

The Convergence of Gaming and Gambling

The Loot Box Conundrum

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Introduction

The business of video games has seen a lot of changes since its inception. The modern gaming business landscape does not solely rely on selling retail copies anymore: business are constantly experimenting with new ways to monetize games beyond the initial sell. Even going, in the freemium model, going as far as offering a complete gaming experience for free, while offering optional content behind pay walls. A popular monetization option for games nowadays is the loot box model.

Loot boxes are a way to offer in-game content through a game of chance [1]. The consumer often uses some sort of 'key' or currency to open the loot box, after which a random prize is handed out, often selected among different categories of items with different value and odds. The presentation of loot boxes can differ vastly: Two fundamental characteristics of the loot box system are how the keys and crates are obtained and how the prizes affect gameplay.

Although loot boxes can offer an entertaining and fun way to add value to a game, predatory business models are arising that target the more vulnerable consumer. Since loot boxes are a game of chance, and could be categorized as gambling [1], they have psychological, governmental and ethical implications.

There is a wide range of short term and long term negative consequences linked to gambling [2]. All the while authorities all over the world are struggling with regulating loot boxes¹, which leaves the vulnerable consumer exposed to unregulated gambling systems [3]. This can result in negative societal consequences, like overspending consumers and gambling addiction. Moreover, some game developers wilfully expose vulnerable consumers to unethical predatory monetization schemes.

Businesses have a social responsibilities when it comes to presenting loot boxes. Ethical principles like fairness, transparency and accountability can be used to assess loot box characteristics [4]. Calling upon the social responsibility of business instead of enforcing law may be more fruitful when it comes to preventing societal problems linked to loot boxes.

Regardless of whether loot boxes are inherently bad and should not exist in the video landscape at all, this thesis investigates the possibility of the existence of a good loot box and a bad loot box. A good loot box can be defined as one that minimizes the risks and maximizes the value for the consumer. A bad loot box would be the exact opposite, minimal value and maximal risk for the consumer. The main goal of this thesis is to make clear what distinguishes good and bad.

The first chapter will take an in depth look at the history of microtransactions in video games, and how offering downloadable content after the initial sell of a game transitioned to the loot box systems we see today.

The second chapter investigates the current landscape of loot boxes from three different perspectives. The psychological perspective investigates the mental effects loot boxes have on consumer. The governmental perspective explains the legal implications of loot boxes around

the world. And the ethical perspective explain the social responsibilities businesses have when it comes to creating monetization schemes in video games.

After discussing and summarizing the results of the previous chapters and defining the research questions and methods in chapter three, chapter four reports the result of manually investigating loot boxes to distinguish characteristics. Additionally, every characteristic is hypothesized to have a positive or negative contribution to loot box systems. A survey among experience loot box users will validate most of these hypotheses.

The fifth and last chapter will summarize all the findings and presents answers to the research questions. Moreover, it discusses the limitations of this thesis and discusses the future of loot boxes.

Authorities could benefit from this thesis in creating more suitable regulations for different types of loot boxes, and game developers could use it to get a sense of what is ethically acceptable in a loot box from the consumer perspective. Characteristics that may subconsciously encourage consumers to buy more loot boxes can be deemed as a predatory business strategy. This thesis can make developers aware of what characteristics they can avoid or use in order to protect their consumers and make loot box systems in their games profitable for themselves, as well as for the consumer. Institutions that are responsible for creating awareness of, for example, gambling addictions could use as in inspiration towards better campaigns that aim towards informing consumers.

1. How did we get to Loot Boxes?

While articles about the potential harm of gambling in video games are slowly but steadily seeping into the national news [5], one may wonder how it could have gotten this far. How did gambling make its way into something as harmless and entertaining as video games? Back when games were just starting to become popular, no one could have ever predicted the amount of revenue companies make with these gambling systems. This section describes how the video gaming industry changed from “plug and play”-video games to the diverse money-making concepts we see in gaming today, which ultimately led to the introduction of gambling in gaming.

1.1. The introduction of Internet to gaming

Classically, every released video game was just a game and that would be it. The revenue made by all the parties (developer, publisher, retailer) involved in getting the game to consumers was purely based on the selling price of these games. The rise of the Internet has made for some new pricing concepts to enter the market. In the early 2000s, South-Korea stood on the forefront of online gaming. Every year, hundreds of online games would be released onto the limited Korean market [6], forcing developers to come up with creative alternative pricing schemes to gain a competitive edge over their competitors. This led to the introduction of, among others, two different revenue concepts: subscription based and item-based payments.

Subscription-based games have players pay a regular fee to keep using the game, and it represents today’s standard in MMORPGs². Depending on the game, one would pay an initial price for the game and then keep paying a periodic fee because developers keep adding content to the game and need a large amount of running servers to facilitate the interactions between players. Some developers choose to adopt the so-called “Freemium” revenue model: they freely release a part of their game, after which you would have to pay a regular fee to get access to other parts of the game. This model poses a challenge: since the consumer is paying for a particular game, it could stop them from experiencing other games than the ones they are paying fees for. This makes for a big barrier for new games trying to acquire a piece of the market.

The Korean game “Quiz Quiz” was the first game to successfully introduce an item-based revenue model, in which consumers pay for each bit of (extra) game content instead of offering the content behind a single pay wall. Item based business models have many challenges for developers: (1) Balancing the amount of free game content over the amount of paid game content; and (2) Balancing the items bought with in-game currency over items bought with real-world currency to keep the game interesting and to maximize revenue. Both subscription-based and item-based business models can be defined under the umbrella term “Games as a service”.³ Until Microsoft introduced microtransactions to its Xbox 360 platform, this model only existed on the PC software landscape. The previous generation of consoles, namely the Xbox, PlayStation 2 and GameCube, did introduce online capabilities to its systems, but these were solely used to interact with other players other than offering any form of priced content after the initial sale of the respective game.

1.2. The beginning of microtransactions on consoles: The infamous Horse Armor

Before the Xbox 360 launched, Microsoft was the first to coin the idea of microtransactions on consoles to its pool of developers and publishers in early 2005. A microtransaction would be a transaction of no more than €5 and would provide a way for consumers to spend their money on something they want, instead of paying an expensive bundle that could potentially contain things the player does not want. A problem was, however, that most of the microtransactions money would be eaten up by transaction fees if paid directly. Hence, Microsoft came up with the idea of a virtual store-front in which consumers could buy goods with a virtual currency named "Microsoft Points". These Microsoft Points could be bought by a minimum of 800 points, which would cost €10. The proof of concept followed later that year with the offering of cosmetic items and playable maps for three of the Xbox 360's launch games ⁴.

The first third-party publisher to jump the microtransaction bandwagon was Bethesda, with the release of the infamous "Horse Armor Pack". Although this marked the beginning of the uprising of microtransactions in casual gaming, it also marked the beginning of continuous controversy surrounding the subject. The Horse Armor Pack offered additional armor for the player's virtual horse in the 2002 role playing game: The Elder Scrolls IV: Oblivion. The armor had no function at all and was purely cosmetic and had a €2,50 price tag. Online discussion platforms like NeoGaf and Reddit clearly show how negatively amazed consumers were with this offer.⁵ A Bethesda spokesperson later told they were merely finding a spot for downloads like this, and were experimenting with the pricing of downloadable items. Also emphasizing the fact that these things are optional downloads.

"We tried to find a spot for [the download] that fit with what other things were out there. A Theme costs 150 points. The Kameo thing was 200. We're trying to find the right spot that fits..."

...These are optional things, not requirements, so if you do not want to get them you do not have to.⁶

In another interview, Bethesda stated that they wouldn't make any knee jerk decisions on the backlash following the Horse Armor release "We'll see what folks think and put out a few others we have planned and figure out where to go from there,"⁷ Which is exactly what they did, following up with DLC's ranging from new chapters to other cosmetic items. 3 years after the release, as part of a April Fools joke, Bethesda halved the price of all their DLC items for Oblivion. Except for the Horse Armor pack, which doubled in price. Clearly a nod towards the controversy at the release of their game.

A year later, and after more games on consoles and PC included all sorts of microtransactions⁸, the market for virtual items, characters and currencies was estimated to exceed 2.1 billion USD in 2007 [7]. It seemed like microtransactions were here to stay, as new pricing concepts entered the market.

1.3. EA's take on microtransactions: From "Project Ten Dollar" to "Online Passes".

In 2007, John Riccitelto became the CEO of Electronic Arts. One of the first things he did was warning the industry that the then €20 billion games market was headed for trouble. All the big publishers kept selling games according to the model of putting shrink wrapped boxes in brick and mortar shops. He foresaw that the second hand market for games would grow rapidly because of the financial crisis, which would mean less revenue for EA. This is exactly what happened, as for the next 11 quarters straight EA had lost money. Shrinking its stock with 68% ⁹. Although EA did shift to cheaper online games a bit to generate revenue for gamers that did not want to spend €60,- on a game, their most important defence against the financial crisis was to tackle the second-hand games market.

This began with introducing their "Project Ten Dollar". The idea was to include a coupon with every shipped game, that gave access to a chunk of content by entering a single use code into your gaming system. Second hand buyers would have to pay €10,- to access the same content. This strategy actually worked and EA slowly started to climb out of its own financial crisis.

"You see a six-foot hole that we're in. I'm telling you that we were in a 20-foot hole and we've climbed 14 feet out of it,"¹⁰

Eventually, "Project Ten Dollar" became "Online Pass". The difference was very slight: Instead of restricting the use of some extra content by second hand buyers, EA started to restrict content that used to be a standard feature. In most cases, this standard feature was online capabilities. Meaning second-hand buyers would have to pay €10,- to access the online features of the given game. Tiger Woods PGA Tour 11 was the first game with an online pass. As EA announced¹¹, all their sports simulation games contained some form of the online pass that year. They did not admit they made this move to tackle the second hand sales problem. Instead, they said that it was only fair to reserve the "Enhanced online experience" to players that paid EA directly:

"In order to continue to enhance the online experiences that are attracting nearly five million connected game sessions a day, again, we think it's fair to get paid for the services we provide and to reserve these online services for people who pay EA to access them."¹²

After EA paved the way, other publishers released games with comparable systems like Ubisoft a year later, with Uplay¹³.

As happened with the introduction of microtransactions, online passes had to endure heavy criticism from the consumers. Players wanted to sell a game whenever they wanted to, without lowering the price because they had used the code it came with, and players who used to rent games criticized the system all the same. Retailers warned the publishers for this to happen¹⁴ and said these systems would only negatively affect consumers in different ways.

After three years of criticism, EA finally decided to pull the plug¹⁵, after which Ubisoft and other publishers followed¹⁶

“Initially launched as an effort to package a full menu of online content and services, many players didn’t respond to the format. We’ve listened to the feedback and decided to do away with it moving forward.”

1.4. From online passes to season passes

Microsoft’s philosophy on downloadable content is focused on microtransactions. Instead of offering a big chunk of content at once for a relatively high price, as used to be the case when additional content was released for PC games, the consumer could pick the exact content they want for a low price. This does have a slight downfall, because consumers generally would pick the best additional extra content available instead of buying all extra content available. Rockstar Games came up with a solution for this challenge in the form of season passes. For their game L.A. Noire, which featured a bunch of downloadable content that totalled at €20, one could buy a Rockstar Pass¹⁷ that gave the consumer access to all of this content for €12. The idea was to lure consumer in with the €8,- discount, while they would be buying content that they would otherwise potentially not even buy. The term season pass refers to the fact that a game can contain multiple “seasons” of content. So potentially consumers could buy multiple season passes to obtain multiple chunks of content that would be released over time after a game’s initial release.

After Rockstar’s take on the season pass, a lot of game developers jumped in on the action and started offering their take on season passes. Just like the previously introduced cash cow systems, developers yet again tested the waters to see how far they could go. Resulting, yet again, in consumer backlash. Activision was the first one that dared to ask a season pass at almost the retail price of a new game¹⁸. For the amount of €50 you would get a full year of content releases by buying the “Elite” pack of Activision’s Modern Warfare 3. The season pass concept was adopted by most of 2011’s major game releases including Borderlands 2, Destiny, Evolve, Gears of War 3, Forza Motorsport 4, and Battlefield 3.

The problem with a lot of these season passes however, was that the consumer was basically pre-ordering a chunk of content. Meaning one would have to buy a €60,- game with an additional €30,- to pay for future content, sometimes not even knowing what this future content would exactly entail. Putting their money and trust in the developers hands to develop something worth their money. Games and season passes were even sold as a bundle, often called the “Deluxe Edition”. This also raised suspicion: consumers suspected developers of purposely withholding content. Only for it to be offered as extra content after the game’s initial release, while the content could have been in the game in the first place. Season passes could basically be used to carefully divide content between the initial release and future released content. These suspicions were confirmed when consumers found out some ‘downloadable content’ was already burned on the disc and were unlocked upon paying for the content in a store.

1.5. From season passes to loot boxes

This brings us the most recent money maker in the world of gaming: loot boxes. Through progression in the game or pay money in the real-world or in-game currency consumers can obtain these loot boxes. This box will contain a virtual item. These items can either be cosmetic, like a fancy outfit, or something that will enhance the gameplay experience, like a skill or a gun. The contents of this loot box can only be acquired by spending money on a key that opens the loot box.

The loot box system resembles that of real-world trading card games like Magic the Gathering, or the Pokemon card game, where one could buy booster packs containing a random set of cards. Whether or not the consumer gets something useful out of the booster packed is 100% amount to chance. These card games have their virtual counterparts, like Hearthstone and Gwent. The difference however between these card games and games containing loot boxes, is that the cards in card games are part of the core gameplay while items gained from loot boxes merely enhance the game in a small matter.

The very first incarnation of loot boxes in western gaming was within Valve's Team Fortress 2. The game transitioned to a free-to-play business model after launching the Mann-conomy update 2010¹⁹ that introduced loot boxes and item trading.

In essence, loot boxes are a way to put game content behind a microtransaction. The only difference with earlier microtransaction offerings is the fact that a consumer, literally, does not know what they will get for their money. Thus introducing a game of chance after a consumer's payment before handing out a piece of content.

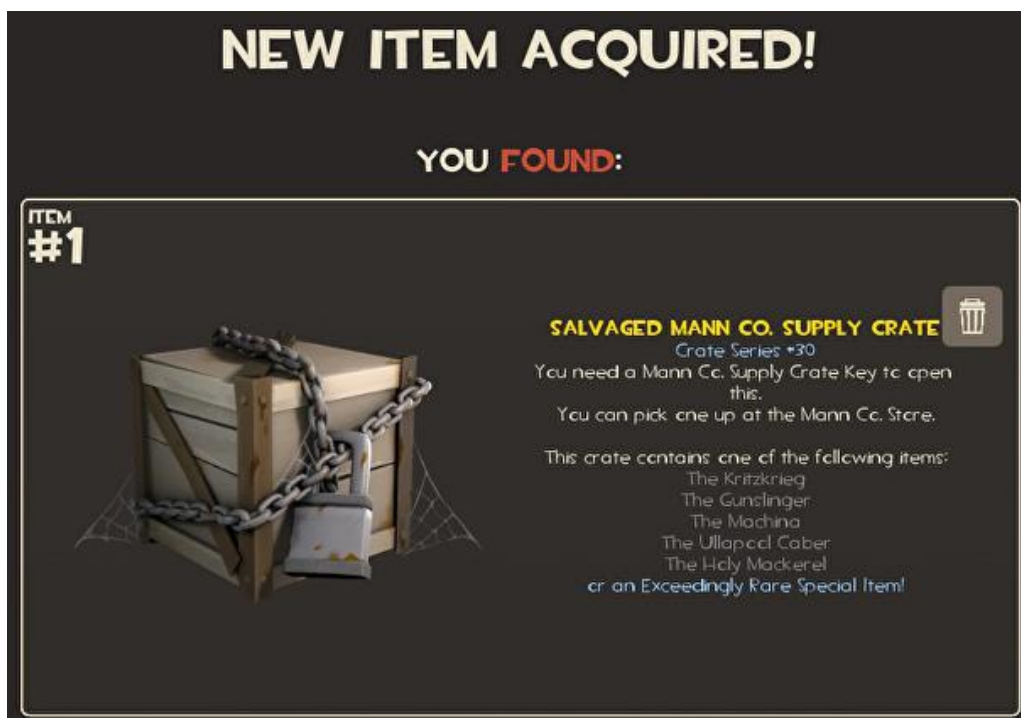


Figure 1: A Team Fortress 2 loot box, acquired after playing a game

Because of the different values of the items, a game with a loot box system in place combined with the possibility to trade the items with other players allows for a complete economy to exist within a game. The most valuable items from these loot box, for example in the first person shoot Counter Strike: Global Offensive, can be sold for over a thousand Euro²⁰.

