



Correlations and similarities between Loot Boxes and Gambling

Alexander Sandqvist

Computer Science, Game Development
Bachelor's Thesis
15 Credits
Spring 2021
Supervisor: Steve Dahlskog

Correlations and similarities between Loot Boxes and Gambling

Alexander Sandqvist
Computer Science, Game Development.
Malmö University
Malmö, Sweden
alex.sandqvist@gmail.com

Abstract—Loot boxes are items in video games that contain a randomized reward. Some of them can be purchased with real-world money. In recent years loot boxes have become very common in almost all of the top games. Because of its similarities to gambling there have been thoughts on branding loot boxes as a form of gambling. Some countries have already taken this matter into their own hands and banned certain loot boxes. But there are different loot boxes with different features. This study looks at what aspects of purchasing loot boxes correlate to form of gambling. By researching the top 10 games on steam and their loot boxes combined with a literature study. In conclusion it was found that the main features of Loot Boxes that correlate to a form of gambling are features that try to mirror or copy features from Electronic Game Machines or different casino games.

Index Terms—Loot boxes; Gambling; Addiction;

I. INTRODUCTION

Loot boxes have become a big part of almost all of the top games. On the platform Steam which this study uses for research to answer the research question "What aspects of purchasing loot boxes correlate to a form of gambling?", children from 13 years old have the ability to access all games and all its features like loot boxes [12].

A loot box is a container (box, chest or pack) that contains a randomized object. These loot boxes can be obtained in many different ways like playing the game, purchased using in-game currency or purchased with real-world money. Opening a loot box shows visuals that often reflect the style of the game and sometimes have various similarities to slot machines or roulette wheels. The items conceived in a loot box vary widely between games, they can give players an advantage in the game or they can just be cosmetics. The items the player gets out of a loot box are often determined by a random number generator where some items are more desirable or valuable than others and the developer chooses the probability for each item to be found from the box.

The growth of lootboxes in games popularity have led to many new studies on this topic. As early as in 2018 the estimated total revenue from loot boxes would land at approximately 30 billion dollars [18]. There are concerns that loot boxes may cause harm or pose a risk to gamers. In action of this rapid growth some countries like the Netherlands and Belgium have already made up regulations and banned certain types of loot boxes [11][9].

With the Internet becoming a part of everyday normal life the market of online gambling has exploded and completely taken over a part of the Internet. One of the biggest reasons for the growth of online gambling in 2020 is because of Covid-19 [17]. With easy access, easy money transfers, easy advertising and fancy visuals the gambling scene continues to grow. What also attracts a lot of customers to the world of online gambling is all the "perks" such as the comfort, less distractions, convenience, privacy and more control over your gambling limits [17].

A. Related Research

Banned loot boxes

With all the controversy around the similarities around loot boxes and gambling over the last couple of years some countries and their regulatory organisations have started to look closely into this. In 2018 Belgiums Gambling Commission decided and established that some forms of loot boxes violated the national gambling legislation [11]. Those forms of loot boxes contained the ones where you could use real-world money in order to purchase loot boxes. It is not only Belgium that has ruled against loot boxes but also the Netherlands. Their rules are not as hard as Belgiums. The Netherlands chose to ban loot boxes whose content can be exchanged back for real-world money [9].

Correlations with gambling addiction

In a study done by Zendle, D., Cairns, P., Barnett, H., & McCall, C. [1] they found results that showed that it does not matter which kinds of loot boxes players opened, it could be a loot box of any form with any reward. It did not matter if it was cosmetics, advantage in the game or the ability to get money back. Just by the pure fact that the player had purchased loot boxes before there was a higher likelihood that they also would develop a gambling addiction. [1] In a study by Zendle & Cairns [16] where they did a large scale survey among random gamers to see if there were links between loot boxes and gambling. They found evidence of a potential relationship between purchasing loot boxes and problematic gambling. There was a strong link between participants' loot box spending and their scores on the Problem Gambling Severity Index (PGSI). With non-problem

gamblers spending \$11.14 a month on loot boxes, low-risk gamblers \$21.87, moderate-risk gamblers \$27.55 and problem gamblers spending \$38.24 a month on average on loot boxes [16]. Their summary stands as “These results suggest either that loot boxes act as a gateway to problem gambling, or that individuals with gambling problems are drawn to spend more on loot boxes. In either case, we believe that these results suggest there is good reason to regulate loot boxes.” [16]

