How Do Video Game Design and Monetization Strategies Mimic Gambling Mechanisms to Exploit Addictive Behaviors and Contribute to Pathological Gaming and Gambling?

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Introduction

Whereas in the early years of video game emergence, the industry standard was to sell video games for a fixed price, the past two decades have seen a shift toward free-to-play or full-priced games with purchasable in-game items known as microtransactions. The most common form of microtransactions is what's called loot boxes, which are digital containers containing randomized rewards that can be purchased using real-world money (Drummond & Sauer, 2018).

Appearing in several video games in the early 2000's, the loot box was popularized in 2008 when Electronic Arts (EA) became the first major company to implement them with the introduction of a new online-only game mode in FIFA 09, called Ultimate Team (Lemmens, 2022). Since then, they have become widespread in the gaming industry. The design of loot boxes has come under scrutiny for exploiting addictive behaviors and mimicking gambling principles to maximize revenue (King & Delfabbro, 2018; Drummond & Sauer 2018; Zandle et al., 2020), prompting some countries such as Belgium to ban them outright (Denoo et al., 2023).

In this paper, I will explore how video game design and monetization strategies exploit addictive human behaviors and psychological tendencies to facilitate pathological gaming, overspending, and gambling addiction. Through my analysis, I will posit that many video games employ strategies akin to those used in gambling, including inviting color schemes, audio cues, and time-elapsing mechanics, to facilitate pathological behaviors both in gameplay and in the microtransactions offered within these games.

Background

The debate over whether video game addiction constitutes a legitimate psychological disorder has persisted since the advent of video games. The American Psychiatric Association (APA) introduced "Internet gaming disorder" as a category for further study in the fifth edition of

the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5, 2013). This decision sparked controversy due to its selective focus on gaming over other potential media-based addictions, such as binge-watching or reading (Bean et al., 2017). While delineating gambling is easier due to its more pronounced detrimental effects on players such as financial impairment, distinguishing video game addiction is much more convoluted.

Unlike DSM-5, which considers the disorder as needing further study, the World Health Organization (WHO) has officially listed "Gaming Disorder" as a disease in the *International Classification of Diseases* (ICD-11, 2018), highlighting the lack of consensus regarding the nature of the issue. In contrast, gambling has long been acknowledged as a disorder, first classified as "Pathological Gambling" in the DSM-III in 1980 in the ICD-10 in 1992 (Petry et al., 2014).

The issue arises when gambling mechanics, known to invoke psychological tendencies associated with a recognized psychological disorder (Gambling Disorder), are integrated into a medium not yet concretely established as a disorder (Gaming Disorder). Loot boxes, which are prevalent in many modern video games, are the primary culprit of this practice. A loot box is a purchasable virtual container offering the player a random item from a predetermined set of rewards (Kowert & Quandt, 2021, p.8-9). These rewards range from cosmetic modifications to items that significantly aid player progression. Most rewards are of minimal value, but occasionally, the player may receive rare and coveted items, characterized by unique visual effects or potent in-game advantages.

The resemblance between loot boxes and gambling, particularly slot machines, is unmistakable. Players spend money hoping to obtain items of greater value. Several studies have shown that players who self-report higher scores on gambling severity scales are more likely to

purchase loot boxes, suggesting that video game companies, knowingly or unknowingly, disproportionately profit from players who may be more susceptible to gambling behaviors, thereby solidifying the connection between the two domains (Drummond et al., 2020; Zendle & Cairns, 2020; Close et al., 2021).

Although the financial and psychological impacts mirror those of slot machines, loot boxes fall outside the legal definition of gambling. The U.S. Code defines gambling as "the staking or risking by any person of something of value upon the outcome of a contest of others, a sporting event, or a game subject to chance, upon an agreement or understanding that the person or another person will receive something of value in the event of a certain outcome" (*31 U.S. Code § 5362 - Definitions*, n.d.). Loot boxes do not meet this criterion because virtual items are not considered 'something of value', and expenditure on loot boxes is not considered a 'financial risk', given that the player is guaranteed to receive an item (King & Delfabbro, 2018). This interpretation is supported by the Pan-European Game Information (PEGI) and North American Entertainment Software Rating Board (ESRB), which stated in 2017 that that loot boxes do not constitute gambling because a reward is always guaranteed (Hood, 2017). Consequently, video game developers have found an opportunity to incorporate gambling mechanics into their games without the constraints of legal gambling regulations.