2. Literature review

This literature review addresses the topic of loot boxes from several perspectives. Each of these perspectives, (information science, social sciences, industry, consumers and government) has its own unique look and focus on the addressed topics. Conclusions drawn can thus be subject to bias since each perspective have different stakes. To avoid this bias, the review is split up in different sections, each addressing a different perspective on the case at hand. 2.1 The psychological perspective **Error! Reference source not found.** will address the psychological perspective, Governing Loot boxes will address the governmental perspective, and Ethics of [loot boxes and the social responsibility of businesses](#) will address the ethical perspective. All perspectives will contain sources and comparisons to the industry perspective since, logically, the industry came up with loot boxes in the first place.

The snowballing method was used to gather all the papers used in this review [8]. The following keywords have been used to find the papers that made up the initial set: Loot boxes, Gambling, Video Games, Addiction, Gaming.

The link between gambling and loot boxes has been prevalent ever since loot boxes as a concept has been introduced in gaming. From the obvious visual similarities, to the comparable more abstract concepts. The question remains whether the use of loot boxes should be treated as a gambling system, and whether symptoms and treatment of subsequent addiction should be treated like a behavioural addiction. Every country has its own laws towards loot boxes. This makes for the fact that in some countries underage gamers can use all the features that come with the wide variety of loot boxes that are on the market. Because of the young age of loot boxes, the consequences of these facts are not yet known. Of course, if we establish that loot boxes are considered gambling, a lot of scientific roads open up because the scientific community has published a large amount of papers on comparable subjects.

2.1 The psychological perspective

This first section of this literature review addresses the key features of loot boxes and how they compare to general gambling theories. An exposition of gambling theories will be followed up by the effect of it all on gaming adolescents, which make up 28% of the gaming community as of 2018 [9].

2.1.1 Loot boxes: gambling or gaming?

In order to successfully compare gambling and loot boxes, it is important to first define what exactly gambling is. In different disciplines, different definitions of gambling occur. However, most of these definitions have certain elements that distinguish them from “risk taking”, the umbrella term under which gambling is defined. There are four elements to be distinguished [1].

1. The exchange is determined by a future event for which, at the time of staking money (or something of financial value), the outcome is unknown;
2. The result is determined by chance;
3. The re-allocation of wealth is usually without the introduction of productive work on either side;
4. Losses incurred can be avoided by simply not taking part in the activity in the first place;

One could add to this that a successful gamble means that the money or prize to be won is of greater financial value than the money staked in the first place. Merely looking at this elements, the opening of loot boxes would “almost” be defined as a form of gambling if one follows the elements above:

1. After completing the transaction to open a loot box, the consumer cannot do anything to influence the prize they are going to get;
2. Which prize is won is thus 100% amount to chance;
3. Next to completing a transaction, the consumer does not have to do anything to obtain the prize;
4. Since the consumer, by definition, cannot lose, the fourth element does not apply to loot boxes;

The consumer always gets something in return when they purchase a loot box. It may not be what the consumer hopes for, but consumers are never left empty-handed. This last element is the reason why, according to the definition above, loot boxes are not considered gambling. Entertainment rating agencies like ESRB²¹ and PEGI²² [10], which follow the appropriate laws of each separate country, rate games in accordance with this fact and thus do not consider loot boxes when giving an age-rating to a game. These organizations do want to avoid underage gamers to come in contact with gambling systems. They do this by adding gambling descriptors to entertainment products, and appropriately changing the advised minimum age at which the game should be played. Games with loot boxes do not get these gambling descriptors. For a game to receive one it has to include content that simulates what is considered gambling, including cash payouts [1], or contain actual gambling systems that fulfil all the previously mentioned elements. Predictably, some game developers do not think loot boxes are gambling and should not be treated as such. For instance: in a 2018 interview Blizzard, the developer of “Overwatch”, stated that they think they have made a fair system and think they are tied up to other developers who have made “less desirable” systems [11]. Overwatch is also one the first Western games that suffered regulatory actions by the Belgium government [12], on which they do not agree with.

Belgium is one of the first Western countries to regulate loot boxes because of their gambling nature. More countries, especially in South-East Asia, have labelled loot boxes as such and are also starting to adopt regulations for them [13]. Furthermore, sixteen government institutions in countries all over the world made an official declaration to research loot box characteristics and govern such systems accordingly [14]. A more in depth view on this topic is covered in Section Governing Loot boxes of this literature review.

2.1.2. Defining behavioural addiction and recovery

When one thinks of addiction, the first thing that comes to mind is probably substance abuse [15]. The abuse of alcohol, cigarettes and hard drugs have been researched thoroughly and have been linked to a wide range of physical and mental consequences. In spite of the existence of this predominant definition of addiction there has been a growing movement which views a number of behaviours as potentially addictive that do not involve the digestion of a psychoactive drug [16] and has led to new definitions of what constitutes as addictive behaviour. If it can be shown that just a behaviour can be an addiction, through for example a consumer being exposed to the continuous rewarding nature of gambling without any psychoactive drug involved, then this will open the floodgates for other excessive behaviours to be theoretically considered as potential addictions. Which will open up new roads of science which may lead to better treatment of these cases.

Some academics argue that in theory, behavioural addictions are not any different from addictions to psychoactive drugs, like alcohol, in terms of the core components of addiction [16]. This has led to new definitions of what constitutes as addictive behaviour, which include activities like gambling and gaming. Like of example the following one, coined by scientists in 1988:

“A repetitive habit pattern that increases the risk of disease and/or associated personal and social problems. Addictive behaviours are often experienced subjectively as ‘loss of control’ The behaviour continues to occur despite volitional attempts to abstain or moderate use. These habit patterns are typically characterized by immediate gratification (short-term reward), often coupled with delayed, deleterious effects (long-term costs). Attempts to change an addictive behaviour (via treatment or by self-initiation) are typically marked by high relapse rates” [17].

Trying to define addiction proves to be a hard task, as it continues to be a topic of discussion among the scientific community [16]. The most basic definition of addiction is “A dependent state acquired over time to relieve stress”. However, defining addiction is rather like defining a mountain or a tree in that there is no single set of criteria that can ever be necessary or sufficient to define all instances [18]. Psychologist Mark Griffiths suggests that for a behaviour to be addictive, it has to fulfil the following six components.

- **Salience:** when the particular activity becomes the most important activity in people's lives. Even if they are not actually engaged in the behaviour, they will be thinking about the next time they will be;
- **Mood modification:** Engaging in the activity can cause a temporary high or buzz, and even tranquilizing feelings of escape or numbing;
- **Tolerance:** More and more of the behaviour is needed to achieve the effects of mood modification. For example: a gambler may need to increase the size of their bets to experience the effect that was previously achieved by placing a smaller bet;
- **Withdrawal symptoms:** Unpleasant feelings and physical effects that occur when the particular activity is discontinued, like shaking, moodiness and irritability;
- **Conflict:** The particular activity causes conflicts with people around the addicts (interpersonal), or conflicts from within the person (intrapersonal);
- **Relapse:** The tendency for repeated reversions to earlier patterns of the particular activity to recur. Extreme patterns and the highest point of the addiction can be quickly restored even after years of abstinence and control;

Adding to these six components, Griffiths [18] postulates that explanations for addictions must come from a biopsychosocial approach, in that addiction arises from a combination of biological predisposition, social environment and psychological constitution.

A relatively new behavioural addiction is technological addiction, which involves human-machine interaction. Technological addiction can either be passive (watching TV) or active (gaming) and usually contains persuasive technologies that promotes the excessive use of the respective technology [19]. A subset of technological addiction is digital addiction. Digital addiction comes in many shapes and forms. It includes the excessive, compulsive, impulsive and even hasty usage of software and computing devices [20].

Despite the growing body of evidence that digital addiction is a serious issue, neither software engineering literature or practice have prevented or aided consumers being addicted. Some scientists [20] believe that the software itself should and could take responsibility to ensure consumers use the particular software wisely. Consumer impact and ethical dilemmas will be further researched in the third section of this literature review.

2.1.3. The loot box conundrum

A new form of technological addictions is addiction to loot boxes. A growing number of problem case examples make it to major news outlets and various discussion forums [21] [22], and even more severe cases make it to the news. For example: a FIFA Ultimate Team²³ player spent over €10,000 on Loot boxes [23] and shared his story with a news website. Various scientific outlets acknowledge the rise of loot boxes as a threat to consumers as they call upon the scientific community to raise awareness of the known behavioural and psychological impacts of the reward structures of loot boxes [24]. Using the six components of Griffiths [18] we can easily define what a loot box addiction would encompass:

- **Salience:** Opening loot boxes becomes the most important activity in the addicts life, even thinking about opening them when not playing the particular video game the loot boxes are in;
- **Mood modification:** They feel a temporary feeling of euphoria when opening a loot box, especially when “winning”. Meaning the value of the obtained item is higher than the cost of opening the loot box;
- **Tolerance:** More and more loot boxes need to be opened to obtain that same euphoric state;
- **Withdrawal symptoms:** When the addict stops opening loot boxes, they experience an unpleasant feeling and even physical effects;
- **Conflict:** Opening of loot boxes can cause interpersonal problems because money spent on them may be more than the addict could actually miss;
- **Relapse:** Even after a very long time of stopping with loot boxes, the addict can very quickly relapse to their worst phase;

Although the continuously rewarding nature of loot boxes excellently lends itself to become very addicted to, it is not the only problem consumers face.

2.1.4. Loot box use in adolescents

Gambling nowadays is no longer a stigmatized activity. It has become a legitimate form of entertainment for adults [25]. Furthermore, gambling institutions are trying to give gambling a positive image. Lotteries, for instance, give gambling a positive image by spending a lot of their revenue on charities. And marketing for gambling is aimed at the recreational value gambling offers, while not showing the downsides of the activity. Only about two decades ago, gambling among youth has emerged as a significant public health concern [26].

Problem gambling among adolescents has been associated with a number of mental health outcomes, a study by Korn *et al.* suggests adolescent gamblers have higher rates of depressive symptoms, increased risk of alcohol and substance abuse, increased risk of suicide ideation and attempt, and higher anxiety [26]. Furthermore, the same study postulates that infrequent gamblers have few, if any, negative outcomes.

As one gambles more frequently, the negative outcomes begin to outweigh any potential benefits, like the provision of fun and entertainment. Recent depictions of gambling, like the

documentary *Double or Nothing*, feature someone losing their entire net worth and marriage through gambling. The extremity of depictions results in youth failing to recognize that there are less severe downsides to gambling.

Other than the positive way gambling is marketed nowadays, there are other ways through which youngsters can come into contact with gambling. Since gambling is not immune to technological advancements, adolescents are continually exposed to many new forms of gambling [27]. The fact that these new forms of gambling are likely to appeal to the tech-savvy youth [28], combined with the fact that the implementation of protectionist policies cannot keep up with the speed of technological change [3], leads to a situation that makes the youth particularly vulnerable.

Loot boxes are portrayed in the same positive manner as other forms of gambling, hiding the fact that there are downsides and risks involved with frequent use of loot box systems. The unveiling of the item one is getting after purchase is mostly accompanied with colourful animations and sounds, which have been proven to influence gambling behaviour [29]. Furthermore, gambling among youth is further stimulated by social media influencers ²⁴ recording themselves opening loot boxes while keeping a positive vibe throughout the process of acquiring large numbers of items while often, against all odds, often hitting the jackpot.

It is not rare for these videos to gather hundreds of thousands of views. Showing that there is a big community of gamers that are interested in loot boxes.



Figure 2: A crate opening video by popular YouTuber Jon Sandman

2.1.5. Conclusion

This generation of youth is the first that will have grown up with the widespread acceptance, multiple formats and opportunities for gambling, and in an environment where gambling is perceived to be a harmless recreational, entertaining, and socially acceptable pastime activity. It has been proven that loot boxes are akin to gambling [2] (the legal age for which is 18 or older in most US states, and in many countries). This raises serious concerns about their appropriateness for games available to younger audiences, especially since it has been proven that adolescent internet gamblers are significantly more likely to be problem gamblers [30], and that problem gambling in adolescents is associated with a wide range of negative consequences.

Education and guidance are needed to aid these young people in dealing with the challenges and conveniences of gambling in video games.

2.2. Governing Loot boxes

Not only are developers testing how far they can go before consumers start to complain, governmental authorities are also more and more getting involved with loot boxes. This section explains how and why different authorities around the world are involved, and what it may mean for the future of loot boxes.

2.2.1 Laws and Legislation

In the nineties, there has been some controversy about the analog counterpart of loot boxes: a series of lawsuits in 1996²⁵ against baseball card manufacturers claimed that the limited-run 'chase cards' – which are rare, valuable cards that might appear in a pack – constituted an illegal lottery. The suits were not successful. Later, in 1999²⁶, similar lawsuits followed. For example: after the release of the Pokemon trading card game, which used booster packs with unknown contents, lawsuits were filed against Nintendo, claiming that the buying of these booster packs constituted gambling. Again, the suits were dismissed. After the dismissal of these "gambling for children" lawsuits in the late nineties, to the best of the author's knowledge, no lawsuits got the media's attention. The controversy surrounding these trading card games have stagnated.

The rise of loot boxes however, have reignited the controversy. There is an established scientific definition for gambling, which this literature review presented in the previous section. Legally, there is a big difference between a gambling game like roulette and loot boxes. In roulette, I hope that the money I put down would return to me with a profit. In loot boxes, I know the money is spent, the gamble is whether the item I get in return is to my liking. However, if I'm able to sell this item in exchange for real money through online markets, the lines between roulette and loot boxes blur. In loot boxes though, your possible selling price is never zero, the value on the item depends on the value the market assigns to the item. In conclusion, there is a difference. The question remains whether it is different enough to have loot boxes abide standard gambling laws.

At this moment, each country has their own way of answering this question. Actions taken against loot boxes can be divided in three categories:

1. No action

As of the today, the United Kingdom trusts rating agency PEGI in giving appropriate ratings for loot boxes. The industry is basically self-regulating, no new laws and regulations are installed by the government. PEGI is tasked with protecting and informing consumers, and the government thinks that this is conclusive in the loot box debate. Other countries take similar attitudes towards loot boxes, for example: the French gambling authority ARJEL announced that they do not see Loot boxes as a form of gambling²⁷. Also, they think that off-platform trading of prizes is irrelevant when it comes to the determination of the monetary value of the prize.

This means that developers will not be held accountable for it and will avoid being subject to regulations by the government. This ruling, however, is deemed non-committal and unspecific, as ARJEL continues to review the subject.