Similarities

As noted by Griffiths [10] many characteristics with loot boxes can and often are associated with gambling. Some correlations when players or gamblers are buying loot boxes and gambling are that they stake real-world money on the outcome of a future event. In hopes of receiving something good or more worth than what the player or gambler risked, this future event is determined mostly or always partially by chance.

Near Misses

Near misses exist in a lot of loot boxes in different games and are also a part of gambling in such machines as slot machines. When players lose the slot machine is intentionally built in such ways that they will show a combination of symbols that were close to those required [13]. Research has proven that players tend to want to see close calls and that these close calls and near misses in games of chance leads to the player believing that they are more likely to win the next time [14]. In a study that tested gamblers who see near misses and almost won scenarios compared to gamblers who see no close calls. It showed that people who are visually shown near misses, almost won or “what you could have won” are more likely to play again upon a loss [15].

Game preference

Electronic game machines and casino games like the roulette table have features like showing near misses and fancy spinning visuals. They have similarities to many sorts of loot boxes like in *CS:GO* which uses the roulette spinning feature as well as shows near misses, and *Dota 2* which uses the showing near misses feature. In a study done on over 25000 Canadian gamblers done by Currie, Hodgins & Casey [8] on their gambling behaviour and preferences it was found that by comparing non-problem gamblers and problem gamblers there was a big difference in gaming preferences. 47% of problem gamblers preferred different types of EGMs or other casino games while only 2.3% of non-problem gamblers preferred EGMs or other casino games [8].

B. Research Question

RQ1: What aspects of purchasing loot boxes correlate to a form of gambling?

C. Audience

The intended audience for this study is mainly people who play videogames, people who are concerned about the

correlations between lootboxes and gambling or people who wants to use this study to build on the investigation on lootboxes and their relationship with gambling. The intention for this study is to help form the ground platform on the topic of lootboxes and the correlation with gambling. There are a lot of recent studies which focus on the correlation between gambling and lootboxes but this study will take the next step and see to which extent they correlate.

II. METHOD

In order to answer the research question for this study a mix of, Case Study Research Process and Literature Review Process was used. The Case Study Research Process focuses on collecting and analyzing data in order to solve problems, in this case collecting data from steam on the different top games to analyze the data and the different loot boxes found in these games.

The Literature Review is a process of examining published material. This is based on both reviewing already published material and the section of my own written work that discussed the research done. For this study it is the Literature reviews done on both gambling and Loot Boxes and then the discussion on the found material and the data collection from the Case Study.

To get a deeper understanding of gambling and lootboxes in general a review was conducted of the two topics separately. Many people are aware of gambling and what it is, but gambling is a very wide topic and it covers a lot of ground. In order to fully understand gambling a literature review was conducted. Unlike gambling, loot boxes are an unknown topic for a lot of people. Persons who know what a loot box is, are very likely to be gamers or researchers. Therefore a literature review was conducted on lootboxes.

A. Motivation

The focus of this paper is to find out what aspects of loot boxes correlate to gambling. By knowing which aspects of loot boxes have similarities or correlates to gambling and even problems in gambling it could open up new aspects in the question or debate on if loot boxes are a sort of gambling and should be restricted as such.

B. Research

The following study collected information through Malmö university’s own database, Libsearch. Google scholar was also used to search for articles and journals in order to find information about loot boxes and gambling. Information was collected on the subjects separately as well as combined to further the understanding and knowledge on the correlations between the two subjects. Data for the study was collected thru the video game digital distribution service called Steam. The top 10 played games on Steam was used for this study in order to examine and analyze different subjects. Data that was looked at was for example do they have loot boxes, features

and age limit.

Inclusion: Papers with defined research questions, search process, data extraction and data presentation.