Gambling Mechanics in Video Games

I will refer to various psychological theories and literary works on gambling to bolster my analysis of the design principles borrowed from gambling in the video game industry, starting with the sensory experience.

In *Addiction by Design* (2012), Natasha D. Schüll investigates the design strategies utilized in gambling machines to foster player addiction. In chapter 2, "Engineering Experience,"

Schüll explores how machines are designed with a focus on the experience they provide rather than product quality. She quotes an engineer stating, "Do not regard auxiliary products as merely auxiliary, but as integral to the experience." Interactive components that gamblers encounter at the point of play – buttons, bill acceptors, audiovisual effects, color schemes and ergonomics - significantly enhance user engagement and potential dependency (Schüll, 2012, p. 54).

These considerations are equally pertinent to designing the loot box experience. Popular games like *Destiny*, *Fortnite*, *Hearthstone*, and *Overwatch* use similar color coding—grey, green, blue, purple, and yellow—to denote item rarity, associating brighter colors with higher-value items. Unboxing higher-rarity items triggers higher-pitched and more enticing sound effects. In *Counter-Strike: Global Offensive* (CS:GO), the sound effect for unveiling the rarest items lasts two seconds longer than for common items. The animations for unboxing and revealing items are meticulously designed to maximize satisfaction. In *Overwatch*, purchased loot boxes bounce on the ground to suggest that the items inside are eager to escape, amplifying players' anticipation and excitement. The entire sensory experience of buying and opening loot boxes is carefully crafted.

The sensory experience can also contribute to addictive gameplay. Luca Galante, an ex-gambling engineer, applied techniques he learned in the gambling industry to develop *Vampire Survivors*. Galante sought to replicate the casino experience, creating a "sensory barrage of colors and sounds" to captivate players. In an interview, he elucidated the similar design principles, stating, "The player is actually spending money every time they press it [referring to slot machines], and because of that, there's a huge attention to detail on the sounds, the animations, and the sequences, because you have so few elements to work with (…) I absorbed that knowledge simply by being in the industry. Thus, when making a game, I've automatically

applied it to what I've been doing." Despite being a solo project, the game ranks as the fourth most positively reviewed game on Steam with 97.4% positive reviews, and reviewers describe it as "If heroin was a game" (Chung, 2022).

Beyond sensory appeal, technical design principles fostering behavioral dependency are crucial in crafting a compelling gambling experience. Schüll posits that achieving “continuous gaming productivity” is vital for successful design in this regard (Schüll, 2012, pp. 52-73). While productivity traditionally implies output per worker, Schüll redefines it within the gambling context as “wagering action (play) per patron per interval” (p. 52). To enhance gaming productivity, she identifies three key strategies: accelerating the pace of play, extending engagement duration, and maximizing total expenditure.

Accelerating play involves maintaining a quick, uninterrupted rhythm of betting to maintain player engagement and focus. Extending duration aims to facilitate a psychological "Flow" state, characterized by deep focus, sense of agency, and an altered perception of time, as described by Mihály Csíkszentmihályi in *Flow: The Psychology of Optimal Experience* (1990). Lastly, maximizing the total expenditure focuses on minimizing the gap between the desire to gamble and the ability to do so.

In video games, developers employ specific design principles to quicken the pace and extend playtime, ensuring long-term player engagement and increasing the likelihood of expenditure on microtransactions. A common approach to quicken the pace is the “just-one-more-go” design (Houghton, 2014), where each match or playthrough is made predictable and relatively short, creating rhythmic game sessions. Players are encouraged to play another round by the allure of high scores, statistics, and a growing understanding of game mechanics. Online team-based games like *CS:GO* and *League of Legends* feature 30-minute matches and provide

immediate feedback through post-match player leaderboards. This design encourages players to commit to "just one more game," as the predictable and manageable duration, combined with the drive to improve scores and statistics, keeps them engaged.