2. Compliance with existing laws

The Netherlands and Belgium look at each individual game to decide whether the loot box in the respective game is in compliance with the current gambling laws²⁸. In The Netherlands, this resulted in a research carried out by the 'Kansspelautoriteit', the local gambling authority. They researched 10 different unspecified games and concluded that 4 games did not comply with the law. These loot boxes broke the law because the prizes won were tradable for real money within the game and thus have economic value.

According to Dutch law it is forbidden to offer these “games of chance” to the consumer without first acquiring the appropriate permits [31]. The developers were given until June 2018 to tweak their games accordingly. Looking for ways to act in accordance to the Dutch law, developer Valve for example blocked players in the Netherlands from opening crates in Counter Strike: Global Offensive.²⁹

3. Strict action through new laws

In mainland China, gambling is strictly prohibited. Although there aren't any exact definitions of what constitutes gambling, law enforcement authorities assess certain activities in a case-by-case manner, and determine whether it is gambling. In countries like China, online games are regulated to make sure no gambling mechanisms are in place. The reignited gambling scrutiny caused by loot boxes did not cause any panic in China. Instead, the two major online gaming regulatory bodies in China, the SAPPRFT (State Administration of Publication, Press, Radio, Film and Television) and the MOC (Ministry of Culture), were quick to install specific laws to require loot boxes to meet certain requirements. The MOC's latest regulatory update made loot boxes to comply with the following rules³⁰:

- loot boxes cannot be acquired with real money or virtual currency;
- virtual items and other services offered in loot boxes must be obtainable by other means, e.g., purchased with real money or virtual currency;
- game publishers must in a timely manner, and truthfully, publicize information such as names, functions and quantity of virtual items or other services offered in loot boxes, as well as the probability of winning; and
- loot box results must be publicly disclosed and their records must be kept by game publishers/operators for no less than 90 days.

Although China takes a strict approach towards loot boxes, they do acknowledge the role of loot boxes in increasing fun, engagement and the importance for developers in the provision of monetization options to games for developers. Therefore, the authorities take a middle ground approach to regulating the gambling mechanisms of loot boxes, other than categorically banning them.

Australia has one of the tougher regulations when it comes to electronic gaming. According to a 2018 study by the Australian Environment and Communications Reference Committee, loot boxes in games could lead to problem gambling.

"Spending large amounts of money on loot boxes was associated with problematic levels of spending on other forms of gambling. This is what one would expect if loot boxes psychologically constituted a form of gambling. It is not what one would expect if loot boxes were, instead, psychologically comparable to baseball cards." ³¹

The committee recommended that games containing loot boxes are not to be sold to consumer under the legal gambling age of 18³². As of today, these recommendations have not been codified to be part of the Australian law, but might in the future.

Every country has their own set of priorities when it comes to regulating loot boxes, and even within countries different regulatory approaches appear. The United States, for example, has not seen any movement on a federal level. On state level, some bills have been issued that empower gambling authorities to research the topic and move to regulatory actions ³³. The ESRB has responded to these initiatives by adding a label to games to warn consumers the game contains interactive elements combined with in-game purchases. They explain the label as follows:

"In-Game Purchases - Contains in-game offers to purchase digital goods or premiums with real world currency, including but not limited to bonus levels, skins, surprise items (such as item packs, loot boxes, mystery awards), music, virtual coins and other forms of in-game currency, subscriptions, season passes and upgrades (e.g., to disable ads)"³⁴

It is however, important to emphasize the fact that the ESRB do not consider loot boxes a form of gambling. As the president of the rating agency explains: "We certainly considered whether or not loot boxes would constitute as gambling, We do not believe it does. We think it's a fun way to acquire virtual items for use within the game." ³⁵

Upon researching the attitude of governments towards loot boxes, one can conclude that regulatory interpretations in the authorities are centred around a definition of gambling in which virtual items are deemed not to possess value outside of the game [32]. Transferability of the virtual items, through which the items gain economic value, seems to make authorities taking regulatory actions. From a law making perspective, the debate in the west has not have taken into account the scientifically proven link between loot boxes and problem gambling [2].

Loot box revenue is estimated to grow to a 50 billion dollar industry by 2022³⁶. Moreover, a UK study suggested that 45% of kids between the ages of 11 and 16 know about loot boxes, while 11 percent say they have actually used keys to open them [33]. The social damage of loot boxes may be bigger than the financial harm, this raises serious questions about the perception of authorities towards loot boxes.

2.2.2. Drawing a line – Do consumers need protection?

Governments have certain responsibilities when it comes to protecting its civilians. Where this responsibility begins, and where it ends, is different in each country. In the case of the Netherlands, the government has guidelines that explicitly states when which authority is responsible for asserting and creating regulations. In the case of gambling, the Dutch government has guidelines to judge when games of chance fall under the supervision of the Dutch gambling authority [34].

Not all games of chance are bad inherently. A game of Yahtzee is also a game of chance, but no literature suggests it is dangerous in any way. So this raises the question: what makes a game of chance dangerous? When do lawmakers need to step in to protect consumers? To answer this question, an interview was conducted at the Dutch gambling authority.

As of the writing of this thesis, the Dutch gambling authority will not interfere in any way if there is no flow of money out of the game the loot box is in. It is not relevant if it took a financial investment to partake in the game of chance. Since this makes sure there is no financial incentive to open loot boxes, and is thus regarded as safe and legal by the authority.

This is where it gets tricky. Although the scientific community has raised awareness about the psychological dangers of loot boxes [2], suggesting that using loot boxes could at the moment there is no data that suggests that loot box addiction exists. Because of this lack of scientific research, the gambling authority concludes that loot boxes can be, for now, a safe, fun and entertaining way to add value to a video game. It does not hurt the consumer if the loot box concept is applied in an ethical way. The question remains: how does the concept of ethics translate to video games? This will be discussed in the next section.

2.2.3. Conclusion

Technological advancements in game business happen at such a high rate that lawmakers cannot keep up with laws and regulations needed to protect vulnerable consumers. As of this moment, in most countries, loot boxes exist in a grey area of the law. This is mostly due to the fact that loot box prizes do not have any real world value. As soon as a game supports prize trading, which allows consumers to gain financial profit from the prize, authorities start to act. Some countries are trying to use existing gambling laws to regulate loot boxes, while other countries are trying to find a way to regulate loot boxes with new laws.

Most countries acknowledge that loot boxes can be fun and entertaining, just as regular gambling can be. Authorities promise to move towards regulations to protect vulnerable consumers from the potential short term and long term consequences of loot boxes. In conclusion: loot boxes are here to stay, but game developers will have to deal with stricter rules and regulations that may differ in each country.

2.3. Ethics of loot boxes and the social responsibility of businesses

Video game businesses continuously find new ways to monetize games after the initial sale. These monetization options have become increasingly sophisticated. Moreover, in-game purchase options have been featured more prominently within popular online games. Some of these options can be viewed as being predatory.

2.3.1. Predatory monetization schemes

Predatory monetization schemes in video games can be defined as purchasing systems that disguise or withhold the long-term cost of the activity until players are already financially and psychologically committed [35]. Publishers like Activision even go as far as registering patents for microtransaction systems that incentivize the player to spend more money [36].

The low probability of obtaining the more valuable items from a loot box means the consumer has to open an indeterminable amount of loot boxes before the desired item is obtained. A scheme like this can be better understood with reference to the concept of 'entrapment' [37], the belief that one has invested too much money to quit trying for the item they desire. Other than the negative consequences players experience from predatory monetization schemes, businesses use data to further persuade players into spending more. Data can, for example, be used to adjust pricing and presentation to maximize the likelihood of a consumer buying more of a particular item.

The predatory nature of some monetization schemes not only raises important psychological questions, as discussed in the previous sections, but also raises questions of an ethical nature.

2.3.2. Social Responsibility and Ethics

Currently, there are limited regulatory or consumer protection frameworks for (predatory) video game monetization schemes. Governmental institutions are working on mitigating this challenge, but other than putting the responsibility with these institutions, one can question whether the developers responsible can in some way contribute to the issue.

Social responsibility is a topic that with every ethical sketchy business concept seems to be discussed in the scientific community. For example: when internet gambling gained popularity over a decade ago it raised a lot of new risks and dilemmas for the consumer. Institutions like Gamcare³⁷ in the United Kingdom worked hard to help the then offline only gambling industry to develop a socially acceptable approach towards its consumers. They needed to completely overhaul their approach to also take into account all the new possibilities, risks, and dilemmas that came with the rise of online gambling, like 24-hour access and the possibility of underage consumers to gamble. The scientific community back in 2004 already offered an extensive list of gambling characteristics that were deemed socially responsible for businesses to consider [38]. The rise of loot boxes ignited a comparable discussion. For example: a 2019 study used existing lessons from the gambling field to develop a preliminary blueprint for social responsibility measures for video game monetization schemes. The ethical principles of fairness, transparency and accountability can be used to align the social responsibility measures [39].

3 Discussion and research definition

This literature review made the current awkward position of loot boxes clear. Although social scientists are publishing papers about the possible negative psychological consequences of loot boxes, like the potential of overspending by vulnerable consumers, or the possible migration to more dangerous forms of gambling, no evidence of loot box addiction has surfaced yet. All the while governments are struggling to install new laws and regulations for loot boxes, either to make them comply with current laws or by creating new ones.

There is however an important conclusion to be drawn: loot boxes are not going anywhere. Although vulnerable consumers should be protected through laws and regulations, and should be informed and be made aware of the dangers of loot boxes, authorities also want to avoid patronizing the less vulnerable consumers. Moreover, authorities also want to avoid to disrupt the free commercial market. Loot boxes appear in a large number of shapes. This complicates creating laws that regulates them in a good manner. Moreover, this also complicates raising awareness and informing consumers. Every single inception of loot boxes in games has to be researched individually to get a grasp on the full extent of loot box characteristics in the particular game.

While loot boxes have proven to have psychological and regulatory implications, developers are testing the waters to see how far they can go without consumer backlash, or even without breaking the law. Coming up with new pervasive features, some developers are moving towards more predatory business models to make as much revenue as possible, like employing loot box in games that are aimed at children. This raises questions that are more of an ethical nature. What loot box characteristics exist to give value to the game, and what characteristics are there to purely serve as a means of tricking consumers into spending as much money as possible.

In this regard, not only governmental institutions are responsible for protecting consumers, but businesses are also tasked with protecting consumers by applying socially responsible monetization schemes. Fairness, transparency and accountability are the main ethical drivers that should be used to measure whether a loot box is responsible.

3.1. Exploratory interviews

To get a sense of the current state of loot boxes in society, three interviews were conducted. The first interview was aimed at getting a better view of the governmental challenges of loot boxes, and was conducted with a senior consultant at the Dutch Gambling Authority. The second interview was aimed at the societal implications of loot boxes and was conducted with a senior researcher at the Trimbos institute. The Trimbos Institute is the Netherlands Institute of Mental Health and Addiction, a non-profit research and knowledge center. A third interview was conducted with a Game Director at serious game developer 'Frisse Blikken'. The aim of the interview was to get a perspective on the business side of loot boxes. This section shortly summarizes each interview and presents its main take-aways.

3.1.1. Dutch Gambling Authority

The main concern of the Dutch Gambling Authority (DGA) is threefold: countering gambling addiction, protecting the public, and countering illegal gambling. They have installed a threshold criterion for the reason that a throw of dice is also considered gambling. Meaning they cannot regulate all forms of gambling and need to draw a line between unregulated and regulated forms of gambling. Traditional gambling games serve only one purpose: making money, existing gambling laws were written with that idea in mind. Loot boxes kind of fit within these existing laws, but it is not clear yet whether it should be regulated in the same manner.

Moreover, it has become a question within the DGA whether they should interfere at all. Do people view loot boxes as a game of chance, or just as something entertaining? And if, for example, children view loot boxes as a game of chance, is this actually a problem?

Although they do think loot boxes are harmful for consumers, the question remains how harmful it is. For example: When you are in a casino too much, you may be addicted to gambling. However, when you play games with loot boxes a lot, it is not clear whether you are a gambling addict or just a video game addict. As the DGA puts it: "If a kid spends their pocket change on loot boxes because they think it is fun, than that is actually quite normal. Only if it will lead to obsessive use, it will become a problem. But how many are actually addicted to loot boxes? We do not know"

At this time, the Dutch and Belgian gambling authorities are the frontrunners of the West when it comes to regulating loot boxes. The Belgian government have pushed stricter regulations than Netherlands. About that the DGA said "It was a bit of a bold move of the Belgian government, which unfortunately makes us look a bit passive". Emphasizing the fact that the DGA will move towards new regulations if they have the data to support it. For now, their strategy involves talking with the industry, and working towards a solution in collaboration with developers.

While the DGA is struggling, and even a but reluctant to install new laws, the industry is pushing for rules and regulations for loot boxes in games in the Netherlands³⁸. The industry thinks it is the DGA's duty to define the difference between loot boxes and gambling and regulate them accordingly. The main take-away for this interview was the following question: "When is interference of the DGA needed with loot boxes, and when are loot boxes deemed acceptable? If someone can find a way to make that distinguishable, it would be very helpful to us."

3.1.2. Trimbo's Institute

The Trimbo's Institute looks at loot boxes from a purely scientific point of view. They research the potential dangers of loot boxes, and use research results to design appropriate prevention methods for consumers. Trimbo's focuses on the societal dangers of predatory schemes used in video games. In that sense they do not focus only on loot boxes, but also on schemes in video games that cause bad habits. An example of this is the daily reward system, which rewards players just for logging in a video game. This means players will miss something if they do not log in, forcing them to create a habit of logging in.

About loot boxes: they especially think that loot boxes with a 'pay to win' mechanism are dangerous. Traditionally, every buyer of a game contributed to the revenue of the business in the same amount. However, with the arrival of 'pay to win' schemes, businesses can focus on a small part of the consumer base that is willing to spend significantly more than other consumers. They use these so called 'Whales' as their main source of revenue, this amounts to around 4% of all consumers according to the Trimbo's Institute. This is what 'Frisse Blikken' referred to as 'Sharks'.

We do not know much about this group of consumers. But the Trimbo's institute thinks it consists mostly from people that can miss the money they spend. Just a small fraction of this group are consumers that have difficulties with budgeting. This group is especially vulnerable to the predatory schemes of businesses. Although this is a societal issue on itself, Trimbo's is still wondering whether the use of loot box encourages consumers to move to other forms of gambling. There is a strong association with gambling behaviour and loot boxes. It is extremely difficult however, to prove that there is a bigger chance that heavy loot box users will move to be problem gamblers in, say, ten years. They do think consumers that use loot boxes with real life gambling-like presentations, like fruit machines, will have a higher chance of moving to real life gambling.

Because these consumers already have positive experiences with this particular form of presentation, they will recognize it in the real life counterpart which will lower the threshold to actually partake in it.

What also concerns the Trimbo's institute is the fact that loot box prizes, in most cases, do not have a financial value, but they do have an emotional value. Winning money is psychologically very gratifying, it is the question whether loot box prizes are not just as gratifying as winning money.

In conclusion, the Trimbo's Institute thinks there are multiple dangers that come with loot boxes. They think the ambiguity between a good and bad loot box can however be very tricky. When classifying a loot box, you come very close to just describing what a game is. If one defeats a monster in World of Warcraft, they will drop a random item. Does this mean every monster is a walking loot box? It is not that different. There are very subtle differences between actual gameplay and loot boxes, this is very important to keep in mind when making a framework of loot box characteristics.

Trimbos will continue researching the topic. They have gathered informal stories about loot boxes, there are some personal theories from the researchers, and they will keep a close eye to what loot boxes do with consumers. The future will tell if loot boxes users will move to other forms of gambling. Right now, there is no way for them to prove it.