Exclusion: Informal papers example no defined research questions, search process, data extraction and data presentation.

III. RESULTS AND ANALYSIS

Literature Review

A. Gambling

What is gambling

Gambling, also known as betting, is wagering real-world money or something of value in hopes of winning more money or material goods. Gambling is very easily accessible in many parts of the world but often has an age restriction of 18, 21 or other ages (differs from country to country). Other than being easily accessible it is very easily addictable and dangerous for the individual human being. You almost can not escape the continuous push of online gambling sites being advertised all over the tv, radio and most importantly the web. By this continuous push of different sites and special offers it becomes very hard and almost impossible for the individual to “not try” to gamble once in their lifetime, and once you gamble, you risk getting addicted.

Versions of gambling

There is no easy way to compare different forms of gambling. Some of the games below are only based on luck (games of chance) while some involve strategy and skill. Be aware that the house almost always holds an advantage over the customer in the long run. Allowed by math the casino will always bounce back over time, even if the player wins a large amount of money in the short term.[4]

1) Casino

The games in this category are often considered to be the most fundamental building blocks of gambling.

a) Card games

These are card games where the player competes against the house. Examples are Blackjack, house banked Poker and Baccarat.

b) Gambling Machines

The outcome of a slot machine is decided the moment the player hits the spin button and is then presented with fancy visuals. No surprise there that the house has the greater edge.

c) Dice Games

The most common examples are Craps and Sic bo. As the name implies these games are decided with dice.

d) Spinning Wheels

These games are decided with a spinning wheel. The most well known game containing a spinning wheel is Roulette.

2) Poker

These games use playing cards and competitions include

four or more competitors and the winner wins it all. The game of poker has grown over the years from being a one game small wager into multiple tournaments with big amounts of money being wagered and won. Here each participant is not trying to win over the house but trying to be better than all the other participants in order to win money. Do not get fooled, casinos still win money by collecting a so-called “rake” from every pot played as a commission fee. In order to win money playing poker you can’t be just as good as everyone else you need to be better or else you are going to lose money to the casino.

a) Hold’em Games

The most common versions are called Texas hold’em and Omaha. In these games the player combines their personal cards with the community cards in order to create the strongest possible hand.

b) Stud Games

Popular games are called 5-card stud, 7-card stud, razz and lowball. Here the player receives a combination of face-up and face-down cards.

c) Draw Games

The most known versions are called 5-card draw, california lowball, four-before and jackpots. Here the player receives a full hand, then the player has the ability to improve their hand by drawing new cards and discarding old ones.

3) Sports Betting

Betting on sports has a large appeal and is often considered a hobby in many parts of the world. The most common favorites are soccer (football) and basketball but any form of competition can be wagered on like newcomers such as e-sports betting. It is common to believe that a bookmaker is supposed to predict the winner of an upcoming event but actually their job is to set the odds in such a way that both parties receive bets. By doing so the bookmaker always goes away with a profit and can cover their losses.

a) Spread Betting

Each team is assigned a number, these are subtracted or added from the final score of the game. The goal for the better is to predict the winning team.

b) Moneyline

The gambler places a bet on the winning team with the odds payings being lower on the favored team and higher on the underdog.

c) Parlays

The gambler places a bet on multiple “winners” and combines all the bets. In order to win all bets must be correct to receive a payout which is much higher than if the bets were placed individually.

d) Prop Bets

Bets that are placed on specific actions in a game. Example which players will score in a game in a

football game or which team will have the most corners taken.

e) **Futures**

Bets are placed to predict the outcome of an event played much later in time. Examples like league winners at the end of the season.

f) **In-Play Betting**

Wagers being placed in the middle of a game.

g) **Head-to-Head**

Two participants in an event are faced against each other and the gambler tries to predict who will achieve the desired outcome first, for example finishing a race or getting disqualified.

h) **Second Half Bets**

The bet is placed in the second half of a game. With only points at half time counting towards the bet.

