

THE ADDICTIVE DESIGN OF MOBILE GACHA GAMES



Bachelor thesis

Degree Programme in Computer Applications
fall, 2023

Viet Thang Dang

Degree Programme in Computer Applications

Abstract

Author Viet Thang Dang

Year 2023

Subject The addictive design of mobile gacha games

Supervisors Elina Vartiainen

ABSTRACT

The gacha game industry is growing larger than ever in today's gaming market. The purpose of the thesis was to look into the game design philosophy of mobile gacha games, in order to understand not only the great game design aspect of mobile gacha games, but also the manipulative technique used to engage with the player base. This thesis sought to answer questions on what makes mobile gacha games addicting; and how they create a serious problem of underage gambling which needs to be dealt with.

This is a theoretical thesis aimed to analyze the design aspect of mobile gacha games. First, the general concept of gaming loot boxes, gacha boxes, gacha games and their popularity will be explained. Then, the thesis analyzes different gacha games, to find their similarity and differences. Starting from the gacha rarity and collection, leveling and RNG progression to daily grind tasks. The thesis then proceeds to explore the design of the gacha boxes themselves, as well as the complexity of the currency system. Finally, the thesis tries to understand how such a game with so many RNG reward aspects can get away with being a gambling game.

Based on the analysis from this thesis, it can be seen how gacha games manage to maintain such a large player base, how developers of these games use so many ways to keep the players playing the game as long as possible, even encouraging players who quit the game to revisit sometime later. The thesis shows how gacha games are technically not legal in the gambling laws, however, it does not persuade people from fighting to have a concrete regulation toward these gacha games.

Keywords Mobile game, mobile gacha game, gambling loot boxes.

Pages 33 pages and appendices 01 page

Contents

1	Introduction	1
2	Concept of mobile gacha game and its popularity	3
2.1	Gaming loot boxes concept.....	3
2.2	Mobile gacha game and its popularity	4
2.2.1	Mobile gacha games concept	4
2.2.2	Mobile gacha games popularity.....	6
3	Analyzing mobile gacha game.....	8
3.1	Analyzing methods	8
3.1.1	Researching gameplay loop	8
3.1.2	Understanding the gacha boxes' design	8
3.1.3	Assessing in-game economics.....	8
3.1.4	Investigate the unregulated law	9
3.2	The gameplay loop design.....	9
3.2.1	Collection and Rarity of Items.....	9
3.2.2	The Leveling System.....	10
3.2.3	RNG progression	12
3.2.4	Daily grind	15
3.2.5	Pay to skip and FOMO rotation.....	17
3.3	The flashy gacha boxes.....	20
3.4	The overly complex currencies system	22
3.4.1	Gacha roll currencies.....	22
3.4.2	Free currency	23
3.4.3	Event currency	24
3.4.4	Purpose for the complex currencies system.....	24
3.5	The "legal" underage gambling.....	25
3.5.1	Laws regarded about gambling.....	25
3.5.2	"Legal" gambling	27
4	Conclusion.....	28
5	Summary	30
	References.....	31

Figures, program codes, commands, and tables

Figure 1: A character from Genshin Impact (2020), awaiting to be upgraded.....	11
Figure 2: A party of 12 units in Arknights (2019)	12
Figure 3: Artifact reward after a run in Genshin Impact (2020)	13
Figure 4: An example of auto sweep function from Path to Nowhere (2022)	14
Figure 5: A filled up stamina bar in Genshin impact (2020)	15
Figure 6: An exchange of premium currency to refill the stamina in Genshin Impact (2020).	17
Figure 7: An about-to-reset monthly rotating shop from Arknights (2019).....	18
Figure 8: An opened gacha box, containing a super rare item from Arknights (2019).	20
Figure 9: A chart shows how much premium currency a player can get in 28 days in Honkai Impact 3rd (2016).....	22

Annexes

Annex 1 Material management plan

Glossary

FOMO: Fear of missing out. It is a feeling of anxiety or apprehension that one may miss out on a rewarding experience, event, or opportunity.

Meta: Most effective tactics available. It is an effective way to achieve the goal of the game, whether it is to beat other players or beat the game itself.

RNG: Random Number Generator. It is a computational algorithm that generates a sequence of numbers that appear to be random.

1 Introduction

This thesis is a research and case study on the design philosophies of mobile gacha games. Mobile gacha games have become one of the highest grossing gaming industries in the recent year, with revenues up to couple billions. Such profit attracts many companies to make their own gacha games, without knowing about the magic behind mobile gacha game designs, or the serious ethical problem permeating in mobile gacha games, such as the easy access and “for all ages” gambling.

Our goal in this thesis is to study various game design aspects from different mobile gacha games, to understand the appeal of these games, what makes them so addicting to play yet so predatory. And how companies use these advantages and also the weakness in players' minds to exploit for profit with questionable gaming business ethics.

Our main research questions are:

- What are mobile gacha games and how big are they?
- What game design aspects make mobile gacha games addicting?
- How mobile gacha games force players to daily login habits?
- How do gacha games manage to introduce gambling to adolescents and children?

The research consists of two parts:

The concept of mobile gacha game and its popularity: This part will focus on explaining the basic concepts that are related to the upcoming analyzed topic, from the loot box system to mobile gacha games. Then revenue of mobile gacha games from various companies will be assessed, to prove how popular and profitable the gacha game industry is.

Mobile gacha games analysis: This is the main part of the thesis. To answer previous research questions, various mobile gacha games will be looked into, they are play tested and analyze similar and different game design aspects of each game, compare them to one another. The design of the gacha system will also be looked at, from the drop rate reward to the visual design of loot boxes.

Finally, the thesis will tackle the problematic gambling mechanics in these mobile gacha games, using the previous analysis to explain how they manage to bypass the underage gambling law.

2 Concept of mobile gacha game and its popularity

Before analyzing the design aspects of mobile gacha games, it is necessary to understand the basic concept of gaming loot boxes, and their counterpart in the Eastern gaming market, gacha boxes. This chapter aims to explain the concept of gaming loot boxes and gacha boxes, followed by their controversy and popularity.

2.1 Gaming loot boxes concept

Loot boxes (or loot crates) are consumable virtual goods in video games, which can be redeemed to receive a randomized selection of further virtual items, ranging from simple customization options for a player's cosmetic to game-changing equipment to make the player more powerful in game. Players can purchase loot boxes using real money or in-game currency, however the contents of loot boxes are usually unknown to the player until they are opened. Loot boxes are often used in free-to-play games, where the game itself is free to download and play, but players are encouraged to purchase loot boxes or other in-game items to support the game's ongoing development and maintenance.

Loot boxes have also been the subject of controversy and scrutiny due to their potential to promote gambling-like behavior among players, particularly among younger players who may not fully understand the risks involved. Many researches have been conducted to find out the relation loot boxes have with gambling and addiction. Brooks's study (2019) provides empirical evidence of associations between loot boxes (i.e., risky use, expenditure) and problem gambling, indicating that individuals with risky gambling beliefs and behaviors are vulnerable to loot box features in gaming. A systematic review study investigating the relationship between microtransactions and disorder in gaming and gambling in 2022 by Raneri, suggested a positive association between these variables, with loot boxes posing a greater risk for addiction than other types of microtransactions. (Raneri et al., 2022)

As a result, some countries have introduced regulations to restrict or ban the use of loot boxes in video games, with Belgium being one of the first to do so in 2018. Meanwhile, supporters of loot boxes argue that they are simply another form of in-game reward system, similar to a slot machine

or scratch-off lottery ticket. Another argument is made that the random nature of the contents adds excitement and unpredictability to the game and can help drive engagement and revenue for game developers. Furthermore, there have been studies in which no association has been found (King et al., 2020), and there also results indicated no support for this relationship. However, most of this research has been limited to samples of adults and the phenomenon in underage individuals is still not yet well understood. (Montiel et al., 2022)

