 43–55. <https://doi.org/10.1016/j.entcom.2018.12.002>
- Anderson, C.A., & Carnagey, N.L. (2009). Causal effects of violent sports video games on aggression: Is it competitiveness or violent content? *Journal of Experimental Social Psychology*, 45(4), 731–739. <https://doi.org/10.1016/j.jesp.2009.04.019>
- Ang, D., & Mitchell, A. (2017). *Comparing effects of dynamic difficulty adjustment systems on video game experience* [Conference session]. Proceedings of the Annual Symposium on Computer–Human Interaction in Play (pp. 317–327). <https://doi.org/10.1145/3116595.3116623>
- Atkinson, P., & Parsayi, F. (2021). Video games and aesthetic contemplation. *Games and Culture*, 16(5), 519–537. <https://doi.org/10.1177/1555412020914726>
- Bailey, E., & Miyata, K. (2019). Improving video game project scope decisions with data: An analysis of achievements and game completion rates. *Entertainment Computing*, 31, Article 100299. <https://doi.org/10.1016/j.entcom.2019.100299>
- Bakkes, S.C.J., Spronck, P.H.M., & van Lankveld, G. (2012). Player behavioural modelling for video games. *Entertainment Computing*, 3(3), 71–79. <https://doi.org/10.1016/j.entcom.2011.12.001>
- Bartle, R. (1996). Hearts, clubs, diamonds, spades: Players who suit MUDs. *Journal of MUD Research*, 1(1), Article 19.
- Berger, A.A. (2002). *Video games: A popular culture phenomenon*. Routledge.
- Bogost, I. (2011). *How to do things with videogames*. University of Minnesota Press.
- Buckley, K.E., & Anderson, C.A. (2006). A theoretical model of the effects and consequences of playing video games. In P. Vorderer & J. Bryant (Eds.), *Playing video games—Motives, responses, and consequences* (pp. 363–378). Routledge.
- Carlquist, E., Ulleberg, P., Delle Fave, A., Nafstad, H.E., & Blakar, R.M. (2017). Everyday understandings of happiness, good life, and satisfaction: Three different facets of well-being. *Applied Research in Quality of Life*, 12(2), 481–505. <https://doi.org/10.1007/s11482-016-9472-9>
- Caroux, L., Isbister, K., Le Bigot, L., & Vibert, N. (2015). Player–video game interaction: A systematic review of current concepts. *Computers in Human Behavior*, 48, 366–381. <https://doi.org/10.1016/j.chb.2015.01.066>
- Cepeda-Carrion, G., Cegarra-Navarro, J.-G., & Cillo, V. (2019). Tips to use partial least squares structural equation modelling (PLS-SEM) in knowledge management. *Journal of Knowledge Management*, 23(1), 67–89. <https://doi.org/10.1108/JKM-05-2018-0322>
- Chang, J., & Lee, D. (2022). Changes in user experience and satisfaction as media technology evolves: The reciprocal relationship between video games and video game-related media. *Technological Forecasting and Social Change*, 174, 121219. <https://doi.org/10.1016/j.techfore.2021.121219>
- Ciampa, K. (2014). Learning in a mobile age: An investigation of student motivation. *Journal of Computer Assisted Learning*, 30(1), 82–96. <https://doi.org/10.1111/jcal.12036>
- Clanaria. (2020). *League of Legends survey results* [Online forum post]. Reddit. <https://www.reddit.com/r/leagueoflegends/comments/f04k12/comment/f04k12/>
- Clement, J. (2021). Number of video gamers worldwide 2015–2023. *Statista*. <https://www.statista.com/statistics/748044/number-video-gamers-world/>
- Cruz, C., Hanus, M.D., & Fox, J. (2017). The need to achieve: Players' perceptions and uses of extrinsic meta-game reward systems for video game consoles. *Computers in Human Behavior*, 71, 516–524. <https://doi.org/10.1016/j.chb.2015.08.017>
- Dale, G., & Shawn Green, C. (2017). The changing face of video games and video gamers: Future directions in the scientific study of video game play and cognitive performance. *Journal of Cognitive Enhancement*, 1(3), 280–294. <https://doi.org/10.1007/s41465-017-0015-6>
- Dalisay, F., Kushin, M.J., Yamamoto, M., Liu, Y.-I., & Skalski, P. (2015). Motivations for game play and the social capital and civic potential of video games. *New Media & Society*, 17(9), 1399–1417. <https://doi.org/10.1177/1461444814525753>
- Davis, S.B., & Carini, C. (2005). Constructing a player-centred definition of fun for video games design. In S. Fincher, P. Markopoulos, D. Moore, & R. Ruddle (Eds.), *People and computers XVIII—Design for life* (pp. 117–132). Springer. https://doi.org/10.1007/1-84628-062-1_8
- De Prato, G., Feijóo, C., Nepelski, D., Bogdanowicz, M., & Simon, J.P. (2010). *Born digital/grown digital: Assessing the future competitiveness of the EU video games software industry* [JRC Scientific and Technical Report, 24555]. Publications Office of the European Union.