To extend gameplay duration and evoke a sense of productivity, developers aim to induce a Flow state through design. A common mechanism used to achieve this is skill-based matchmaking (SBMM), which tracks player performance to pair them with others of similar skill levels, ensuring matches are challenging yet fair. This keeps players at the edge of their abilities, challenging them to improve and creating a synthetic sense of productivity that appeals to the fundamental workings of the human brain (Nacke & Lindley, 2008).

To maximize revenue, the addictive gameplay design is complemented by an enticing loot boxes experience to promote continued spending. The digital nature of video games streamlines the process of accessing and spending funds, efficiently maximizing player expenditure. By incorporating gambling-centric strategies into both gameplay and loot box design, developers create a significantly more addictive experience overall for players.

The third perspective for understanding the similarities between loot boxes and traditional gambling is to analyze their shared psychological mechanisms. B.F. Skinner's work on operant conditioning provides valuable insights and has been foundational to understanding the psychology of gambling. Operant conditioning is a learning theory wherein behavior is shaped by its consequences (McLeod, 2024). Skinner conducted experiments with rats using various reinforcement schemes to study how different reward schedules conditioned behavior, revealing that inconsistent reward schedules were more engaging than constant and predictable ones. The variable reinforcement schedule, where rewards were given at random times and amounts, elicited the most consistent and persistent behavior (Wise, 2013; Lim, 2024).

This insight has been fundamental in understanding the psychology of gambling; somewhat counterintuitively, it indicates that inconsistent rewards – a core aspect of gambling - can increase behavioral persistence. This finding helps explain the success of loot boxes, which mimic the variable reinforcement schedule. When purchasing a loot box, players are uncertain of the quality of rewards they will receive (variable amount) or how many boxes they will need to open to get their desired item (variable time).

Another psychological phenomenon present in both loot boxes and slot machines is the near-miss effect, highlighted by R. L. Reid (1986). A near-miss refers to a "special kind of failure to reach a goal, one that comes close to being successful" (p. 32). Reid argues that this type of failure can have the same conditioning effect as success. A salient example of this is getting two matching symbols on a slot machine; although functionally identical to getting no matches, it feels psychologically closer to a win, encouraging the player to continue gambling. This effect is mirrored in loot boxes when a player unboxes an item of the same rarity as the one they desire but not the exact item itself. The matching rarity makes the loss feel closer to a win, compelling the player to try again.

A more direct implementation of the effect is found in CS:GO weapon cases. When a case is unlocked, the animation revealing the reward resembles a segment of a spinning wheel. The possible rewards spin on the screen, allowing the player to see the perimeter around the indicator. As the spin slows, the indicator may narrowly miss a highly valuable item, awarding a common one instead. This frustrates yet tempts the player, inducing a desire to continue unboxing in pursuit of the satisfaction that comes with obtaining a rare reward.

Case Study

In the case study, I will examine how one of the largest game developers, Valve, has contributed to the proliferation of loot boxes and detail the distinctive phenomenon of "skins betting" enabled by their unique implementation of loot boxes in their popular first-person shooter game, *Counter-Strike: Global Offensive* (CS:GO). I will posit that Valve's Steam marketplace serves as a conduit for third-party websites to sidestep gambling regulations and exploit the addictive qualities of gambling and gaming to profit from CS:GO's player base - a significant portion of whom are underage.

Since its founding in 1996, Valve has become a leading force in the video game industry. With the launch of Steam in 2003, a digital game distribution platform for PC, Valve now commands 75% of the digital video game distribution market (Solomons, 2024). CS:GO stands as its most commercially successful game to date, boasting over 900,000 daily active players more than a decade after its release (SteamDB, 2024).

In 2010, Valve played a pivotal role in popularizing loot boxes after integrating them into *Team Fortress 2*, their most popular team-based multiplayer game at the time. Recognizing their profitability, Valve made many games on Steam free to play the following year, prioritizing microtransactions as the primary revenue source. This led to a twelvefold increase in *Team Fortress 2*'s revenue (Miller, 2012). To further capitalize on microtransactions, Valve launched the Steam Community Market in May 2013, enabling players to trade, buy, or sell items obtained from games on the platform for Steam Wallet Funds.