4) **Bingo**

Bingo is a game of chance that features randomly drawn numbers and players hoping that these numbers are going to match the numbers on their cards. There are a dozen kinds of versions of bingo but almost all of them use the basic concept of bingo. Winning on bingo is purely based on luck.

5) **Lottery Games**

In some places where other forms of gambling are banned Lottery games are still allowed. Lottery games often have a few big wins and a lot of small wins (like cash back on a scratch-off ticket) to bait players to come back for more. Scratch-off tickets and lottery drawings are almost the easiest form of gambling to come across since you can buy them in almost every convenience store, but your odds of winning are very low. For example your odds of guessing six correct numbers from a pool of 49 numbers are 1 in 13,983,816. Your odds are far better on almost all other forms of gambling.

a) **Scratch-Offs**

The customer purchases a scratch-off card and starts to scratch off a chosen amount of covered spaces to reveal what's under, often amounts of cash or symbols. If they get the decided amount of matches they win in a pre-decided amount of money.

b) **Drawings**

Lottery drawings require the player to select a series of numbers from a sum of numbers. Once all tickets are gone or the deadline for buying tickets have come the winning numbers are then announced. If the right numbers are predicted the player wins. If all of them or most of the numbers match the player might even walk home with enough money to never have to work again.

Types of gamers and Levels to gambling

There are some different ways to present and group different types of gamblers. One way is to use the Problem Gambling

Severity Index also known as PGSI. This is the standardised measure of at risk behaviour in problem gambling [7]. The PGSI is a tool based on research on the common signs and consequences of problematic gambling. The participants of a PGSI quiz score themselves against nine different questions based on their gambling behaviour over the last 12 months. After scoring themselves against these nine questions the participant gets placed in one of four different groups among gamblers. The different groups are

1) **Non-problem gambler**

The gamblers in this category have no negative consequences when gambling.

2) **Low-risk gambler**

This category of gamblers experience a few or no identified negative consequences when gambling. These consequences are of low level of problems like feeling guilty about gambling or spending over their time limit gambling.

3) **Moderate-risk gambler**

Moderate-risk gamblers experience problems leading to a couple negative consequences. Like low risk gamblers they can feel guilty about gambling but they can also lose track of time and sometimes spend more money gambling than what they can afford.

4) **Problem gambler**

The gamblers of the problem category can often lose control when gambling and encounter negative consequences. Like the other categories with problem gambling they often spend over their time limit gambling but different from the others they can end up gambling to win back money and feel enormous amounts of stress about their gambling and their behaviour.

Another way to measure types of gamblers is based on the psychiatrist and medical doctor, Dr. Robert L. Cluster who was the first person to identify 6 categories of types of different gamblers [5].

1) **Professional Gamblers**

Professionals consider gambling to be an occupation or even a job. These types of gamblers pick bets or games that they believe will win more frequently. They often carry less risk because they rely on calculations and statistics.

2) **Antisocial Personality Gamblers**

These players may have an antisocial personality disorder. They are more likely to illegally fix bets and are towards the side of illegal gambling.

3) **Casual Social Gamblers**

This type of gambler sees gambling as another activity or hobby and will often have a variety of other hobbies and interests and will rarely develop problematic gambling habits. If this type of gambler develops an addiction to gambling it's often due to a traumatic event or big win.

4) **Serious Social Gamblers**

This kind of gambler can control their gambling habits, but this player also has an increased chance of de-

veloping more detrimental gambling habits following a traumatic event, a big win or from raised levels of stress and anxiety at work or in relationships. The serious social gambler considers gambling to be a source of entertainment.

5) **Relief and Escape Gamblers**

Gambling acts for them as an emotional relief from the underlying feelings of trauma that they cannot verbalise. They bet to escape feelings of anxiety, depression, boredom, anger or loneliness in their personal or professional life. This type of gambler tends to be highly vulnerable, and the negative elements of their social or work life may lead to problems in gambling.

6) **Compulsive-Pathological Gamblers**

These persons are classified as having a pathological disorder and have become addicted to gambling. They have lost all control over their gambling habits. They will experience altered moods and feel regret and guilt about their habits.

