Gameplay limiters in free-to-play mobile games

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TURUN YLIOPISTO
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Ilmaismobiilipelien muututtua mobiilipelien valtavirraksi on syntynyt tarve uusille monetisaatio menetelmille. Ilmaispeleillä ei ole samankaltaisia suoria tulonlähteitä kuin peleillä jotka ostetaan tai peleillä joiden pelaamisesta maksetaan esimerkiksi kuukausimaksua. Yksi tapa monetisoida ilmaispelejä on kehittää nämä monetisaatiomenetelmät keskenäiseksi osaksi pelimekaniikkaa. Yksi tällainen menetelmä ovat pelirajoitteet.

Pelirajoitteet ovat elementtejä jotka asetetaan peliin rajoittamaan koko pelin tai joidenkin pelin osien pelaamista. Näiden rajoitteiden takana voi olla monia syitä, kuten yritys säilyttää pelaajien kiinnostus peliä kohtaan pidempään, mutta ilmeisin näistä syistä on monetisaatio. Yleisimpiä pelirajoitteita ovat energiamekaniikka, emämämekaniikka ja aikaportit. *Energiamekaniikkassa*, kun pelaaja pelaa peliä, hän jatkuvasti kuluttaa energiaa. Energiaa palautuu koko ajan, mutta jos energiamäärä menee liian pieneksi, pelin, tai ainakin sen osien, pelaaminen saattaa estyä. *Elämämekaniikkassa*, kun pelaaja epäonnistuu (esm. kuolee tai häneltä loppuu aika), hän menettää elämän. Tämä rajoite ei rankaise onnistuneesta pelaamisesta, mutta epäonnistumisten jälkeen pelaajaa estetään pelaamasta peliä. *Aikaportiteissa*, kun pelaaja tekee jonkun toiminnon, (esim avaa arkun tai aloittaa rakennuksen rakentamisen) alkaa ajastin. Pelaajan on odotettava ajastimen loppumista ennen kuin tehty toiminto suorittuu.

Pelirajoitteiden monetisaatio syntyy siitä, miten niiden ohi päästään. Suurin osa rajoitteista on mahdollista ohittaa rahalla. Tämä luo ongelmia, kuten miten toisia pelaajia vastaan pelatuissa peleissä, maksavien pelaajien on mahdollista päästä aikarajoitteiden ohi. Tämä antaa siis maksaville pelaajille selvästi etua.

Avainsanat: Ilmaismobiilipelit, mobiilipelit, rajoitteet, pelirajoitteet

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As free-to-play mobile games have become the mainstream of mobile games, new monetization methods have also started to emerge. Free-to-play games do not have the direct money flow from purchases or subscriptions like buy-to-play or pay-to-play models do. One way to add monetization into free-to-play games, is to integrate it directly into the core of a game. One of these integrated methods are gameplay limiters.

Gameplay limiters are elements which are added to limit playing of the game. This limiting can have many reasons behind it, such as keeping the game interesting for a longer period of time, but the most prevalent reason for limiting is monetization. Some of the most common ways to implement limiters are energy mechanic, life mechanic and time gates. In *energy mechanic*, whenever the player plays the game, they exhaust an energy resource which gradually regenerates. When player is out of energy, they might be limited out of parts of the game or they might be unable to play the game at all. In *life mechanic*, whenever the player fails a level (e.g. dies or runs out of time) they lose a life. Hence, successful play is not limited by life mechanic at all but after a few failures, the player might have to wait a long time for their lives to replenish. In *time gates*, whenever the player does a certain action, (e.g. opens a chest or starts constructing a building) a timer starts. The player then has to wait for the timer to expire before the action is complete.

The monetization in these limiters comes from getting over them. Most of gameplay limiters in free-to-play games can be bypassed by money. This brings up issues like limiting PvP (player versus player) games as the players who use money get the advantage of skipping all limiters.

Keywords: Free-to-play, mobile games, limiters, gameplay limiters, time gates, energy mechanics

Contents

1. Introduction

Mobile games, more specifically free-to-play mobile games, have been quickly gaining popularity in the past decade. As these games lack the familiar buy-to-play way of asking for the player's money, they have been in need of alternative monetization methods. A plethora of these methods exists, some more studied than others. Some of these methods are straightforward, you pay an amount of money to get a pretty icon, or a new character. However, there are also methods which are not so easy to recognize. These monetization methods can be intertwined within the design of the actual gameplay, rather than being a separate portion hidden away in the store section of the game. One of these methods is called *gameplay limiters*. Gameplay limiters are different kinds of methods, which prevent the player from playing a game. In most cases they are directly embedded into the monetization of the game, meaning that the main point of these limiters is to create revenue for the developers. But in some cases, the limiters are deeper than that and play a very important role of the core loop of the game, creating a flow around how the game is supposed to be played.

In this thesis, we explore what gameplay limiters are, what kinds of different gameplay limiters exist, how they are used in free-to-play mobile games and why they are used and what benefits they possess. The main point of view from which we look at gameplay limiters is monetization, but we do not completely overlook the design portion of them.

First, in Chapter 2, we start off by discovering what game design is in general and more specifically in free-to-play mobile games. After that we focus on the mobile games market and finding reasons for why monetization of free-to-play mobile games is an important thing and why it should be researched more diversely. Next, we explore gameplay limiters, their history, why they exist and what is their purpose. To conclude Chapter 2, we present a literature review to explore previous research done on this subject, and it turns out that gameplay limiters are not a widely researched topic.

In Chapter 3, we explore whether these limiters can have an impact on a game's success or if there are any observable patterns in how more successful games employ these limiters versus how less successful games employ them. This is done by analysing a set of games and, based on these analyses, creating a questionnaire to analyse more games in a consistent manner. We also conduct an applied study in Chapter 4, where we use the findings of the earlier analyses to see if the found patterns can be generalized and used in any type of free-to-play mobile game. After the analyses and applied study, we take a deep look in Chapter 5 into the results obtained from both of these sections.

Finally, we end the research with a conclusion in Chapter 6 as well as a discussion in Chapter 7. We also present future work which extends this study and data gather during it.

2. Overview of the gameplay limiters

Gameplay limiters are factors that prohibit players from either playing or progressing in a game. A good example of a simple gameplay limiter would be having lives which are lost upon a failure and replenished over time. In this chapter, we first take a look at what game design actually is, what are some of the different factors in game design and what does it take to design a mobile game that players want the play. Second, we explore the mobile game market, its growth and forecasts for the future to line out how big of a thing mobile games actually are as there are huge amounts of money in the business. Last, we take a deeper look at what gameplay limiters are, how they came to be and what different kinds of gameplay limiters exist. We also explore how gameplay limiters affect designing, making and most importantly playing games.

2.1. Game design in free-to-play mobile games

Let us first explore the very base on which gameplay limiters and even games themselves are built upon, *game design*. Game design is a quite widely researched topic and one could argue that game design has existed for hundreds of years producing non-digital games long before computers. Naturally, the emergence of computer technology drew a lot more attention to this field of research as digital games started becoming widely accessible. [13]

Game design, even mobile game design, is much different from designing a tool like an application. It borrows elements from different kinds of entertainment experiences such as amusement park rides and from other mediums. Games should not require the lowest possible mental capacity but instead they should be challenging, entertaining and allow for the player to make meaningful choices. [11] Game design is a broad topic and multiple researchers and writers have given definitions of it. Let us take an example from the book *Game Design: Theory and Practice* [10] by Richard Rouse III:

"The game design is what determines the form of the gameplay. The game design determines what choices players will be able to make in the game-world and what ramifications those choices will have on the rest of the game. The game design determines what win or loss criteria the game may include, how the user will be able to control the game, and what information the game will communicate to him, and it establishes how hard the game will be."

In short, game design is everything in a game. Every detail that makes the player want or not want to play a game is game design or the lack of it. The essence of what game design is about is a simple question of: "*What players want?*". Rouse answers this question with a multitude of answers. Let us pick a few most suitable for the purposes of this thesis [10]:

- *Players want a challenge*. Challenge can be seen as a motivating factor because a challenge forces the players to think actively and stay engaged. Usually after a challenge has been conquered, the player has learned something new. Gameplay limiters can be used in different ways to provide challenges for players, for example punishing a player with a time limit after failing.

- *Player want bragging rights*. Mobile games are rarely without some form of multiplayer aspect, they might include playing against other players, belonging to a guild to compete in co-operative challenges or simply challenging other players for a spot on the leaderboards. Bragging rights come from outperforming other players, be it in power in a roleplaying game, speed in completing a level in a puzzle game or amassed wealth in a strategy game. Gameplay limiters can be used to block these bragging rights behind them, after player has cleared enough limiters, it in itself can act as a bragging right.

- *Players want to explore*. Players have an inbuilt desire to explore new areas in video games. It is rewarding to not only explore physical space in a game world but also different options available to them. Gameplay

limiters can be used to block players from instantly exploring everything and letting them have the satisfaction of exploration in smaller portions.

Even though mobile games might seem quite simple compared to games on other platforms like PC, designing them can still be a complex process. There are dozens of identified patterns describing game mechanics and interaction elements for mobile game design. [12]

Even though the usual goal of game design is to make games that people enjoy and want to play, it is also obvious that the makers of games need to have their salaries paid. In free-to-play games, this happens through in-app-purchases. As for how people make the decision on in-app purchases, it has been studied that the most affecting factors are [15]:

1. Player's loyalty towards a game, which means how committed they are to it.

2. The price versus reward of an in-app-purchase, in other words, how much does the user get in exchange for their money.

3. Other drivers have also been discovered which from design perspective should be taken into account when designing free-to-play mobile games.

2.2. Mobile games market

Let us next take a look at the mobile games market to give the reasoning behind why all aspects of mobile game monetization should be considered important. We will briefly explore the global games market, its history, present state and forecasts for the future. The potential of the mobile games market can easily be understood by a few key facts, mobile games were expected to have 2.4 billion players in 2019 globally. Gaming is the third most popular app category on mobile platforms and 90% of time spent on mobile devices is spend on apps. In

2018 out of all app revenue from mobile stores, including all applications and games, 73% was expected to be from games. [16]

According to Newzoo's 2013 Global Games Market report the total revenue produced by games on all platforms combined globally in 2012 was $66.3 billion. The share of mobile games market (including smartphones as well as tablet devices) was 13.8% or $9.1 billion. In the 2013 report the estimated growth for the total produced revenue for 2015 was to $80.5 billion of which the mobile games market would account for 24.6% or $19.1 billion. [17]

As for the actual 2015 Global Games Report by Newzoo, these numbers were even larger than forecast. In the 2015 report, the total games market produced revenue was found to be $91.5 billion of which the mobile games market accounted for $29 billion or 31.7%. [18]

A newer study, Newzoo's 2019 Global Games Market report, the revenue produced by the games market is going to be $152.1 billion which is around a 10% yearly increase from last year. Mobile games account for $68.5 billion or 45% of all global games market revenue. The growth of the mobile games market is forecasted to outpace both PC and consoles games market resulting in the diminishing of PC market share towards 2022. As for the future, by 2022 it is estimated that the global games market will grow to $196 billion. The share of mobile games market is also forecasted to increase in percentage from current 45% to 49% ($95.4 billion) by 2022. But as discovered from the leap from 2013 report and the estimates from it to the 2015 report and the true values, the growth was even more than expected. Visualization of the growth of the mobile games market can be seen in Figure 1. [19]