The advent of "skins betting" began with the launch of CS:GO shortly after the release of the Community Market. The game featured weapon cases, allowing players to unlock, buy, sell,

and trade weapon modifications, referred to as skins. These skins are obtained through purchasing keys to unlock weapon cases or through buying them directly on the marketplace.

In addition to popularizing loot boxes, the game significantly increased viewership for esports, professional video game competitions watched by live or online viewers. Similar to traditional sports betting, esports spectators can wager on match results using skins. This is made possible by the Steam marketplace, where each skin has a market-determined value. Normally, skins hold value only in their capacity to be traded for other skins or converted to Steam Wallet funds, which can only be used to purchase games on Steam and cannot be converted to real currency. However, Valve's application program interface (API), Steamworks, allows third party websites to link players' accounts, enabling skins to be traded for monetary value (Martinelli, 2017).

These websites exploit the marketplace's economic system by enabling users who link their account to cash out their skins for real currency, equivalent to their marketplace value. While weapon cases themselves are problematic due to their resemblance to slot machines, sites like CS:GOEmpire further blur the line between video game and traditional gambling by enabling the conversion of skins into real money. On these sites, skins act as a de facto currency—akin to casino chips—allowing participants to wager on Esports matches, and cash out the skins they win. Some sites also offer alternative ways of gambling that closely resemble traditional forms, such as roulette or coinflip.

Legal Challenges

Significant legal and ethical issues surround skin gambling, particularly regarding the potential for underage gambling and the risk of fostering gambling addiction. The Steam subscriber agreement mandates a minimum user age of 13, and CS:GO is rated for ages 17 and

up by the ESRB. However, these age restrictions are easily bypassed as Steam accounts can be created and CS:GO can be played without age verification, granting access to weapon cases. Any Steam user can link their account to these third-party websites and participate in skins betting. Transactions can be made directly on these sites via PayPal or anonymously using cryptocurrencies.

The borderless nature of betting sites and the global popularity of CS:GO, coupled with the lack of age or identity verification, poses an international challenge that various countries addressed differently. Belgium banned the sale of loot boxes in 2018, but this proved ineffective as players circumvented the ban by using foreign servers (Denoo et al., 2023). In 2023, China limited the amount players can spend on games and banned probability-based microtransactions, like loot boxes. These regulations undermined the economy, causing the market value of Chinese gaming companies to drop by nearly $100 billion within three weeks of the ban, underscoring the profitability of loot boxes (Zheng, 2024). Moreover, the anonymity afforded by betting sites raises tax evasion concerns, as earnings from skins betting are hard to trace and trades can be made internationally. This makes the imposition of different tax policies on international websites and games unfeasible (Holden & Ehrlich, 2017). Within the U.S., variations in state-level gambling age restrictions further complicate regulation attempts.

Three principal federal laws relevant to gambling could potentially apply to skin betting, but each has limitations. The first, the Wire Act of 1961, bans specific interstate or foreign gambling-related wire transmissions. However, because skin betting does not involve the direct transfer of funds for gambling but rather the conversion of skins into currency, it falls outside the Act’s scope (Hardenstein, 2017).

The Professional and Amateur Sports Protection Act (PASPA), enacted in 1992, illustrates a key challenge in regulating skin betting. The law prohibited any entity, whether private or governmental, from facilitating, operating, or promoting betting on amateur or professional sports outcomes (Hardenstein, 2017). However, the Supreme Court's 2018 decision in *Murphy v. NCAA* declared PASPA unconstitutional for violating the 10th Amendment's anti-commandeering principles (*Murphy v. National Collegiate Athletic Association, n.d.*). This ruling granted states the freedom to regulate sports gambling on their own, complicating the establishment of a unified regulatory framework.

The Tenth Amendment, which prohibits the federal government from commandeering state governments to enforce federal laws or regulations, presents a significant barrier to establishing regulation on a federal scale. The third potential law, the Unlawful Internet Gambling Enforcement Act (UIGEA) enacted in 2006, prohibits certain financial transactions related to unlawful Internet gambling (Hardenstein, 2017). However, because what constitutes 'unlawful' gambling varies by state, and the UIGEA only covers activities considered illegal under existing state laws, it does not provide a comprehensive regulatory framework.