B. *Loot Boxes*

What are loot boxes

Loot boxes are an in game item which can be bought with real-world money. Once bought and opened they contain a randomized product which can vary from items to give you an advantage in the game or just cosmetics like skins or items that are visually nice to look at. When paying and opening the crate you do not know if the box is going to contain something rare and valuable or something common and almost worthless instead.

There are significant similarities between paying for lootboxes and gambling in a casino[10]. When paying for lootboxes or gambling on a machine in a casino the individual uses real-world money in order to hope of receiving something more valuable than what they paid for. Some more similarities are fancy visuals, showing near misses and ability to cash out. These similarities and many more have raised concerns that loot boxes encourage or exploit problems in gambling and cause harm or pose a risk to gamers.

What different kinds of loot boxes exists

Loot boxes come in many different terms and some of them are called packs, crates, chests or boxes. What you find in the loot box is completely up to the developer as well as the chance of you getting a certain item. In games like *Fifa* you hope for players to make your team better and get an advantage over your opponent in order to win. While in games like *Counter-Strike:Global Offensive* you hope for items that either are cool to have or are more worth than what the box costs so that you eventually can sell it for a profit to other players. In games like *Overwatch* you hope for rare skins that maybe not so many people have in order to look flashier and cooler to yourself, your teammates and opponents.

Obtain a loot box

How does one obtain a loot box? There are many different

ways to obtain a loot box but it all varies from game to game. In some games like *Counter-Strike:Global Offensive* you always need to pay real-world money in order to get to open a box. In games like *Fifa* you can either choose to open a pack with real-world money or with in game currency. In cases like this it is often considered to be a waste of in-game currency and not worth opening, whilst if you open with real-world money you can only “win” because you do not lose any in-game currency. In games like *Overwatch* you can pay for loot boxes with real-world money, but here you also get to open packs for free by playing the game, you get one free crate every time you level up in the game. So it’s up to every developer to choose how the player can contain a loot box and open it and it varies a lot.

Why buy loot boxes?

In some games like *Overwatch* the loot you receive from the crates are immediately bound to your account and can not be converted back to real-world money or transferred to another account. They are forever stuck to the account who opened the crate. In this case the items you receive are skins or cosmetics that are only visual enhancements to make your character or weapons look nicer.

In some games like *Fifa* you open a pack in hopes of getting something that will be worth a lot of in-game currency or make your team better in order to have an advantage over your opponents. The items opened can not be converted back into real-world money but they can be worth a lot of in-game currency and they can be sold on the in-game market for in-game currency. The items can not be traded between players but only sold on the market.

In games like *Counter Strike:Global Offensive* the items you receive in the loot box are also cosmetics or skins like in *Overwatch* but in difference from *Overwatch* these items can be transferred between accounts. Other than being able to trade with other players you can sell your item on the steam market which other players pay real-world money in order to buy the items from you. With this in mind players who open crates in *Counter Strike:Global Offensive* hope of getting something valuable and rare that are worth more money than what they spent on the crate itself.

In games like *Rocket League* items that you contain from a box are not bound to your account but they can be transferred between accounts. This opens up a market for players to sell the items they contain from boxes to other players through trading. This opens up an option for players to cash out but not through the built in market.

Showing near misses

When opening loot boxes in games like *Counter Strike:Global Offensive* the player is shown a spinning wheel which resembles a casino roulette wheel with all the items displayed where the numbers normally are on a roulette wheel. The wheel gradually slows down until it stops on a certain item which the players then get. Other items are shown next to it which the player does not get and these items are often rare

items. Showing the player what they “almost” got and what they could get the next time they open a crate.

Results Games

According to “Steam: Game and Player Statistics” [6], as of May 14, 2021 the top 10 played games are.

TABLE I: Player Count

Game	Current Players	Peak Today
Counter-Strike: Global Offensive	569,551	986,626
Dota 2	352,199	612,630
Playerunknown’s Battlegrounds	212,991	383,527
Apex Legends	144,184	277,564
Team Fortress 2	84,161	92,341
Grand Theft Auto V	72,402	115,596
Source SDK Base 2013 Multiplayer	65,020	178,952
Rust	58,458	112,928
Destiny	56,891	104,615
Tom Clancy’s Rainbow Six Siege	40,770	84,272

These top 10 games played right now make up for around 9.8% running “apps” on steam. The data collected are not only based on games on steam but also on all the other apps such as wallpaper engine (place 12 most played) and so on.