3.1.3. Frisse Blikken

Frisse blikken is a 'serious games'³⁹ company in Utrecht. The goal of this interview with one of their gaming expert was to get a more business and technical oriented view on the matter of loot boxes. In their view loot boxes are a very smart way to implement a system that hands out prizes to a consumer. In the more traditional 'single reward'-systems, developers were forced to create a high number of prizes, whereas with the loot boxes' 'random reward'-system, only a few prizes have to be developed at a time, saving money in the process.

They think a big risk arises when items in loot boxes can grant you a gameplay perk that makes you stronger than other players. This influences the way consumers experience the game when they do not want to spend money on loot boxes. Moreover, when these kind of loot boxes are sold for real money this can lead to an inequality between 'normal players' and 'loot box players'.

Moreover, when implementing loot boxes, developers have to keep in mind the long term attachment of gamers to the game. Also keeping in mind to not create a artificial skill gap between casual players and hardcore players. If hardcore players' skill drift too much from the casual group, consumers might lose interest. When designing a game, decisions about loot boxes have to be made early in the development process to ensure long-term success. However, most developers have a more short-term focus. An important goal of short-term focussed game design is reeling in so called 'sharks', which are a very small minority of gamers that spend money significantly above average on microtransactions. Basically becoming the main source of revenue for the developers.

According to the interviewee, prohibiting loot boxes altogether is not going to work. It will hurt businesses too much. So a solution has to be found that will satisfy both the industry and gambling authorities. Researching monetization models would be a good start. Since the gaming business is more and more shifting towards the freemium model, the question of on what the consumers will spend their money on. Loot boxes seem to be a good idea to monetize games, but other models may work as well. Looking at for example Fortnite, a freemium game. The developer, Epic Games, does not use loot boxes to monetize their game, but offer cosmetic skins and items that can be directly bought. The game is a huge success, which proves that different forms of monetization will work well.

3.2. Research questions and research methods

While authorities and addiction prevention institutes are struggling to regulate loot boxes and raise awareness, businesses are making billions of dollars on sketchy loot box systems in games. This thesis aims to make a distinction in what constitutes a good loot box, and what constitutes as a bad loot box. By decomposing existing loot box systems in games a framework of loot box characteristics will be made. Then, each distinct characteristic will be analysed to explore the purpose and influence of the characteristic.

This thesis consists of three parts. A research definition stage, an investigation stage, and a results and conclusion stage. This section explains what these stages entail, and what research questions it aims to answer.

3.2.1. Research definition stage

This is the formative stage of the research. Papers, grey literature like websites and interviews, and domain expert helps build the knowledge that is needed to get a complete grasp of the subject of loot boxes and helps define the research goals. Knowledge gathered from grey literature is used to create an overview of loot boxes. This overview explains how loot boxes came to exist, and how they evolved to the current state of the art. Following the loot boxes overview, a scientific literature review helps create an overview of current research related to loot boxes. Since the concept loot boxes is strongly related to law, governance and ethics, the literature is divided amongst these three fields. Lastly, interviews with domain experts provide practical insights from a governmental and business perspective. The research definition stage helped defining the main research question of this thesis:

Main research question: What distinguishes a good loot box from a bad loot box

Moreover, this first part of the thesis answers the first of three subquestions:

SQ1: What is known about loot boxes in contemporary research?

3.2.2. Investigation stage

The investigation phase follows. By using the grey literature gathered in the previous chapter, as well as using search engines on gaming related websites, a list of games containing loot boxes is created. This list contains loot boxes of several genres, over different platforms (PC, consoles and mobile). Next is this stage is the research of the games in this list. Each game is investigated separately with the goal of uncovering the distinctive characteristics of which these loot boxes are made out of. For every characteristic uncovered, variations to the characteristic are investigated as well. Every game is played up until the point a loot box is introduced. Sometimes this took a couple of minutes, while at other times one has to do some progression in the game before the loot box mechanics are introduced. Once the loot box mechanic is introduced, investigation of every possible menu and feature was needed to uncover characteristics to add to the list. If manual investigation is not possible, because it proved impossible to get a copy of the game in question, other means, like YouTube and Wiki pages of the concerning game are used to uncover the characteristics and variations.

Following the completion of the list of characteristics and variations, the variations are hypothesized to encourage or discourage consumers to buy additional loot boxes. By researching the underlying psychological mechanics, it is hypothesized that the characteristic in question is either encouraging or discouraging. Or, if the characteristic is neither encouraging or discouraging, deemed neutral.

A consumer survey follows to validate these hypotheses. Not every hypothesis can be validated because the survey with become too long, so a subset is created. The subset is created by using the strongest hypotheses, the ones that have mechanics that have previously been researched by the scientific community. The investigation stage aims to answer the following subquestion:

SQ2: What are the distinctive characteristics of loot boxes

3.2.3. Results and conclusion stage

Next, is the final stage of this thesis: the results and conclusion stage. This stage begins by analysing the consumer survey results. By plotting the results on a stacked bar chart, characteristics can be ordered from most encouraging or discouraging to least encouraging or discouraging. These results are used to discuss the hypotheses created in the previous stage. Subsequently the results are used to discuss what characteristics game developers could use to make their loot box mechanic valuable for the consumer as well as for the business. Finally, to conclude the thesis, the future of loot boxes is discussed. The results and conclusion stage aims to answer the following subquestion:

SQ3: What constitutes an (ethically) acceptable loot box

A diagram on the next page presents every activity in an orderly fashion. This is done using the Project Deliverable Diagram technique, that splits up the project in activities (left-hand side) and deliverables (right-hand side) [40].

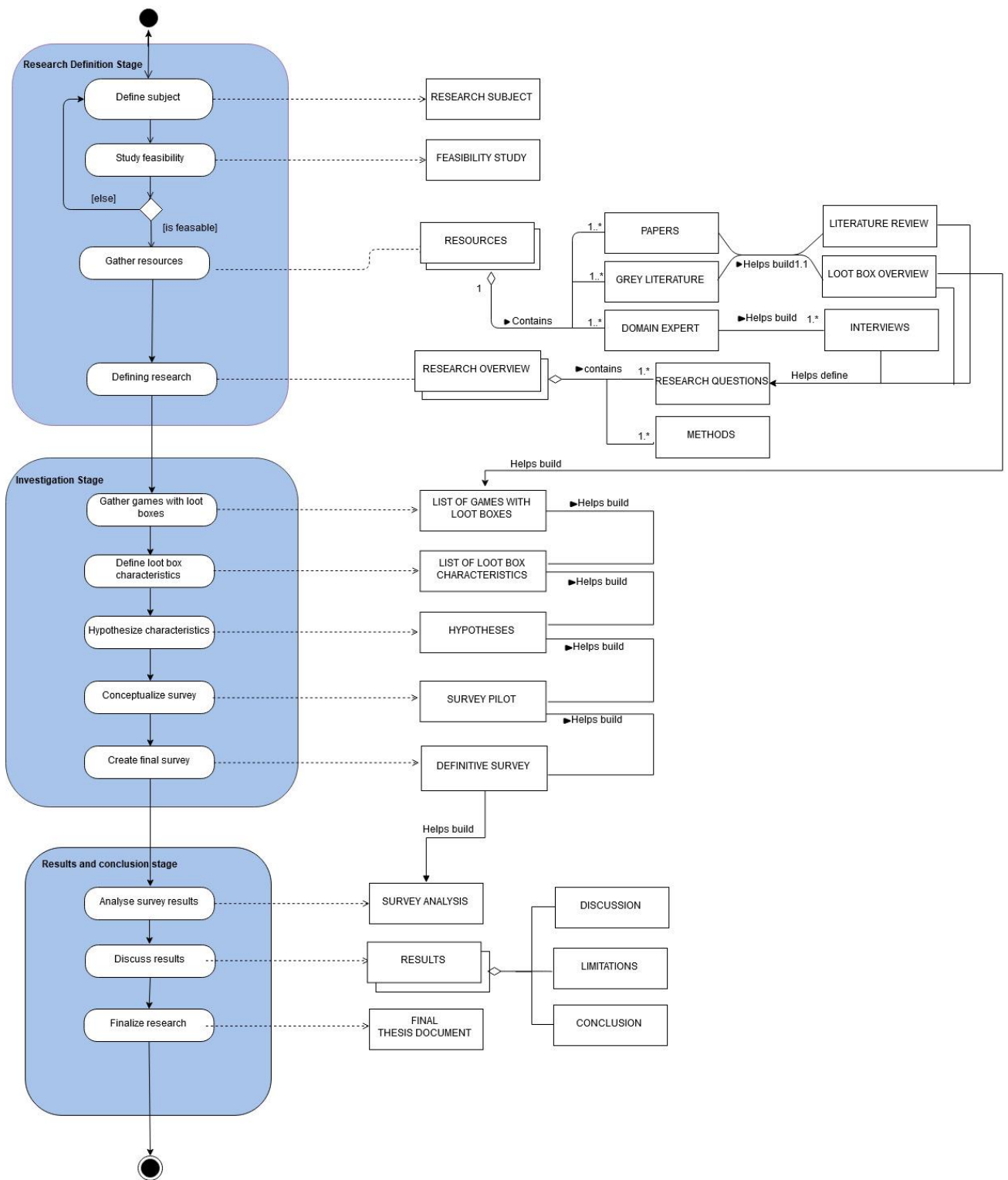


Figure 3: Project Deliverable Diagram of this thesis

4. Characteristics of loot boxes

There are many different incarnations of loot boxes. In this section, different loot boxes will be examined to be able to make a distinction of characteristics that can be found within them. By examining games of all genres and platforms, a complete overview of characteristics can be made.

Each characteristic found in loot boxes is categorized according to the Blueprint for Practical Social Responsibility Measures, as proposed by King and Delfabbro (2018) [39]. Four categories are distinguished. Within these categories, a characteristic is presented and variations to the characteristics are discussed. Also, known psychological effects of the given variations are presented and discussed with the use of existing gambling literature.

4.1. Method

Characteristics have been found by investigating popular PC, console and mobile games released over the last years. These console and pc games are all high-budget AAA-games⁴⁰. The reason for this is the fact that these games are all reviewed and discussed extensively on gaming websites. Most reviews cover basic explanations of the workings of a loot box in a video game. By searching these websites for the keyword "loot box" , the list of games to investigate was formed.

PC and Console:

Title	Year of release	Genre	Free to play
1. The Lord of the Rings Online	2007	MMORPG	No
2. Team Fortress 2	2007	Multiplayer First Person Shooter	Yes
3. League of Legends	2009	Multiplayer Action RPG	Yes
4. Counter Strike: Global Offensive	2012	Multiplayer First Person Shooter	Yes
5. Rocket League	2015	Multiplayer Sports	No
6. Halo 5	2015	Multiplayer First Person Shooter	No
7. Overwatch	2016	Multiplayer First Person Shooter	No
8. Gears of War 4	2016	Multiplayer First Person Shooter	No
9. Plants vs Zombies: Garden Warfare 2	2016	Multiplayer Third Person Shooter	No
10. Destiny 2	2017	Multiplayer Action RPG	No
11. Need for Speed: Payback	2017	Multiplayer and Single player Sports	No
12. Injustice 2	2017	Multiplayer Beat 'em Up	No
13. FIFA 2019	2018	Multiplayer Sports	No
14. Apex: Legends	2019	Multiplayer First Person Shooter	Yes

Table 1: List of PC-games used in this investigation

Since there are thousands upon thousands of mobile games, the same method has been used to uncover mobile games that have loot boxes. By searching game review archives for the keywords "Loot box" and "Mobile". The following list has been used to investigate:

Mobile **games:**

Title	Year of release	Genre	Free to Play
15. Modern Combat 5: Blackout	2014	Single Player First Person Shooter	Yes
16. Clash Royale	2016	Multiplayer Real Time Strategy	Yes
17. Fire Emblem Heroes	2017	Single player Role Playing Game	Yes
18. Animal Crossing Pocket Camp	2017	Single Player simulation	Yes
19. Pocket Mine 3	2017	Single Player Strategy	Yes
20. Asphalt 9: Legends	2018	Multiplayer Racing	Yes
21. Sega Heroes	2018	Single Player Puzzle	Yes
22. Kingdom Hearts: Union X	2015	Single Player Role Playing Game	Yes

Table 2: List of mobile games used in this investigation

4.2. Observations

PC and Console

Before diving into the characteristics of the loot boxes in these games, a few things can be concluded from the information already gathered. As one may notice, a few of these loot box containing games originate from before 2010, while the first loot box was introduced in Team Fortress 2.

Some of these games did not have loot boxes on release. Upon seeing the great economic success the developer of Team Fortress 2 had with loot boxes, some developers decided to incorporate similar systems in their existing video games.

Another striking detail is the amount of multiplayer games containing loot boxes opposed to the amount of single player games containing loot boxes. A possible explanation concerns the more competitive and social nature of multiplayer games. Loot box prizes that you can show off to your friends, or prizes that you can use to be better than your friends blend in very well with the appeal of multiplayer games. Alongside continuous updates in the game, which will keep things fresh and gamers returning, it makes for a great recipe for a continuous revenue stream with loot boxes.

Since single player games do not have these social appeals, it is more difficult for developers to implement an attractive loot box system to the game. A good example of a developer taking a wrong turn in this regard is Bethesda with their 2017 video game Middle Earth: Shadow of War. Although you could finish this game without buying a single loot box⁴¹, the developer tried to make loot boxes in the game appealing by creating prizes that grant in-game bonuses that let the player progress in the game faster. For example, by spending the in-game currency Gold, you could open a loot box that would contain Orcs that fight alongside you.

Although this currency could be earned by progressing in the game, one could also take their wallet and buy the currency directly from the appropriate store. By spending more money, you could open loot boxes that contain even better Orcs. The company suffered heavy backlash by the community. So much so, that they had to cave and phase out the loot box system entirely⁴².

These controversies are not exclusive to single player games though. With Star Wars: Battlefront 2 being the latest one in a series of controversies by EA games. The game had prizes that gave gameplay perks, which could make the difference between killing or being killed in an online game. After backlash, EA Games also had to cave by removing all microtransactions from the game⁴³.

Mobile games

The mobile game loot box market is slightly different from its PC and console counterparts. As the table with mobile game shows, not a single mobile game with loot boxes has been found where consumers initially pay for the game. There is always a free part in the game, and loot boxes offer extra's that one may want to progress in the game further.

4.3. Encouraging or discouraging characteristics

Many variations to the characteristics within loot boxes have a certain psychological effect on consumers [2]. These psychological effects can be categorized as encouraging or as discouraging. Subsequently, a video game that overflows with encouraging characteristics can be deemed as bad for consumers. Or even unethical. Games that have less or none of these encouraging characteristics, and have discouraging factors can be deemed as good or ethical. Relatively of course, one can argue that no loot box at all would be best.

Of course, it is not as black and white as that. Not all developers may care about their community, and may choose money over their mental health. These developers may put more encouraging characteristics in their games. Other developers however, may care more about the mental health of their community. Some developers even openly ask for help by requesting more research and information from the appropriate authorities. For example: A group of Dutch game developers came together to sign a manifest that states they are motivated to protect the mental health of their communities.

“Dutch developers and publishers want to prevent that their games provide a gateway to a gambling addiction. Also they want to prevent that gambling games are being perceived as entertaining games. They share a love for developing and playing games and see entertaining games as an important cultural outing. Games, just like other media like film, have an impact on society. And because of this impact, it is an important subject.”⁴⁴

Developers will put a mix of characteristics in their games taking into regard a multitude of considerations. Does the loot box fit the narrative? Is it appealing to buy the loot boxes? Are the loot boxes worth the consumer’s money? The next section of this thesis uncovers all characteristics that have been found in different incarnations of loot boxes. Subsequently, variations to these characteristics will be uncovered. With available literature these variations will if possible be rated as encouraging or discouraging. Encouraging meaning the variation encourages consumers to buy additional loot boxes. Discouraging meaning the variation discourages consumers to buy additional loot boxes.