- Denham, J., & Spokes, M. (2021). The right to the virtual city: Rural retreatism in open-world video games. *New Media & Society*, 23(6), 1567–1583. <https://doi.org/10.1177/1461444820917114>
- Donaldson, S. (2017). Mechanics and metagame: Exploring binary expertise in league of legends. *Games and Culture*, 12(5), 426–444. <https://doi.org/10.1177/1555412015590063>
- Dörnyei, Z., & Ushioda, E. (2013). *Teaching and researching: Motivation*. Routledge. <https://doi.org/10.4324/9781315833750>
- Elias, H., Almeida, F., Filgueiras, E., Rodrigues, E.P.F., & Alexandre, S.C. (2021). No-places and immersion in open world games: A rock star case study. In N. Martins & D. Brandão (Eds.), *Advances in design and digital communication* (pp. 166–179). https://doi.org/10.1007/978-3-030-61671-7_16
- Fernandez de Henestrosa, M., Billieux, J., & Melzer, A. (2022). Last man standing: Battle Royale games through the lens of self-determination theory. *Games and Culture*, 18(4), 427–448. <https://doi.org/10.1177/15554120221101312>
- Franceschini, S., Bertoni, S., Lulli, M., Pievani, T., & Facoetti, A. (2022). Short-term effects of video-games on cognitive enhancement: The role of positive emotions. *Journal of Cognitive Enhancement*, 6(1), 29–46. <https://doi.org/10.1007/s41465-021-00220-9>
- Fröhlich, T., Alexandrovsky, D., Stabbert, T., Döring, T., & Malaka, R. (2018). *VRBox* [Conference session]. Proceedings of the 2018 Annual Symposium on Computer–Human Interaction in Play (pp. 153–162). <https://doi.org/10.1145/3242671.3242697>
- Gabbiadini, A., & Greitemeyer, T. (2017). Uncovering the association between strategy video games and self-regulation: A correlational study. *Personality and Individual Differences*, 104, 129–136. <https://doi.org/10.1016/j.paid.2016.07.041>
- Galka, P., & Strzelecki, A. (2021). How randomness affects player ability to predict the chance to win at *PlayerUnknown's BattleGrounds* (PUBG). *The Computer Games Journal*, 10(1–4), 1–18. <https://doi.org/10.1007/s40869-020-00117-1>
- Gazzard, A. (2011). Unlocking the gameworld: The rewards of space and time in videogames. *Game Studies*, 11(1), 9–13.
- Gestwicki, P., & Largent, D.L. (2022). *Building community and validating co-curricular achievement* [Conference session]. Proceedings of the 53rd ACM Technical Symposium on Computer Science Education V. 2, pp. 1095–1095. <https://doi.org/10.1145/3478432.3499127>
- Giese, J.L., & Cote, J.A. (2000). Defining consumer satisfaction. *Academy of Marketing Science Review*, 1(1), 1–22.
- Glass, B.D., Maddox, W.T., & Love, B.C. (2013). Real-time strategy game training: Emergence of a cognitive flexibility trait. *PLoS One*, 8(8), Article e70350. <https://doi.org/10.1371/journal.pone.0070350>
- Gómez Maureira, M.A., & Kniesedt, I. (2018). Games that make curious: An exploratory survey into digital games that invoke curiosity.

- Lecture Notes in Computer Science*, 11112, 76–89. https://doi.org/10.1007/978-3-319-99426-0_7
- Gómez-Maureira, M.A., & Kniestedt, I. (2019). Exploring video games that invoke curiosity. *Entertainment Computing*, 32, 1–34. <https://doi.org/10.1016/j.entcom.2019.100320>
- Granic, I., Lobel, A., & Engels, R.C.M.E. (2014). The benefits of playing video games. *American Psychologist*, 69(1), 66–78. <https://doi.org/10.1037/a0034857>
- Greenberg, B.S., Sherry, J., Lachlan, K., Lucas, K., & Holmstrom, A. (2010). Orientations to video games among gender and age groups. *Simulation & Gaming*, 41(2), 238–259. <https://doi.org/10.1177/1046878108319930>
- Grofal T. (2000). Video games and the pleasures of control. In D. Zillmann & P. Vorderer (Eds.), *Media entertainment: The psychology of its appeal* (pp. 197–213). Routledge.