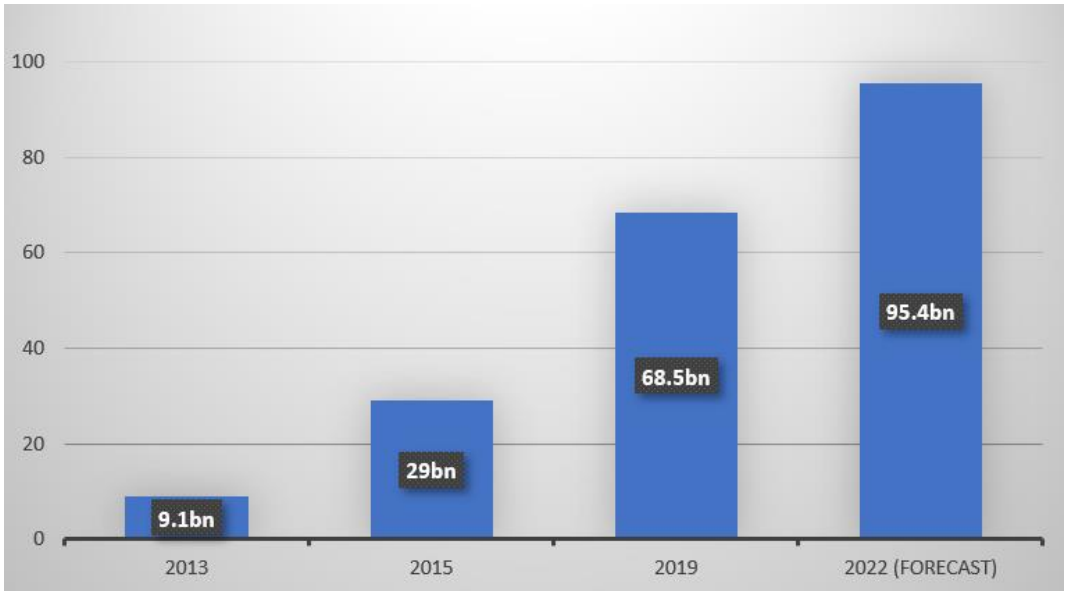

Figure 1: Growth of mobile games market in USD, from 2013-2022 according to Newzoo's Global Games Market reports. [17][18][19]

The mobile games market is growing at a fast pace and the market share of mobile games continues to outpace that of PC and console games. That means there is a lot of revenue to be made from mobile games with correct monetization methods. It is also obvious that even the smaller and less researched monetization possibilities, such as gameplay limiters should not be omitted as even a small piece of the mobile games market revenue is a lot of revenue.

2.3. What are the gameplay limiters

Let us take a deeper look into what kinds of gameplay limiters exist in different kinds of games. We will also explore the evolution of gameplay limiters, video game monetization and the ongoing transition from games as a product to games as a service. To fully understand what gameplay limiters are, we should first take a look at why gameplay limiters exist in the first place. This requires us to explore the background of video game monetization. Monetization according to the

Oxford Dictionary is “the action or process of earning revenue from an asset, business, etc.”.

Different ways to monetize video games include retail purchase, in-game microtransactions, digital download, subscription model and indirect monetization. When video games first started coming out in the beginning of 1970s, they were free, mostly internally passed around between their makers and others interested in the field. [1] In early 1970s Nolan Bushnell created *Spacewar* and sold it to Nutting Associates, a manufacturer of coin-operated games. [2] Coin-operated games can therefore be seen as one of the earliest monetization methods for video games. The idea behind coin-operated games is to get the user to enjoy a game enough to keep repeatedly paying for it. This can in one way be seen as a very early game limiter, the limiter in itself being the difficulty of a game. The more difficult a coin-operated game is, the more “limiters” it has and the more the user has to pay. We can view the core loop design of coin-operated games to be very similar to mobile games with a lot of microtransactions to allow the player to progress further.

In 1972, the first ever home videogame console, Odyssey, was released. This naturally led to retail sales of videogames, another monetization method which became one of the mainstream ways of acquiring digital games. In 2007, a video game developer company Zynga started popularizing microtransactions in their free-to-play Facebook based games. Microtransactions are by definition “a very small financial transaction conducted online“, usually in video games this means the user pays a small fee to get something they want instantly, perhaps a cosmetic, a power-up or, in the case which is the most interesting in context of this research, an extra life [1]. In 2014, free-to-play games were found to be the most common revenue model in top grossing app-store games [3]. One example of the power of microtransactions as a monetization tool is a shooter game called *Team Fortress 2* (Valve 2007), after being launched in 2007 as a retail game and relaunched in 2011 as a free-to-play game, its revenue increased twelvefold [4]. Some benefits of the free-to-play model include flexibility in pricing of additional content, as the players themselves can choose which content do they want to pay for and how much money overall to spend on a game. Microtransactions in a free-to-play game

also make the function more as a service instead of a product, which enables for developers to keep iterating on the game mechanics in order to create the best possible product for its customers. [3]

The reason why free-to-play games are the main topic of this thesis is that as free-to-play games became increasingly more common, the creators of these games started inventing new ways to monetize them. One of these ways is gameplay limiters. Gameplay limiters can be further broken down into different factors like time requirements, resource requirements or skill requirements. Some genres employ other factors more than others, for example, in puzzle games limiters require more skill to overcome, whereas role-playing games have a majority their limiters in the time factor. In a vast majority of cases, these limiters can be overcome by microtransactions, usually by purchasing a hard currency with real-world money. Hard currency is one of the two currency types usually seen in free-to-play games, which is acquired usually only in small amounts, if at all, from gameplay activities and is mainly purchased. Its counterpart, soft currency, is usually gained from simply playing the game. In some games, limiters can also be skipped with soft currency and soft currency can be purchased with hard currency. These limiters are not a much-discussed monetization method, yet they are still present in surprisingly many free-to-play games, as we will later see. It is also noteworthy that gameplay limiters as we call them in this thesis are a quite scattered research topic that no unified terminology has formed around them. For instance, Gamasutra calls them “Time Controls” or “Time gates”. [14]

In his blog post Joel Julkunen, Head of Games Analysis, from GameRefinery defines the three most common limiters right now to be energy, lives and wait-to-finish. [7] Energy means that by performing actions like entering dungeons or attempting to complete levels in a game, you exhaust a replenishing energy resource. According to his post, this method is usually successful in RPG’s (Role-playing games), CCG’s (Collectible card games) and match-three puzzle games with at least a bit of character development. Lives means that every time you lose a level, you lose a life and if you are out of lives, you will have to wait for them to replenish. Lives differ from energy in the sense that only failing makes you lose a life, whereas energy is consumed even on successful attempts. Lives are used as

limiters in the majority of match-three puzzles games. Wait-to-finish is quite frankly what the name suggests, player performs actions which takes up a certain amount time, like upgrading technologies, constructing buildings or training troops. Wait-to-finish limiters differ from lives and energy as it gives you a concrete amount of progression for your money. As Julkunen mentions in his post, you can spend a lot of money on match-three games to buy lives, only to end up where you started by failing, which can not be the case when skipping timers. The games which apply this kind of limiters are usually games with minimal luck and randomness factors, such as strategy games. In his blog post, he also provides statistics about the prevalence of limiters. Only 9% of the top 100 games in the iOS AppStore are without any sort of session length restrictions, yet it is possible to maintain over 10-minute game sessions without purchase in 89% of these. In the games of rank 100 to 1000, only 50% impose limiters but in 44% of these games it is possible to have a longer than 10-minute game session. This would leave us to conclude that games need limiters to succeed but limiting playing too much will most likely have negative outcomes. [7] Therefore, having session lengths limited at less than 10 minutes can have a negative impact on the success of a game. This is also backed by the fact that the average session length for top 16% most popular of mobile games in a study done in 2017 was 11.5 minutes [8]. For the bottom 16% of the least popular of studied games the average session length was only three minutes [8].

A great way to design limiters is to do something called *flexible session design* [9]. Flexible session design means that players are not abruptly forced out of a game by exhausting their lives, but rather eased out by making longer sessions have diminishing benefits. A player starting a game session should be rewarded handsomely during the first minute, for example, by letting them collect rewards and perhaps finish things they started in their last play session. During the second minute, the player should still be rewarded, but not that much, and after playing around six minutes, the amount of rewards can be toned down. Other than diminishing rewards, the game can get harder the more the player plays it. A game called *Smash Cops* introduces a mechanic where the player's wanted level raises as they play subsequent games. This makes the players potentially play for ever,

but it would not be as beneficial as logging out and coming back later for another play session. Another way to impose limiters, is to separate playing and progress which can be achieved by providing players with quests to complete on a daily basis, and once these quests are complete, the player may be allowed to play but not progress further. Limiters can also be semi-randomized, by designing a game around random levels in combination with a life-mechanic. This means that more skilled players can complete more levels at once, but if they are hit with a difficult random level, they are forced to exhaust lives. Less skilled players are not allowed to play as much but are still able to complete levels if randomness is in their favour. This kind of limiting mechanic allows keeping play sessions flexible, which makes the game feel much less restrictive. [9] Without gameplay limiters, a game may become unattractive to players who are willing to spend a lot of money and not a lot of time on a game. [14]

Some governments have also ruled for nationwide limits on how much some of its citizens are allowed to play games. For example, in China, children are only allowed to play for 90 minutes per day and playing video games during the night is completely banned. This kind of limiters are *not* a part of this thesis in any way and the research is limited to gameplay limiting mechanics imposed by the developers of games.

2.4. Previous research

To back up the statements presented in this thesis about gameplay limiters not being a very scientifically researched topic, a thorough database search is conducted to find all possible studies done in the field. For this review, seven databases/digital libraries are selected. After selection of the databases, a list of keywords and their combinations is put together with the purpose of casting as wide of a net as possible, to find all related scientific articles. From each database, relevant articles are selected for a closer study. The criteria to pass the first part of the selection are that the title, abstract or keywords for the research contain any form of the words “gameplay limiters”, the list of exact keywords is presented

below. After the abstracts are read and relevant studies selected, all of the studies are read in order to decide whether they are actually relevant to this topic. The criterion to pass the second part of the selection is that the research should clearly have at least a part of it focus on limiting the playing of games. Each found relevant study will be presented at the end of this chapter.

The selected databases are sources [20], [21], [22], [23], [24], [25] and [26]. The selection criteria for these databases is that they were all included in the University of Turku database guides Information Technology section. [27] The list of combinations of keywords and phrases are selected to be used in searches are:

1) "gameplay limit*"
2) "game limit*"
3) "free to play" AND "limit*" AND "game"
4) "free to play" AND "energy mechanic" AND "mobile"
5) "time gate* AND game*"

These keywords and phrases were selected on the basis of knowledge on the topic as well as earlier searches and articles and blog posts that surfaced from those searches.

The first search phrase results in two articles, after reading the abstracts, it was clear neither of these were related to the study.

The second search phrase a total of 66 articles are found. After skimming through the abstracts, it is clear that none of these articles is related to gameplay limiters.

The third search resulted in 40 articles, out of these 40, three are selected for the next phase of this analysis based on their abstracts.

The fourth search resulted in six articles. None of these articles was related to gameplay limiters.

The fifth search resulted in seven articles. None of these articles was related to gameplay limiters.

Also, multiple different variants of these combinations of keywords and phrases are attempted but they most result in thousands of articles which are, judging by their title, completely unrelated to gameplay limiters. The rest of these attempts of combining selected the keywords and phrases result in no results at all.