Regardless of one's stance on the issue, there is no denying that loot boxes have become a major part of the gaming industry. Many of the most popular games today feature loot boxes in some form or another, and developers continue to experiment with different types of rewards and pricing models. According to Zendle's research in 2020, loot boxes are the key feature in almost every highest grossing mobile game. Specifically, fifty-eight percent of Android games and fifty-nine percent of iPhone games in the game store have loot boxes. In total, there are over 1.8 billion installations of games with loot boxes. Almost 1 billion of those are for games deemed suitable for children aged seven or older. (Zendle et al., 2020)

2.2 Mobile gacha game and its popularity

Due to increasing regulations toward the loot box system, loot boxes have started to disappear from many video game franchises, whether they are from mobile or not. However, mobile gacha games with a similar system as loot boxes, are getting more and more popular in recent years. This sub chapter focuses on explaining what gacha games are and how they can be popular regardless of loot box regulation. (Kersley, 2021)

2.2.1 Mobile gacha games concept

Mobile gacha games are a type of mobile game that feature a random loot system, where players can spend in-game currency or real money to obtain virtual items or characters. The term "gacha" refers to a type of Japanese vending machine that dispenses random toys or figurines, and the concept has been adapted into mobile games. In mobile gacha games, players can purchase "gacha boxes", which are similar to loot boxes mentioned in the previous part. The contents of these boxes are randomized and unknown until they are opened, creating a sense of excitement and anticipation for players. However there are a few differences between the two:

- Design: Loot boxes typically contain cosmetic items, such as skins or emotes, while gacha boxes often contain characters or items that have a direct impact on the gameplay aspect.
- Rarity: In loot boxes, the rarity of the items is usually predetermined, meaning that players have a higher chance of obtaining common items and a low chance of obtaining rare or legendary items. In gacha boxes, the rarity of the items is often based on a percentage system, where players have a specific chance of obtaining each rarity tier.
- Transparency: Loot boxes are often required to disclose the odds of obtaining specific items, while gacha boxes are not always required to do so.

Based on these comparisons, it can be seen how the gacha box in mobile gacha games can be a bit more problematic than its loot box counterpart. Not only does the reward system in gacha boxes heavily impact the gameplay progress, but they are also vague in rarity and odds which make it easier the more money that is spent for them. Despite that, gacha boxes in these games have faced less regulation, especially on the Western side of law, although there have been calls for increased transparency and regulation in some countries. (Cermak, 2019; Washington Journal of Law, Technology & Arts, 2022)

Just like loot boxes, the use of random reward systems in mobile gacha games has been a controversial issue. Some critics argue that these games are a form of gambling that preys on vulnerable players, particularly children. The random nature of the rewards means that players are essentially gambling on the chance of getting rare yet game-changing in-game items, with no guarantee of success. Many critics have also raised concerns about the addictive nature of these games, particularly when it comes to people with addictive tendencies who have a lot of free time, as mobile gacha games are designed to be addictive to retain their players (Hao, 2023). On the other hand, there are counter arguments against the gambling nature of these gacha games, stating that previous research focused almost exclusively on investing money in the game and viewed the game as separate from the structuring forces of everyday life. The study also explored how gacha games can teach players discipline, control desire and deferred value, leading to positive resource maximizing behaviors. (Woods, 2022)

2.2.2 Mobile gacha games popularity

Despite their controversy, mobile gacha games are extremely popular among young players, particularly in Asia. These games have proven to be incredibly lucrative, generating billions of dollars in revenue for their developers. Some of the most popular mobile gacha games include:

- Fate/Grand Order - This game has been a massive success in Japan and around the world, with estimated revenues of over \$4 billion since its release in 2015.
- Genshin Impact - This game was released in 2020 and quickly became a global sensation, generating over \$1 billion in its first six months.
- Granblue Fantasy - This game has been a popular choice in Japan since its release in 2014 and has also gained a significant following around the world.
- Honor of Kings - Also known as Arena of Valor outside of China, generated over \$2.5 billion in revenue in 2020, making it one of the highest-grossing mobile games in the world. (Craig, 2020)

According to a report by App Annie, a mobile app analytics company, the mobile gaming industry generated over \$91 billion in revenue in 2020, showing a 23% increase from the previous year, with mobile gacha games playing a significant role in this growth. Meanwhile, a report by Sensor Tor, a mobile app analytics firm, shows that mobile gacha games generated over \$21 billion in revenue worldwide in 2020. This represents a significant increase from the previous year, with a growth rate of 26%. Asia is the largest market for mobile gacha games, with Japan and China being the biggest players in the industry. In Japan, gacha games accounted for over 70% of the mobile gaming market in 2020. China also has a significant market for gacha games, with Honor of Kings being one of the most popular games in the country. (Lexi, 2020)

However, the popularity of mobile gacha games is spreading to other regions as well, with games like Genshin Impact gaining a significant following in Europe and North America. Gan's study (2022) shows how Genshin Impact generated 3 billion dollars in revenue in its first year in 2020. The study also notes that the COVID-19 pandemic has contributed to the growth of the mobile gaming industry, with people spending more time at home and looking for ways to entertain

themselves. As a result, mobile gacha games, which offer addictive gameplay and randomized reward systems, have become even more popular. (Gan, 2022)

Overall, the revenue generated by mobile gacha games highlights the profitability of this genre and its importance to the mobile gaming industry. While there is some controversy surrounding the use of randomized reward systems, the popularity and profitability of these games suggest that they will continue to be a major force in the mobile gaming industry for the foreseeable future.

3 Analyzing mobile gacha game

This chapter is dedicated to analyzing the gameplay design of mobile gacha games. The analysis focuses mainly on the design aspects, however, many important topics on gacha games such as legal rights and company's monetize decision will also be analyzed.

3.1 Analyzing methods

This chapter aims to explain how the analysis of mobile gacha games had been carried out. As the thesis is a study on game design philosophy of mobile gacha games, the analysis mainly focuses on game design aspects, such as: game mechanics and economy, reward and gacha system. Many analyses are drawn from the author's experience of playing these gacha games, as well as other players' experience, which were well documented by previous studies. There are four parts the study focuses on:

3.1.1 Researching gameplay loop

It is crucial to figure out what makes players so invested in gacha games, to determine which part hooks players in and which make players linger. Therefore, gameplay loop design of mobile gacha games needs to be studied. Even Though the gameplay of different gacha games can be unique, there are still some common design aspects such as: the gacha collection, which is the core part of gacha games; the leveling grind; the stamina systems; and the pay for convenience feature. There are also some unique features in some gacha games which will also be mentioned.

3.1.2 Understanding the gacha boxes' design

The design of gacha boxes and the suspension players get from opening them are something that need to be studied. How do such designs attract young people? How important is this aspect for the longevity of the gacha game itself? These are questions that will be answered.

3.1.3 Assessing in-game economics

Then, the gacha games economics will be analyzed, in order to understand how complex the currency system in these gacha games is. By assessing how much time and real money are needed to earn these in-game currencies, the thesis draws conclusion on why such a system existed.

3.1.4 Investigate the unregulated law

Lastly, the analysis shifts to the legal aspect of mobile gacha games. By comparing the law about gambling and the analyses on gacha games from previous parts, the thesis shows how gacha games get away from being banned, and how new regulations are slowly being made to counter this problem.

3.2 The gameplay loop design

This subsection focuses on discussing gameplay loop aspects of these gacha games, as well as game design features, including grinding and daily quest, and in-game shop.

3.2.1 Collection and Rarity of Items

The collection and rarity of items are the main drivers of the gacha game's gameplay loop. Players are incentivized to collect as many items as possible because each item has unique stats, abilities, and appearance. Moreover, items are classified into different rarity tiers, ranging from common to legendary, with the rarest items being the most sought after by players. Gacha games often employ a random drop system, where players have a chance to receive a rare item when opening a "loot box". This system creates a sense of anticipation and excitement, as players hope to get lucky and receive the item they want. When specifically asked what makes people pull for the gacha, there are different reasons for each player. Jecius (2022) had made a list of answers in his research regarding this question:

Appearance: It is one of the biggest reasons for choosing a specific game in the first place, as players are interested in the art appeal, which in turn lures the players to be interested in and try out the game. As how positive first impressions are extremely important to catch players' attention, the appealing art and interesting characters are the biggest draw of gacha games. Dominykas also stated that: On almost every occasion, a player will dedicate the majority of their in-game time working toward the goal of acquiring their favored characters.