Variations to characteristics that cannot be placed in one of these categories will be deemed as ‘neutral’. Meaning they are purely functional and do not have any psychological effects.

4.4. Characteristics and variations

This section presents every characteristic, and variations to that characteristic, uncovered by investigating video games containing loot boxes.

4.4.1. Game Design and In-game Purchasing System Characteristics;

C1. Obtaining a loot box

- 1: Random drop - *neutral*
- 2: Consistent drop- *neutral*
- 3: Drops and buying loot boxes - *neutral*

Every video game presents loot boxes in a different manner. There are three presentations to be distinguished. The first two, 'Random drop' and 'Consistent drop', presents the player with a loot box by fulfilling a certain condition, like complete an online match or gaining a level. In some video games the loot box will always be presented when the condition is fulfilled, and thus is consistently dropped. Other video games present a loot box randomly after a condition is fulfilled. The latter one makes receiving a loot box more of a special occasion. A third manner of obtaining a loot box is the ability to buy them in an in-game store. This is always combined with one of the previous presentations.

C2. Opening loot boxes

- 1: Opening loot box with a key - *neutral*
- 2: Opening loot box without a key - *neutral*

There are two minor variations to the opening of a loot box. The first one is the type of loot box that requires a key to unlock. These keys have to be obtained separately. In some games these keys represent a certain in-game value. For example, Rocket League has a thriving economy with third party websites offering a marketplace for consumers to sell and buy prizes with keys as a currency⁴⁵. As of April 16th 2019, the opening of Rocket League loot boxes is prohibited by the Belgian and Dutch government, because of the real-world value the prizes can represent⁴⁶.

The second variation of loot box does not require a key to open. Loot boxes can be obtained directly, and opened without any additional cost.

C3. Loot box availability

- 1: Constant availability - *neutral*
- 2: Seasonal availability - *encouraging*

When developers change the content of loot boxes every now and then, this often means that the previous presented loot box will cease to be offered. Players will not be able to acquire the prizes in these loot boxes anymore. The content is often offered in periods called 'Seasons'. These seasons have a clear beginning and ending. Before the seasons ends, a developer may put the available prizes in the spotlight, so players can avoid missing out on these prizes.

Scarcity is a concept that is often used to increase the value of a product. Research proves that unattainable products raises arousal in consumers [41]. By applying this concept in the availability of loot boxes it may raise the value of the soon to be unattainable loot box, persuading consumers to buy and open loot boxes before it is 'too late'.

This satisfaction that a consumer may experience from obtaining something that will soon be unobtainable is partly due to the fact that the consumer will not 'miss out' on the item that other players may have. The fear of missing out (or FOMO) is defined as follows:

"A pervasive apprehension that others might be having rewarding experiences from which one is absent, FoMo is characterized by the desire to stay continually connected with what others are doing." [42]

This again makes certain variations to this characteristic of a more predatory nature.

C4. Obtaining keys or in-game currency

- 1: Buying – *neutral*
- 2: Random drop free keys- *encouraging*
- 3: Consistent drop free keys- *encouraging*
- 4: Combination of free and buying keys- *encouraging*

The most straightforward way of obtaining the keys that open loot boxes is by buying them. However, the developer may choose to reward a player with a free key every now and then. These keys can either be rewarded randomly, by fulfilling a certain condition like completing a challenge. This offers player that choose to not spend any money after the initial buy of the game a way to open loot boxes and acquire, for example, cosmetic items that would otherwise only be available for the paying player.

Supposedly, the offering of these free keys are introduced to enhance the player experience. However, players that were previously restraining themselves from buying keys may be triggered to start buying them because of these offerings. Research suggests that the offering of these so called 'Freebies' can entice vulnerable consumers into spending (more) money on gambling [43].

C5. Buying keys and loot boxes with

- 1: In-game currency - *encouraging*
- 2: Real-world currency – *discouraging*

Not all video games let you buy anything with real-world money. Some developers decide to first let players buy in-game currency. This currency is subsequently used to buy several products in the game, like keys to open loot boxes.

This system may decrease the awareness of spending of the players because these in-game currencies often translate to bigger amounts compared to the real-world money (e.g. €1,- for 250 diamonds). Also, the increased distance between real money and the individual may increase spending because of the 'tokenization' of their money [44].

C6. Obtaining in-game currency

- 1: Through playing the game - *neutral*
- 2: Through buying - *neutral*
- 3: (Duplicate) prizes exchange - *encouraging*
- 4: Through trading – *encouraging*
- 5: Combination

When a game does not allow purchases to be made directly with real-world money, it uses an in-game currency system to represent value in the game. This currency can often not only be used to buy keys for loot boxes, but also for other items that the consumer may find in the in-game shop. In some cases, this currency can be obtained by playing and progressing in the game. This means that prizes otherwise only obtainable by paying consumers can also be obtained by playing the game. However, the time needed to obtain an amount of currency that can be bought for a couple of Euro's can differ significantly.

Because consumers can take out their wallet to get what they want, instead of grinding⁴⁷ in the game, they may spend money they would otherwise not spend. Some games offer the in-game currency when duplicate prizes are won after opening loot boxes. In some cases, this currency can be used to unlock certain prizes that would otherwise only be available by opening more loot boxes.

C7. Package deals:

- 1: No deals - *neutral*
- 2: Timely deals - *encouraging*
- 3: Constant deals - *encouraging*

To persuade consumers into buying a higher amount of keys or loot boxes at once, some developers choose to give quantity discounts to consumers. Other developers may also choose to have, for instance, deals that lower the price for loot boxes or keys for a short period of time.

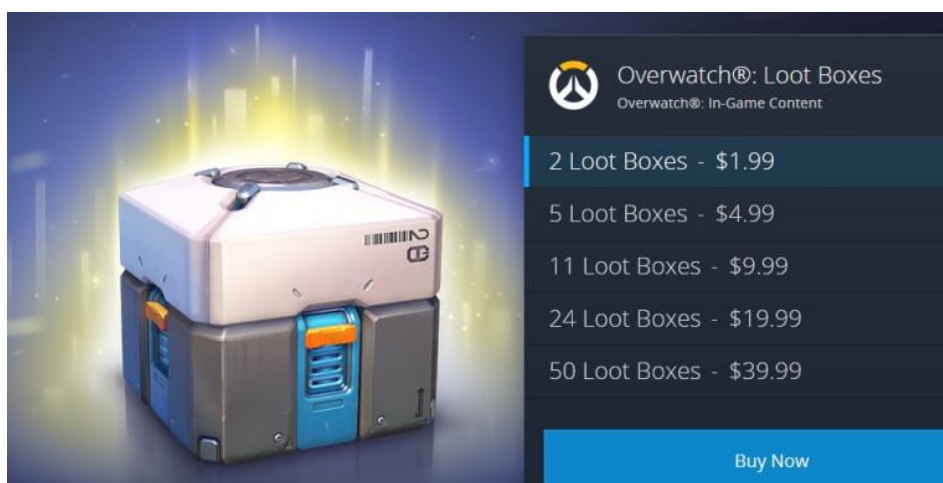


Figure 4: An Overwatch loot box with a constant deal (quantity discount)

C8. Prize goal:

- 1: Cosmetic – *encouraging*
- 2: Gameplay perk - *encouraging*
- 3: Currency prizes – *neutral*
- 4: Combination of prize goals - *neutral*

A controversial topic in the loot box debate is the goal of the loot box prizes. Loot boxes that offer prizes that are purely cosmetic, like an outfit for your character, are often accepted⁴⁸ and rarely suffers backlash from the community, whereas loot boxes that offer gameplay perks are often susceptible of heavy critique⁴⁹.

A prize that grants a gameplay perk will enhance the character's skills. It may for example boost the run speed, make guns more accurate, or may even unlock characters that would otherwise take hours to unlock⁵⁰. In multiplayer games this is often referred to as 'Pay-to-Win', as the paying consumer's character is better equipped to win in online games. This unfair advantage of paying consumer forces the not paying consumer to spend money on loot boxes to be on par with heir paying counterpart. This style of loot boxes is frowned upon by the community, and after some big backlashes from the gaming community, less developers will choose to implement this characteristic.

Some single player games also have the gameplay perk, or 'Pay-to-win' loot boxes. The loot box may contain items that help you progress in the game. This progression would otherwise be more difficult, or impossible if one does not choose to open a loot box. As with its multiplayer counterpart, developers that implement these kind of loot boxes often suffer consumer backlash. In the case of Lord of the Rings: Shadow of War, the developer even decided to ditch the loot box system altogether⁵¹.

C9. Necessity of loot box opening for progression

- 1: No necessity – *neutral*
- 2: Increases progress – *encouraging*
- 3: Loot box needed to progress in the game - *encouraging*

In some games opening a loot box is integral part of the game. The game will not continue unless you open the loot box. This type of loot box is especially seen in smaller freemium games. Since these games are free, apart from microtransactions, developers may choose for this characteristic to forcefully make consumer acquaint with the loot box system in the game. This can be considered as a more predatory way to get the consumer to get hooked on the loot box system, because the consumer can not make a considered choice.

In some multiplayer games it is not necessary to open loot boxes, but since opening loot boxes makes you progress faster or gives you gameplay perks that other players do not have, it is necessary to stay competitive. In these cases, not opening loot boxes means you do not stand a chance to players that do open loot boxes.

C10. Exclusivity of prizes:

- 1: Only obtainable through loot boxes - *encouraging*
- 2: Also obtainable through direct monetary transaction - *discouraging*
- 3: Also through progression in the game - *neutral*
- 4: Mix of previous characteristics – *neutral*

Most multiplayer video games have multiple ways of obtaining prizes. Some of these items may be exclusive to an aspect of the game, like loot boxes, challenges, playing matches or progression. Or developers may offer the same prizes throughout ever aspect of the game. The scarcity concept of the 'Loot box availability' characteristic also applies to this characteristic. Making loot box scarce by not being able to buy them whenever the consumer wants adds a false sense of value that may cause consumers to make quick decisions in order to feel satisfied [39].

C11. Handling duplicate prizes:

- 1: No handling of duplicate prizes - *neutral*
- 2: Trading up duplicate prizes - *encouraging*
- 3: Trading for in-game currency – *encouraging*
- 4: Not possible to get duplicate prizes – *encouraging*

If one chooses to open multiple loot boxes, there is a chance they will end up with duplicates. Especially the lowest 'quality', the prizes with the lowest odds, are known end up on a big pile of duplicates of the consumers account. For some games, like the ones that use prizes to progress in the game, this may not be an issue. But if a prize is purely cosmetic, the prize is useless. Subsequently the consumer may feel like it has thrown away their money. To alleviate this frustration, developers may choose to install a system to make a use of these duplicates. A game like overwatch grants you in-game currency (credits) for duplicates. The amount of credits compares to the quality of the duplicate prize.

Quality (Credits for Duplicate)	Common €25	Rare €75	Epic €250	Legendary €500
Player Icons		✓		
Skins		✓	✓	✓
Emotes			✓	✓
Sprays	✓			
Voice Lines	✓			
Victory Poses		✓		
Highlight Intros			✓	
Credits	N/A	€50	€150	€500

Figure 5: The amount of currency one gets for duplicate prizes in Overwatch

The different categories of odds in games, and the value it represents, makes the most common drops the least valuable. Because these prizes drop the most, one may end up with piles of these common items, or even duplicates. Some games offer the possibility of trading a certain amount of these prizes for a random item of the next value odds category.



Figure 6: The Rocket League up-trading system

C12. Trading of prizes:

- 1: Trading prizes with other players in-game - *encouraging*
- 2: No trading - *neutral*

This is the most important deal breaker for gambling authorities around the world. The characteristic that makes loot boxes gambling according to the law. The government perspective of the literature review covered this topic in depth. To summarize: When a prize is tradeable for real-world money, it means it has real world value and thus is considered gambling. Because the prize won can be traded for other items, or maybe in-game currency, but not for real-world money, it resides in a grey area. There is no consensus on whether this still is gambling, so regulations differ from one country to the next.

Although some developers allow trading among players in friends lists, a lot of third party websites exist alongside the game to accommodate trading among strangers. Because of this, some games have markets complete with supply and demand defining the prices of prizes.

4.4.2. Transparency and Accuracy of Game Design and Features

C13. Literal display of odds:

- 1: No display of odds - *encouraging*
- 2: External display of odds - *discouraging*
- 3: In-game display of odds - *discouraging*

According to the Blueprint for Practical Social Responsibility Measures [39] games should always prominently the odds of the prizes before opening a loot box. In some games, the highest quality prizes have a 1% droprate⁵². If the key to open a loot box cost 1 Euro, this means on average a player has to open 100 loot boxes before a prize of the highest quality would drop.

These highest quality prizes are normally the most valuable or beautiful prizes in the game, not being transparent about the odds of winning these prizes is a pervasive way of getting consumers to spend more money. Unbeknownst of the very low chance of receiving the prize they actually want.

C14. Labelling of prizes

- 1: Labelling not according to odds – *neutral*
- 2: Labelling according to odds - *neutral*
- 3: No labelling - *neutral*

Developers find creative ways of labelling the different categories of quality in their games. Although defining this characteristic can be somewhat subjective. One can agree that an item that has a droprate of 40% cannot be considered a rare item.

Most developers choose that label their categories choose a combination of words and colours to define the quality of the prize. Words like Common, (Very) Rare, Epic, Legendary, Exotic, Import, and Black Market are some of the words one may find. If these words are combined with a list of odds shown on a prominent place, there is not much to say about these categories. They may even be in line with the game, making it somewhat immersive with the experience. On itself however, without knowing the odds, they do not say anything that may help the consumer in any way.

C15. Visual presentation

- 1: Appropriate reveal - *neutral*
- 2: Inappropriate reveal - *encouraging*

Developers play around with the revealing of loot boxes a lot. Every game researched had some sort animation upon opening a loot boxes. The delay between the choice to open a loot box and the actual reveal of the prize activates reward anticipation within the consumer. The dopamine system in the brain codes reward anticipation and outcome evaluation. And it has been proven that dopamine releases at both stages of gambling [45].

The animations and sounds used in these delays differ a lot in appropriateness. Appropriateness in this situation is measured by how close it resembles real life gambling visuals. The most commonly used gambling visual is the slot machine, accompanied with the near miss principle. A “near miss” means not getting the prize you want. However, visually it looks like you ‘almost’ had it.

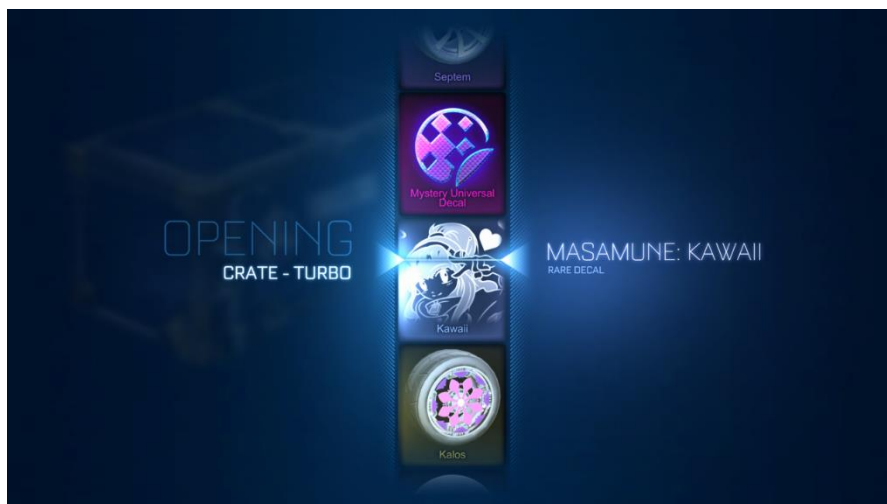


Figure 7: The slot machine loot box animation of Rocket League

However, the system already decided beforehand that you would not get that one prize. And it also decided that it would let it look like the ‘machine’ almost picked the price you wanted. Study have shown that the near miss principle motivate opening more loot boxes [46].