In total from these searches, three articles are selected to be studied in more depth. After reading the articles, none of them was found to contain direct research about gameplay limiters, rather they were more focused on how and why players spend money on free-to-play games. However, one of the articles contains a reference to a book called *Irresistible Apps Motivational Design Patterns for Apps, Games, and Web-based Communities* by Chris Lewis [28].

Lewis touches the subject of gameplay limiters under the title "*Monetary dark patterns*" which are defined as "*Patterns designed to encourage users to part with money in a way they did not expect, either by being confused into spending more money than expected, or feeling regret at the amount of money spent*". Which is a good description of gameplay limiters, as they usually are not apparent when a player starts enjoying the game but rather, they are presented later on. These monetary dark patterns are further distributed into three sub-categories:

- *Pay to Skip:*
  Is a direct synonym to gameplay limiters skippable with hard currency. Lewis defines pay to skip as having the user pay money in order to get past content that hinders progression.

- *Monetized Rivalries:*
  Is the pay-to-win aspect in free-to-play games, which offers players an edge through using real-world money to progress in a game. This is also directly related to gameplay limiters, as in multiplayer PvP (Player versus Player) games, skipping gameplay limiters with money usually gives the player an advantage.

- *Currency Confusion:*
  Means confusing the player by presenting multiple different currencies of different values. This makes the player not realize how much money they are spending on the game.

Let us focus on taking a deeper look at Pay to Skip patterns as Monetized Rivalries are closely related to them and Currency Confusion can be omitted in the context of this thesis. Pay to Skip methods are used by creating road blocks for the player to get frustrated by and use real-world currency to get past them. An example of this can be found from the Angry Birds series: A powerup called "Mighty Eagle" which allows for the user to pass levels easily with the large explosion created by the eagle. After clearing these hard levels by the possible aid of Pay to Skips, the player often faces easier levels, making the play more fun again. Another view at Pay to Skips is provided by Pascal Luban in a 2012 article on Gamasutra where he states that:

"*Frustration is what drives players to actually spend money in a "free" game. The mechanism is simple: 1) get the players to enjoy the game, 2) give them a taste for game progression through short and medium-term rewards, 3) make new progression rewards increasingly numerous AND long to get. When they cannot wait any longer, they'll start buying. There are variations around this principle, but you get the idea."* [29]

What this means, is that games applying Pay to Skips make the game purposely fun and enjoyable for free at first and once the player is hooked, the game starts to require payments to continue being fun. As a way to avoid Pay to Skips, games can use "grind" mechanics. These grind mechanics can be described as repeating a task that requires no skill to give the user a feeling of performing something worthwhile. Games involving Pay to Skips and grind usually become a battle for the player's time versus money. Meaning the player must either pay or waste an enormous amount of time grinding. [28] [29]

2.4.1. Conclusion

Gameplay limiters have many names, they can be called gameplay limiters, pay to skips, time gates or energy mechanics. There seems to be no consensus about what they should be called as they are still a rather fresh topic, the oldest mention found in this research is from 2012. Therefore, it is possible that some of the search results that would have benefitted this research are lost because no common terms have yet been agreed upon. However, even with this restriction in mind we can easily conclude that gameplay limiters are not a much academically researched topic. Most of the sources are books and blogs in which the experience is from more of a personal opinion and experience point of view instead of a qualified academic research point of view. No empiric study of any kind was found about gameplay limiters.

3. Gameplay limiter analysis

In this chapter, we introduce an analysis created specifically for the purposes of this thesis, we explore the decisions which were made in order to create the analysis as well as the reasoning behind those decisions. The analysis aims to be a broad overview from as many points of view as possible. However, due to the limitations of this research, some introduced points of view are not part of the actual analysis, which is further explained in Section 3.3. The analysis was based on a questionnaire also created solely for the purposes of this thesis. We also discuss in depth the decisions and reasoning behind the questionnaire.

3.1. Goals of the analysis

In this section, we explore what kinds of results are expected from the analyses as well as how those results could be analysed in order to provide meaningful results for the purposes of this thesis. Before the analyses were conducted, a few things were expected and the hypotheses for the analysis are as follows:

A) Many games would have limiters which limit playing the game at least partially. This is expected because of the previous knowledge from generally playing free-to-play mobile games unrelated to this research.

B) Not many games would completely limit playing. This is expected because it would seem counter-beneficial to limit the players completely playing a game.

C) In most games limiters could be skipped with hard currency. This is expected because the perceived big picture of gameplay limiters is that they mainly act as a monetization method.

3.2. Methodology of analysis

In this section, we look in more depth at the analysis how the analysis was built and how games were selected to be analysed. We also explore the reasoning behind the decision regarding constructing the analysis and selection criteria for the games.

First, a set of 15 top-grossing games in Finland on October 6, 2019 was picked and each game was played for 30 minutes while writing notes about different kinds of limiters as well as overall feelings about how limiting the playing felt. The set of selected games is presented in Figure 2. These analyses were then analysed as a bigger picture in an attempt to find recurring patterns. Based on these findings a questionnaire was created which will be used to analyse the rest of the games. At first only 10 games were analysed and a questionnaire with 20 questions was formed out of these analyses. After this, five more games were played, analysed and checked against these questions. After no more questions were formed in analysing these latter five games, we deemed the questionnaire to be good enough for the purposes of this thesis. As no new questions surfaced after the last five games, we concluded that improving the questionnaire further would require testing of more games than the time and resources allotted for this research would permit. Analysing fifteen of the top grossing games to find patterns that relate to session length limiting was the most that could be achieved in the scope of this research. In order to find more and better patterns related to session length limiting, more games could have been analysed. Generating the survey was rather complicated. The analysed games were quite different and handle limiters in different ways. Finding things that games from different genres have in common proved not to be an easy task. There were games which might have three different kinds of limiters (time, resources, skill e.g. *Idle Heroes),* two of which can be partly skipped by soft currency, or games which do not have any sort of limiters (e.g. *PUBG Mobile*). There are older games (*Candy Crush Saga, 201*2) as well as newer games (*The Walking Dead: Our World, 2018*) which (from

the play session perspective) have a seemingly different approach to limiters, even though with such a small sample size it is impossible to say whether these differences originate from the release year of the game or simply genre differences.

As the 15 analyses on which the questionnaire was based upon were quite lengthy, not all of them are shown in this paper. However, it is crucial for the understanding of this thesis for the reader to be somewhat familiar with the base of the questionnaire which all of the results are based upon. Therefore, below is attached one of the 15 analyses. The analysed game was *Clash of Clans* and it was selected as an example because it has a wide range of different kinds of limiters as well as ways to get around them compared to most of the other analysed games. Full list of these analyses can be found in Appendix C.

Clash of Clans

> *The first time I open the game, I get a popup telling me that "Clash of Clans can be played for free but you can also speed up your progress with IAPs". The game also has a building mechanic and the first thing I do is skip it with what seems to be hard currency (gems or similar). 7 times in 3 minutes, the longest time I skipped was 7 minutes. I seem to have two builders so I can queue up to two things to be upgraded/built at once. In this front I seem to get behind a time limiter in the first 10 minutes. I have one building building for 15 minutes and every 10 seconds I can build a smaller one. However not many smaller ones later, I get stuck behind a limiter again. This time it's a resource limiter as I run out of gold and elixir. Meanwhile I'm also recruiting more troops for 10 minutes. I attempted to play the single player campaign the game has to offer, but it proved too difficult for now. My only option is to play PvP. A short PvP match gives me enough resources to add more units to recruitment queue as well as build more small buildings. Around 15 minutes of play I've run out of things to do. I've exhausted all of my resources and I'm waiting for my troops to be recruited. At this point I realize I'm finally strong enough to beat the single player match, this again gives me more resources and*

now the only thing limiting me is time. Every minute I'm allowed to do one action as I have another 15 minute building in the making. Skipping 10 minutes of wait time costs 3 gems. 80 gems can be purchased with €1.09. This makes the cost of skipping an hour of waiting at around €0.25. For now the only thing I can do is to recruit units and play a PvP match every five minutes. The building and upgrading times of buildings and units seem to get longer the more advanced the units are. Even at 30 minutes of gameplay I feel limited in multiple different areas of the game (time and resources) which forced me into a position of simply waiting. However all of the wait times (in the first 30 minutes) were so low that I wouldn't stop my session, but simply wait it out. I can believe that later on in the game the wait times (without using hard currency) get so extreme that players have no option but to stop their sessions.

Limiters: Limit some parts of play, Limit progress

Overall feeling of session length limits: Medium

Would IAPs help progress: Yes

After the survey was complete and all of the games in the first group (Top 15 grossing, GROUP A) were analysed, a random selection of 10 games was made from the top 100 most grossing games (not including the top 15, so games from 16-100) as GROUP B. As third analysed group 10 games were randomly selected from the top 500 (not including top 100, so games from 101-500). GROUP B and GROUP C were not analysed in as much detail as GROUP A since they were not used to create the survey. The analysis of these groups was solely based on the created survey. Afterwards these groups were compared against each other to study whether the games with varying amount of success applied limiters differently. We will take a closer look at the results of the analyses in the next chapter.

In GROUP B, one of the selected games turned out to be *Roblox*, but because of the nature of the game it was discarded. The creators of *Roblox* describe it as an online entertainment platform which consist of user generated games. After *Roblox* was discarded a new random selection was done. In GROUP C, one of the selected games was *Food Fantasy* which was discarded due to inability to launch it with the test device. A new random selection was also done in case of *Food Fantasy*. Somewhat unrelated to this research, it was curious that in Group A out of the 15 games, five were released between 2012 and 2013, which at the moment of writing this research is seven to eight years ago. Even though it is not important for this thesis, it was interesting to notice that not a single game in Group A was released between the years 2014 and 2015.

Name:	**Genre:**	**Year:**	**Publisher:**
Pokémon Go	Adenture	2016	Niantic
Empires & Puzzles: RPG Quest	Puzzle	2013	Small Giant Games
Candy Crush Saga	Casual	2012	Kind
Brawl Stars	Action	2017	Supercell
Clash of Clans	Strategy	2012	Supercell
Guns of Glory	Strategy	2017	Century Game
AFK Arena	Role Playing	2019	Lilith Games
Idle Heroes	Role Playing	2016	DHGAMES
RAID: Shadow Legends	Role Playing	2018	Plarium Global Ltd
Hay Day	Casual	2012	Supercell
Clash Royale	Strategy	2016	Supercell
Growtopia	Adventure	2012	Ubisoft Entertainment
Lords Mobile: Battle of the Empires	Strategy	2016	IGG.COM
King of Avalon: Dragon War	Strategy	2016	Century Game
Homescapes	Casual	2017	Playrix

Figure 2: Games in Group A, which were the basis for a set of fifteen written analyses based on which a survey for further analyses was created.

3.3. Restrictions

The only inclusion criterion was the ranking of the games and random selection. No exclusion was done based on release date, number of downloads. The only reason for exclusion was inability to launch games on the test device. This choice was made out of lack of prior research on the topic which leads to incapability of making justified decisions. This leaves the research as open as possible and allows for viewing the analysed games from multiple angles such as: “How do games from different genres limit the game” or “How do games with different amounts of revenue limit the game”. With this approach we also have the possibility of comparing different angles to find interesting trends and patterns.