TABLE II: Loot Boxes, features

Game	Contains Loot boxes?	Showing near misses?	Can be sold for real money?
Counter-Strike: Global Offensive	Yes	Yes	Yes
Dota 2	Yes	Yes	Yes
Playerunknown’s Battlegrounds	Yes	No	Yes
Apex Legends	Yes	No	No
Team Fortress 2	Yes	No	Yes
Grand Theft Auto V	No	-	-
Source SDK Base 2013 Multiplayer	-	-	-
Rust	Yes	No	Yes
Destiny	No	-	-
Tom Clancy’s Rainbow Six Siege	Yes	No	No

All of the games above have an age restriction of 13 years old. Why? Because that is the age restriction to own a steam account [12]. When you are old enough to own a steam account you can access all these games and all their features inside of the game, like loot boxes. It is also very easy for someone to get an account before they are 13 years old because there is no verification process. Steam does have features like so called “Family View” that does give the parents full control over what their children can do and see on the platform. In order to make this work parents have to first of all know about “Family View”, take the time to learn about it and understand it and then implement it on the children steam account. If “Family View” is not implemented the kid can access all things mentioned above as well as the chats, forums and steam market, which could be dangerous because then the player can get exposed to scammers [12].

C. Limitations

While only doing research on the top steam games this paper do not cover games like *Overwatch*. The company Blizzard games that made the game *Overwatch* released that in November 2020 the game still had 10 million monthly players [19]. While I do not get to cover games with this large player base I still cover games like *CS:GO* as of April 2021 who reach more than 1 million concurrent players, and in the month of February 2020 *CS:GO* had 24 million monthly active users [20].

But regardless of the player count I still find it very wise to examine the top steam games since these games are so easily accessible by children from the age of 13.

IV. DISCUSSION

Aspects that highly correlate loot boxes and gambling are showing near misses. As we can see from the data collected above some of the games which contain loot boxes also show near misses. These games are also the two most played games of the top 10 games played based on the player base. The feature of near misses do exist in a lot of different kinds of gambling. For example slot machines. The people who design slot machines intentionally implement the feature of showing people who have lost a combination that they could have gotten or was close to getting in order to win a large amount of money [13].

Why do all slot machines contain the feature of showing near misses to people who have lost?

Research displays that in games of chance people are more likely to by themselves choose such combinations that they “stay in the game longer” or seem like they have a chance to win. As well, the player of games of chance believes that they are more likely to win the next game when shown what they could have gotten, also known as near misses [14].

A study was run by Côté, Caron, Aubert, Desrochers, & Ladouceur [15] that experimented with near misses. They ran tests on players where one group was exposed for 27% near misses on losses, that means when a player lost it had

a 27% chance to show a close call to a big win. The other group was not exposed to any near misses. Participants played as long as they wanted and it showed that the group shown near misses played 33% more games than the other group [15]. 55.6% of the top 10 most played games contain near misses in loot boxes and the results of the previous studies suggest that near misses can motivate people to gamble more. Using data of 25000 Canadian gamblers Currie, Hodgins & Casey [8] looked into gambling problems. They found out when using the Problem Gambling Severity Index (PGSI) we can see a big difference in choice of game to play between non-problem gamblers and problem gamblers. 47% of problem gamblers preferred different types of Electronic game machines or other casino games while only 2.3% of non-problem gamblers preferred EGMs or other casino games [8]. While the rise from non-problem gamblers to problem gamblers is very big, even the rise between all four different categories are big, low-risk gamblers at 14% and moderate-risk gamblers at 27%. Therefore the presence of showing near misses and making loot boxes have similarities in looks like casino games can not only show correlations between loot boxes and gambling but also correlation to problems in gambling. These loot boxes who show near misses and have similarities with other casino games should be regulated as the most dangerous loot box.