4.4.3 Consumer Protection Measures

C16. Option to hide Loot boxes:

- 1: Option to hide loot boxes - *discouraging*
- 2: No option to hide loot boxes – *neutral*

For the consumer that knows they will be tempted to open loot boxes if they see them, some games offer the option to completely hide loot boxes from the game. Research has proven that ‘self-exclusion’ from gambling can have favourable psycho-social effects for consumers prone to being problem gamblers [47].

C17. Opening process:

- 1: One-step opening - *neutral*
- 2: Multiple-step opening - *discouraging*

There are minor differences between choosing to open a loot boxes. Some games give a prompt that asks the consumer whether he is sure to open the loot box, giving the consumer a chance to rethink his decision. While others do not give that warning.

C18. Bad luck protection

- 1: No bad luck protection - *neutral*
- 2: Bad luck protection – *encouraging*

Bad luck protection assures the consumer that he will get something valuable every number of times they open a loot box. For example: In League of Legends you cannot open three chests in a row without dropping at least one skin shard. This raises the effective drop rate of skin shards to roughly 57 percent. Since the dropping of items have different odds, there is a chance that players will after many loot box openings not get what they want. With this kind of bad luck protection, the consumer at least has a bit of certainty about what they will get every number of loot box openings.

C19. In-game overview of spendings

- 1: No overview of past spendings - *encouraging*
- 2: An overview of past spendings - *discouraging*

Research suggests that regularly being informed of recent and historical spendings helps consumers to make better decisions and has a discouraging effect on gambling behaviour [48].

4.4.4 Characteristic and variation overview

C1. Obtaining a loot box	1: Random drop - <i>neutral</i> 2: Consistent drop- <i>neutral</i> 3: Drops and buying loot boxes - <i>neutral</i>
C2. Opening loot boxes	1: Opening loot box with a key - <i>neutral</i> 2: Opening loot box without a key - <i>neutral</i>
C3. Loot box availability	1: Constant availability - <i>neutral</i> 2: Seasonal availability - <i>encouraging</i>
C4. Obtaining keys or in-game currency	1: Buying – <i>neutral</i> 2: Random drop free keys- <i>encouraging</i> 3: Consistent drop free keys- <i>encouraging</i> 4: Combination of free and buying keys- <i>encouraging</i>
C5. Buying keys and loot boxes with	1: In-game currency - <i>encouraging</i> 2: Real-world currency – <i>discouraging</i>
C6. Obtaining in-game currency	1: Through playing the game - <i>neutral</i> 2: Through buying - <i>neutral</i> 3: (Duplicate) prizes exchange - <i>encouraging</i> 4: Through trading – <i>encouraging</i> 5: Combination
C7. Package deals:	1: No deals - <i>neutral</i> 2: Timely deals - <i>encouraging</i> 3: Constant deals - <i>encouraging</i>
C8. Prize goal:	1: Cosmetic – <i>encouraging</i> 2: Gameplay perk - <i>encouraging</i> 3: Currency prizes – <i>neutral</i> 4: Combination of prize goals - <i>neutral</i>
C9. Necessity of loot box opening for progression	1: No necessity – <i>neutral</i> 2: Increases progress – <i>encouraging</i> 3: Loot box needed to progress in the game - <i>encouraging</i>
C10. Exclusivity of prizes:	1: Only obtainable through loot boxes - <i>encouraging</i> 2: Also obtainable through direct monetary transaction - <i>discouraging</i> 3: Also through progression in the game - <i>neutral</i> 4: Mix of previous characteristics – <i>neutral</i>
C11. Handling duplicate prizes:	1: No handling of duplicate prizes - <i>neutral</i> 2: Trading up duplicate prizes - <i>encouraging</i> 3: Trading for in-game currency – <i>encouraging</i> 4: Not possible to get duplicate prizes – <i>encouraging</i>
C12. Trading of prizes:	1: Trading prizes with other players in-game - <i>encouraging</i> 2: No trading - <i>neutral</i>
C13. Literal display of odds:	1: No display of odds - <i>encouraging</i> 2: External display of odds - <i>discouraging</i> 3: In-game display of odds - <i>discouraging</i>
C14. Labelling of prizes	1: Labelling not according to odds – <i>neutral</i> 2: Labelling according to odds - <i>neutral</i> 3: No labelling - <i>neutral</i>
C15. Visual presentation	1: Appropriate reveal - <i>neutral</i> 2: Inappropriate reveal - <i>encouraging</i>

C16. Option to hide Loot boxes:	1: Option to hide loot boxes - <i>discouraging</i> 2: No option to hide loot boxes – <i>neutral</i>
C17. Opening process:	1: One-step opening - <i>neutral</i> 2: Multiple-step opening - <i>discouraging</i>
C18. Bad luck protection	1: No bad luck protection - <i>neutral</i> 2: Bad luck protection – <i>encouraging</i>
C19. In-game overview of spendings	1: No overview of past spendings - <i>encouraging</i> 2: An overview of past spendings - <i>discouraging</i>

Table 3: Complete overview of characteristics, variations, and hypotheses.

4.5. Further investigation of characteristics

In this section, the framework presented in the previous section will be given a closer look.

4.5.1. Loot boxes deleted after release

From the 25 games that ended up on the loot box investigations list, 3 games have had their entire loot box system removed. These games: Star Wars: Battlefront 2, Forza Motorsport 7 and Middle-Earth: Shadow of War, were each called out for their extremely predatory loot box characteristics by the community and professional critics.

Star Wars: Battlefront 2's loot boxes were removed because prizes won from loot boxes gave players perks and other gameplay advantages in the multiplayer parts of the game⁵³. Moreover, they introduced microtransactions that would allow players to buy in-game currency. The in-game currency was also earned by playing and progressing in the game. But in order to raise enough currency to buy in-game items one would have to invest a lot of hours. Since this content included items that affected gameplay, like the popular playable character Darth Vader, this only made the pay2win concept in this particular game even stronger.

Forza Motorsport 7 had a similar concept by introducing cars as prizes in loot box. These cars each had their own statistics, meaning they could give you a competitive advantage if you won a good one⁵⁴. Microsoft removed the cars from the loot boxes, leaving only cosmetic items in the prize pool.

Middle-Earth: Shadow of War has been discussed multiple times in this thesis already. It is a clear example of a developer implanting a monetization scheme that is too predatory. All in all, the microtransaction model in this game completely disrespected the consumer's wallet and is likely to remain a stain in the history of loot boxes.

4.5.2. Characteristic occurrence in games

Some variations of these characteristics appear more frequently in video games than others. Some of these variations are even unique to the video game. Furthermore: Some characteristics are significant to the experience of using loot boxes, while others are less significant and may not make any difference in encouraging or discouraging consumers to buy additional loot boxes. In this section, a few striking observations are presented with the help of statistics on loot box occurrences. Characteristics discussed fall either in the encouraging or discouraging category, as the neutral characteristics are hypothesised to have no impact on consumer behaviour.

The 6.2 Appendix of this thesis contains an overview of all the investigated games with the loot box characteristic variations.

Game Design and In-game Purchasing System Characteristics

Prize goal

Researching 22 loot boxes made clear that every developer finds their own distinct way of designing loot boxes for their games. With multiple community backlashes over predatory loot box systems in the past, developers seem to be on their toes. This is obvious when one looks at how loot boxes are marketed nowadays. Developers often choose to emphasize the fact that prizes in their loot box will not affect gameplay. Meaning that the pay2win concept seems like a thing of the past. Not forgetting of course the loot boxes with prizes that are crucial to the game at hand. Like the soccer player prizes in FIFA Ultimate Team, and the booster packs in Hearthstone. There is a fine line between what communities accept and what not in that regard.

Handling duplicate prizes

Not all games have a system in place for duplicate prizes. Not in one game this means you are stuck with items you do not want. In some multiplayer games you are able to trade every item you get, so it is possible to give duplicates away. In other games it may be possible to just use the prizes if they are one time use. However, this is not the point. Although this is not the case with every game, in some games it is possible that you get prizes that are not of value. Maybe you do not need the prize, or maybe it is just not good enough. If one keeps paying, and ends up with duplicates of prizes they do not want, the whole experience can get very frustrating. Thus implementing some system that handles duplicate prizes encourages the players to buy more loot boxes because the experience is less frustrating.

Trading of prizes

Trading prizes is for some consumers a game on itself. Collecting sets prizes, acquiring the rarest and most valuable of prizes. Developers that implement trading in their games, if done successfully, have thriving markets and in-game economies that are run completely by the consumer.

Disregarding the legality of these trading practices, it seems like a fun additional to a game. 6 out of 14 PC and console games investigated makes use of trading systems. However, as of the writing of this thesis, multiple games are under investigation by the Dutch and Belgian gambling authorities⁵⁵. No mobile game has been found to have a trading system.

Transparency and Accuracy of Game Design and Features

Display of odds

Displaying the chances that a consumer can win a certain prize is not in any way mandatory for developers. They may just do it to make the loot box system come over as more honest, less predatory. Being completely open about the workings of the system is just the better thing to do, ethically. 5 of 14 PC games investigated show the odds to their players. From these 5 games, only 2 do it in game. For other games one has to visit the official wiki or blog of the developer to find the odds.

For mobile games it is another story. It seems like, because most of the invested games fully rely on the revenue made by microtransactions, it is more important that a developer makes a good loot box system. 6 out of 8 games investigated are fully transparent about the odds of their prizes.

Consumer Protection Measures

Option to hide loot boxes

This characteristic was coined by the Blueprint for Practical Social Responsibility Measures [39] as a means for consumers to self-regulate their behaviour, which helps consumers committed to avoiding certain features [47]. Unfortunately, only one single game in all investigated games offered this feature, Rocket League.

Bad luck protection

Hypothesised to be an encourager, because it takes away some of the frustration that comes with continuously winning prizes of low value, bad luck protection is a characteristic that protects consumers from overspending. Out of 14 PC games investigated, 4 games had some form of bad luck protection. 3 out of 8 mobile games had some form of bad luck protection.

In-game overview of spendings

One single game of all investigated game has this characteristic, League of Legends.

PC and Mobile differences

The most important difference in loot box found in PC games and mobile games is the fact that all mobile games investigated are free to play. That means that every single Euro of revenue is made from microtransactions found within the game. This means the developers of these games will have to balance out the fact that they want people to spend as much money as possible within the game, and the fact that the game needs to have entertaining value. The loot box system within the game must not overshadow the gameplay experience, but compliment it.

The fact that they need consumer to spend as much money as possible can be seen in the occurrence of encouraging characteristics within these games. Literally every game makes use of an in-game currency system with a possibility to earn in-game currency by progressing in the game, combined with the ability to buy more currency. The amount of currency earned is just enough to keep some consumer satiated, but when consumers find that they want to progress in the game faster, they have to pay up. Moreover, in all the games investigated the prize goal was something that directly affected gameplay. Faster cars, better guns, stronger heroes, stronger tools, etcetera. 6 out of 8 mobile games investigated are transparent about the odds of the prizes, although sometimes one has to search to multiple menu's before the odds table can be found.

In conclusion: All these mobile games investigated have a loot box system that is very similar, and only is different in some of the details to suite the specific needs of the game or to better fit in the narrative. For example: In Animal Crossing: Pocket Camp one has to build and furnish a house. So while it doesn't mean the consumer will progress faster when buying in-game currency, he sure will be able to afford nicer things for his house. Although this could be seen as a cosmetic prize, it also affects how the game is played.

4.6. Validating psychological effects

The previous section of this thesis uncovered a hypothesis for every variation found of a characteristic. Either the characteristic is encouraging, or it is discouraging or neutral. In this section, some of these hypotheses will be tested. We use a survey to find out what consumers think will encourage or discourage them. The main question will be as follows:

The following loot box characteristics ENCOURAGES me to buy loot boxes

And

The following loot box characteristics DISCOURAGES me to buy loot boxes.

Only consumers that have experience with spending money on loot boxes are eligible for this survey. It is important that respondents have a full comprehension of what a loot box is because the concept is hard to explain. Moreover, respondents should be able to recall how it felt to open loot boxes, and what it made them spend money in the first place.

Since the population size of this survey is within the hundreds of thousands, more than 100 respondents are needed to achieve a confidence level of 90%⁵⁶. To achieve this number, the survey will be spread over a high number of channels. The channels used to gather respondents are:

Subreddits for games that have loot boxes

The survey was posted on a few subreddits, unfortunately it did not gain a lot of traction. Most of the responses came from the Rocket League subreddit, based on the fact that it had the most comments.⁵⁷

Forums;

The survey was also posted on a few forums. Like the subreddits it was posted to, it did not gain a lot of traction on this medium too.⁵⁸

Direct relations;

Most of the respondents came from the direct network of the author of this thesis. These respondents were asked to participate over WhatsApp, Facebook or Steam.

In the end, this resulted in 75 respondents. This is unfortunately below the threshold 100 to achieve a confidence level of 90%.

Questions

Not all characteristics and variations can be validated through the survey. This would not only make the survey too long, but asking about more than two variations of a characteristics may be too confusing for the respondents. Moreover, some of the characteristics can not be explained clearly in a single sentence. To keep things clear and simple, a maximum of two variations of a single characteristic made it in the survey. Neutral characteristics did not make it into the survey either.

Choosing the final variations happened on the basis of the occurrence of the variation in video games and whether the hypothesis is based on scientific literature.

The following variations of encouraging characteristics have been presented to the respondent:

- Seasonal availability of loot box prizes;
- Regularly receiving free keys or loot boxes;
- Prizes that can be obtained only by opening loot boxes;
- Prizes that grant gameplay perks or power-ups;
- Prizes that are purely cosmetic;
- The ability to trade prizes with other players;
- Knowing I will receive a valuable prize every five loot boxes;
- The ability to exchange duplicate prizes for in-game currency;
- Quantity discounts for keys or loot boxes;
- Buying loot boxes with purchasable in-game currency (keys, credits, Riot Points, etc);

The following variations of discouraging characteristics have been presented to the respondent:

- The ability to buy loot box prizes directly instead of obtaining them through playing the game;
- Knowing the probability of winning (odds) of prizes;
- The ability to hide all loot boxes;
- A multi-step purchasing process with warnings;
- Buying loot boxes with real-world currency, instead of buying them with purchasable in-game currency;
- An overview of past spendings on loot boxes;

For this survey a 4-point Likert scale is used. The neutral option is left out because we want to force respondents to have a preference. After the survey closed, the data was used to make stacked bar charts. With these stacked bar charts one can easily spot the differences of encouragement of the characteristics, a top 3 of both encouraging and discouraging characteristics can be made.

4.7. Results

Animations



Figure 8: Animation 1: Slot machine and near-miss



Figure 9: Animation 2: No resemblance to gambling

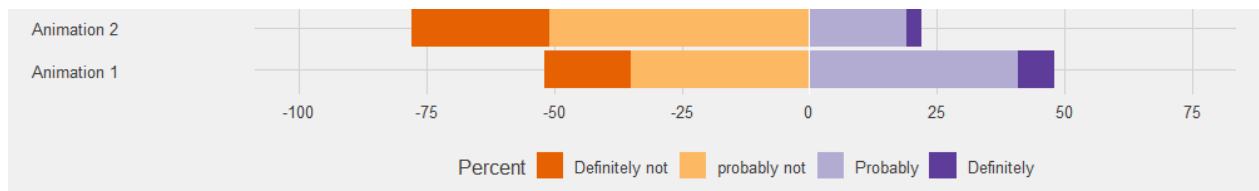


Figure 9: Survey results for the comparison of two loot box opening animations

Comparing these two animations clearly shows that consumers are more encouraged by animations that resemble real life gambling situations. The animation showed resembles a fruit slot machine. Moreover, it makes use of the near-miss principle. Which has been proven to encourage gamblers. [46].