- Hair, J.F., Risher, J.J., Sarstedt, M., & Ringle, C.M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review*, 31(1), 2–24. <https://doi.org/10.1108/EBR-11-2018-0203>
- Harris, N., Hollett, K.B., & Remedios, J. (2022). Facets of competitiveness as predictors of problem video gaming among players of massively multiplayer online first-person shooter games. *Current Psychology*, 41(6), 3641–3650. <https://doi.org/10.1007/s12144-020-00886-y>
- Hedlund, D.P. (2023). A typology of esports players. *Journal of Global Sport Management*, 8(2), 460–477. <https://doi.org/10.1080/24704067.2021.1871858>
- Henseler, J., Ringle, C.M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, 43(1), 115–135. <https://doi.org/10.1007/s11747-014-0403-8>
- Hilgard, J., Engelhardt, C.R., & Bartholow, B.D. (2013). Individual differences in motives, preferences, and pathology in video games: the gaming attitudes, motives, and experiences scales (GAMES). *Frontiers in Psychology*, 4, Article 608. <https://doi.org/10.3389/fpsyg.2013.00608>
- James, E.A. (2018). Queer Easter eggs and their hierarchies of play. *Game Studies*, 18(3). <https://gamestudies.org/1803/articles/james>
- Jannidis, F. (2009). Metareference in computer games. In W. Wolf, K. Bantleon, & J. Thoss (Eds.), *Metareference across media: Theory and case studies* (pp. 543–565). BRILL. https://doi.org/10.1163/9789042026711_022
- Jeon, H., & Choi, B. (2012). The relationship between employee satisfaction and customer satisfaction. *Journal of Services Marketing*, 26(5), 332–341. <https://doi.org/10.1108/08876041211245236>
- Johnson, D., & Gardner, J. (2010). *Personality, motivation and video games* [Conference session]. Proceedings of the 22nd Conference of the Computer–Human Interaction Special Interest Group of Australia on Computer–Human Interaction—OZCHI '10, (pp. 276–279). <https://doi.org/10.1145/1952222.1952281>
- Johnson, D., Wyeth, P., & Sweetser, P. (2013). *The People-Game-Play model for understanding videogames' impact on wellbeing* [Conference session]. 2013 IEEE International Games Innovation Conference (IGIC), (pp. 85–88). <https://doi.org/10.1109/IGIC.2013.6659143>
- Klimmt, C., Blake, C., Hefner, D., Vorderer, P., & Roth, C. (2009). Player performance, satisfaction, and video game enjoyment. *Lecture Notes in Computer Science*, 5709, 1–12. https://doi.org/10.1007/978-3-642-04052-8_1
- Klimmt, C., Schmid, H., & Orthmann, J. (2009). Exploring the enjoyment of playing browser games. *CyberPsychology & Behavior*, 12(2), 231–234. <https://doi.org/10.1089/cpb.2008.0128>
- Kłosiński, M. (2022). Ghosts and mirrors: Devourment by the other in cyberpunk 2077. *Journal of Gaming & Virtual Worlds*, 14(1), 67–84. https://doi.org/10.1386/jgvw_00052_1
- Kuvaas, B., & Dysvik, A. (2009). Perceived investment in employee development, intrinsic motivation and work performance. *Human Resource Management Journal*, 19(3), 217–236. <https://doi.org/10.1111/j.1748-8583.2009.00103.x>
- Lesner, E.D. (2017). O tworzeniu i technikach przekładu tzw., „easter eggów“ na wybranych przykładach z trylogii gier komputerowych „Wiedźmin“ i jej tłumaczenia na język niemiecki. *Lingwistyka Stosowana*, 23, 187–211. <https://doi.org/10.32612/uw.20804814.2017.3.pp.197-211>
- Lockwood, P., Jordan, C.H., & Kunda, Z. (2002). Motivation by positive or negative role models: Regulatory focus determines who will best inspire us. *Journal of Personality and Social Psychology*, 83(4), 854–864. <https://doi.org/10.1037/0022-3514.83.4.854>
- Lyons, E.J., Tate, D.F., Ward, D.S., Bowling, J.M., Ribisl, K.M., & Kalyaraman, S. (2011). Energy expenditure and enjoyment during video game play. *Medicine & Science in Sports & Exercise*, 43(10), 1987–1993. <https://doi.org/10.1249/MSS.0b013e318216ebf3>
- Mago, Z. (2016). Self- and cross-promotion within digital games. *Marketing Identity*, 4(1), 336–345.