You could argue that all loot boxes correlate somewhat to a type of gambling. Both when gambling and opening some kinds of loot boxes the individual gamble real-world money in hopes of receiving a valuable reward who is at least partially chosen by chance. By both Belgium and the Netherlands deciding to ban loot boxes you could argue that loot boxes do correlate to gambling, but you could also argue against it because the Netherlands and Belgium decided to ban different kinds of loot boxes on different terms. The Netherlands chose to ban loot boxes whose content can be redeemed back for real-world money [9]. The Belgium Gambling Commission decided that loot boxes you could purchase using real world money were going to be prohibited [11]. There are studies to support these regulations that the two countries made. Zendle & Cairns [16] found evidence on the potential relationship between purchasing loot boxes and problem gambling while doing a large scale survey on randomly selected gamers. There was a strong link among participants between the Problem Gambling Severity Index and loot box spending. Their results of the survey states that “loot boxes act as a gateway to problem gambling, or that individuals with gambling problems are drawn to spend more on loot boxes” [16]. They also believed that based on the results there was a good reason to regulate loot boxes. Another study done by Zendle, D., Cairns, P., Barnett, H., & McCall, C, [1] pointed at “being able to cash out, showing near-misses, and letting players use in-game currency to buy loot boxes may weakly strengthen the relationship between loot box spending and problem gambling” [1]. They also pointed out that either way the study also found that if the

loot box is able to be purchased with real-world money the purchase of that loot box is linked to problems in gambling. Researchers have also pointed out that if the content of a loot box can be sold for real-world money they are mirroring the features of gambling on example blackjack or a slot machine [10].

Future Work

Grand Theft Auto has manage to escape the questions about loot boxes in games but in the other hand they have released a full on casino in their game. The player can use in-game currency in order to gamble in a casino. In game currency in Grand Theft Auto can then be purchased with real-world money. I've found that loot boxes that resemble casino games could potentially correlate to problem in gambling, and therefore the implementation of a casino in Grand Theft Auto could correlate to problem in gambling.

Other ways to answer the research question could have been to research all the top games at the moment since steam is not the only platform with games. There are other big games that contain loot boxes with a lot of players but do not exist on steam. With that being said steam is not a small platform, it contains some of the biggest games with loot boxes and has an enormous player count but it does not have it all. This study may have benefited to research more top played games outside of steam.

V. CONCLUSION

This paper is set out to see what aspects of purchasing loot boxes correlate to a form of gambling. We have found that the loot boxes in games like *CS:GO* which is the top played steam game not only correlates features in gambling but also harmful features in problem with gambling[8]. These are mainly the loot boxes who show near misses like a slot machine or mirror features like a roulette wheel. I have also found out that features and aspects like purchasing loot boxes with real life money and being able to sell the content of a loot box for real-world money correlate to gambling [1][10]. These are features who try to mirror or copy features of casinos and EGMs and therefore show distinct similarities between loot boxes and gambling. [10] It has been proven in research that even using in-game currency could strengthen the relationship between gambling and purchasing loot boxes [1] but that is kind of a stretch and is not seen as a major aspect that correlates loot boxes and gambling in this study.

VI. ACKNOWLEDGEMENT

I would like to express my special thanks of gratitude to my supervisor Steve Dahlskog who have supervised and helped with this this study when I needed guidance. I would also like to thank the reviewers that helped me detect early flaws in my text and guided me towards the right path and a well developed study.

