

Application of a Subjective Method of Analysis of the User Experience with the Onboarding Phase in Free-To-Play Mobile Games

Matheus Paulino dos Santos
State University of Paraíba
 Patos, Brazil
 paulinom47@yahoo.com.br

Alysson Jerônimo Dantas
State University of Paraíba
 Patos, Brazil
 allysonjeronimo@gmail.com

Jucelio Soares dos Santos
Electrical and Computer Engineering Center
Federal University of Campina
 Campina Grande, Brazil
 jucelio@copin.ufcg.edu.br

Abstract—The video game market is one of the most profitable in the entertainment industry. Thanks to the advent of smartphones and their app stores, a new category of games have become popular. Free games have gained prestige among mobile users because they are games that do not require any financial investment to obtain them. In this perspective, developers need to think about different ways to generate income through these games. However, if the game fails to hold the player’s attention in the first few minutes, the user may abandon it before even generating any income. These initial minutes of the experiment are known as the boarding phase. Because of this problem, this research seeks to analyze the boarding phase of different free mobile games, highlighting the feelings that affect the player’s involvement. For this, we carried out a case study with the games *Zombie Tsunami*, *Toy Defense*, and *Dungeon n Pixel Hero*, in the boarding phase. Then we analyzed the experience of different users based on the following metrics: positive experiences, negative experiences, tiredness, and return to reality. The results showed that the three games have many positive points, but none of the three managed to please a significant number of players, resulting in unsatisfactory boarding phases. The data obtained from the survey can help game developers by showing the areas of experience that need improvement.

Index Terms—free mobile games, user experience, onboarding phase

I. INTRODUCTION

The video game market has become one of the primary forms of entertainment for the current population, but it has not always been so. In the 1980s, this market almost fell into oblivion as it was considered a “fad” [1]. However, it has managed to rebuild itself and is currently the largest and most profitable in the entertainment industry [2].

With the advent of smartphones and mobile networks, it did not take long before the gaming experience that was offered by consoles was transported to these devices, transforming them into a gaming platform that attracts more and more players due to its practicality and portability [3].

Among the games made available for mobile devices, the ones that stand out the most are the free games to play (F2P). F2P is a game that profits only through advertisements and elective microtransactions carried out within the game itself, thus eliminating the need for an initial financial investment to obtain it [4].

Free mobile games continually attract new players due to the absence of a financial barrier, but they have specific usability problems that can cause low player retention. The user’s first experience with a game is a crucial phase for the player’s involvement and, consequently, is responsible for showing the probability of abandoning the game in question [5]. This initial phase is known as the boarding phase. At this stage, the player has his first contact with the mechanics of the game [6].

In order for a free game to produce financial income, it is necessary to promote user engagement so that the player feels motivated enough to continue playing after the first phase of interaction [7]. Considering the need for player retention for a free mobile game to produce financial income, what is the importance of the boarding phase for this scenario?

Through the analysis of the user experience with the boarding phase of free mobile games, it is possible to identify the different factors that are responsible for promoting the engagement of the player in his first interaction with the game [8]. When adopting the subjective method, the player can verbally describe the difficulties faced during this phase of interaction, opening the possibility for direct intervention in the problem [9]. In this way, it is possible to use the data obtained to treat the problems encountered and, consequently, increase the rate of player retention.

Currently, a large number of free games are available for mobile devices daily. This diversity, together with the absence of a financial barrier to obtaining the games, makes the user prone to abandon a game right after their first interaction with it. Thus, it is necessary to have careful planning of the boarding phase of the game, so that the user remains interested after the first minutes of the game.

Given the problem discussed, this research seeks to apply a subjective method to analyze the experience of users with free mobile games of different genres during the boarding phase, emphasizing the player’s engagement during the experience based on the description of their feelings. We present a discussion on the development of mobile games and show the importance of proper planning of the boarding phase for the retention of players in this type of game.

To achieve the general objective of this research, we iden-

tified the factors responsible for the player’s retention in the game; we verified the variation of the results in players of different profiles; we analyze the player’s feelings during the experience with the boarding phase; and finally, we compare player retention in games of different genres.

We organized the rest of the article as follows. In Section II, we present the Background of this study. In Section III, we present the research design. In Section IV, we present and discuss the results. Finally, in Section V, we present the final considerations and future work.

II. BACKGROUND

Smart mobile devices, or smartphones, have become indispensable items in the daily lives of the vast majority of the population. According to data revealed by the GSMA¹, the number of smartphone users already exceeds the 5.1 billion mark in 2019, totaling at least 67% of the world population. These devices are used daily for the most diverse purposes, games being one of the main ones.