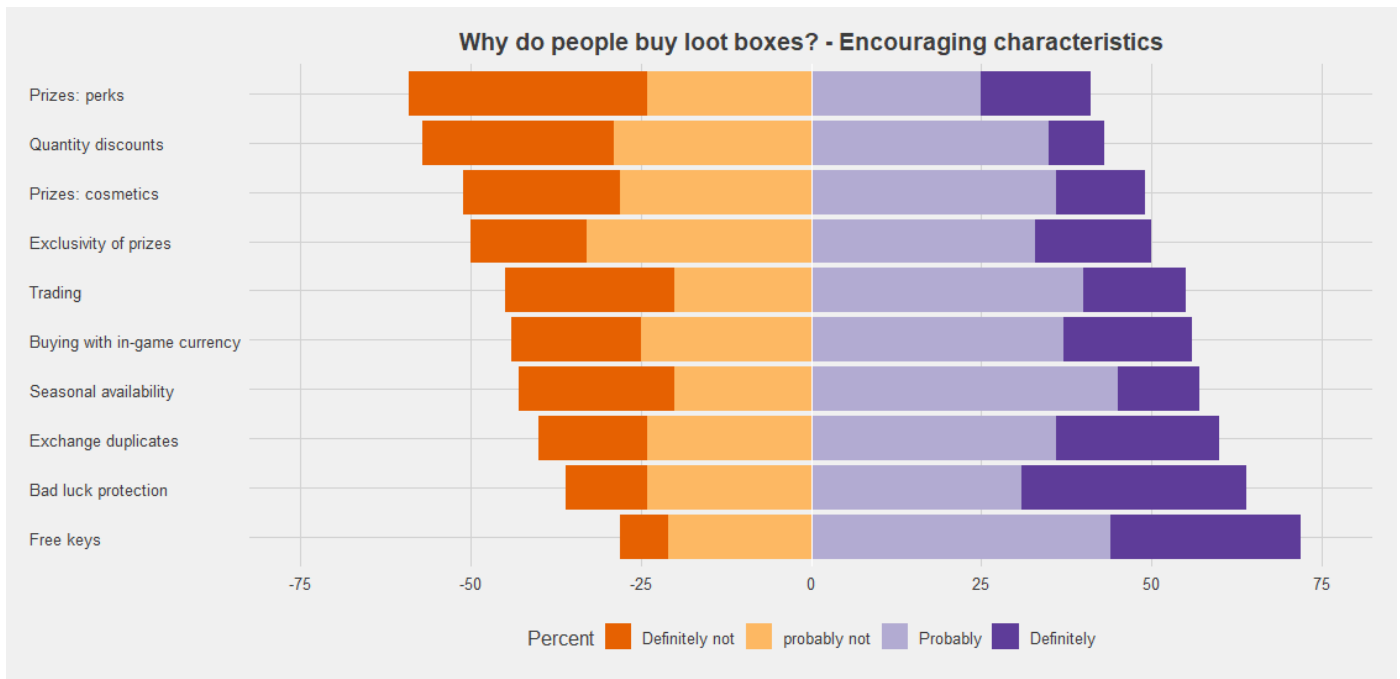


Figure 10: Survey results: Encouraging characteristics

This graph indicates that not all loot box characteristic variations encourage consumers to buy additional loot boxes equally. Some variations, while hypothesised that they would encourage consumers, do not encourage at all, while others encourage a lot. This section will shortly analyse this chart. The characteristics variations in the chart are ordered by how much the characteristic encourages the consumer to buy additional loot boxes.

Top 3 encouragers

1 Regularly receiving free keys or loot boxes

Consumers think this characteristic in loot box encourages them the most. Just like research suggests, being offered freebies in gambling encourages people to gamble more [49]. Research done on this topic is very relevant for loot boxes, and thus this hypothesis can be accepted.

2 Knowing I will receive a valuable prize every five loot boxes

Second place is bad luck protection. Although only half of all games investigated had bad luck protection. This survey suggests that it would be a good move for all developers to think of some sort of bad luck protection for their communities.

3 The ability to exchange duplicate prizes for in-game currency

Useless and invaluable duplicates are a frustration for the loot box user. As this survey suggests, exchanging these useless prizes for in-game currency, which can be used for other items in the game, is a good way to mitigate this frustration.

Prizes: cosmetic or gameplay perk

Although the difference is small, consumers think they are more encouraged to buy more loot boxes by loot boxes containing cosmetics, than by loot boxes containing gameplay perk prizes. As this thesis has pointed out, communities and critics seem allergic when it comes to loot boxes containing prizes that gives you a gameplay advantage. However, overall the type of prize do not seem to encourage the player much.

Quantity discounts for keys or loot boxes, the ability to trade prizes with other players, seasonal availability of loot box prizes and prizes that can be obtained only by opening loot boxes are on the lower end of encouraging characteristics.

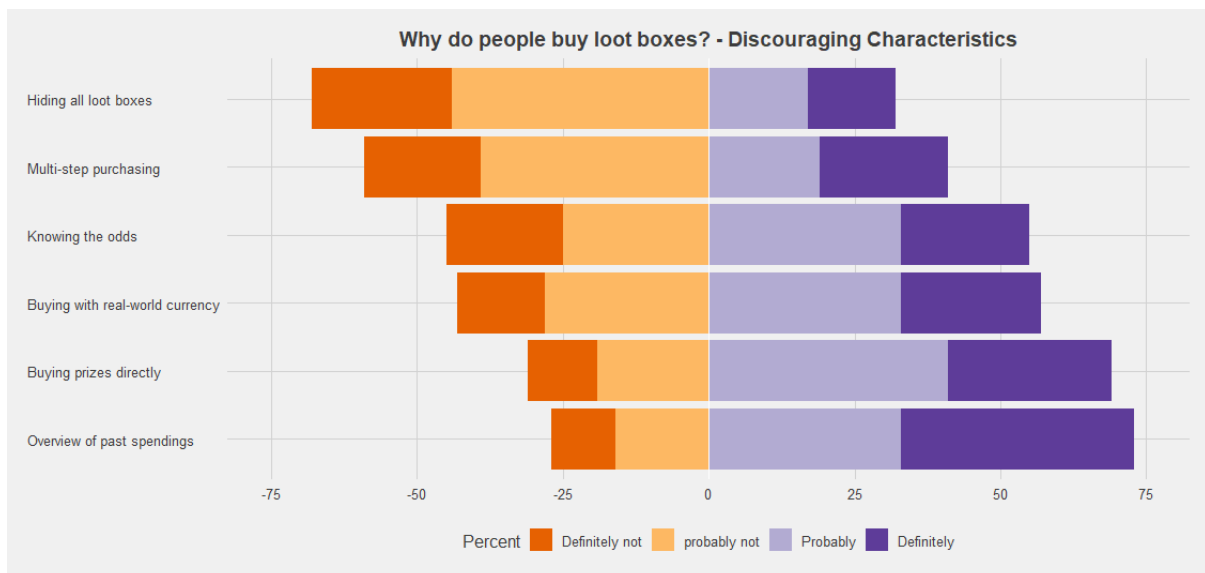


Figure 11: Survey results: Discouraging characteristics

Top 3 discouragers

An overview of past spendings on loot boxes;

Only one game investigated has this characteristic, League of Legends, consumers think knowing what they have spent would heavily discourage them to buy more loot boxes. As research suggests, some players may benefit from reminders of their recent and historical financial spendings on microtransaction in the game [48].

The ability to buy loot box prizes directly instead of obtaining them through playing the game.

If consumers have the certainty of obtaining an item for a fixed price, it would discourage them from gambling for it. Although the survey did not go into specifics. One may argue this result by questioning the price of the prizes that can be bought directly, related to the price of opening a loot box with a chance for the same prize.

Buying loot boxes with real-world currency, instead of buying them with purchasable in-game currency.

Tokenization of money [44] creates a distance between real-world money and in-game money, which decreases the awareness of spending. Consumers think that without the tokenization of their money, meaning they would buy loot boxes directly with their real-world money, they would be discouraged to buy more loot boxes.

5 Conclusion

What is known about loot boxes in contemporary research?

Loot boxes are the result of a long history of video game developers and publishers experimenting with different forms of microtransactions. Microtransactions are low priced purchases, usually between the €1 and €5 range. These microtransactions unlocked small pieces of content. This content can add a wide variety of things to a game. Missions, maps, weapons, cars, clothes, developers kept coming up with new things to put behind a paywall. Until they found out they could use a gambling mechanic to unlock a piece of content.

In this thesis, loot boxes are investigated from three different perspectives. A psychological one: which views how loot boxes affect consumers mentally. A governmental one: which views how loot boxes stand within the law. And an ethical one: which views the ethical and societal implications of loot boxes.

2.1 The psychological perspective

The most important question in this perspective is the question whether or not using loot boxes is addictive. Research suggests loot boxes may drive consumers to become problem gamblers [2], although there is no definitive research yet linking loot boxes to gambling. Moreover, loot boxes do not fulfil the scientific definition of gambling because of the fact that a consumer can not lose when opening a loot box [1]. In gambling, the gambler places a bet and they hope to at least win back the amount of the bet, plus more. There is a chance however, that the consumer loses their initial bet. With loot boxes, the bet is not whether or not the player will win money, but if he will be satisfied with the prize he wins. However, since the prize still has value to the consumer, one can wonder if opening loot boxes should be considered to be gambling after all. If the scientific community decided to do so, this means they can extend current gambling research to investigate what kind of risks are involved with loot boxes.

Governing Loot boxes

In this perspective, the question revolves around the fact whether loot boxes should be legal or not. Or, whether loot box need some kind of regulation. The definition of gambling in law is slightly different than the scientific one. Upon researching the attitude of governments towards loot boxes, one can conclude that regulatory interpretations in the authorities are centred around a definition of gambling in which virtual items are deemed not to possess value outside of the game [32]. This would change however, if the prize could be traded for real money. Some governments have decided that loot box prizes do have a certain value if they can be traded between players, and thus decided to regulate certain games in which this was possible.

Ethics of loot boxes and the social responsibility of businesses.

Since loot boxes are designed to make money through addictive games of chance, questions of an ethical nature arise. At this moment, there is not enough research done on loot boxes to make considered arguments against the predatory nature of loot boxes. Developers know this and thus can walk the thin line between ethical and unethical when it comes to their loot box designs. However, some developers support the scientific community and await more research so they can make considered decisions that protect their communities.

What are the distinctive characteristics of loot boxes and what constitutes an (ethically) acceptable loot box?

By researching 22 different loot boxes in games over different genre and platforms, 19 characteristics have been uncovered, each with two or more variations. With this framework one can put together every form of loot boxes investigated. Characteristics of loot boxes can fall within three categories. These categories are: Game design and In-game purchasing system characteristics, transparency and accuracy of game design and features, and consumer protection measures. Moreover, each characteristic is hypothesised to be encouraging, neutral, or discouraging. Encouraging meaning the consumer is encouraged to buy more loot boxes when a loot box has this characteristic, and discouraging meaning the consumer is discouraged to buy more loot boxes when a loot box has this characteristic. Neutral characteristics have no impact on consumer behaviour.

Scientific literature from gambling research has been used to support the encouraging or discouraging nature of the characteristics. And a consumer survey is used to validate these hypothesis. The survey suggests that regularly receiving free keys, bad luck protection and the ability to exchange duplicate prizes for in-game currency are the biggest encouragers of all characteristics.

An overview of past spending on loot boxes, the ability to buy loot box prizes directly instead of obtaining them through playing the game, and buying loot boxes with real-world currency, instead of buying them with purchasable in-game currency are the three most discouraging characteristics.

It is difficult to judge a loot box by its characteristics. It is a premature to say that loot boxes with a lot of encouraging characteristics are bad, and loot boxes with a lot of discouraging characteristics are better. For example: bad luck protection proves to be encouraging for consumers. However, it does contribute to a better loot box experience. In this regard, one has to look at which characteristics solely exist to encourage consumers to buy more loot boxes. These characteristics are not part of the game, the narrative, and thus do not have any value to the player. Since a good loot box is all about finding a balance between value for the player and for the developer, these characteristics would tip the scale to 'bad loot box'. And on the other side of the spectrum, loot boxes that have discouraging characteristics that solely exist to help the player to make informed decisions, and prevent overspending and addiction, tip the scale to 'good loot box'.

Contribution of this thesis.

This thesis investigated loot boxes and all the different characteristics and variations they can have. By stripping loot box mechanics down to its essence a framework was made that makes the inner workings of every single characteristic clear. Developers of games could use this research to make informed decisions on what kind of loot box they want to create for their games. Moreover, if they are willing to make the best loot box possible, this thesis shows which characteristics they could apply and why they should do so. On the other hand, they learn which characteristics to avoid to make their loot box consumer friendly.

Authorities can use this thesis to get a better perspective on loot boxes. Knowing how and why loot boxes work the way they do can help them make informed decisions to regulate loot boxes in a matter that works for consumers and developers alike.

5.2. Limitations and threats

Investment

The most important limitation of a survey into loot boxes lies in the reason why loot boxes are so successful in the first place. Loot boxes extend the value of a game the consumer is already invested in. Loot boxes are in that regard a part of the game's world or story. Because the loot box experience is woven into the game like that, it is almost obvious that a consumer opens loot boxes because it can seem as an integral and important part of the game.

In that regard, prizes in the loot box of a particular game can get a sense of importance to the player. A sense that can never be achieved by merely telling someone about the game or the loot box prizes. Asking questions about a system that works best on invested consumers thus limits how close the answers in the survey are to the actual behaviour in video games. By only asking consumers that have experience with loot boxes we tackle this issue. Consumers can use their experiences by answering the questions accordingly.

Characteristics

Not all characteristics that have been distinguished can be weighed with the survey and literature. Neutral characteristics are not hypothesised to be either encouraging or discouraging. The characteristics that fell by the wayside are the ones that are too niche, or too specific, to make it into the survey. This limits the amount of characteristics that can be researched. However, the characteristics that are specific to a video games aren't the ones that contribute to the value and risk of respective loot box. For example:

The line between a 'Good' loot box and a 'bad' loot box.

The initial idea of this research was to draw a clear line between a good loot box and a bad loot box. However, it has become clear that it is not that black and white. Instead of concluding on a loot box being good or bad, one can look at which variations of characteristics a loot box uses. If a loot box uses a lot of discouraging characteristics, and a none or less encouraging characteristics, it can be deemed a better loot box than vice versa. In conclusion, this means the uncovering of these variations and their influence on the consumer means one can easier spot predatory or protecting mechanics in a loot box. Whether or not a loot box crosses the line to being a bad or good one, is another discussion and remains somewhat subjective.

5.3. Discussion - The future of loot boxes

At this point, it is very unclear what the future holds for loot boxes. The fact that companies make such enormous amounts of money on them will probably not make them go anywhere for the coming years. Developers will keep tweaking their loot box concepts until a healthy balance is reached that is valuable for the consumer as well as profitable for the developer.