VII. REFERENCES

- [1] Zendle, D., Cairns, P., Barnett, H., & McCall, C. (2020). Paying for loot boxes is linked to problem gambling, regardless of specific features like cash-out and pay-to-win. *Computers In Human Behavior*, 102, 181-191. doi: 10.1016/j.chb.2019.07.003
- [2] Langham, E., Thorne, H., Browne, M. et al. Understanding gambling related harm: a proposed definition, conceptual framework, and taxonomy of harms. *BMC Public Health* 16, 80 (2015). doi: 10.1186/s12889-016-2747-0
- [3] DeCamp, W. (2020). Loot Boxes and Gambling: Similarities and Dissimilarities in Risk and Protective Factors. *Journal Of Gambling Studies*, 37(1), 189-201. doi: 10.1007/s10899-020-09957-y
- [4] Ray, R. (2021). Types of Gambling - Comparing Casino Games, Sports Betting and More. Retrieved 16 December 2016, from <https://www.gamblingsites.com/blog/different-forms-of-gambling-compared-14775/>
- [5] Spruce, H. (2021). What are the Different Types & Forms of Gambling Addiction?. Retrieved 4 February 2016, from <https://www.highspeedtraining.co.uk/hub/types-of-gambling-addiction/>
- [6] Steam: Game and Player Statistics. (2021). Retrieved 14 May 2021, from <https://store.steampowered.com/stats/>
- [7] Problem Gambling Severity Index (PGSI). (2021). Retrieved 17 May 2021, from <https://responsiblegambling.vic.gov.au/for-professionals/health-and-community-professionals/problem-gambling-severity-index-pgsi/>
- [8] Currie, S., Hodgins, D., & Casey, D. (2012). Validity of the Problem Gambling Severity Index Interpretive Categories. *Journal Of Gambling Studies*, 29(2), 311-327. doi: 10.1007/s10899-012-9300-6
- [9] Yin-Poole, W. (2021). The Netherlands declares some loot boxes are gambling. Retrieved 18 May 2021, from <https://www.eurogamer.net/articles/2018-04-19-the-netherlands-declares-some-loot-boxes-are-gambling>
- [10] Griffiths, M. (2018). IS THE BUYING OF LOOT BOXES IN VIDEO GAMES A FORM OF GAMBLING OR GAMING?. *Gaming Law Review*, 22(1), 52-54. doi: 10.1089/glr2.2018.2216
- [11] Uscher, W. (2021). CS: GO Players In Belgium And The Netherlands Can No Longer Open Loot Boxes. Retrieved 18 May 2021, from <https://www.cinemablend.com/games/2450129/cs-go-players-in-belgium-and-the-netherlands-can-no-longer-open-loot-boxes>
- [12] Ucciferri, F. (2020). Parents' Ultimate Guide to Steam. Retrieved 19 May 2021, from <https://www.common sense media.org/blog/parents-ultimate-guide-to-steam>
- [13] Schüll, N. (2012). Addiction by Design, 456. doi: 10.1515/9781400834655
- [14] Reid, R. (1986). The psychology of the near miss. *Journal Of Gambling Behavior*, 2(1), 32-39. doi: 10.1007/bf01019932
- [15] Côté, D., Caron, A., Aubert, J. et al. Near Wins Prolong Gambling on a Video Lottery Terminal. *J Gambli Stud* 19, 433-438 (2003). doi: 10.1023/A:1026384011003
- [16] Zendle, D., & Cairns, P. (2019). Loot boxes are again linked to problem gambling: Results of a replication study. *PLOS ONE*, 14(3), e0213194. doi: 10.1371/journal.pone.0213194
- [17] Sutevski, D. (2021). Why and How Online Casinos are Taking Over the Gambling Industry. Retrieved 19 May 2021, from <https://www.entrepreneurshipinbox.com/23641/why-and-how-online-casinos-are-taking-over-the-gambling-industry/>
- [18] Brookes, J. (2018). In-Game Gambling Will Become A Cash Cow For Video Game Publishers - Which-50. Retrieved 19 May 2021, from <https://which-50.com/in-game-gambling-will-become-a-cash-cow-for-video-game-publishers/>
- [19] Richman, O. (2021). Is Overwatch dying heading into 2021? How many still play it?. Retrieved 19 May 2021, from <https://win.gg/news/6884/is-overwatch-dying-heading-into-2021-question-mark-how-many-still-play-it-question-mark>
- [20] Clement, J. (2021). CS:GO peak players on Steam 2021 — Statista. Retrieved 19 May 2021, from <https://www.statista.com/statistics/808630/cs-go-number-players-steam/>