The ease in distributing games to mobile devices allows the creation of a new segment of free games to play, also referred to as freemium or F2P games.

Games in this category are monetized primarily through in-app purchases and advertisements. The central differential of this type of game is the absence of a financial barrier to obtaining it, which ensures that anyone with a compatible smartphone can download the game and start playing it immediately without spending anything [4].

On the other hand, this installation caused saturation in the mobile games market, generating a large number of low-quality games and, consequently, an increase in the churn rate of the game due to the lack of interest from the players [10]. Thus, the producers of this type of game are decreasing a game’s churn rate results in improving its productivity, considering that, as it is a free game, the player has not yet invested any amount of money, so the game will not generate monetization if players lose interest in it. One way to address this problem is through user experience analysis.

Assessing the quality of using a game is a process that has many benefits for the development stage. This evaluation considers specific criteria of the interaction/interface of these games so that it is possible to adapt them to the effects planned for the use of the system.

The most used quality of use criterion is usability - considered synonymous with quality of use [11]. Usability is the guarantee that an interactive product is easy to learn, efficient, and pleasant to the user’s perspective. By combining these values with the user’s feelings and emotions, it is possible to analyze the user experience.

Usability has multiple attributes that need to be taken into account when analyzing user experience. They are Ease of learning, efficiency, Ease of remembering, safety, and satisfaction [12]. Ease of learning is the user’s ability to quickly understand the features and ways of using a system, ensuring

rapid productivity when using it. Efficiency is the service of the system after the barrier of initial use (learning). An efficient system has high productivity from the moment the user has mastered its functionality. Ease of recall is the user’s ability to reuse the system after some time without having to relearn its functionality. Security is the guarantee that the user will make few mistakes when using a system, in addition to the fact that, in case any mistake is made, the user can recover quickly, avoiding fatal errors. Satisfaction is the certification that the user is pleased when using a system.

Each type of system has unique characteristics that define them. These characteristics generate different feelings in users and, with this, different experiences to be analyzed [11]. Digital games have specific characteristics and usability problems that differentiate them from other types of software. While the productivity software aims to solve a problem or obtain a result, a game is intended only for entertainment [13].

Thus, the analysis of the user experience with games is an essential phase to recognize some of the usability attributes [12]. Among these attributes, user satisfaction is considered a key factor for analysis. Efficiency, for example, can be a problematic criterion to be implemented in a game, because if the user can achieve his goals without many obstacles or limitations, the game becomes monotonous and, consequently, unsatisfactory for the user [14].

The methods of analyzing user experience with games used today are adaptations of methods designed for other types of software [7]. Among these methods, the ones that stand out in the market today are the objective, subjective and objective-subjective methods.

The objective method reads the user’s physiological responses during the gaming experience, such as heart rate, brain waves, and breathing. Meanwhile, the subjective method focuses on the user’s self-assessment, with an emphasis on verbal discourse and the application of questionnaires. Finally, the objective-subjective method is a combination of the two methods, relating the user’s physical responses to the description of the experience [9].

The experience with free mobile games can be affected by completely different factors compared to games on other platforms [15]. While specific functions such as mobile networks bring benefits to this experience by allowing the user to connect to online games at any time, other unique features such as the size and resolution of the device’s screen can also negatively affect the user experience [16].

Another unique feature of free mobile games is the existence of small transactions within the game, using real money. These small transactions, if not balanced, can generate the “pay to win” effect, which offers exclusive advantages to players who have invested in the game and generates a feeling of frustration in players who are at a competitive disadvantage due to this condition [17].

Due to the low player retention, the objective of analyzing the user experience with free mobile games is to try to predict if and when a user will abandon the game and, if possible, try to prevent this abandonment with small incentives for

¹<https://www.gsma.com/r/mobileeconomy/>

the player. For this, it is necessary to understand the user's motivations during the different phases of the engagement of a game.

In Figure 1, we present the Octalysis framework that analyzes the different factors responsible for the involvement of players with digital games. This framework studies the way games manipulate players' feelings of empowerment and inspiration. This framework defines eight main motivations, divided into four phases of the game experience: Discovery, Onboarding, Scaffolding, and Endgame.