The lore: What is the character's role in the story line, why the character was made, how it connects to any real-world history, or simply just a good back story that draws players in and increases their interest in a character. A character's background can also greatly impact their design.

Completionist: There is a small group of players who try to collect everything the game has to offer, as some games will give rewards for collecting different characters. Each distinctive character might also fit together in a group or an in-game faction through appearance, lore or history. Many gacha games nowadays try to give players the feeling of completion through many achievements systems such as card collections, characters progression, etc. As such, acquiring different characters and items is a big part of how most gacha games incentivize their players.

Meta: Overpowering character or weapon is a simple deciding faction for many players. Especially if the gacha games have a competitive aspect in them, obtaining rare and valuable items can provide a competitive edge in multiplayer or player-versus-player (PvP) modes. While others might be looking for a new character with unique gameplay to have a better new gameplay experience, or players just want to feel powerful while playing these games. (Jecius & Frestadius, 2022)

3.2.2 The Leveling System

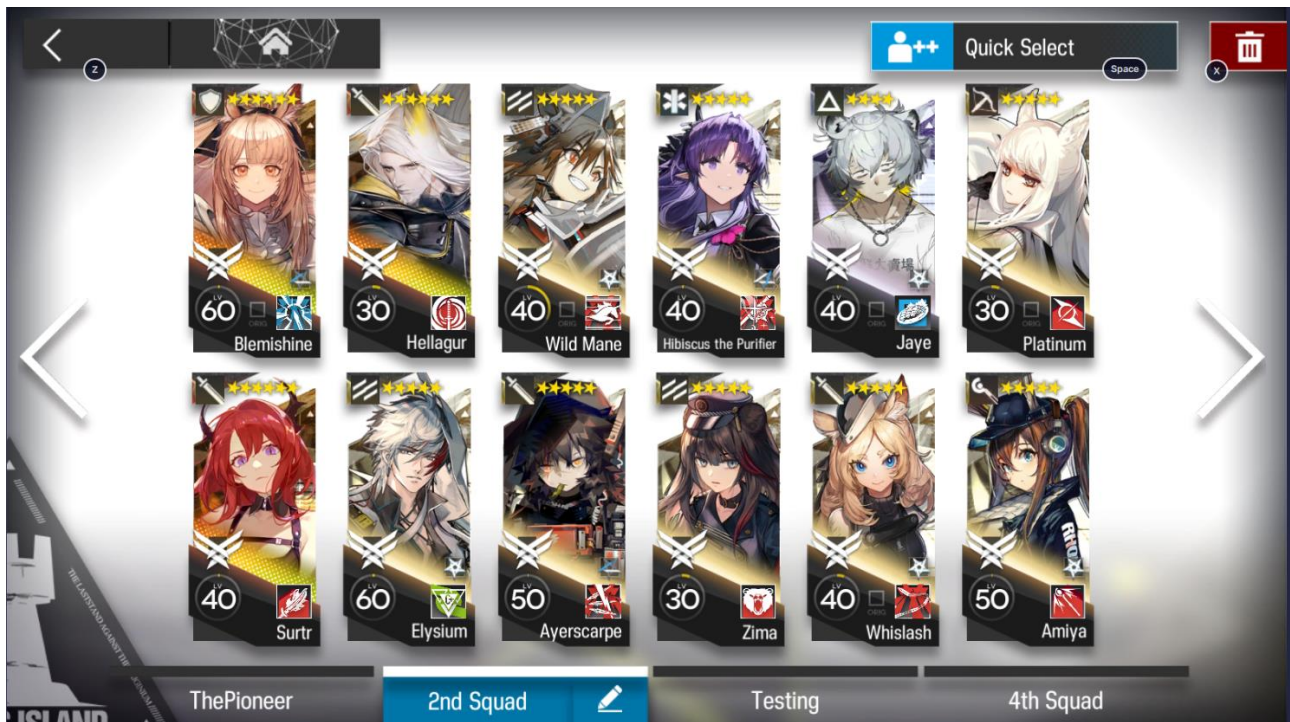
The leveling system is another key component of the gacha game's gameplay loop. Having a powerful character or weapon is not enough. To properly progress through the game, players need to level up their items by using them in battles or give them sufficient level up material. The higher the characters' level, the stronger their stats and abilities become. Moreover, most gacha games integrate another system, allowing players to evolve their items into more powerful versions, further increasing their usefulness in battles. The leveling system can create a sense of progression for players, as they can see their items become stronger and more valuable over time. However, the leveling system in most gacha games is also a grind, as players need to spend a lot of time and resources to level up their items.

Figure 1: A character from Genshin Impact (2020), awaiting to be upgraded.



Looking at Genshin Impact from Figure 1, to level up a character, playing casually and defeating enemies is extremely insufficient. The best way is to gather level up material and in-game money (which is called “mora” in game), then spend it on the designated character. However, this will hit a cap at level 20, which then different kinds of upgrade materials and even more “mora” are needed, in order to continue leveling. There are 5 more level caps at level 40, 50, 60, 70 and 80 before the desired character reaches their full potential at level 90. A single unit needs over 2 million “mora” to reach their max level, which is not accounted for the level up and upgrade materials that are also needed in this process. Furthermore, there are two other sub power systems that also need to be progressed, weapon and artifact set. While weapon systems go through the same level process as character. The set of six artifacts go through an RNG base grind which will be mentioned in the next part. Overall, it will take about three months to completely max out a character in Genshin through three different power systems. Even though not all gacha game leveling systems are as complicated as Genshin, most of them still have the same leveling cap and upgrade requirement to continue. Looking at Figure 2, most gacha games also design their gameplay to be party base, which means each game stage generally needs three or more units, therefore it is necessary to also level them.

Figure 2: A party of 12 units in Arknights (2019)



3.2.3 RNG progression

Gacha games, like many other games, use RNG (Random Number Generator) as a core component of their progression system. RNG determines the outcome of actions that have an element of chance, such as opening loot boxes, obtaining items, or reward from winning battles. In gacha games, RNG is used to determine the rarity of items that players receive from gacha boxes, the success rate of fusing or evolving items, and the outcome of battles. RNG-based progression in gacha games can be both a blessing and a curse for players. On one hand, it adds an element of excitement and unpredictability to the gameplay experience. Players never know exactly what they will get when they open a loot box, and the chance of receiving a rare or powerful item can be a thrilling experience. On the other hand, RNG can be frustrating and unfair, especially when players spend a lot of time and resources, rolling hundreds of times to obtain a rare item, only to receive duplicates or useless items. While players who just put much less effort are able to get it on their first try. RNG grinding for level up or upgrading materials is also a frustrating experience for players. Figure 3 demonstrates a stage clear in Genshin (2020), to obtain materials, players need to repeat the stages that have already been cleared over and over again until they get enough material to spend on leveling up their in-game units. Generally, this will take five to six

consecutive runs for each material. However, due to the RNG nature in reward of these runs, it might take way more for some players, leaving them a sense of wasting time and effort, while players who do less feel positive and satisfied with their own luck, motivate them to do more. The matter can become worse if the powerful item is locked behind the RNG reward system. Take another look back at Genshin Impact and its artifact system. There are six different types of artifacts to make a full set, each artifact however has different stats which might or might not be useless for the desired character, even though the artifacts are equipable to them. Therefore, making artifact grinding a time-consuming process that requires players to invest a significant amount of time and effort, as players are required to do the same runs countless times to obtain the best artifacts for their characters.