The device used for testing all of the games was an Honor 8 with Android version 7.0, 4.0 gigabytes of RAM and a Hisilicon Kirin 950 processor. All of the games in the lists were games that are available for this device and every game which was not available was discarded. Also, every analysed game was to be free to play and in cases of random selection rolling a premium game (pay to play), the game was simply rerolled. All missing data is accounted to the fact that that specific statistic was unreachable in the 30-minute play session. As an example, it was unclear how much an energy refill would cost in certain games as it was impossible to run out of energy during the play session. It is acknowledged that all aforementioned restrictions might deter the quality of the research.

4. Application of analysis results

Based on the findings from the analyses an empirical approach was formed by creating a free-to-play mobile game and splitting it into two different variations with different kinds of limiters. We refer the variations as Variant A and Variant B. These variations were then both published and data on their success was gathered on different metrics. The purpose of this approach is to give us a more hands-on data on the topic. The goal of this part of the research is to study whether concrete gameplay limiters can be formed and generalized to be used in any type of game.

4.1. Description

The game itself is a simple recipe following puzzle game, where the player faces different levels of increasing difficulty. In each level, the player is given a set of ingredients to collect in order to pass the level. These ingredients fall from the sky and the player can move their character left or right in order to collect or dodge these falling ingredients. If the player collects a wrong ingredient or more than the wanted amount of an ingredient, they get a “mistake”. The player can make a maximum of two mistakes in each level. If player makes more than two mistakes, the level is over. If the player manages to collect all the ingredients, they unlock the next level. The difficulty increase comes from the variance of ingredients to be collected, the amount of ingredients to be collected, the speed at which the ingredients fall at and the interval of how often the ingredients drop (more often it is more difficult as the player has to dodge faulty ingredients). There are a total of 20 levels.

Based on the findings from this thesis, the game is designed to be fun and easy at first to get the player hooked before introducing any kind of limiters or grindy elements. Completion of the first levels is estimated to take less than half a minute per level rising to a minute in the latter levels.

Variant A is named Monster Baker and Variant B is named Baker Monster. Gameplaywise, the variants are almost identical to each other. The only difference between the different variants comes from failing a level. In Variant A, failing a level bears no penalty. In Variant B, failing a level costs a life. Player can have a maximum of three lives at any time and lives replenish every five minutes. The reasoning behind this is to observe the differences even the simplest gameplay limiters can have in a controlled environment. A screenshot of the game can be seen in Figure 3.

Figure 3: A screenshot of Monster Baker

4.2. Results

The test lasted for three days and the total number of participants for both games combined was 17. The players were distributed randomly between variants and each got to choose which one they played. Variant A had 11 players and Variant B had 6 players. Day one retention for both games was 0%, meaning that not a single player opened the game on two separate days. Not a single player played for more than one session. This was unexpected because the intention of limiters in Variant B was to keep the players interested in the game with retention in mind.

The average session length for Variant A was 246 seconds whereas for Variant B the average session length was only 83 seconds. It is not surprising that the game with limiters should have a lower session length. Users failed levels and ran out of lives and decided to quit playing instead of watching an ad. However, it is surprising that the session length varies so much, and this might be due to one outlier in Variant A having a session length of 1200 seconds. Even with this subtracted the average of Variant A is still considerably longer at 137 seconds.

The highest level reached in Variant A was 20 and in Variant B 10. 80% of players in Variant A reached level 14 after which the game apparently got too hard and after a few failures almost all the players gave up. Almost all users (90%) in Variant A reached level 10. This reveals that players wanted to keep playing despite failures, however they did not want it enough in Variant B to watch many ads. The average amount of ads watched in Variant B was one, meaning that every user watched an ad.

The total amount of levels completed in Variant A was 154 which means an average of 14 levels completed per user. The total amount of levels completed in Variant B was 53 which means an average of less than nine levels completed per user. By this it is also clear that users playing Variant A without limiters were engaged more than their limited Variant B counterparts.

4.3. Conclusions

By the results it was clear that Variant A was more successful as it performed better on every single metric. This was quite surprising as almost all the most successful games implement limiters in one way or another. The only metric where Variant B was more successful, was potential revenue as all the users watched an ad. However, this could be attributed to the fact that all the users knew that they were playing as a part of research and felt obliged to keep playing a little longer than first three failures. Also, the negative impact on average session lengths and failure to introduce any sort of retention showed clearly that Variant B was not as successful as Variant A.

These results could be explored from multiple viewpoints. Perhaps the game did not have enough depth to keep users interested and maybe a more polished game could have had its retention improved by limiters. It was also possible that the game was either too easy or too hard and the players quit or stopped trying simply out of boredom. The number of participants was also too low and a single user could affect the whole statistics way too much.

The research could have been improved by having a more polished game, more participants, and more content in the game. The games should be interesting enough for the retention of both variants to be more than 0% for better comparison. With a more polished game it would also have been possible to include a Variant C with in-app-purchases to further inspect the behaviour of players under different limiters.

5. Results

Let us next go over the results gathered from the analyses. The findings answered all the presented hypotheses as well as revealed some unexpected features of gameplay limiters. The results also revealed which parts of the analyses were lacking and which parts should have been focused on more.

5.1. Overview of the analysis results

Let us first review the raw results of the analyses after which we attempt to evaluate what these results mean.

As a general note from the analyses, many of the games seem to have multiple different “modes” of play, for example, a “building mode” and a “fighting mode”. “Building mode” means the player has an overview perspective of a city in which they can construct and upgrade buildings. “Fighting mode” has more different kinds of occurrences: it could mean, for example, the player leading an army against another army or simply the player having a few characters battling against a few enemies. One of the games (*Lords Mobile: Battle of the Empires - Strategy RPG*) had even more modes. Along with the ”building mode” it separated the fighting mode into both previously mentioned formats. An army fight mode with many troops battling in large scale battles as well as a hero fight mode with turn-based hero battles with only a handful of heroes. In most games, the limiters during the first 30 minutes were taking turns in these modes, and often the games with more than one mode had seemingly more limiters but the limiters, were also divided up between the different modes so much that the actual play is limited a lot less.

After conducting four different analyses the results seem fairly scattered. The amount of results which could be used in real-world applications is small if existent at all. In the genre-based analysis some notable results are as follows:

1) Casual category is by far the most limiting of all genres according to data as well as personal opinions from analyses.

2) The number of ads that could be watched in order to get past limiters is nearly non-existent.

3) All games in Strategy and Role-Playing categories allow for player to get past limiters using a soft currency whereas not a single game in the Casual category allows this.

The rest of the discoveries that came up during the analyses are quite obvious, such as most grind limiters are found from Role Playing games and that almost every single game allows for speeding progress with in-app purchases.

Next we analyse the results of the hypotheses presented in Section 3.1.

A) This hypothesis is correct as 94% of the analysed games did limit at least parts of the gameplay. 80% of the analysed games noticeably limited the player's progress in the game. The amount of games which limited parts of the game is surprisingly large as there were only two out of the 35 games which did not.

B) This hypothesis is incorrect as more than a half (51%) of the games completely limited the player from playing the game. This is a surprising result by itself but connecting it to hypothesis C opens new points of view on this hypothesis.

C) This hypothesis turns out as expected as a vast majority of 86% allowed direct skipping of limiters using hard currency. Combined with games that allowed skipping of limiters with soft currency (60%) brings the amount of games where limiters are skippable up to 97% (all except one game). It is also worth noting that with few exceptions, soft currency is directly acquirable by spending hard currency (or real-world money). It is also expected that skipping limiters with hard currency would not be limited in many games. Yet it is also slightly

surprising that only 3% of the games (one game) limited the amount of how much a player could skip with hard currency. In every other game (97%) the player could use as much hard currency as they wished to progress in the game nearly without any limiters.

In the questionnaire, there are three ways limiters could be gotten over aside from spending hard currency. These limiters are difficulty, time and resources, all of which are often interconnected and linked to each other.

In 74% of games, one of the limiting factors is difficulty. Difficulty can be further distributed into two subcategories which are skill/ability and, need to "grind" (completing completed levels again in order to gain power to get over more difficult parts). The distribution between skill/ability requirement and grind requirement is quite similar, with 57% of difficulty limiters relating to grind and 54% of the difficulty limiters relating to skill. It is possible for a game to possess both of these limiters.

In 86% of games, one of the limiting factors is time, which means the player could not play the game at all and they would get over their current limiters. It is rather surprising that the amount of games that require waiting is so large and it remains as a possibility for further research to compare this number with, for example, older mobile games or even computer or console games. Some games (14%) offered the possibility to skip shorter wait times free of charge, but the reason behind this, remains a question out of the scope for this research. The recorded average for the duration of these free skips is 6.4 minutes. In 37% of the games the waiting is not limited to a single timer but instead multiple timers at once. No maximum amount of wait timers at once is recorded.

In 97% of the games, one of the limiting factors is resources. This result is not surprising as everything that could be used in a game as currency is counted as a resource. Resources can often be used in purchasing more troops, better equipment or better structures. In many cases, resource limiters are connected to

time limiters as resources are used to purchase something, that required waiting. Resources also included soft currency, which is often gained in games simply by waiting or grinding. Even though statistically in the scope of this research it might seem that resources are the biggest limiter in games, it can be argued that resources are just an additional limiter in all games and the real limiters come from time and difficulty.

Before the we it is expected that advertisement would play a big role in limiters, but only 23% of the games allowed viewing of ads in order to skip limiters. A majority of the games that allowed viewing ads to skip limiters do not limit the number of watchable ads (62.5% of the 23%), which means the players can keep watching ads to get past limiters.

As game session lengths in the research are 30 minutes long and it is concluded that 51% of the games had their limiters affecting the game play in that time. In 88% of the games where limiters are visible during the first 30 minutes, the limiters are only partially limiting the game, whereas 12% of the games completely lock the player from playing the game during the first 30 minutes. Additionally, we noticed that in 43% of the games it is possible to calculate the amount of real-world currency (euros in this case) required in order to skip one-minute worth of limiters in the game. That price averaged at 0.025 euros (2.5 cents) per minute. Furthermor, only 6% of the games offered rewards as incentives for longer game session lengths.

On a scale of 1-5 (1 = does not feel limiting at all, 5 = feels very limiting), the overall feeling of how limiting the whole group of studied games felt is 2.6.

To conclude all hypotheses and other assumptions are mostly proven to be true with only a few exceptions. The most common limiter in analysed games is resources. However, the fact that resources often only allow the player to open up new timers makes time limiters almost as important as resource limiters. Many games let the player play for a while and then limit parts of the game by timers.

However, in almost all of the cases it is possible to get past these wait times simply by paying with hard currency.

5.2. Analysis by revenue group division

Let us next investigate the answers for the questionnaire in groups A, B and C individually. This is done to find possible recurring patterns and themes between the analysis groups.

5.2.1. Group A

In Group A, 40% of games completely limited playing the game by locking a major portion of gameplay behind a limiter. Almost all (93%) of games limit the progress and parts of the game. In most cases (87%) the limiting factor is difficulty and in 60% of the games it is possible to get past this difficulty limiter by grinding whereas in two thirds of the games the difficulty limiter is skill. In every single (100%) game with limiters, it is possible to get over the limiters by waiting. It is also possible to use some sort of resources in all (100%) of the games to get past limiters. In two thirds of cases with resources being able to get past limiters, the player can use a soft currency as limiter skipping resource. In all but one case (93%) the player can use hard currency as means to get past these resource limiters. In only one game (7%) the number of limiters skipped with hard currency is limited.