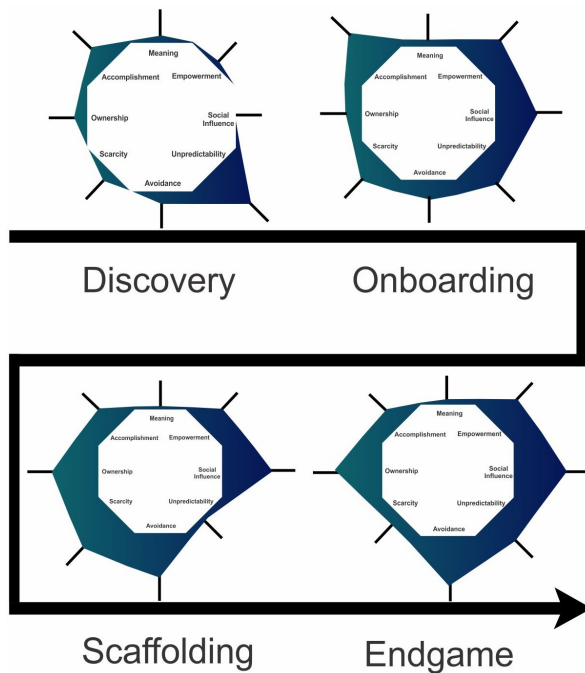


Fig. 1. Octalysis Framework Gaming Experience Phases

The initial phase is the Discovery, where it focuses on the player's motivation to start the game experience for the first time. This impulse is usually motivated by the player's curiosity to learn about the game through the media or third parties. After that, the Onboarding encourages players to learn the different mechanics presented by the game and focus on the player's sense of accomplishment and learning. The Scaffolding is responsible for motivating the player to reach his goals, performing repetitive tasks, and persisting with trial and error. Finally, the Endgame is the stage in which the player will decide to remain involved in the game in order to maintain his achievements and goals [6].

Among these phases, we consider the Onboarding phase for this paper, as it is one of the essential steps for the engagement and permanence of players in the context of free mobile games. The Onboarding is the second phase of the gaming experience. This Onboarding represents the first moments of user interaction with a digital game. It is during the Onboarding that the player learns to play the game, as it contains all the main mechanics and tutorials for using the game.

The Onboarding proposal is related to another popular concept in the user experience area: First User Experience (FTUE). During an FTUE with a game, the first minutes of play are crucial, as they are responsible for showing the player's interest and, consequently, the probability of abandoning the game [5].

When it comes to free mobile games, this phase is even more crucially important. Because the user has not yet invested any amount of money in the game, it is necessary for the user to feel interested in the game from the first minutes of interaction and continue to play it even after this stage, as this is the only way the game produces financial income [7].

III. DESIGN

In this section, we present the details of the steps followed by the applied study. The study aims to analyze the impact of the boarding phase of free mobile games on player retention.

A. Technical

This paper uses as a technique the questionnaire model for measuring post-game experience [18]. This model has four attributes: negative experiences, positive experiences, tiredness; and, return to reality.

The dimension of negative experiences presents some feelings that can negatively impact the user's interaction with the game. These feelings are motivated by factors such as regret, guilt, or shame. The dimension of positive experiences presents aspects that positively impact the player's interaction with the game. These aspects include feelings like pride, power, and satisfaction. The fatigue dimension lists conditions that impact the user experience through exhaustion, resulting in a lack of motivation. Finally, the return to reality dimension lists conditions generated by the player's deep immersion that can result in the difficulty of returning to the world outside the game.

B. Selection of games

We selected three games of different genres for analysis with players from different profiles: Zombie Tsunami, Toy Defense, and Dungeon n Pixel Hero.

Zombie Tsunami (Fig. 2) is a fun endless runner game that includes different missions that bring some variety to your gameplay.



Fig. 2. Zombie Tsunami Game Home Screen

Toy Defense (Fig. 3) is a strategy game, the objective of which is to defend your base from invading enemies, defeating enemies.



Fig. 3. Toy Defense Game Home Screen

Dungeon n Pixel Hero (Fig. 4) is an RPG game whose objective is to explore simple dungeons, hunt monsters and weapons (reinforce your equipment) and collect gold.

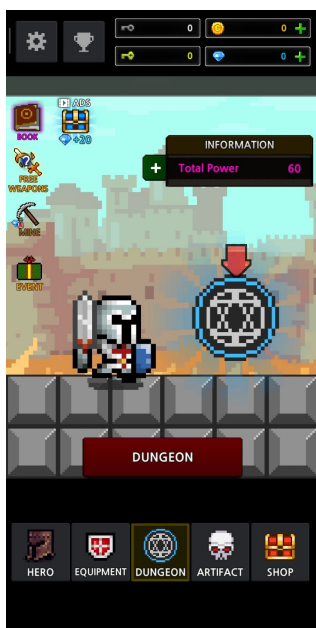


Fig. 4. Dungeon n Pixel Hero Game Home Screen

We select games by the following criteria:

- Availability in the application stores of Android and iOS operating systems for free;
- Small amount of memory required for installation (less than 200mb);
- Availability in Brazilian Portuguese language;
- Possibility to play without an internet connection (offline).