Figure 3: Artifact reward after a run in Genshin Impact (2020)

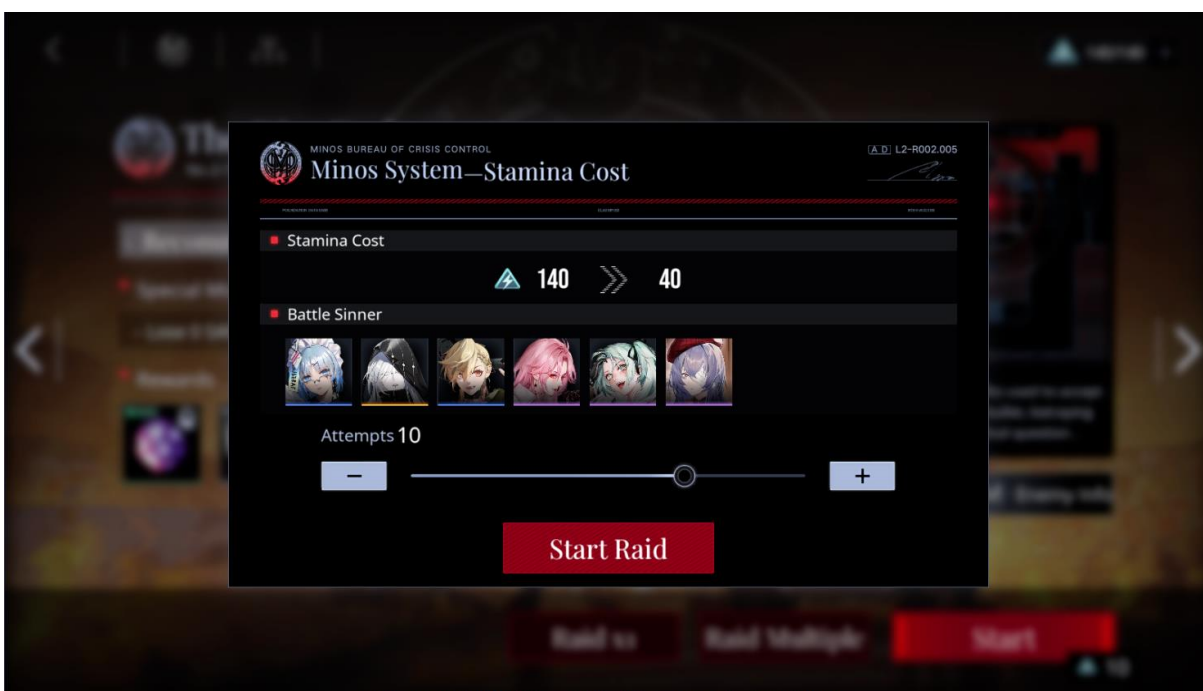


To mitigate the negative effects of RNG-based progression, some gacha games offer systems that increase the chances of obtaining rare items in their gacha system. For example, some games offer a “pity system” that guarantees a rare item after a certain number of failed attempts. Others offer a “guaranteed pull” system, where players can spend a certain amount of virtual currency to obtain a specific item they want. These systems can help alleviate some of the frustration and unfairness associated with the extremely low rarity of the gacha loot box system. Limited-time

events are often introduced to gacha games, offering exclusive rewards that are only available during a specific period. These events give players a chance to earn desirable rewards without relying solely on RNG. Some gacha games offer guaranteed rewards for completing certain activities or achievements. For example, a game might offer players a rare item or character after they complete a difficulty or any stage for the first time. Some games have also implemented duplicate protection to prevent players from receiving the same item or character multiple times in a row. This can help to reduce frustration and increase the chances of obtaining new and desirable rewards. Another feature that is implemented into gacha games is auto-battle, a feature that allows players to automate battles and gameplay. This feature not only saves players a significant amount of time, especially when grinding for materials, multi-task and doing other activities while the game runs in the background, but also make the grinding process more efficient by allow them to repeat the runs quickly and reduce boredom from having to put too much focus on every runs.

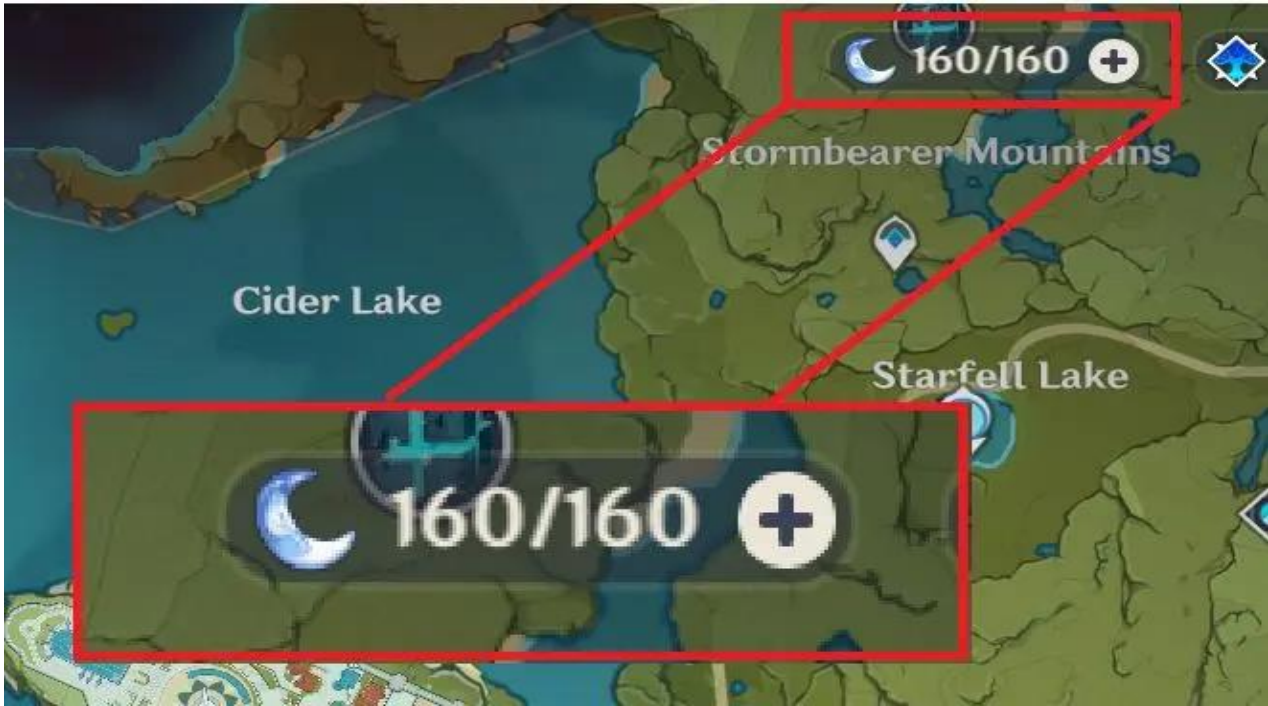
Some gacha games such as Path to Nowhere in Figure 4 even go so far as implementing an auto sweep (auto raid) function, which technically trades players in game stamina resources for a direct amount of material, instead of doing a run again for them, completely skipping the gameplay aspects of the game.