Three of the games allowed free skipping of limiters with an average time of 5.66 minutes of time skipped without a fee. Only one of the games allow viewing of ads to directly or indirectly ease limiter times. In almost half (47%) of the games it is possible to calculate the cost of skipping one minute of limiters and average of that value is €0.019. In 40% of the games, it is possible to have multiple wait timers simultaneously. In 80% of the games, the limiters are visible in the first 30

minutes of playing the game. In all of the games in which limiters are visible in the first 30 minutes, the limiters only limit the game partly. Not a single game limits playing of the game completely after the 30-minute session. 13% of the games offer incentives for longer game sessions.

On a scale of 1 to 5 (1= does not feel limiting at all, 5 = feels very limiting) the games are found to feel slightly limiting with an average of 2.8.

5.2.2. Group B

In Group B, 60% of games completely limited playing the game by locking a major portion of gameplay behind a limiter. Almost all (80%) of the games limited progress and even more (90%) parts of the game. In 40% of the cases the limiting factor is difficulty and in 40% of the games it is possible to get past this difficulty limiter by grinding, whereas in 30% of the games the difficulty limiter is skill. In the majority (70%) of games with limiters, it is possible to get over the limiters by waiting. It is possible to use some sort of resources in almost all (90%) of the games to get past limiters. In 30% of the cases with resources being able to get past the limiters, the player is allowed to use a soft currency as limiter skipping resource. In all but one case (90%), the player can use hard currency as means to get past these resource limiters. In every single game with the possibility to use HC as a resource to skip limiters, there are no restrictions on the skippable amount.

One of the games allows free skipping of the limiters by 10 minutes of time skipped without a fee. 30% of the games allowed viewing of ads to directly or indirectly ease limiter times. In almost half (40%) of the games, it is possible to calculate the cost of skipping one minute of limiters and average of that value is €0.053. In 30% of the games, it is possible to have multiple wait timers simultaneously. In 30% of the games, the limiters are visible in the first 30 minutes of playing the game. Two of the three games in which the limiters are

visible in the first 30 minutes completely limit playing the game, one of the three only partly limits the game. None of the games offer incentives for longer game sessions.

On a scale of 1 to 5 (1= does not feel limiting at all, 5 = feels very limiting) the games are found to feel not very limiting with an average of 2.2.

5.2.3. Group C

In Group C, 60% of games completely limit playing the game by locking a major portion of gameplay behind a limiter. More than half (60%) limits the progress, and every single one (100%) games parts of the game. In 90% of cases, the limiting factor is difficulty, and in 70% of the games, it is possible to get past this difficulty limiter by grinding, whereas in 60% of the games the difficulty limiter is skill. In the vast majority (80%) of games with limiters, it is possible to get over the limiters by waiting. It is possible to use some sort of resources in all (100%) of the games to get past the limiters. In 80% of cases with resources being able to get past limiters, the player can use a soft currency as limiter skipping resource. In all cases (100%), the player is able to use a hard currency as a means to get past these resource limiters. In every single game with the possibility to use HC as a resource to skip limiters, there are no restrictions on the skippable amount.

One of the games allows free skipping of the limiters by 5 minutes of time skipped without a fee. 40% of the games allow viewing of ads to directly or indirectly ease limiter times. In almost half (40%) of the games, it is possible to calculate the cost of skipping one minute of limiters and the average of that value is €0.009. In 40% of the games it is possible to have multiple wait timers simultaneously. In 30% of the games, the limiters are visible in the first 30 minutes of playing the game. In all of the games, where limiters are visible in the first 30 minutes, the limiters only limited the game partly. Not a single game

limits playing of the game completely after the 30-minute session. None of the games offers incentives for longer game sessions.

On a scale of 1 to 5 (1= does not feel limiting at all, 5 = feels very limiting) the games are found to feel not very limiting with an average of 2.3.

5.2.4. Comparison

In this section we compare the answers for the questionnaire in groups A, B and C against the others to find out whether there are noticeable similarities or differences between the groups. The hypothesis for this part of the analysis is that there will be more specific limit usage (the same limiters used repeatedly in different games) in the first group, A, and in groups B and C the used methods will be increasingly (more in group C than B) random (different limiters used in different games). Also, we expect that there will be more overall limiters in group A compared to groups B and C and more limiters in group B than group C.

Group A completely limits playing of the game significantly less than groups B and C, groups B and C are similar in this regard. Group A limits the player's progress slightly more than group B and group B limits the progress slightly more than group C. In group B, there is a significantly smaller number of limiters which relate to difficulty, whereas groups A and C are similar in this regard.

5.3. Analysis by the genre group division

In this section of the analysis, the games are divided into groups displayed on their Google Play main page. The division results in 11 different genres which are: Adventure, Puzzle, Casual, Action, Strategy, Role Playing, Casino, Card, Board, Racing and Simulation. Out of these 11 categories five are omitted from the analysis as there is only one game in them. The omitted categories are Casino,

Card, Board, Racing and Simulation. The amount of games in the remaining six categories are:

- Strategy games: 9
- Casual games: 6
- Role playing games: 5
- Adventure games: 4
- Action games: 3

Our hypothesis is that adventure and action games would have the least limiters and strategy games would allow for the most spending of money to get past limiters. The casual category is expected to contain a lot of different types of data as almost any type of game can be categorized as casual.

Role-playing is the category that limits gameplay the least. Overall (limits progress or parts of the game) on average the least limiting category is action and the most limiting category is either puzzle or casual. Puzzle category had slightly more limiters than casual. The category with the smallest amount of difficulty limiters is adventure, whereas the most difficulty limiters can be found in strategy and puzzle categories. The most grind limiters can be found unsurprisingly as these kinds of games are known for their "grindy" nature, in role-playing category, the least grind limiters are found from casual category. The most skill limiters are found in puzzle category and the least in adventure category. Almost every game in every category had limiters related to time which could be waited out or, in most of the cases, skipped with some sorts of resources. As shown in Figure 4, all games in strategy and role-playing categories allow the player to skip limiters with soft currency. Not a single game in casual category allows that**.** Every single game, except for one in adventure category, allows skipping limiters with hard currency. Only one game in all categories limits skipping limiters with hard currency. Almost half of games in strategy category allow for free skipping of time limiters, whereas other categories only at most one game allowing free skipping.

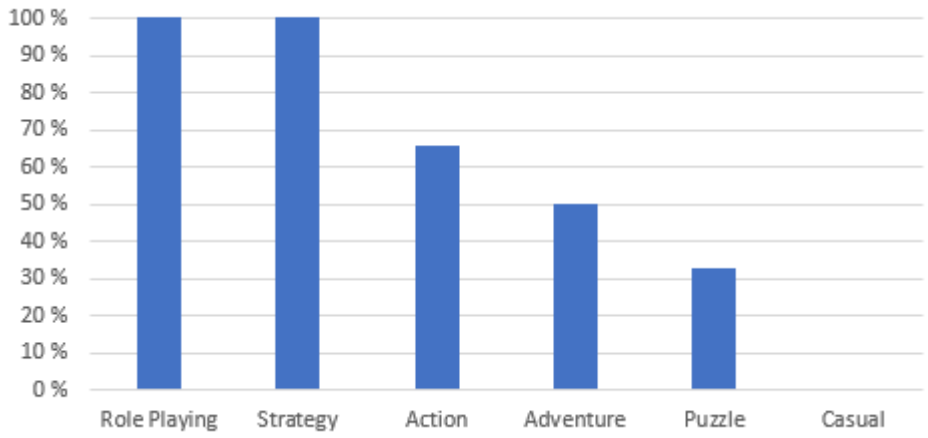

Figure 4: Percentage of games where skipping limiters with soft currency is allowed, by genre

Not a single category had more than one game which allows skipping limiters by viewing ads. The money cost of skipping the limiters remains almost constant between the categories. Almost all games in strategy category involve more than one simultaneous wait timer whereas numbers for other categories are much smaller. As shown in Figure 5, the category with most visible limiters in the first 30 minutes of gameplay is casual with almost all the games limiting the 30-minute session. Least visible limiters in this time can be found in Adventure games.

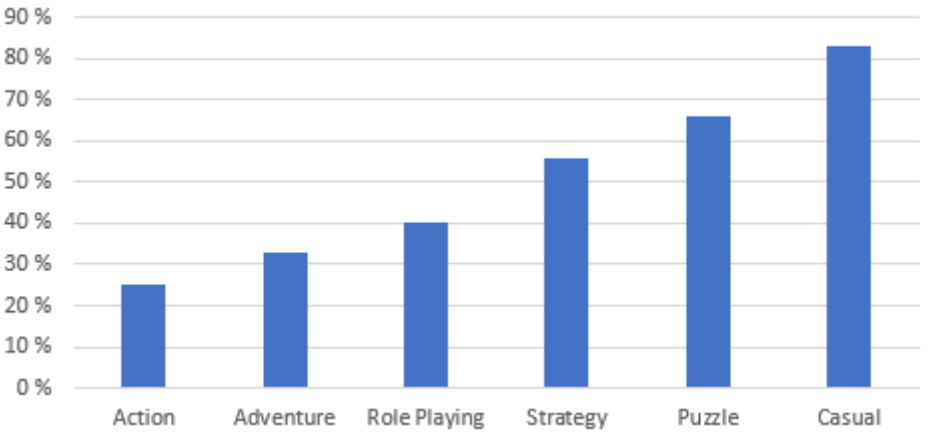

Figure 5: Percentage of games where limiters visible during the first 30 minutes of gameplay, by genre

The only games to completely limit playing of the game during the first 30-minute sessions are also in the casual category (33% of all games in the category). On a personal opinion scale from 1-5, the most limiting games (by far) can be found from the casual category with an average of 3.8, the next being role-playing games with an average of 2.8. The least limiting games are in action (1.3) and adventure (1.5) categories. From this part of the analysis we can deduce that casual games have the most limiters out of all categories by far.

5.4. Analysis by clustering group division

This section of the analysis divides the questions from the questionnaire into three separate categories, each of which have a selected set of questions relating to a common topic. Each answer is then given a value for each game in each category. The selected categories are introduced below. So far, the study has focused on looking at each game depending on the whole questionnaire. The goal of this analysis is to go deeper into the questionnaire and to sort the games into groups depending on how they fare in different areas of the questionnaire. Each game is given three score values (one for each category) and these values are compared to other games as well as other analyses to find out possible recurring patterns in parts of the questionnaire. The three clusters of the questions are separated into gameplay limiter questions, limiter variance questions and limiter cost questions. All of the games and their respective scores are shown in Table 1. The definitions for each category are as follows:

Gameplay limiters questions, indicates how limiting the game is overall. Definition of gameplay limiters cluster**:** Questions 1-3, 16, 18, 20 (Scored 0-8.5, each “yes” is worth one point from questions 1-3 and 16. Answer A to question 18 is worth one point and answer B is worth 2 points. Answer to question 20 is worth

1⁄2 of the answer (0-2.5). A low score in this category means the game is not very limiting, a high score in this category means the game is very limiting).

Limiter variance questions, indicates how many different kinds of limiters in the game. Definition of Limiter variance cluster: Questions 4-10 (Scored 0-7, each "yes" is one point. A low score in this category means the game has a fairly narrow angle to limiting and perhaps only limits the play in one or two ways. A high score in this category means the game has a lot of different kinds of limiters.)