- Mago, Z. (2019). Easter eggs in digital games as a form of textual transcendence (Case Study). *Acta Ludologica*, 2, 48–57.
- Mainemelis, C. (2010). Stealing fire: Creative deviance in the evolution of new ideas. *Academy of Management Review*, 35(4), 558–578. <https://doi.org/10.5465/amr.35.4.zok558>
- Marchand, A., & Hennig-Thurau, T. (2013). Value creation in the video game industry: Industry economics, consumer benefits, and research opportunities. *Journal of Interactive Marketing*, 27(3), 141–157. <https://doi.org/10.1016/j.intmar.2013.05.001>
- Marelić, M., & Vukušić, D. (2019). E-sports: Definition and social implications. *Exercise and Quality of Life*, 11(2), 47–54. <https://doi.org/10.31382/eqol.191206>
- Monge, C.K., & O'Brien, T.C. (2022). Effects of individual toxic behavior on team performance in league of legends. *Media Psychology*, 25(1), 82–105. <https://doi.org/10.1080/15213269.2020.1868322>
- Montola, M., Nummenmaa, T., Lucero, A., Boberg, M., & Korhonen, H. (2009). *Applying game achievement systems to enhance user experience in a photo sharing service* [Conference session]. Proceedings of the 13th International MindTrek Conference: Everyday Life in the Ubiquitous Era on—MindTrek '09 (pp. 94–97). <https://doi.org/10.1145/1621841.1621859>
- Nam, S.-H., & Han, H.-W. (2022). A study on transtextuality and effect on replayability of Easter eggs in digital games. *Journal of Korea Game Society*, 22(1), 3–17. <https://doi.org/10.7583/JKGS.2022.22.1.3>
- Newzoo. (2019). *Newzoo's Gamer Segmentation™: An overview of the nine unique personas*. https://resources.newzoo.com/hubfs/Newzoo_Gamer_Segmentation.pdf
- Newzoo. (2023). *Newzoo's Global Games Market Report 2023| Free version*. <https://newzoo.com/resources/trend-reports/newzoo-global-games-market-report-2023-free-version>
- Nutt, D., & Raiton, D. (2003). The SIMS: Real life as genre. *Information, Communication & Society*, 6(4), 577–592. <https://doi.org/10.1080/1369118032000163268>
- Pomikło, S., & Strzelecki, A. (2022). The moderating effect of knowledge on the virtual market in FIFA ultimate team. In J.L. Reis, M.K. Peter, R. Cayolla, & Z. Bogdanović (Eds.), *Marketing and smart technologies*. Smart innovation, systems and technologies (Vol. 280, pp. 179–188). Springer. https://doi.org/10.1007/978-981-16-9272-7_15
- Prugl, R., & Schreier, M. (2006). Learning from leading-edge customers at the SIMS: Opening up the innovation process using toolkits. *R and D Management*, 36(3), 237–250. <https://doi.org/10.1111/j.1467-9310.2006.00433.x>

- Przybylski, A.K., Rigby, C.S., & Ryan, R.M. (2010). A motivational model of video game engagement. *Review of General Psychology, 14*(2), 154–166. <https://doi.org/10.1037/a0019440>
- Quick, J.M., Atkinson, R.K., & Lin, L. (2012). Empirical taxonomies of gameplay enjoyment. *International Journal of Game-Based Learning, 2*(3), 11–31. <https://doi.org/10.4018/ijgbl.2012070102>
- Reid, G. (2012). Motivation in video games: A literature review. *The Computer Games Journal, 1*(2), 70–81. <https://doi.org/10.1007/BF03395967>
- Reiss, S. (2012). Intrinsic and extrinsic motivation. *Teaching of Psychology, 39*(2), 152–156. <https://doi.org/10.1177/0098628312437704>
- Rheinberg, F., & Engeser, S. (2018). Intrinsic motivation and flow. In J. Heckhausen & H. Heckhausen (Eds.), *Motivation and action* (pp. 579–622). Springer. https://doi.org/10.1007/978-3-319-65094-4_14
- Rigby, S., & Ryan, R.M. (2011). *Glued to games: How video games draw us in and hold us spellbound*. Praeger.
- Ringle, C.M., Wende, S., & Becker, J.-M. (2022). *SmartPLS 4*. SmartPLS GmbH.