Figure 4: An example of auto sweep function from Path to Nowhere (2022)



3.2.4 Daily grind

Figure 5: A filled up stamina bar in Genshin impact (2020)



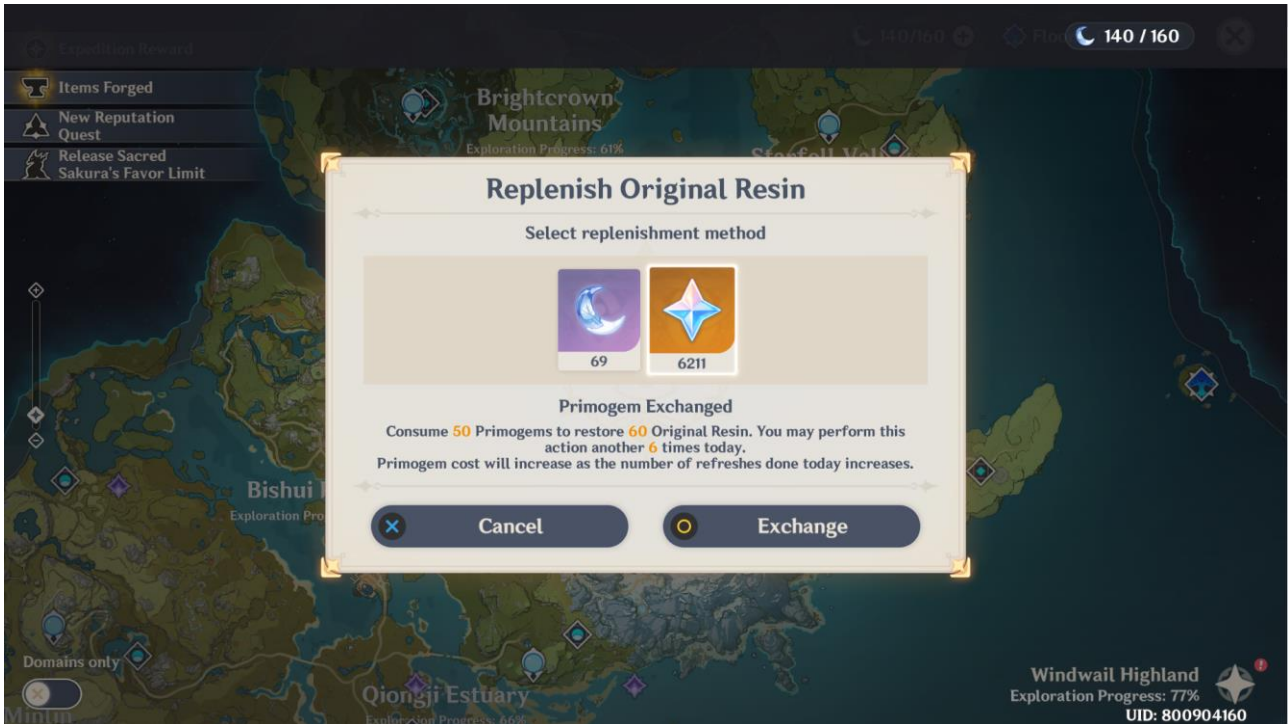
Despite all of the time and resources players have to spend grinding for a single unit in gacha games. Grinding, however, is a very common gameplay element in many types of games, particularly in RPGs (role-playing games) and MMOs (massively multiplayer online games), even sports games or fighting games may also include grinding elements. Grinding is used as, positively, a way for players to improve their skill for the next challenge as well as improve their units at the same time, or negatively, a method to coercing the player into spending needlessly large amount of time in a game, for the sole purpose of extending the game's duration. The latter case is true in almost all gacha games, as most of them implement a design, which is regarded as "Playing by appointment" by Zagal et al. in their research in 2013, called the stamina system, also sometimes referred to as the fatigue system in these gacha games. According to Zagal, this is a design that requires the players to play at specific times (and or dates), in a specific amount of time as indicated by the game, rather than the players' preferences. The stamina system limits a player's playtime, as they are required to spend some of their in-game resource, in this case, "stamina" or "fatigue" in order to do more content or grinding in the game. Look at Figure 5, if a single run takes about 4 minutes but needs 30 "stamina", then the players can only grind for their desired

items for only 20 minutes every day, disregarding how much free time they have on either workday or weekend. Players have to wait for their stamina refills at a painstakingly low rate or stop and continue to progress the next day. Players are also expected to complete the daily quests given to them before the “stamina” runs out to maximize their grinding output, as both of them will be reset on the next day. This daily repetitiveness combined with motivation to raise your character creates a daily grinding habit that can last for months, depending on how much players need to raise their party of units to their maximum potential. (Zagal, 2013)

The daily grinding habit, however, can also linger even if the players have no goals to achieve. Gacha games are most of the time live service games, of which contents are updated monthly. Therefore, many players, experienced or newcomers, are encouraged to prepare for new future contents. According to Zagal et al.’s example on dark pattern grinding, players tend to do a lot of preparation and grinding for items before a new unit is released, and on the actual day of release, players are able to almost immediately max that unit out. They can now solely enjoy the gameplay aspect without bothering with the grind, until there is no more content left, and some players will incline to go back to their daily grinding habit, waiting for new content updates. To prevent players from getting bored or burn out from the daily grind during the downtime between content release, gacha games make sure their contents are highly repeatable, from including challenging runs that could take hours to figure out, to entirely new game mode for more refreshing gameplay. Gacha games also introduce limited-time events or even daily login rewards, which offer extremely rare rewards and materials with just a simple task. This instills a potential fear of missing out (FOMO) in players who want to stop playing the game for a while. All of these design tactics, in order to make sure players keep logging into the gacha game every day as long as possible or pay real money to play the game less. (Zagal, 2013)

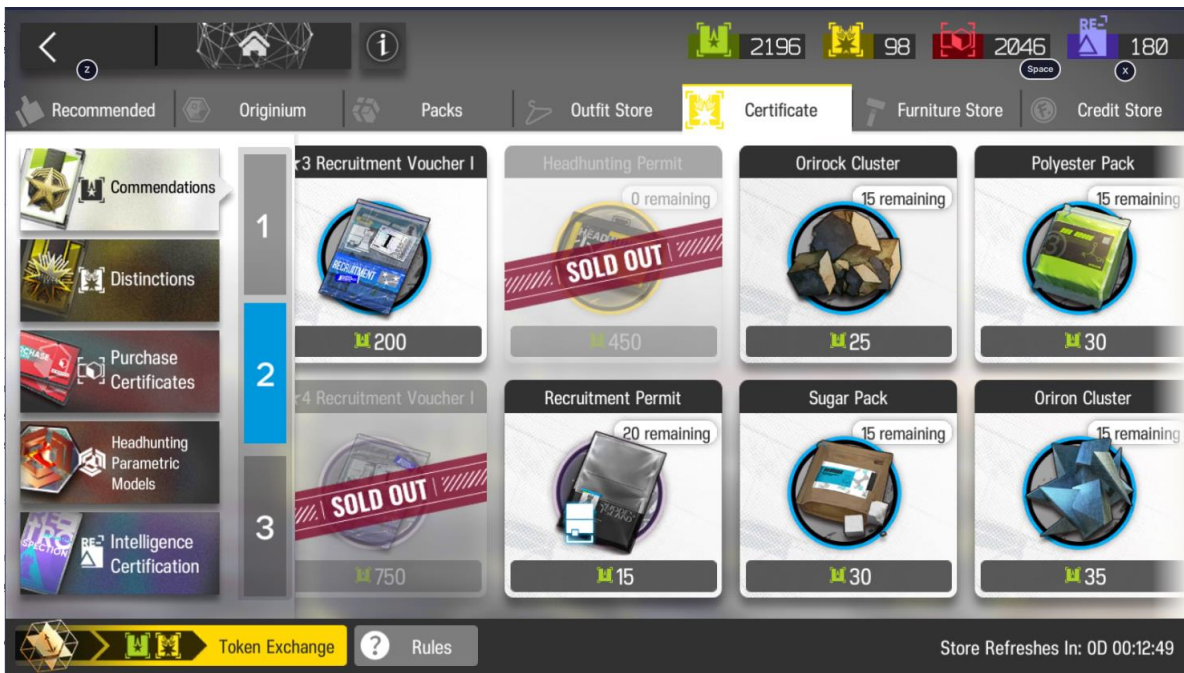
3.2.5 Pay to skip and FOMO rotation

Figure 6: An exchange of premium currency to refill the stamina in Genshin Impact (2020).