Limiter costs, indicates how costly it is to get past limits in the game
Definition of limiter cost cluster: Questions 11, 13-15, 19 (Scored upwards from 0-7, "No" to questions 11,13 and 19 is worth one point, "Yes" to question 14 is worth one point, each cent per minute in questions 15 is worth 1⁄2 a point, up to 3 points maximum)

The results of this analysis are scattered, and values ranged from minimums to maximums in most categories. According to this analysis it is clear that some games limit playing more than others as values for gameplay limiter questions category vary from 0.5 (min 0) to 7.5 (max 8.5). The average and median values for this category are both 4.5. In the top five of this category, four games are from the casual genre and one is from the puzzle genre. No significant differences can be found between the analysis groups in the top five of this category as three of the games are from analysis Group B, one game from Group A and one game from Group B.

The variance of the number of limiters is also quite varying as the smallest result is 0 (min 0) and the largest results is 7 (max 7). The average value for this category is 5.3 and the median value is 6. These numbers mean that there is a large amount of variance in the number of limiters as in games limit gameplay in many different formats. In the top eight (eight games shared the same score) of this category, three games are from strategy genre, three from role-playing, one from adventure and one from action. Interestingly, from all of the top scoring

games in this category, five (out of eight) belong to analysis Group A, which would indicate that games with a bigger variance in limiters fare better in the market than games with a smaller limiter variance.

Also, the limiter costs are rather different among games, the minimum score out of any game for this category is 2 (min 0) and the maximum is 6 (max 7). The average value for this category is 3.5 and the median value is 3. In the top five of this category, two games are from the strategy genre, two from casual and one from puzzle. It is interesting to note that also the bottom three games from this category are all from the strategy genre, which would indicate that strategy games have a big variance in their limiter costs. Three out of the top five games for this category belonged to analysis Group A, which would indicate that games with bigger costs in overcoming limiters fare better in the market than games with lower costs of limiters.

Table 1: How games scored in different categories, green for gameplay limiters, blue for limiter variance and red for limiter costs

Category:		**Category:**		**Category:**	
Gameplay limiters	Score:	**Limiter variance**	Score:	**Limiter costs**	Score:
Coin Master	7.5	Clash of Clans	7	Last Shelter	6
Covet Fashion	7	Last Shelter	7	Hay Day	6
Merge Dragons	6.5	Langrisser	7	King of Avalon	5
Hay Day	6	AFK Arena	7	Bubble Witch 2 Saga	5
Bubble Witch 2 Saga	6	Idle Heroes	7	Empires & Puzzles	5
Clash of Clans	5.5	RAID: Shadow Legends	7	Merge Dragons	5
King of Avalon	5.5	Pokemon GO	7	Guns of Glory	4
Empires & Puzzles	5.5	DRAGON BALL LEGENDS	7	Clash Royale	4
Guns of Glory	5	Guns of Glory	6	DomiNations	4
Lords Mobile	5	Clash Royale	6	Clash of Clans	3
Dynasty War	5	Lords Mobile	6	Langrisser	3
AFK Arena	5	King of Avalon	6	Dynasty War	3
Idle Heroes	5	DomiNations	6	Candy Crush Saga	3
Clash Royale	4.5	Dynasty War	6	Homescapes	3
Candy Crush Saga	4.5	Endless Frontier Saga 2	6	Covet Fashion	3
Homescapes	4.5	Merge Dragons	6	Coin Master	3
DRAGON BALL LEGENDS	4.5	Brawl Stars	6	AFK Arena	3
Last Shelter	4	Candy Crush Saga	5	Idle Heroes	3
Langrisser	4	Homescapes	5	Hustle Castle:	3
RAID: Shadow Legends	4	Bubble Witch 2 Saga	5	Pokemon GO	3
Hustle Castle:	4	Empires & Puzzles	5	Growtopia	3
Pokemon GO	4	Angry Birds Blast	5	The Walking Dead	3
Growtopia	4	Coin Master	4	BlockStarPlanet	3
Angry Birds Blast	4	Hustle Castle:	4	Angry Birds Blast	3
The Walking Dead	3.5	BlockStarPlanet	4	Brawl Stars	3
DomiNations	3	Hay Day	3	PUBG MOBILE	3
Endless Frontier Saga 2	3	Covet Fashion	3	DRAGON BALL LEGENDS	3
Brawl Stars	3	The Walking Dead	3	Lords Mobile	2
BlockStarPlanet	1.5	Growtopia	2	RAID: Shadow Legends	2
PUBG MOBILE	0.5	PUBG MOBILE	0	Endless Frontier Saga 2	2

5.5. Omitted analysis groups

Due to limited time and resources for the making of this thesis, some of the planned analysis groups had to be omitted. These groups include but are not limited to analysis group based on bottom-up principle, analysis group based on release year and analysis group based on game store rating. Analysis group based on bottom-up principle would have focused on taking a look at the questions and their answers without putting the games in any sub-categories. The goal of this section of the analysis would have been to attempt to recognize connections between games from different groups and sub-categories, as well as connections between answers (for example, does a certain answer to a certain question make some other answer more likely to be the same or different). An attempt is made but no kind of sensible data came out as a result. Analysis group based on release year is left out due to time limits, the reason this analysis is left out instead of others is the fact that this thesis focuses rather on the current situation of gameplay limiters and not as much on their evolution. Analysis based on rating is left out due to lack of data. No data could be recovered later for the purposes of this analysis. It would require the rating data from the date from when all the other data for this research was acquired. Fetching this data later could be misleading and all the other analyses would also have to be redone.

6. Discussion

Let us next, we discuss and explore what the different findings of the research mean and what kind of impact the findings have for players and creators of free-to-play mobile games. We start the by discussing the total amount and type of limiters found in all games covered by the analyses. After that, we discuss the limiters from a more genre specific point of view, more specifically, we discuss which genre had the most limiters and try to find some reasoning behind that.

6.1. Prevalence of limiters

As mentioned in Section 3.1, it was to be expected that limiters would be found quite commonly in many games crossing many genres. Still it is rather surprising that over half of the 35 analysed games completely limited playing and almost every single one of analysed games limited parts of the game. Even though no data is gathered in the context of this research for limiters of free-to-play (or other monetization method) games on other platforms, we would expect that conducting a similar research on, for example, free-to-play PC games, would yield significantly different results. There are probably a far fewer limiters in free-to-play games on other platforms. The reason limiters are so common in mobile games could be caused by the fact that free-to-play mobile games are easily accessible, at least more so than their other platform counterparts.

6.2. Casual games with hardcore limiters

The results of this research are quite clear, casual games have way more limiters than those of any other genre. Let us next attempt to find reasoning why this is the case, this part of the thesis will disclose assumptions which are simply based on observations and results from the conducted analyses and as this was not the primary concern of the thesis, finding scientific reasoning for why casual games have more limiters remains a topic of future work.

In Section 4.4, we observed that casual games are dominant in the number of limiters, semi-dominant in limiter costs and completely absent in limiter variance. This leads us to conclude that, whereas many casual games limit the gameplay, they do so in very few ways. The research part of this thesis shows that the most common way casual games limit playing themselves, is a life mechanic, player plays levels and if they fail, they lose a life. These lives replenish with time or, obviously, money. In a nutshell, casual games limit strictly, simply and expensively.

The application of analysis results in Chapter 4 was aimed to be a test on limiters in general but it was found that casual game limiters are the easiest to develop as well. Limiters in for example, strategy and role-playing games often require more input than a simple failure or success. Unfortunately, the application of analysis results did not meet its goal and fell short on the amount of users as well as retention rates.

7. Conclusion

As acknowledged in Section 3.3, there were quite a few restrictions and limits to time and resources as well as other details when conducting this research. However, we do believe that some general guidelines for game developers and some insights for players of limited games can be found from the results of this research.

For the developers of free-to-play mobile games, the most important results are the general number of limiters in each genre. Even though no real differences were found between successful and less successful games, it is noteworthy that all of these games still made it to the top 500 of Google Playstore best grossing games, so even the lowest of games can not be considered complete failures. Perhaps the research should have involved another group, from even further down the list of best grossing games but for now, that only remains as a possibility for future work.

For the players of free-to-play mobile games, the most important are probably the amount of money spent to skip a minute worth of limiters. If the costs of skipping limiters are far above what was discovered in this research, the players should be aware of that there might be cheaper games around. Another result would be that players, unfortunately, seem to have not much choice if they want to play free-to-play mobile games fully without limiters as they are far and few. For the least limiters, players should stick to action categories and stay away from games that label themselves as casual.

7.1. Future work

Let us line out things that could be done with the current data gather from this research and move on to topics which would require a completely new data set, perhaps using parameters formed from the learnings of this research.

The quickest way to continue this research would be to explore all the options mentioned in Section 4.5. Some of which were left out of this research because of time and resource limitations could be continued by anyone interested in the field of free-to-play mobile game limiters. Also, a more data-oriented point of view could be explored by a person with more knowledge in the field of data analysis. This point of view could be easily done with the existing data and it would be interesting to see what things could be revealed by it.

It would also be interesting to involve more analytics from selected games into the analyses, as our data only consisted of the game's revenue amount, genre, release year and other minor details. Mobile market data and analytics solutions like *App Annie* [6] would probably reveal a lot of interesting insights on how to amount and type of limiters effect different performance indicators of a game. Platforms like *App Annie* provide a wide range of statistic including but not limited to: Download and Revenue Estimates, App Usage Estimates, Active User counts and Retention numbers. [6] Unfortunately this kind of a solution was out of the resource scope for this thesis, as the pricing models on these platforms can be somewhat expensive.

Next, we explore points of view for future work which could be conducted even with the data acquired from this study but would probably require more and in most cases different kind of data to be gathered. One of these points of view would be looking at the topic of mobile free-to-play limiters not by exploring the amount and type of limiters, but by looking at the reasoning behind them. To put it short, instead of asking the question "what?" a good ground for future work would be to ask "why?". Why do game developers choose the types of limiters they choose and what is the reasoning behind the number of limiters for any game? This kind of research would probably require a more interview-based solution as simply by looking at and playing the games, it is impossible to say exactly why these decisions were made. Perhaps by interviewing the designers as well as other decision makers behind these, or other games which impose successful gameplay limiters, new points of view could be had for this type of research as well.

Another rather simple point of view for continuing on the topic of this research would be to compare free-to-play mobile games with games on other platforms such as free-to-play PC games. Or simply to compare free-to-play mobile games with buy-to-play mobile games.

The application of analysis results in Chapter 4 could serve as another starting point for future research. Nothing resembling the practical research was found during the literature review in Chapter 2.4. Evaluating the same game with different kinds of limiters could be a way to find out which kinds of limiters work in what context and why. Ways to improve on the practical research would be to create a more polished game, running a longer test to acquire more users. Running multiple smaller scale tests to ensure at least some kind of retention on the base game before splitting it into variants would also be beneficial.

As a conclusion for future work, there are a lot of interesting points of view which can be considered to widen the understanding of gameplay limiters in video games. This topic is rather new and research like this could help makers and players of games better understand why limiters are needed and how are they best applied. Limiters could have simply started out as a monetization method but there might be other ways to look at them as well, perhaps games are made more compelling, if the player is not allowed to play them till boredom on their first play session. There are countless ways limiters could affect the ways players perceive a game, most if not all of which are still completely unresearched.

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Appendices

A. List of games for analyses

This is the list of games from analysis groups B and C. Group A was already presented in Section 3.2.