Valve faced several lawsuits regarding skins betting, starting with a lawsuit filed by Michael McLeod on June 23, 2016. McLeod accused Valve of enabling accounts to link to gambling sites, violating the Civil Racketeer Influenced and Corrupt Organizations (RICO) statute and engaging in unfair or deceptive trade practices. Two additional lawsuits were filed on July 7, 2016, one by a minor and another by a minor's mother, citing similar grievances. However, these cases were dismissed, with the court ruling that Valve wasn't directly involved with the implicated third-party gambling sites (Dealessandri, 2022).

In response to the controversy, Valve took steps to dissociate itself from skin gambling. It sent cease-and-desist letters to 23 gambling sites and made changes to Steam that made skin trading for gambling purposes more difficult. Notably, they introduced a seven-day trade hold on items traded between accounts, aimed at disrupting the immediate use of skins for gambling. These measures, while not a direct consequence of the lawsuit outcomes, were influenced by the legal and public scrutiny Valve faced (Lee, 2016).

Ethical Concerns

Utilizing the aforementioned design strategies, such as variable reinforcement schedules and mechanisms to prolong game sessions, is not inherently unethical. However, ethical concerns arise when these tactics prioritize profit over user well-being. For instance, Valve's reluctance to modify its API to prevent access by gambling sites, while opting for more publicly recognizable actions like issuing cease-and-desist letters, indicates a preference to protecting its public image over addressing the root of the problem. This is compounded by the fact that Valve benefits from the additional attraction to their skins and esports matches generated by these gambling sites. Furthermore, their conspicuous use of the near-miss effect in the skin reveal animation suggests a deliberate intent to augment addictive features borrowed from the gambling industry.

A critical and unresolved issue is the absence of preventative measures for underage gambling. Nearly all games featuring loot boxes lack safeguards against users younger than mandated by user agreement, leading to unsupervised spending by minors. A Kotaku article highlights this problem through the story of a 19-year-old who confessed, "I am 19 and addicted to gambling," after spending over $17,000 on microtransactions within three years in games like CS:GO, Smite and The Hobbit: Kingdoms of Middle-earth (Gach, 2017). He estimated that about 90% of his biweekly paychecks went towards microtransactions. Reflecting on the

experience, he said, "When you're about to click the button going 'Do you agree to spend $100?' you don't really feel that low kind of gut punch that I get now," highlighting the psychological disconnect between making digital and physical purchases.

This phenomenon extends beyond individual players, affecting the entire gaming community. Players who invest heavily in microtransactions drive others who wish to remain competitive to spend more in return. This cycle of purchases fosters a deeper commitment to the game, which in turn makes disengagement increasingly difficult. Expenditure incentivizes further play, and further playtime incentivizes more expenditure. This interplay leads to a state of "entrapment," where players, heavily invested both financially and timewise, find it hard to quit (King & Delfabbro, 2018). This situation is exacerbated by the 'sunk cost' effect, where previous investments in loot boxes, now irrecoverable, justify continued spending.

Conclusion

The incorporation of gambling mechanics in video games, most prominently with loot boxes, has increasingly blurred the line between gaming and traditional gambling while operating largely without regulation, presenting significant ethical and legal challenges. Game developers have found a lucrative avenue; exploiting psychological tendencies by mimicking gambling mechanisms proven to foster addiction, in a domain free of gambling regulation, to elicit excessive spending. The confluence of addictive video game and loot box design amplifies the overall addictiveness of video games, potentially leading to a sense of entrapment and uncontrolled spending of time and money.

Despite evidence of unethical business practices, the skins betting case study also highlights the numerous challenges associated with regulation. Moreover, given their immense profitability, it is unlikely that developers, publishers or legislators would voluntarily curb these

practices. Ideally, a collective effort from video game enthusiasts such as myself can reverse this trend and return to a business model that prioritizes quality over predatory monetization schemes. As the consumers, by expressing distain for current industry practices and showing appreciation for high-quality games with a single price tag, we can cultivate a healthier gaming environment and discourage the exploitation of addictive tendencies for profit.

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