Having to pay to continue playing has been a regular part of video games since the early arcade days. Traditionally, players could pay to continue playing from where they lost (e.g., “insert coin to continue”). Zagal’s research, however, shows a recent game design has been integrated into many games, especially gacha games, to monetize directly the solutions to the challenges in their games, whether it is hard to clear content or negative grinding experience. Instead of encouraging a player to pay more to continue, the gacha games allow players to pay and skip many gameplay aspects which define gacha games in the first place. Example in Figure 6, players in these gacha games are allowed to pay money to refill their stamina system, meaning they can essentially skip the waiting time associated with their refilling of stamina, thus allowing the players to play for a bit longer and progress through the game much quicker than those who don’t. This makes the essential requirement for planning ahead in grinding meaningless. Knowing this, developers of these gacha games have made many modifications to this exchange system, such as limiting the amount of refill players can do each day and making the exchange price go up each time to discourage spending too much. (Zagal et al.,2013)

Figure 7: An about-to-reset monthly rotating shop from Arknights (2019)



The rotating shop is another integral part of the gacha game's gameplay loop. It is essentially the marketplace in gacha games, as players are able to exchange unnecessary items for desired ones. Not only are they able to retrieve characters or weapons they miss, but also leveling and upgrading materials. The items in the shop, however, are daily, weekly or monthly limited. Most materials can only be exchanged for a certain amount, then have to wait for the scheduled refreshment of the shop for the materials to be available again. Characters and weapons are limited in different ways in the shop. A certain unit is available for a certain amount of time until the shop refreshes, normally about two weeks to a month. Whenever the time runs out, the unit is then completely unavailable unless players find it from the gacha loot boxes, the lack of transparency on scheduling making it almost impossible to predict whenever they will be available in the shop again. This creates a pressure to buy toward players, in other words, FOMO to buy the characters or the weapons available before they are taken down. Leaving players with tight budgets frustrated on the premise they are going to miss out on an item they wanted, incite them to spend real money to make up for the lack of in-game financial. Figure 7 shows a monthly rotate shop from Arknights, players need to collect a specific currency to exchange for materials from the shop, the shop however is locked in three tiers with better rating resources per tier. It took 5000 of said currency to reach the final tier, which is impossible to do for a free-to-play player. The only way players can make sure they do not miss anything new from the shop is to follow notices,

either from logging into the game or social media. Therefore, players are encouraged and motivated to check out or revisit the game every now and then.

Conclusion

The gacha games' gameplay loop revolves around the collection and rarity of items, the leveling system, RNG progression and daily grind, while also integrating with the pay to skip aspect and rotation shop. The collection and rarity of items create a sense of anticipation and excitement for players, as they strive to obtain the most powerful and sought-after desired characters and items with many different motivations in mind. The leveling system is also important, as it provides a sense of progression and achievement as players work to improve their units and make them stronger, following their favorite character through their goals and growth create a sense of pride and achievement. RNG progression, the key feature in gacha games, can be frustrating for some players, it can also be exciting and motivating when players get lucky and obtain rare or powerful items. Games also add many features in order to make the progression as less frustrating as possible. The daily grind might be repetitive and time consuming, however the combination of personal players goals and constant updates of limited time event and login rewards help players stick with the gacha games for a long time, even when players have reached their set out objective, as they are excited and prepare for future content. The pay to skip system not only entices players to spend money for convenience, but its rotation shop also creates a sense of FOMO in the players, making them to always keep in touch with the game even when they have quit. All of these gameplay loops and design aspects help gacha games to not only obtain an enormous number of players in such a short amount of time, but also maintain players for a very long period. Judging from the study of the mobile game community by Britt (2021), the popularity and growth of mobile gacha games will continue for much longer. (Britt et al., 2011)

3.3 The flashy gacha boxes

This section focuses on the design of the gacha boxes, how they are monetized and encouraged to purchase, their opening animation and reward.

Figure 8: An opened gacha box, containing a super rare item from Arknights (2019).



Gacha box design is a crucial component of many modern video games, particularly those with gacha mechanics or other randomized reward systems. These loot boxes are typically purchased with real or in-game currency, and players receive a random assortment of rewards upon opening them. The visual design of these loot boxes and gacha boxes is an important aspect of their appeal, as it can help create a sense of excitement and anticipation when opening them.

The first aspect of gacha box design is the box itself. Gacha boxes are typically designed to be visually appealing and eye-catching, using bold colors, striking graphics, and unique shapes to stand out on the screen. They may be adorned with special effects, such as glowing borders or particle animations, to create a sense of rarity or value. Once the player clicks on the box, a special animation will play to signify the opening of the box. This animation is usually accompanied by an upbeat and catchy sound effect that captures the player's attention and creates a sense of excitement. The animation may include a 3D model of the box, which opens up to reveal the

rewards inside. The rewards themselves are usually displayed with eye-catching graphics, such as shimmering animations or bright colors, to make them more appealing to the player. (González-Cabrera, 2023)

One important element of flashy loot box design is the use of rarity indicators. In most games with loot boxes, the rewards are divided into different tiers of rarity, such as common, uncommon, rare, and legendary. The loot box design will typically indicate the rarity of the rewards contained within, either through the use of a color-coded system or through specific graphics and animations associated with each tier of rarity. For example, a rare item might be displayed with a golden border and a special animation that emphasizes its value.

Another key aspect of flashy loot box design is the use of psychological tricks to encourage players to purchase more boxes. For example, some games may offer a limited-time discount or bonus reward for purchasing a certain number of loot boxes at once. Others may use a "pity timer" mechanic that guarantees a rare reward after a certain number of boxes have been opened without receiving one. These tactics are designed to create a sense of urgency or FOMO in the player, encouraging them to spend more money to get the rewards they want. (González-Cabrera, 2023)

In conclusion, flashy loot box and gacha box design is an important aspect of many modern video games. These gacha boxes are designed to be visually appealing and exciting, using bold colors, striking graphics, and unique animations to capture the player's attention. The use of rarity indicators, sound effects, and psychological tricks are all important aspects of loot box design, as they help create a sense of value and urgency that encourages players to purchase more boxes. However, it is important for game developers to be transparent about the odds of obtaining specific rewards from loot boxes, and for regulators to ensure that these mechanics are not leading to problematic gambling behaviors in players.

3.4 The overly complex currencies system

Gacha games are known for their complex currency systems, which can be overwhelming for new players and confusing even for seasoned players. These currency systems often include at least 2 types of currencies, each with its own set of rules and uses, or iterate with one another. This chapter will focus on figuring out how complex the multiple currencies system in gacha games is. The reasons behind such overly complex currency systems and their impact on players will also be explored.

3.4.1 Gacha roll currencies

Figure 9: A chart shows how much premium currency a player can get in 28 days in Honkai Impact 3rd (2016).

Activity	Crystals	Notes
Dailies	1120	
Daily Login	400	
HoYoLab Daily Check-in	50	Need to check-in up to 23 times to get all 50 crystals.
Armada Contribution	100	
Memorial Arena	480	360/month for every tier below Exalted.
Ex Abyss (8 cycles) - Agony3/Red Lotus*	3360/4000	May be subjected to change based on tier.
Elysian Realm (4 cycles) - Difficulty 130	2000	May vary based on the highest clearable difficulty.
Battle Pass	480	
Survey	200	Only need to answer each question to get the crystals.
Maintenance Compensation	600	
Total	8790/9430	

The first system that needs to be focused on is the gacha roll currencies. These are considered premium currency, as players need to spend them to pull items from gacha boxes. Players can only get premium currencies by buying them with real money. Gacha games will normally provide an alternative way to get these currencies by clearing specific stages. However, the amount of gacha roll currency is limited weekly depending on each gacha game. For example, look at Honkai Impact 3rd (2016) and Figure 9, there are multiple ways to earn gacha roll currency, which is called crystal, in this game. Each way gives different amounts of crystals and is locked in either daily or weekly limits. An average player gets about 9000 crystals per month, or 2250 crystals per week, which is quite insufficient for standard ten pulls on a banner, which needs 2800 crystals. Players might be tempted to spend a lot of money to exchange for these premium currencies, as they are often sold in packs, in which the minimum amount is enough for 20 gacha rolls. According to Yamakami's study (2013a), the high exchange price might be obscure as one or ten attempted gacha can be cheap. Therefore, an unaware player might miscalculate or unintentionally disregard how much such purchases and have too much to roll. On the other hand, unlucky players who still have not had their desired character, might be tempted to purchase more. (Raneri, 2022) (Yamakami, 2013a)