Pay2win

Although the pay2win concept⁵⁹ in multiplayer games have been heavily criticized by communities and critics, there will always be games that have them as a part of their core gameplay. The line between predatory and acceptable is very thin though, as a game like FIFA Ultimate Team perfectly shows. Player packs bought in this game directly affect the statistics of the players in the field. Although critics and lawmakers question the gambling mechanic⁶⁰, the gameplay mechanic is accepted by the community, generating hundreds of millions in revenue for EA Games⁶¹. So it seems that the pay2win concept does have a right to exist, just not in every game. The past has proven that pay2win concepts in card games and sports games are accepted, but putting these concepts in shooter games has proven unacceptable.

Regulation

As this thesis has shown, government authorities are slowly but steady mingling in the loot box discussion. The Dutch and Belgian authorities already started banning loot boxes in games that have tradable prizes, and other countries are investigating whether they should do so. This raises the question if there will ever be a nation-wide ban on all loot boxes.

This will heavily depend on the results of scientific research. If the scientific community undoubtedly proves that loot boxes is gambling, and has the same addictive qualities as gambling, regulations will probably follow. These regulations could come in the form of age restrictions, or mandatory consumer protection measures. Either way, loot boxes are still changing and their final form has not yet been reached. We hope that this research will steer developers towards more ethical practices.

6. References

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6.1 End notes

¹ <https://www.pcgamer.com/the-legal-status-of-loot-boxes-around-the-world-and-whats-next/>

² Massively Multiplayer Online Role Playing Games: a type of game wherein a large amount of players interact with each other over the internet. Popular example: World of Warcraft.

³ Games as a service represents providing video games or game content on a continuing revenue model, similar to software as a service. Games as a service are ways to monetize video games either after their initial sale, or to support a free-to-play model.

⁴ Microsoft itself offered a winter-themed outfit for Kameo: Elements of Power for €2.50 (200 Microsoft Points), alongside new maps for Perfect Dark Zero and new cars for Project Gotham Racing 3: <https://marketplace.xbox.com/en-us/Product/Winter-Warrior-Pack/00000000-0000-4000-8000-000b4d5307d2>

⁵ A good example of a thread about the Horse Armor content for Oblivion in April 2006: <https://www.neogaf.com/threads/oblivion-360-items-for-sale-bring-real-money.93310>

⁶ Bethesda spokesperson responds to Horse Armor controversy: <https://www.engadget.com/2006/04/04/bethesda-responds-to-oblivion-backlash/>

⁷ In an interview with 1UP: <https://www.webcitation.org/6Eef3BWvu?url=http://www.1up.com/news/bethesda-responds-oblivion-issues>

⁸ A few examples: Emotes for Metal Gear Solid: https://store.playstation.com/en-us/product/UP0101-CUSA01140_00-MGOAPPEALPACK001. Costumes for fighting game Dead or Alive 5: https://store.playstation.com/en-us/product/UP4108-CUSA01665_00-SEASONPASS491300 or a new character for a GUNDAM-game https://store.playstation.com/en-us/product/UP0700-CUSA08790_00-GUNDAMVSDLCCR002

⁹ http://www.businessweek.com/magazine/content/10_08/b4167064465834.htm

¹⁰ John Riccitiello in the Business Week interview above.

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- ¹¹ <https://www.ea.com/news/online-pass-for-ea-sports-simulation-games>
- ¹² <https://www.gamespot.com/articles/eas-online-pass-required-to-play-tiger-woods-11-online/1100-6261856/>
- ¹³ <https://support.ubi.com/en-GB/Faqs/000014544/Uplay-Passport>
- ¹⁴ <https://www.gamesindustry.biz/articles/project-ten-dollar-will-alienate-consumers-warns-retail>
- ¹⁵ <https://venturebeat.com/2013/05/15/ea-kills-its-controversial-online-pass-program/>
- ¹⁶ <http://blog.ubi.com/assassins-creed-iv-black-flag-and-uplay-passport/>
- ¹⁷ https://store.playstation.com/en-us/product/UP1004-BLUS30554_00-DLCROCKSTARPASS1
- ¹⁸ New retail games are often sold in the €60 - €70 price range
- ¹⁹ Team Fortress 2 Mann-conomy update: <http://www.teamfortress.com/mannconomy/FAQ/>
- ²⁰ The AWP Dragon Lore gun in Counter Strike Global Offensive is offered on the in game market for 1555 real world Euro's. <https://skins.cash/blog/expensive-csgo-skins/>
- ²¹ The Entertainment Software Rating Board (ESRB) is an American self-regulatory organization that assigns age and content ratings to consumer video games.
- ²² Pan European Game Information (PEGI) is a European video game content rating system established to help European consumers make informed decisions when buying video games or apps through the use of age recommendations and content descriptors.
- ²³ A popular loot box based game mode in FIFA - [https://en.wikipedia.org/wiki/FIFA_\(video_game_series\)](https://en.wikipedia.org/wiki/FIFA_(video_game_series))
- ²⁴ An influencer is a person with the ability to influence potential buyers of a product or service by promoting or recommending the items on social media.
- ²⁵ Sports Trading Cards: Wholesome Fun or Gambling? <https://www.wsj.com/articles/SB846202501868224000>
- ²⁶ Suit Claims Pokemon is Lottery, Not Just Fad: <https://www.nytimes.com/1999/09/24/nyregion/suit-claims-pokemon-is-lottery-not-just-fad.html>
- ²⁷ <https://www.linkedin.com/pulse/french-gambling-regulator-releases-its-position-loot-sebastian/>
- ²⁸ An article by PCGAMER about the legal status of loot boxes in different countries: <https://www.pcgamer.com/the-legal-status-of-loot-boxes-around-the-world-and-whats-next/>
- ²⁹ Valve blocks players from opening loot boxes. <https://www.polygon.com/2018/7/12/17565720/csgo-loot-boxes-netherlands-belgium-steam-trading-marketplace>
- ³⁰ <http://www.mondaq.com/china/x/672860/Gaming/A+MiddleGround+Approach+How+China+Regulates+Loot+Boxes+and+Gambling+Features+in+Online+Games>
- ³¹ A quote from one of the submissions from the public hearing following the research: https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Environment_and_Communications/Gamingmicro-transactions/Public_Hearings
- ³² <https://www.pcgamer.com/loot-boxes-are-psychologically-akin-to-gambling-according-to-australian-study/>
- ³³ <https://www.lexology.com/library/detail.aspx?g=04c83f73-6a42-43ec-baf3-dd30b7094ab0>
- ³⁴ http://www.esrb.org/ratings/ratings_guide.aspx
- ³⁵ ³⁵ <https://kotaku.com/after-months-of-controversy-esrb-will-add-in-game-purc-1823356171>
- ³⁶ <https://www.juniperresearch.com/press/press-releases/loot-boxes-and-skins-gambling>
- ³⁷ <https://www.gamcare.org.uk/>
- ³⁸ <https://www.nu.nl/games/5737206/nederlandse-game-industrie-wil-meer-duidelijkheid-over-loot-boxverbod.html>
- ³⁹ A serious game or applied game is a game designed for a primary purpose other than pure entertainment[50].
- ⁴⁰ [https://en.wikipedia.org/wiki/AAA_\(video_game_industry\)](https://en.wikipedia.org/wiki/AAA_(video_game_industry))
- ⁴¹ <https://www.pcgamer.com/how-the-loot-boxes-work-in-middle-earth-shadow-of-war/>
- ⁴² <https://www.polygon.com/2018/4/3/17192132/middle-earth-shadow-of-war-microtransactions-removed-war-chests-gold-marketplace>
- ⁴³ <https://www.gamespot.com/articles/star-wars-battlefront-2s-loot-box-controversy-expl/1100-6455155/>
- ⁴⁴ <https://www.emerge.nl/wire/nederlandse-gamesindustrie-vs-loot-boxes>
- ⁴⁵ <https://rocket-league.com/trading>
- ⁴⁶ <https://tweakers.net/nieuws/151666/rocket-league-loot-boxes-kopen-met-geld-kan-niet-meer-in-nederland-en-belgie.html>

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- ⁴⁷ In video gaming, grinding is performing repetitive tasks for gameplay advantage. Many video games use different tactics to implement, or reduce the amount of grinding in play.
[https://en.wikipedia.org/wiki/Grinding_\(gaming\)](https://en.wikipedia.org/wiki/Grinding_(gaming))
- ⁴⁸ <https://www.theverge.com/2017/5/28/15702686/overwatch-blizzard-loot-box-business-model-masterpiece>
- ⁴⁹ <https://theconversation.com/loot-boxes-and-pay-to-win-features-in-digital-games-look-a-lot-like-gambling-88010>
- ⁵⁰ <https://www.usgamer.net/articles/eas-notorious-star-wars-battlefront-2-darth-vader-reddit-response-is-now-a-loot-box-skin>
- ⁵¹ <https://www.pcgamer.com/middle-earth-shadow-of-war-is-ditching-loot-boxes/>
- ⁵² <https://www.rocketleague.com/news/drop-rates-in-rocket-league-crates/>
- ⁵³ <https://www.gamespot.com/articles/star-wars-battlefront-2s-loot-box-controversy-expl/1100-6455155/>
- ⁵⁴ <https://www.eurogamer.net/articles/2018-07-26-loot-boxes-to-be-removed-from-forza-motorsport-7>
- ⁵⁵ <https://dutchgamesassociation.nl/news/loot-boxes-netherlands-gaming-authoritys-findings/>
- ⁵⁶ <https://www.qualtrics.com/experience-management/research/determine-sample-size/>
- ⁵⁷ https://www.reddit.com/r/RocketLeague/comments/c049el/why_do_we_buy_loot_boxes/
- ⁵⁸ <https://forum.fok.nl/topic/2502126>
- ⁵⁹ <https://en.wikipedia.org/wiki/Free-to-play#Pay-to-win>
- ⁶⁰ <https://www.independent.co.uk/life-style/gadgets-and-tech/news/fifa-19-ultimate-team-loot-box-illegal-belgium-investigation-ea-sports-a8532341.html>
- ⁶¹ <https://www.gamesindustry.biz/articles/2017-03-01-eas-ultimate-team-now-worth-USD800-million-annually>

6.2 Appendix

1. Characteristic occurrence in games

This section presents all the games investigated. The top row of the tables represent the characteristic, the bottom number represents which variation of the characteristic the loot box system in the game has. An 'X' means the characteristic is not present in the game at all.

PC games

Overwatch	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	3	2	2	X	2	3	3	1	1	1	3	2	2	2	1	2	1	2	1

Rocket League	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	1	1	2	1	2	5	3	1	1	1	2	1	3	1	1	1	2	1	1

FIFA 2019	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	3	2	1	X	2	4	1	1	1	1	1	1	1	1	1	2	1	1	1

CS:GO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	1	1	2	1	2	4	1	1	1	1	1	1	1	1	1	2	1	1	1

Apex: Legends	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	3	2	2	X	2	X	3	1	1	1	1	2	3	2	1	2	1	2	1

Destiny 2	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	3	2	2	X	1	5	1	1	1	4	4	1	1	3	1	2	1	1	1

NFS: Payback	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	3	2	1	4	1	5	3	4	2	1	3	1	1	3	1	2	1	1	1

PvsZ: GW2	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	3	2	2	4	1	5	3	4	2	4	1	2	1	2	1	2	2	1	1

League of Legends	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	2	1	1	4	1	5	3	1	1	4	4	2	2	1	1	2	2	2	2

Halo 5	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	2	2	1	4	3	5	1	4	1	1	4	2	1	2	1	2	1	1	1

GoW 4	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	2	2	2	4	1	5	3	2	2	1	3	2	1	2	1	2	1	1	1

LotrO	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	1	1	2	1	1	5	3	4	2	1	1	1	1	1	1	2	2	1	1

Injustice 2	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	3	2	1	4	1	5	3	4	1	1	1	1	1	2	1	2	2	1	1

Team Fortress 2	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	1	1	2	1	2	5	1	1	1	1	1	1	1	1	1	2	1	1	1

Mobile games

Clash Royale	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	3	1	1	4	2	5	3	4	3	1	1	2	1	1	1	2	1	1	1

Asphalt 9: Legends	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	3	1	2	4	1	5	3	4	3	1	3	2	1	3	1	2	1	1	1

FE: Heroes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	3	2	1	4	1	5	3	2	3	1	2	2	3	3	1	2	2	1	1

AC: Pocket Camp	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	3	1	2	4	1	4	3	1	2	1	3	2	3	2	1	2	2	1	1

MC5: Blackout	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	3	2	1	4	1	5	3	4	1	1	3	2	2	1	1	2	2	1	1

SEGA: Heroes	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	3	1	2	4	1	5	2	2	3	1	4	2	3	3	1	2	2	2	1

Pocket Mine 3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	3	1	1	4	1	5	2	2	2	3	3	2	2	3	1	2	2	2	1

KHuX	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	3	2	2	4	1	5	2	2	2	1	2	2	3	2	1	2	2	2	1

2. Consumer survey

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Section 1 of 5

Why do we buy loot boxes?

At Utrecht University, we are conducting research on the reasons why players buy loot boxes when playing video games, and the factors that encourage or discourage the purchasing of loot boxes. Our aim is to understand whether common patterns can be found on incentives and deterrents.

If you have bought loot boxes before, you are eligible for filling out this questionnaire, which will take only 10-15 minutes of your time.

Loot boxes are in-game systems that offer random prizes through a consumable virtual item. These prizes can in some cases be used to customize your character or may help you compete or progress in the game. Loot boxes are often found under the guise of a different term. A few examples are:

- Chests in League of Legends
- FIFA packs
- Crates in Rocket League
- Cases in Counter Strike: Global Offensive
- Supply Drops in Call of Duty
- Card Packs in Hearthstone

The data is collected and processed anonymously: no personal information that may identify you is collected.

Thanks in advance for your participation!

For any questions about the research, you are welcome to contact us at f.p.leeuw@students.uu.nl

Frank de Leeuw
Dr. Fabiano Dalpiaz

Demographics

Please provide an answer to the following simple questions about loot boxes and gamer types.

How many loot boxes have you opened so far? *

- 1-10
- 11-50
- 51-250
- More than 250
- I do not know how many loot boxes I opened

What gamer type describes you the best? *|

- Killer: You thrive on competition with other players, and prefer fighting them over computer-controlled opponents.
- Achiever: You prefer to gain points, levels, equipment and other concrete measurements of succeeding in a game.
- Socializer: You gain the most enjoyment from a game by interacting with other players, and on some occasions, co ...
- Explorer: you prefer discovering areas, creating maps and learning about hidden places.

Loot box animations

You are shown two animations that present different ways of buying and opening a loot box. After watching each animation, answer the question that follows.

Crate opening animation 1



This animation would encourage me to buy loot boxes *

- Definitely not
- Probably not
- Probably
- Definitely

Crate opening animation 2



This animation would encourage me to buy loot boxes *

- Definitely not
- Probably not
- Probably
- Definitely

Loot box characteristics

You are presented with characteristics that may encourage or discourage you from buying loot boxes. Please answer how much those characteristics affect you. To help you provide consistent answers, the characteristics are grouped in tables, so that you can compare the items within a table.

The following loot box characteristics ENCOURAGES me to buy loot boxes *

	Definitely not	Probably not	Probably	Definitely
Seasonal availability ...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Regularly receiving fr...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Prizes that can be obt...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Prizes that grant gam...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Prizes that are purely ...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The ability to trade pri...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Knowing I will receive ...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The ability to exchang...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Quantity discounts fo...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Buying loot boxes wit...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The following loot box characteristics DISCOURAGES me to buy loot boxes †

	Definitely not	Probably not	Probably	Definitely
The ability to buy loot ...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Knowing the probabili...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The ability to hide all l...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A multi-step purchasi...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Buying loot boxes wit...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
An overview of past s...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The following section is optional

Description (optional)

Additional Remarks

Long answer text

Please fill in your e-mailaddress below if you want to receive the results of this research

Short answer text