Table 2: Analysed games from Group B

Group B		
Name:	**Genre:**	**Publisher:**
Huuuge Casino Slots - Play Free Slot Machines	Board	Huuuge Games - Play Together
Merge Dragons!	Puzzle	Gram Games
Hearthstone	Card	Blizzard Entertainment
The Walking Dead: Our World	Adcenture	Next Games
Last Shelter: Survival	Strategy	LONG TECH NETWORK LIMITED
Covet Fashion - Dress Up Game	Casual	CrowdStar
Coin Master	Casual	Moon Active
Bingo Blitz™ - Bingo Games	Board	Playtika Santa Monica
Hustle Castle: Medieval life RPG. Fantasy Kingdom	Role-playing	My.com B.V.
PUBG MOBILE	Action	Tencent Games

Table 3: Analysed games from Group C

Group C		
Name:	**Genre:**	**Publisher:**
Langrisser	Strategy	ZlongGames
Bubble Witch 2 Saga	Casual	King
DomiNations	Strategy	Big Huge Games, Inc.
F1 Manager	Racing	Hutch Games
DRAGON BALL LEGENDS	Action	BANDAI NAMCO Entertainment Inc.
Dynasty War - Hero Clash	Strategy	i3Fun Hong Kong
BlockStarPlanet	Adventure	MovieStarPlanet ApS
Block Craft 3D: Building Simulator Games For Free	Simulation	Fun Games For Free
Endless Frontier Saga 2 - Online Idle RPG Game	Role-playing	ekkorr
Angry Birds Blast	Puzzle	Rovio Entertainment Corporation

B. Questionnaire

This is the questionnaire which was used to analyse each game.

1. Does the game completely limit playing of the game? (Player is completely locked out of major parts of the game because of limiters)

2. Does the game limit player progress? (Player can not progress further in the game without waiting or spending limited currencies)

3. Does the game limit parts of the game? (Player can not progress in some areas of the game without waiting or spending limited currencies)

4. If there are limiters in the game, are they related to difficulty? (Player is allowed to play, but can not progress further because the game is too difficult)

5. If there are limiters in the game and they are related to difficulty, can the player get over the limiters by "grinding"? (e.g. Player can repeat previous levels in order to get stronger and get over the limiters)

6. If there are limiters in the game and they are related to difficulty, could another more skilled player get over the limiters with and identical setup?

7. If there are limiters in the game, can the player get over the limiters by waiting? (e.g. Player can wait to get stronger to get past levels they couldn't before)

8. If there are limiters in the game, can the player use resources to get around these limiters? (Player can for example purchase more strength to get over difficulty restrictions or purchase more energy points to get over time restrictions)

9. If there are limiters in the game which player can use resources to get around, can the player get over the limiters by using a "soft" currency? (e.g. Player can use in-game currency earned from playing the game to get past levels they couldn't before)

10. If there are limiters in the game which player can use resources to get around, can the player get over the limiters by using a "hard" currency? (e.g. Player can use currency bought with real money to get past levels they couldn't before)

11. Is the player allowed to skip wait times for free, if yes and if applicable, what is the maximum amount of time (per single wait) skipped for free?

12. If applicable, is the amount of skippable limiters limited if using HC?

13. Can the player view ads to affect waiting times (directly or indirectly e.g gaining soft currency)?

14. If player can watch ads to skip waiting times, is the amount of ads limited?

15. If applicable, what is the cost (in euros) of skipping one minute of waiting?

16. Does the game include more than one simultaneous progression wait timer (daily rewards and interval rewards excluded)?

17. Are limiters noticeable in the first 30 minute session?

18. If yes to 17, do they limit the game A) Partly or B) Completely?

19. Does the game offer rewards as incentives for longer game sessions at least daily? (e.g. game offers a reward after a 5 minute session and a bigger one after 10 minute session)

20. On a scale of 1-5 (1 = doesn't feel limiting at all, 5 = feels very limiting), what is the overall feeling of limiters in the game?

C. Analyses used to form questionnaire

These are the initial analyses, formed while playing games from Group A. The questionnaire used to gather all data for this thesis was based on these analyses. One game, Brawlstars, was omitted from these analyses due to inability to recreate first-time play session because of earlier play sessions. Also *Clash of Clans* is omitted from this list as it was already included in Section 3.2.

Pokemon GO

Limited amount of pokeballs. Started with 50. In my 30 minute play session I managed to use 20 pokeballs. During the time I also received multiple level ups as well as reached pokestops which also gave me more pokeballs. From first inspection, it does not seem like there are any other progress limiters in place except for pokeballs, which there doesnt seem to be a limit to. Pokeballs are accredited from visiting Pokestops, amount of which seems plenty. The game offered PokeBalls to be bought through IAPs, 200 Poke Balls for 800 IGC, price of IGC is 11€ for 1200. It did also seem like my Pokemon were able to run out of health which would also slow down progression. Pokemon could only be healed by Potions, Potions could be received from Pokestops or bought with IGC 200 for 10 to completely heal a pokemon. By the end of my 30 minute session, all of my pokemon had full health and the amount of pokeballs I had gone up to 78.

Limiters: Limit some parts of play, very little

Overall feeling of session length limits: None/Very low

Would IAPs help progress: Yes

Empires & Puzzles: RPG Quest

The game seems to consist of two parts, match three gameplay and a city building. Start of very first play session, game tells me that there is waiting in the game but it can be skipped with "gems" which I assume to be in game hard currency. In the first 10 minutes of the game, I'm allowed to skip several wait times ranging from a few seconds to ten minutes. At around 15 minutes of playing, I'm introduced to an energy currency, a fight which lasts around a minute costs 3 out of my 15 energy points. Leveling up increases maximum energy points and refreshes them. After around 25 minutes, I notice that my progression on city building side is limited by time and the time can either be skipped with hard currency OR I can use buy a VIP pass to get another builder (so that I can build two buildings at once, doubling my progress), VIP pass costs 5,49€ for a month. Hard currency to skip 30 minutes of time has a cost of 15, 400 HC can be bought with 5,49€. Right before hitting my 30 minute mark, I run out of energy to play the match three side of the game. Replenishing this energy is possible and to restore 100% costs 100 HC. The game also has "Raid Energy" which is used for "Raid Battles", 30 minutes of gameplay was not enough to unlock this, but it seems like a further limiter of gameplay. It is possible to gain some amounts of HC in the game, through rewards and adds. At the end of my session, I have 121HC.

Limiters: Limit some parts of play. Limit progress

Overall feeling of session length limits: Medium

Would IAPs help progress: Yes

Candy Crush Saga

After 5 minutes of playing the game, the limiter is clear: Failing a level will cause the player to lose a life, the player has 5 lives. Lives replenish with time. 5 Lives are replenished on my first level up. The game has a hard currency and I can use 69 HC to get infinite lives for 6 hours. 10HC costs 2,29€, 50HC costs 8.99€. At around 15 minutes of play, I receive another level up and 5 lives with it. After that, I am also awarded with 50 HC. During my first 30 minutes of gameplay, I do not lose a single life.

Limiters: Limit playing game very little

Overall feeling of session length limits: Very low

Would IAPs help progress: Yes

Guns of Glory: Build an Epic Army for the Kingdom

The game's FTUE keeps me busy simply tapping the screen for the first 5 minutes. During this time I learn that it is a very similar game to previously analysed Clash of Clans. In this game, I only have one builder to build with at once, I can buy one extra builder for 1,09€ and receive a lot of resources at the same time. I see a lot of the buildings requiring a time of around 5 minutes to complete, but I seem to be able to build the first few levels of everything instantly for free. When I reach a level where I cannot do it instantly (at around 5-10 minutes of game time), it costs 25HC to skip 15 minutes. Cheapest choice of purchasing currency comes up at 1,09€ for 100 coins but there are various deals which make it a lot cheaper. The cheapest one giving me 200HC for 1,09€ along with a second builder and resources. The IAP store is quite confusing as there are over 80 different kinds of "deals" available and it is really hard to which would have the best value for me. At around 10 minutes of game time I've hardly done any waiting as I'm offered free speed ups and wait skips. Without these, I would've had to spend over 30 minutes building. I spend the next 10 minutes browsing my mail and opening/receiving around 30-40 free boxes/other rewards. All of the opened rewards seem to have given me 475 hard currency, which would

be enough to skip almost 5 hours of building waiting times. In addition to the building screen, the game also has a map screen which lets you hunt for monsters. Hunting monsters costs an energy currency, to start with each hunt costs 5 points and I have a total of 100 points. I regenerate 1 point every 360 seconds and therefore had I exhausted all my points, it would take 10 hours for them to regenerate. At 25 minutes of gameplay I'm waiting on building, upgrading, recruiting and hunting. Which means there are a lot of different kinds of time limiters in place for this game. It is also apparent that there will be resource limiters as I possess two different kinds of resources, food and wood. For the scope of 30 minutes, those seem to be far far away though. Browsing through some of the games many menus, I also stumble upon many additional currencies such as iron and silver. Just before I run out of time, I realise everything that requires under 5 minutes of upgrading/construction, can be constructed immediately for free. To sum it up, it seems like this game has so much to do that your gameplay will not get limited for a very long time after starting to play. I felt like after 30 minutes I had barely scratched the surface. This game might be way too complex for the scope of this analysis.

Limiters: Limit some parts of play, Limit progress

Overall feeling of session length limits: Low/Medium

Would IAPs help progress: Yes

AFK Arena

A short FTUE of 5 minutes gets me to the game. It is in no way apparent whether there are limiters in place or not. 10 minutes later, I have received quite a bit of HC, but haven't really been limited in any way. A little after 10 minutes I hit my first progression limiter, which is difficulty. I upgrade my characters with soft currency and get past this stage. So far it seems that the only limiter in the game is difficulty. Very big part of the difficulty comes from the need to grind more. At 15 minute mark it seems like there are no other kinds of limiters in place, the

game can be played as much as the player wants with the only limiting factor being the strength of my heroes. At around 15 minutes I'm granted a higher quality hero which makes progression a lot easier. I also collect a gift of 2 hours of progress that can be received only once per day. The game does seem to contain a lot of complex fighting mechanics and character combinations and later on in the game the difficulty progression limiter will most likely shift towards a skill requirement instead of a grind requirement. At 20 minutes it becomes clear that my progress would have halted without the free strong hero I received. I look into the stores and find out that a hero of similar quality level can be bought at 2700 HC (diamonds), 600 diamonds cost 5,49€ so the cost of a hero of this quality would be around 25€. It is also possible to buy heroes with varying in-game currencies and all come with a chance to get these rare heroes. The chances are not disclosed, so it is impossible to calculate the value to time ratio of these purchases.Upgrading my characters whenever my progress stop allows me to play the full 30 minutes without any kinds of limiters. The game has an AFK currency/experience gain system where your heroes get stronger by waiting. To get forward in the game in the later stages, players will probably have to either wait extended periods of time OR spend money to obtain hard currency, to obtain better heroes as well as items.

Limiters: Difficulty, Grind at first, Shifts towards Skill when moving forward.