3.4.2 Free currency

Free currency is a type of in-game currency that is earned by playing the game and completing certain tasks, rather than by spending real money. The specific use of these currencies in a gacha game will depend on the game's design and mechanics. However, generally they are used for gameplay progression, such as: upgrade materials for characters and weapons from the gacha, tickets to unlocked contents and features, in-game money to buy supporting tools or items for the gameplay. Normally, these are what players grind for in mid to late game. As discussed in the previous part on the gameplay loop of gacha games, because of the stamina system and the FOMO for the upcoming update, players are encouraged to visit their gacha game as often as possible. (Andrea, 2023)

3.4.3 Event currency

Event currency is a type of in-game currency that is earned by participating in special events within a gacha game. These events are often time limited, with challenges, quests, or activities that are designed to give players a different gameplay experience or a new story content depending on each gacha game. Players obtain event currency as they go through the event content. These currencies then can be exchanged in the in-game store for rewards, which are hard or time-consuming to get, from materials and in-game money, to gacha roll currency. However, there is a limit on how much each item can be exchanged. Furthermore, these gacha games masterfully design the event currency drop rate, so that it is almost impossible for players to get everything from the event store, before the whole event closes. (Andrea, 2023)

3.4.4 Purpose for the complex currencies system

The first reason for the complex currency system in gacha games is to encourage player engagement. Gacha games are designed to keep players coming back for more, and the complex currency system plays a big role in that. By having multiple types of currencies, players are encouraged to log in regularly to earn or spend these currencies before they expire. For example, daily login bonuses or event-specific currencies may only be available for a limited time, incentivizing players to log in every day to take advantage of them. Another reason for the complex currency system in gacha games is to create a sense of scarcity and value. In many gacha games, some currencies are more valuable than others, and players may need to spend real money to obtain them. This creates a sense of scarcity and exclusivity, making these currencies more desirable and valuable to players. (Koeder, Tanaka, 2017)

Additionally, the complexity of the currency system may make it difficult for players to understand the true value of the items they are purchasing, leading them to spend more money than they intended. The complex currency system also allows game developers to offer a wide range of rewards and items to players. By having multiple currencies, developers can offer rewards that are difficult to obtain, such as rare characters or powerful items, while still offering low-tier rewards that are more easily accessible. This creates a sense of progression and achievement for players, as they work to collect and unlock the most valuable rewards. (Koeder, Tanaka, 2017)

However, the overly complex currency system in gacha games can also have negative consequences for players. For one, it can be confusing and overwhelming, making it difficult for players to understand how to earn or spend their currencies effectively. This can lead to frustration and dissatisfaction with the game, as players feel like they are missing out on valuable rewards or not getting enough value for their money. Additionally, the complex currency system can create a sense of gambling in players, as they work to collect the currencies, they need to unlock rare rewards. This can lead to compulsive spending and even addiction in some players, as they become obsessed with obtaining the most valuable rewards in the game. (González-Cabrera, 2023)

In conclusion, the complex currency system in gacha games serves a number of purposes, including encouraging player engagement, creating a sense of scarcity and value, and allowing developers to offer a wide range of rewards. However, it can also be confusing and overwhelming for players, leading to frustration and gambling-like behaviors. As such, it is important for game developers to balance the benefits of a complex currency system with the needs and interests of their players.

3.5 The “legal” underage gambling

From the conclusions of previous analysis parts, it is understanding how mobile gacha games, or gacha games in general, can be considered as gambling games. However, as mentioned before, gacha games face less regulation than their loot boxes counterpart. This chapter aims to answer how gacha games manage to get away with advertising and enticing gambling to children and teenagers.

3.5.1 Laws regarded about gambling

Gambling generally refers to the act of risking something of value, usually money, on an event or outcome that is uncertain, with the hope of winning a prize or reward. There are many different forms of gambling, including traditional casino games like slots and blackjack, sports betting, and lottery games. In most jurisdictions, gambling is regulated by law to protect consumers and prevent addiction and harmful behavior. Laws around gambling vary widely between countries

and states, but most require operators to obtain a license and follow strict regulations around advertising, consumer protections, and responsible gambling. (Rose, 1992)

In general, activities that are considered gambling involve three key elements:

- **Consideration:** This refers to something of value that is exchanged in order to participate in gambling activity. This could be money, chips, tokens, or any other form of currency or object.
- **Chance:** Gambling activities involve an element of chance, meaning that the outcome is uncertain and cannot be predicted with certainty. This element of chance is what makes gambling exciting and potentially rewarding, but it also means that there is a risk of losing the money or value that was wagered.
- **Prize:** Finally, gambling activities offer a prize or reward for participants who are successful in their wager. This prize could be money, goods, or services, and it is the main motivation for participating in the gambling activity.
- It's important to note that not all activities that involve chance or prizes are considered gambling. For example, games of skill that involve an element of chance, such as poker or fantasy sports, may not be considered gambling in some jurisdictions. Similarly, sweepstakes or giveaways that are free to enter and do not require consideration may not be considered gambling. (Rose, 1992)

Overall, the exact definition of what constitutes gambling can vary depending on the jurisdiction and the specific activity in question. However, in general, gambling involves risking something of value on an uncertain outcome with the hope of winning a prize or reward. Gacha games have been criticized by some as being similar to gambling due to their random reward system and the potential for players to spend large amounts of money trying to obtain rare or desirable items. However, gacha games are not technically classified as gambling because they do not involve the exchange of real money for a chance to win real money or prizes. Instead, they use virtual currencies that can be purchased with real money, which are then used to obtain virtual items with no real-world value.

3.5.2 “Legal” gambling

Despite this distinction, gacha games have still been accused of using manipulative tactics to make players feel like they are gambling, even if they are not technically risking real money. Some of the ways that gacha games achieve this include:

- Creating a sense of anticipation and excitement: Gacha games often use flashy visuals and sound effects to make the process of opening a loot box or obtaining a reward feel like an exciting event. This creates a sense of anticipation and excitement that is similar to the feeling of gambling.
- Offering rare or valuable items: Gacha games often offer rare or valuable items that are difficult to obtain through regular gameplay. This creates a sense of exclusivity and encourages players to spend money in order to obtain these items.
- Using random chance: Gacha games use a random chance system to determine what items players receive. This creates a sense of uncertainty and unpredictability that is similar to the feeling of gambling.
- Creating a sense of addiction: Gacha games are designed to be addictive, with frequent rewards and a constant sense of progression. This can lead to players spending more and more money in order to continue the addictive cycle. (Abarbanel, 2018)

Despite these manipulative tactics, gacha games are still legal because they do not involve the exchange of real money for a chance to win real money or prizes. However, some countries have begun to regulate gacha games in order to protect players from the potential harm caused by their addictive and manipulative nature. For example, Japan has introduced regulations that require gacha games to disclose the odds of obtaining certain items, and Belgium has banned gacha games entirely. Other countries may follow suit as concerns about the harmful effects of gacha games continue to grow. (King et al., 2020)

4 Conclusion

Mobile gacha games, or gacha games in general, have become one of the largest pillars in the gaming industry. With a total revenue report between 100 million to 200 million dollars per month, they show how profitable the gacha games market is and enticing other companies to develop their own gacha games. To make the most profitable gacha game, however, developers have to design and iterate many gameplay mechanics to keep players within their games as long as possible. These gameplay design aspects can be the core of the gacha game itself, such as:

- **Collection and Rarity of Items:** The main feature and attraction of a gacha game. Players are encouraged to use premium currency to open gacha boxes for a unit they desire. Players' motivation for engaging with it can also be various, from their interest in a character's appearance or in-game lore, to the urge of completing the game one hundred percent or pursuing the game meta.
- **Leveling and RNG progression:** These game design aspects can be different for each gacha game. However, there are still some common similarities between them. The units players obtain in the gacha rolls needed to be leveled up and upgraded to continue going through the game content. Due to the RNG nature of the reward system, this process takes a lot of time to complete, making sure players will stick to the game for months till the next game content release.
- **Daily grind:** This can be considered the negative game design aspects toward players in gacha games. To hold on to players as long as possible, the game's progress is made longer than it needs to be. Players are limited with the stamina system, only allowed to play the game for a short amount of time per day. The developers are well aware of this fact. Therefore, many events and daily login rewards are handed out regularly to help players put up with this negative aspect.