- Rushton, S., Juola-Rushton, A., & Larkin, E. (2010). Neuroscience, play and early childhood education: Connections, implications and assessment. *Early Childhood Education Journal, 37*(5), 351–361. <https://doi.org/10.1007/s10643-009-0359-3>
- Ryan, R.M., Rigby, C.S., & Przybylski, A. (2006). The motivational pull of video games: A self-determination theory approach. *Motivation and Emotion, 30*(4), 344–360. <https://doi.org/10.1007/s11031-006-9051-8>
- Salvador, R.B. (2017). History's first Easter egg. *Journal of Geek Studies, 4*(2), 63–68. <https://doi.org/10.5281/zenodo.8352227>
- Sarstedt, M., Ringle, C.M., & Hair, J.F. (2017). Partial least squares structural equation modeling. In C. Homburg, M. Klarmann, & A. Vomberg (Eds.), *Handbook of market research* (pp. 1–40). Springer. https://doi.org/10.1007/978-3-319-05542-8_15-1
- Sepehr, S., & Head, M. (2018). Understanding the role of competition in video gameplay satisfaction. *Information & Management, 55*(4), 407–421. <https://doi.org/10.1016/j.im.2017.09.007>
- Shang, R.-A., Chen, Y.-C., & Shen, L. (2005). Extrinsic versus intrinsic motivations for consumers to shop on-line. *Information & Management, 42*(3), 401–413. <https://doi.org/10.1016/j.im.2004.01.009>
- Sherry, J.L., Greenberg, B.S., Lucas, K., & Lachlan, K. (2012). Video game uses and gratifications as predictors of use and game preference. In P. Vorderer & J. Bryant (Eds.), *Playing video games—Motives, responses, and consequences* (pp. 213–224). Routledge.
- Skoric, M.M., Teo, L.L.C., & Neo, R.L. (2009). Children and video games: Addiction, engagement, and scholastic achievement. *CyberPsychology & Behavior, 12*(5), 567–572. <https://doi.org/10.1089/cpb.2009.0079>
- Sotamaa, O. (2010). When the game is not enough: Motivations and practices among computer game modding culture. *Games and Culture, 5*(3), 239–255. <https://doi.org/10.1177/1555412009359765>
- Staewen, R., Trevino, P., & Yun, C. (2014). *Player characteristics and their relationship to goals and rewards in video games* [Conference session]. 2014 IEEE Games Media Entertainment (pp. 1–8). <https://doi.org/10.1109/GEM.2014.7048088>
- Taylor, T.L. (2012). *Raising the stakes: E-sports and the professionalization of computer gaming*. MIT Press.
- Trepte, S., & Reinecke, L. (2010). Avatar creation and video game enjoyment. *Journal of Media Psychology, 22*(4), 171–184. <https://doi.org/10.1027/1864-1105/a000022>
- Uribe-Jongbloed, E., Scholz, T.M., & Espinosa-Medina, H.D. (2015). The joy of the Easter egg and the pain of numb hands: The augmentation and limitation of reality through video games. *Palabra Clave, 18*(4), 1165–1195. <https://doi.org/10.5294/pacla.2015.18.4.9>
- Van Ooijen, E. (2018). On the brink of virtual extinction: Hunting and killing animals in open world video games. *Eludamos: Journal for Computer Game Culture, 9*(1), 33–45. <https://doi.org/10.7557/23.6164>
- Veenhoven, R. (2012). Happiness: Also known as “life satisfaction” and “subjective well-being.” In K. Land, A. Michalos, & M. Sirgy (Eds.), *Handbook of social indicators and quality of life research* (pp. 63–77). Springer. https://doi.org/10.1007/978-94-007-2421-1_3
- Wang, D., Moh, M., & Moh, T.-S. (2020). *Using deep learning and steam user data for better video game recommendations* [Conference session]. Proceedings of the 2020 ACM Southeast Conference (pp. 154–159). <https://doi.org/10.1145/3374135.3385283>
- Yu, D., Wang, S., Song, F., Liu, Y., Zhang, S., Wang, Y., Xie, X., & Zhang, Z. (2022). Research on user experience of the video game difficulty based on flow theory and fNIRS. *Behaviour & Information Technology, 42*(6), 789–805. <https://doi.org/10.1080/0144929X.2022.2043442>
- Zagała, K., & Strzelecki, A. (2019). eSports evolution in football game series. *Physical Culture and Sport. Studies and Research, 83*(1), 50–62. <https://doi.org/10.2478/pccsr-2019-0020>
- Zohaib, M. (2018). Dynamic difficulty adjustment (DDA) in computer games: A review. *Advances in Human-Computer Interaction, 2018*, Article 5681652. <https://doi.org/10.1155/2018/5681652>