We emphasize that the choice of games followed the criteria listed above, but we are not limited to them, as other games follow these criteria, but we chose to work with them.

C. Selection of participants

We selected 16 participants with different profiles through an online form in which people volunteered to participate in the study. We disseminated the form through a note published on social networks that detailed the activities of the study. We conducted this study at the Cícero José de Araújo Community Telecentre, located in the Várzea do Feijão District in Condado-PB for everyone's convenience.

D. Data Analysis

We adopted a five-point Likert scale model of the evaluation sheets, with the answer for each question represented as follows: 1 = disagree, 2 = partially disagree, 3 = undecided, 4 = partially agree, and 5 = agree.

The results of this experiment are numerical, decimal and quantitative in nature for each variable treated. We analyzed the data using the proportion test and presented as a comparison between the three games.

The proportion test aims to verify whether 50% or more of the survey participants agreed with the premise in question. We performed this test using the Action Stat 3 software.

We converted the data obtained by the Likert scales used in the questionnaires into successes and failures, replacing the values 4 and 5 with one and the values 1, 2, and 3 by 0. In real questions, while in the negative questions, the values of 1, 2, and 3 were replaced by one, and the values of 4 and 5 were replaced by 0. We inserted these values in the Action Stat with a significance level of 95%, null hypothesis at 50%, and hypothesis 'greater than' alternative. For data analysis, it is necessary that the p-value obtained is more significant than 0.05 so that the result of the premise in question is considered satisfactory.

E. Threats

The following threats present risks to the study and can hinder its development: i) possible incompatibility of users' smartphones with the games to be analyzed; ii) exhaustion of the participants; iii) withdrawal from the participants; and, vi) problems in the interpretation of the questionnaires.

IV. RESULTS AND DISCUSSIONS

In this section, we present the data we obtained through the post-game experience questionnaires applied in the study. The questionnaires sought to analyze the different feelings expressed by the player after the game. In this research in question, we analyzed these feelings during the boarding phase of free mobile games so that it was possible to measure the engagement and interest of the players, factors that are important to guarantee retention in the game after the first experience.

The first part of the research sought to analyze the sample user profiles. As a result, we concluded that the audience was composed of 16 people, eight males, and eight females, with an average age of 19.5 years (ranging from 12 to 32 years, with a standard deviation of 5.57). As for the level of education of the participants, 12.5% has incomplete higher

education, 18.8% has incomplete elementary education, 31.3% has incomplete high school, and 37.5% has completed high school. The frequency of interaction with participants' digital games varies between very rarely (12.5%), at least once a week (12.5%), and daily (75%).

As part of the initial stage of the research, we selected participants to list the preferred digital games for each one. With that, it was possible to list the predominant game genres amid the preferences of the participants. They are: Battle Royale (37.5%), FPS (31.3%), simulation (18.8%), puzzles (18.8%), arcade (18.8%), RPG (12.5%) and casual (12.5%). The genres of words, casual, educational, music, board, sports, adventure, running, and action were also mentioned, with each one representing 6.3% of the predominance.

After applying the first part of the survey, we instructed participants to play three different free mobile games for 10 minutes and report on their experiences using the questionnaires. We list and discuss the results of these experiments below.

A. Analysis of Negative Experiences

This dimension seeks to analyze possible negative experiences faced by the player during the game experience. We list the results of these experiments in Table 1.

TABLE I
ANALYSIS OF RESULTS ON NEGATIVE EXPERIENCES FACED BY PLAYERS

Question	Zombie Tsunami		Toy Defense		Dungeon N Pixel Hero	
	Suc.	p	Suc.	p	Suc.	p
I found it a waste of time.	93,8%	0,01	81,3%	0,01	81,3%	0,01
I felt that I could have done more useful things.	93,8%	0,01	50%	0,5	62,5%	0,16
I felt sorry.	100%	0	81,3%	0,01	75%	0,02
I felt guilty.	100%	0	100%	0	93,8%	0,01
I felt ashamed.	100%	0	100%	0	93,8%	0,01
I felt bad.	93,8%	0,01	93,8%	0,01	87,5%	0,01

From the results presented in Table 1, it is possible to observe that none of the analyzed games aroused in a considerable portion of players the feeling of wasted time, which is an essential factor for the retention of players. However, Toy Defense and Dungeon n Pixel Hero players felt they could have applied the time spent on the experience to other, more useful activities.