On the other hand, there are game designs such as an in-game rotating shop, stamina exchange, and auto sweep system, allowing players to pay to skip playing the game, which completely contradict the core gacha gameplay loop. A good gacha game manages to balance this pay to skip aspect with its gameplay, offering players convenience if they really need it. The rotating shop

might put time pressure on some players, motivate them to play the game more, or revisit the game every now and then.

The design of the gacha boxes also contributes a lot to the players' motivation to pull them. Many gacha boxes feature colorful graphics, animated characters, and other eye-catching visuals to create a sense of excitement and anticipation around opening the box. The boxes may also include sound effects and music to add to the overall experience. Such designs are often deliberately addictive, as players may become hooked on the thrill of opening a new box and discovering what they might receive. This can lead to players spending more money than they intended and can be particularly dangerous for children or individuals who struggle with impulse control.

The currency system in gacha games can be particularly complex and confusing for many players. There are multiple types of currencies, each with their own value and purpose, which can be earned or purchased through various means. Gacha games intentionally make their currency systems complex in order to incentivize players to spend real money on virtual currency. Such complexity also creates a sense of scarcity and value and allows developers to offer a wide range of rewards.

Despite the very action of paying money for random rewards in gacha boxes, gacha games are still considered to be not gambling and legal. Due to the fact that gacha games do not involve the exchange of real money for a chance to win real money back, or other tangible rewards. Instead, players typically spend money on items that have no real-world value outside of the game. However, some countries have begun to regulate gacha games in order to protect players from the potential harm caused by their addictive and manipulative nature. While others have not yet taken a stance on the issue. The question of whether or not gacha games constitute gambling is still a matter of debate and interpretation.

5 Summary

The objective of this thesis is to figure out what gameplay design aspects in mobile gacha games, or gacha games in general, that hook players in and linger them for a long period of time. The thesis also aims to discover how popular and profitable these gacha games are in the gaming industry, as well as how they manage to bypass the gambling law. All of the questions in the introduction have been explored thoroughly:

- The concept of gacha games as well as loot boxes and gacha boxes are explained. Some of the gacha games revenue are shown to demonstrate their popularity.
- Various gacha games aspects are analyzed. The analysis on gacha game collection and rarity of item and leveling systems helps answer how mobile gacha games can be addicting. While their gameplay loop, RNG progression and daily grinding mechanic help to understand how these games force players to daily login habits.
- By studying how gacha games are technically not legal from the laws, the thesis is able to answer how gacha games manage to introduce gambling to children and teenagers. The study on the effect of gacha game gambling behavior on this age gap is still limited and not yet in-depth.

The thesis focuses mainly on analyzing the game design aspect that is somewhat unique to gacha games. It manages to explain how such design affects players, encouraging or urging them to play the game how the developers want. Future study can explore the manipulation technique of these gacha games with a more in-depth into human psychology and behavior.

References

- Abarbanel, B. (2018). Gambling vs. gaming: A commentary on the role of regulatory, industry, and community stakeholders in the loot box debate. *Gaming Law Review*, 22(4), 231-234.
- Andrea, k. (March 3, 2023) Types of Mobile Game Currencies You Need to Know. Udonis Mobile Marketing Agency.
- Britt, B. C., & Britt, R. K. (2021). From waifus to whales: The evolution of discourse in a mobile game-based competitive community of practice. *Mobile Media & Communication*, 9(1), 3-29.
- Brooks, G. A., & Clark, L. (2019). Associations between loot box use, problematic gaming and gambling, and gambling-related cognitions. *Addictive behaviors*, 96, 26-34.
- Cermak, D. (2019). Micro-transactions, massive headaches: international regulation of video game loot boxes. *Mich. St. Int'l L. Rev.*, 28, 273.
- Craig, C. (November 2020). Global Mobile Game Revenue Grew 26% Year-over-Year in First Nine Months of 2020 to Nearly \$60 Billion. Sensor Tower - Market-Leading Digital & Mobile Intelligence.
- Gan, T. (2022). Gacha Game: When Prospect Theory Meets Optimal Pricing. arXiv preprint arXiv:2208.03602.
- González-Cabrera, J., Basterra-González, A., Ortega-Barón, J., Caba-Machado, V., Díaz-López, A., Pontes, H. M., & Machimbarrena, J. M. (2023). Loot box purchases and their relationship with internet gaming disorder and online gambling disorder in adolescents: A prospective study. *Computers in Human Behavior*, 143, 107685.
- Hao, W. L. (2023). A Review on the Evaluation of Video Game Addiction as a Legitimate Disorder. *Open Journal of Social Sciences*, 11(3), 410-417.

Jecius, D., & Frestadius, A. (2022). How do players experience a gacha game depending on their perspective as a starting or a veteran player?: A case study of Genshin Impact.

Kersley, A. (May 2, 2021). Loot boxes are dead. what comes next will be worse. WIRED UK.

King, D. L., & Delfabbro, P. H. (2019). Loot box limit-setting is not sufficient on its own to prevent players from overspending: A reply to Drummond, Sauer & Hall.

Koeder, M. J., & Tanaka, E. (2017). Game of chance elements in free-to-play mobile games. A freemium business model monetization tool in need of self-regulation?

Lexi, S. (January 15, 2020). The State of Mobile in 2020: How to Win on Mobile. App Ai.

Montiel, I., Basterra-González, A., Machimbarrena, J. M., Ortega-Barón, J., & González-Cabrera, J. (2022). Loot box engagement: A scoping review of primary studies on prevalence and association with problematic gaming and gambling. *Plos one*, 17(1), e0263177.

Raneri, P. C., Montag, C., Rozgonjuk, D., Satel, J., & Pontes, H. M. (2022). The role of microtransactions in internet gaming disorder and gambling disorder; A preregistered systematic review. *Addictive Behaviors Reports*, 100415.

Rose, I. N. (1992). Gambling and the Law-Update 1993. *Hastings Comm. & Ent. LJ*, 15, 93.

Washington Journal of Law, Technology & Arts (December 7, 2022). Glorified gambling: Moral and legal issues within the gacha Gaming industry.

Woods, O. (2022). The economy of time, the rationalisation of resources: Discipline, desire and deferred value in the playing of gacha games. *Games and Culture*, 17(7-8), 1075-1092.

Yamakami, T. (2013, September). Cross-Culture Analysis of Mobile Social Games: Toward Design Guidelines of Lessons Learned from Globalized Mobile Social Games. In 2013 International Conference on Cloud and Green Computing (pp. 266-270). IEEE.

Zagal, J. P., Björk, S., & Lewis, C. (2013). Dark patterns in the design of games. In *Foundations of Digital Games 2013*.

Zendle, D., Meyer, R., Cairns, P., Waters, S., and Ballou, N. (2020) The prevalence of loot boxes in mobile and desktop games. *Addiction*, 115: 1768– 1772. <https://doi.org/10.1111/add.14973>.

Annex 1: Material management plan

Research work:

All of the references are thesis and article which is free and can be found on the internet. Game analysis is a combination of both this thesis's author personal experience of these games and others from many social forums, as well as from others research thesis. All of the figures are taken by the author as his in-game footage. Everything is stored on the author's personal computer file.