Overall feeling of session length limits: Low/Medium

Would IAPs help progress: Yes

Idle Heroes

In the very first few minutes I encounter a few very short (around five seconds) wait times. The game is very similar to previously analysed AFK Arena. At 5 minute mark it seems like there are no progression limiters in place at first, but difficulty will be playing a big role in the same manner as in AFK Arena, at first grind but later shifting towards skill. The game offers a lot of timed rewards

ranging from every few minutes to daily. I also receive a strong hero in the same manner (as in AFK Arena) at the very start. This hero once again seems to represent the bulk of my power, being more than twice as powerful as my second most powerful hero and many times more powerful than my third most powerful hero (I have 6 heroes in total). At 10 minute mark every battle has been a breeze. However the wait time between each stage seems to be getting longer, starting at 5 seconds and very quickly climbing to 10 seconds. It does not seem possible at this point to skip these wait times. At 15 minutes every single battle has been very easy, so far I have progressed around 15 stages. I was gifted tons of ingame currencies at start which seems to be making my first 30 minute session. If my progress was to get stuck, a way to get forward would be to purchase another one of these strong heroes. Looking around the store (excluding first time purchase offer which grants such hero even for the cheapest purchase of 5,49€) the cost of this kind of hero would be 29,99$, but this package would include a plethora of other rewards. At 30 minute mark it has become apparent that as stages get more and more difficult, I will be forced to log off and wait for periods of time which get longer and longer, or spend real money to buy different kinds of packages to progress further.

Limiters: Difficulty, Grind at first, Shifts towards Skill when moving forward.

Overall feeling of session length limits: Low/Medium

Would IAPs help progress: Yes

RAID: Shadow Legends

The game starts out with a tutorial telling me exactly where to tap. In the very first steps of the tutorial, it becomes clear that this game is about purchasing more power, much like Idle Heroes and AFK Arena. The game also uses an energy mechanic for battles (progression). The initial tutorial lasts about 10 minutes. After the tutorial I'm presented a gift (daily login) as well as a first time deal. The game appears to have 4 different currencies, An energy currency, a soft currency,

a hard currency and another time replenishing currency that is not presented to the player yet. After a few battles and quests, my energy meter is at 51/24. Every day the game offers “Playtime rewards” up to 180 minutes, this mechanic seems very contradicting to the energy mechanic which would limit session lengths. Idle Heroes also had a similar mechanic, but they didn’t seemingly disclosed the time limits to the players. Reward limits for RAID are 5, 20, 40, 60, 90 and 180 minutes. A potion to restore my energy points to full, costs 40 hard currency, 175 hard currency can be purchased with 5.49€. Even without a lot of upgrading, all my battles seem pretty easy at 20 minute mark. And at 20 minutes I am at 74/27 energy points, each level up and quest seems to give me more and more points, which makes me unable to confirm how long replenishing a single point of energy would take. After the next battle, my energy hits 100/30. The first battles cost me 3 energy but starting at 20 minutes, the battles cost 4. Completing a single stage took anywhere from 50 seconds to 1:04 minutes. The very first battles being the shortest and the last battle being the longest. There is clearly a trend of battles costing more energy and taking up more time. At 25 minutes I am at 124/33 energy. With the average cost of 4 energy points and battle length of 1 minutes if I were to only battle (the game had a plethora of other time spending mechanics as well) and not level up (which is pretty much guaranteed taken that I leveled up 4 times in the first 25 minutes) I would still have more than half an hour extension making my first play session last at least an hour. Before hitting the thirty minute mark I reach 187/39 energy and battles lasted up to 2 minutes while still costing only 4 energy points. This would allow me (with the same restrictions as in previous calculation) to extend my first play session to up to two hours.

Limiters: Difficulty, Grind at first, Shifts towards Skill when moving forward.

Overall feeling of session length limits: Very low

Would IAPs help progress: Yes

Hay Day

Game starts with a notice saying that progress in game can be sped up with IAPs. In the first few minutes of the tutorial, I am allowed to skip 20 minutes of "egg laying" for free three times. Five minutes in the game, it becomes clear that the main point of the game is to wait for your crops/animals to produce things. At this time I have 12 things I could speed up for a total of 80 minutes. Skipping all of these wait times would cost me 8 diamonds, 50 diamonds can be purchased for 2,29€. To progress further after around 5 minutes, I am prompted to either wait for my maize to grow (5 minutes) or purchase it for 1 diamond, therefor parts of the gameplay are limited. Next part of the tutorial prompts me to wait for a quest to be finished and after several seconds, this happens. There was no way to skip this wait. After 15 minutes of gameplay, I find myself constantly waiting on the game. Skipping waiting times of more than 15 minutes costs 2 diamonds, skipping waiting times of 15 minutes or less, costs 1 diamond. This leads to a conclusion that waiting costs 1 diamond per 15 minutes, which divided by the price of hard currency makes the price of waiting 15 minutes 0.687€. At 20 minutes, I've noticed that every single resource can be purchased and every single wait time longer than a few seconds can be skipped with diamonds (hard currency). The first wait times I had to wait, were 2 to 5 minutes long. But after 25 minutes, I am starting to see wait times up to 2 hours and still I could be skipping all of these with IAPs. I do discover a few items that I yet can not acquire, however these are not necessary at the moment to progress further in the game. The last 5 minutes of my 30 minute session are nothing but waiting.

Limiters: Time, resources

Overall feeling of session length limits: Hard

Would IAPs help progress: Yes (A LOT)

Clash Royale

Game starts with a tutorial match after which I'm granted a chest, which takes 5 seconds to open, I'm presented with the opportunity to use 1 gem to skip this wait.

Same thing happens after another tutorial match, I see that I have 4 slots to open chests, perhaps at the same time. And same thing after third and fourth matches as well. Tutorial takes me about 10 minutes to complete. After the tutorial I'm prompted with a notice saying that the game progress can be accelerated with IAPs. After the tutorial I'm granted a chest that takes 90 minutes to open, skippin the wait costs 9 gems. 80 gems can be purchased with 1,09€, this makes waiting 10 minutes cost 0.123€. The game also offers multiple daily gifts, first one is collectable right away and the second one 4 hours after collecting the first one. No time is specified for the third chest. The game appears to be PvP only and after winning my first match, I receive another 90 minute wait chest. It turns out that I can not open chests simultaneously but will have to manually open every chest after each other. This manual process can be made automatic by purchasing a "Pass Royale" for 5,49€, it states that the current season lasts for 20 days. After my second victory, I'm granted a chest that would take 4 hours to open. I win my third match as I hit the 30 minute mark, this match also granted me a 90 minute chest. My chests slots are now full. Winning a match would not grant me another chest, meaning my progression is partially limited, I could still earn coins, experience and other resources from playing, but to gain chests, I would either have to wait or pay. Also to progress further in the game (win PvP matches against stronger players) I can both, grind for chests (which give me more power) and get better at the game. Upgrading my current units also costs resources which are gained from playing the game (grinding).

Limiters: Time (waiting needed to open chests), Resources (needed to upgrade characters), Skill grind (needed to get resources) and skill (needed to win other players)

Overall feeling of session length limits: Medium

Would IAPs help progress: Yes

Growtopia

I complete the tutorial in a few minutes, the game seems to be like a 2d minecraft, sandbox/building game. The game has waiting times to harvest planted trees, however you can plant as many trees as you want and have other actions available constantly. Each tree that I plant takes 30 seconds of waiting. In my first 15 minutes in the game, I fail to see any objectives, I aimlessly harvest and plant things and earn some gems (soft currency). The game has different kinds of IAPs varying from soft currency, to subscriptions of 3, 14, 30 or 365 days. After 20 minutes of playing, I come across different trees which take more than 7 days before being harvestable, however I do not find any way to skip or make these wait times faster. On multiple occasions I'm locked out of world I created and all of my efforts go to waste, locking of worlds seems to be possible with soft currency. It is impossible to determine any limiters except from the trees, which the player can plant as many as they wish (therefore it is not really a limiter). It is also impossible to determine any kind of value for used money without a lot longer play session. IAPs could be used to purchase World Locks allowing you to lock other players out of your worlds and play without interference.

Limiters: Time (waiting for trees to grow)

Overall feeling of session length limits: Very Low

Would IAPs help progress: Yes

Lords Mobile: Battle of the Empires - Strategy RPG

The tutorial starts with a building mechanic and I'm allowed to skip two tait times. The game seems to consist of building mode and a fighting mode. After that the tutorial guides me to a 5 minute wait time, which can be skipped for 25 gems. My current cheapest offer would give me 1344 gems for 1,09€, this makes the cost of waiting one minute 0.004€. In building mode, I can build/upgrade only one building at once, the game seems to follow the same convention as Guns of Glory where each upgrade under X minutes can be skipped for free (in this game the X seems to be 7). At least for the first 15 minutes I'm showered with gifts. I'm

also awarded with four 1 minute wait time skips and two 3 minute wait time skips. Resources are also required to build buildings, gathering resources takes time. There seems to be a third game mode, hero mode, in which my heroes can battle without my armies. In this mode, I use up stamina which regenerates one point every 6 minutes,my current maximum is 120 and one battle costs 6. My heroes also have power, skills and items, which seems to require grinding for both gear and items. At 25 minutes I'm still being showered with gifts, I feel majorly overwhelmed with the game, it does seem to have every single possible limiter in place, but there are so many different "modes" of play that it seems impossible to run out of things to do and would require many hour long sessions to get limited. I join a guild and find out that my guild mates can help me thru many wait times, even further lessening limiters. During my session I also received timed session length rewards as well as daily login rewards. Up until 30 minutes the gifts keep coming, still feeling majorly overwhelmed by the game.

Limiters: Time (waiting for building, upgrades, stamina for hero battles), Resources (needed to build, upgrade), Grind (gear+skill needed to progress in hero battles)

Overall feeling of session length limits: Low

Would IAPs help progress: Yes

King of Avalon: Dragon War | Multiplayer Strategy

The game starts with a tutorial which allows me to skip a waiting time. This game is VERY similar to guns of glory. During the first 5 minutes the game allows me to skip several wait times. It also has the mechanic of skipping wait times shorter than X (X is 5). Otherwise the cost to skip wait times is approximately 3 gold per 1 minute. The player can purchase 100 gold for 1,09€ making the cost of skipping one minute approximately 0.03€. The game also includes the possibility of hiring a new builder to double the concurrent amount of simultaneous building/upgrading. This game also has two modes, building mode

and fighting mode, in fighting mode, the player has a limited amount of stamina and marching to battles also takes time (which can be sped up). For the first 15 minutes I'm showered with rewards. This game also has resources which limit building (resource grind), the game has a hero who has power, as well as different kinds of troop combinations (gear and skill grind). At 25 minutes of play, I'm stuck behind a 15 minute wait, waiting for an upgrade to be complete. I can still march to enemies, to get loot meaning my progress is not completely halted. The game has a weekly login calendar, but at least during the first 30 minutes, it is not clear whether the game gives rewards for game session length.

Limiters: Limit some parts of play, Limit progress

Overall feeling of session length limits: Medium

Would IAPs help progress: Yes

Homescapes

The game starts with a match-3 tutorial. Idea of the game is to complete match-3 levels to gain stars to progress in the game. Failing levels of match-3 costs lives. I have 5 maximum lives and regenerating one takes 30 minutes. Lives can be requested from and sent to friends. Player can use 1000 ingame currency to extend a level for 5 turns (more match-3 turns). 1000 ingame currency can be bought for 1,09€. The game limiters are very clear, after too many failures, progress will stop completely, IAPs can be used to ease progress (skip skill grind limiter) but not to skip time limiters. Boosters can also be bought with currency, they also ease progress. During my first 30 minutes, I do not run out of lives. The levels started getting harder towards the end so using up lives/currency seemed to get more likely all the time.

Limiters: Limit playing

Overall feeling of session length limits: Medium/High

Would IAPs help progress: Yes