The feelings of malice, shame, and guilt were also not expressed by a significant number of players in any of the experiences. Despite this, Dungeon n Pixel Hero players reported regret after the experience, which is a feeling that can make it difficult for the player to engage during the first experience with a game.

B. Analysis of Positive Experiences

This dimension seeks to analyze possible positive experiences faced by the player during the game experience. We list the results of these experiments in Table 2.

TABLE II
ANALYSIS OF RESULTS ON POSITIVES EXPERIENCES FACED BY PLAYERS

Question	Zombie Tsunami		Toy Defense		Dungeon N Pixel Hero	
	Suc.	p	Suc.	p	Suc.	p
I felt victorious.	62,5%	0,16	12,5%	0,9	31,2%	0,9
I felt proud.	50%	0,5	6,2%	0,9	18,7%	0,9
I felt powerful.	31,3%	0,9	0%	1	25%	0,9
I felt satisfied.	68,8%	0,07	18,7%	0,9	18,7%	0,9
I felt revived.	0,2%	0,9	0%	1	12,5%	0,9
I felt energized.	37,5%	0,84	6,2%	0,9	6,2%	0,9

As noted in the data in Table 2, none of the games was able to transmit any of the positive experiences analyzed by the experiment to a significant number of participants. Feelings like a sense of victory, pride, power, satisfaction, and the ability to transmit energy or make the user feel revived are essential items that can impact a user's first experience with a game. Therefore, the results obtained in this stage are worrying and unsatisfactory.

C. Tiredness Analysis

This dimension seeks to analyze the possibility of tiredness faced by the player during the game experience. We listed the results of these experiments in Table 3.

TABLE III
ANALYSIS OF RESULTS ON TIREDNESS FACED BY PLAYERS

Question	Zombie Tsunami		Toy Defense		Dungeon N Pixel Hero	
	Suc.	p	Suc.	p	Suc.	p
I felt exhausted.	100%	0	81,3%	0,01	68,8%	0,06
I felt fatigued.	100%	0	87,5%	0,01	68,8%	0,06

Through the data listed in Table 3, it is possible to observe that the Zombie Tsunami and Toy Defense games showed positive results in this stage of the research, generating very little exhaustion in the players. In contrast, the game Dungeon n Pixel Hero showed opposite results to previous games, being responsible for making players feel exhausted and fatigued during the experience.

D. Return to Reality Analysis

This dimension seeks to analyze the possibility of difficulty in returning to the reality faced by the player after the game experience. We listed the results of these experiments in Table 4.

TABLE IV
ANALYSIS OF RESULTS ON DIFFICULTIES IN RETURNING TO THE REALITY METEED BY PLAYERS

Question	Zombie Tsunami		Toy Defense		Dungeon N Pixel Hero	
	Suc.	p	Suc.	p	Suc.	p
I found it difficult to return to reality.	100%	0	100%	0	81,3%	0,01
I felt disoriented.	100%	0	100%	0	81,3%	0,01
I had the feeling that I returned from a journey.	100%	0	100%	0	87,5%	0,01

As shown in Table 4, none of the analyzed games was able to please a significant number of players among the study participants, with Zombie Tsunami being the game that came closest to obtaining a satisfactory result. Although the Zombie Tsunami and Toy Defense games have more successes than the number of failures, this amount has not yet been sufficient for the games to obtain a satisfactory result.

V. FINAL CONSIDERATIONS AND FUTURE WORK

The present paper aimed to analyze the user experience with the boarding phase of three different free mobile games, seeking to highlight the positive and negative points that impact the player's experience and may be responsible for abandoning the game after the first experience, preventing thus, the billing of the game. For this, we applied post-game experience questionnaires with Zombie Tsunami, Toy Defense, and Dungeon n Pixel Hero games.

The results showed that the studied games have many positive points, but none of the three offered enough qualities to be able to please a significant number of players during the experiment. Through this research, it was possible to analyze the strengths and weaknesses of the boarding phase of each of the games studied. The data resulting from this experiment can assist game developers by clearly presenting the areas of gambling that need to be improved or rethought, thus resulting in a better experience for the player and, consequently, increasing the probability of player retention and ensuring product billing.

Among the various possibilities for future work, we highlight: Apply the subjective method of analyzing user experience in other free mobile games, making it possible to prove its effectiveness in the evaluation of boarding phases of different games. Analyze the users' experience using an objective method, being able to analyze the same games of this study so that it is possible to compare the results obtained through the two methods and measure their efficiencies and precision.

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