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Designing for monetization: A taxonomy of dark patterns in top-grossing GaaS video games

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This article examines the highest-grossing free-to-play video games of 2024 to identify the use of dark design patterns as core monetization strategies. Drawing on a taxonomy organized around temporal, monetary, and social dimensions, the study analyses nine representative GaaS titles on mobile and console platforms. The findings reveal a denser and more aggressive deployment of these practices in mobile games, where mechanics such as daily rewards, opaque virtual currencies, loot boxes, and socially driven incentives converge. Several of these tactics closely mirror gambling dynamics, raising ethical concerns over compulsive spending, particularly among younger audiences. This research underscores the need for enhanced digital literacy, stronger regulatory frameworks, and further research into user self-regulation mechanisms within increasingly monetized play environments.

Este artículo examina los videojuegos free-to-play con más ingresos del 2024 para identificar el uso de patrones de diseño oscuros centrados en estrategias de monetización. Basándose en una taxonomía organizada en torno a dimensiones temporales, monetarias y sociales, el estudio analiza nueve títulos GaaS representativos en plataformas móviles y de consola. Los resultados apuntan a un despliegue más denso y agresivo de estas prácticas en los juegos para móviles, donde convergen mecánicas como las recompensas diarias, las monedas virtuales opacas, las cajas de botín y los incentivos sociales. Varias de estas tácticas reflejan fielmente la dinámica del juego, lo que suscita preocupaciones éticas sobre el gasto compulsivo, especialmente entre el público más joven. Esta investigación subraya la necesidad de reforzar la alfabetización digital, consolidar marcos regulatorios más sólidos y profundizar en la investigación sobre los mecanismos de autorregulación de los usuarios en

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Palabras clave: *juego como servicio (GaaS), patrones oscuros, estrategias de monetización, comunicación persuasiva, alfabetización digital.*

Over the past five decades, the video game industry has evolved from a niche market into one of the most dynamic and influential sectors within the cultural and creative industries (Lesser and Woodliffe, 2024). In 2024, it generated 187 billion dollars in global revenue, with 92.6 billion dollars attributed to the mobile segment (Pamboris and Bruno, 2024). This surge in mobile earnings is closely linked to the widespread adoption of monetization models deemed particularly effective (Niknejad *et al.,* 2024), including free-to-play (F2P) formats, microtransactions, and subscription-based services.

The increasing prevalence of these monetization strategies reflects not only a shift in consumer behaviour but also an industry-wide imperative to ensure profitability, particularly for high-budget "Triple-A" productions. The significant financial investments required for such titles have driven developers and publishers to adopt commercial models that go beyond the traditional one-time purchase framework, instead favouring mechanisms for ongoing revenue generation (Dillon and Cohen, 2014; Ahmad *et al*., 2017). As of 2024, microtransactions accounted for 58 % of PC gaming revenue and 38 % of console gaming revenue (Rosier *et al*., 2025).

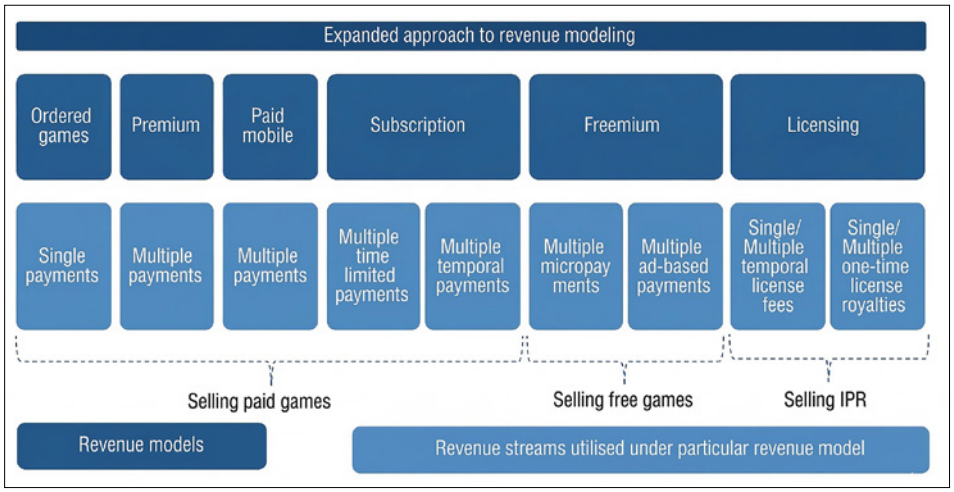
This transformation of video games in business models is illustrated in Figure 1, emphasizing the shift from traditional one-time purchases to ongoing monetization strategies, primarily driven by microtransactions and subscription services. This structural change has reshaped the relationship between developers and players, creating new commercial opportunities that extend the life cycle of digital entertainment products (Landoni *et al*., 2020).

In this context, the Game as a Service (GaaS) model has gained prominence, consolidating throughout the 2010s alongside the expansion of freemium schemes illustrated in the previous figure. GaaS combines free-to-play access with paid additional content and relies on fully digital distribution, which has fostered new patterns of consumption in both games acquisition and in-game spending (Kaleva, Jari-Pekka, 2022).

By the 2020s, the model has become firmly established. The game industry, increasingly dominated by large corporate conglomerates, has broadly embraced these practices, utilizing digital distribution platforms such as Apple Store, Play Store, Steam, GOG.com, and Epic Games Store as the primary environment for their GaaS strategy (Kaleva, 2022). It should be noted, however, that this trend is often

driven by top-down publishers and conglomerate mandates, and many developers have expressed significant disagreement with these business models. This internal friction is confirmed by recent industry data, such as the State of the Game Industry Report 2025, which found that a plurality of developers (42 %) is explicitly "not interested" in working on GaaS titles, citing concerns about predatory monetization, market saturation, and burnout (Game Developers Conference, 2025).

Figure 1. Revenue models leveraged by video game companies



Source: Klimas (2017, p. 132).

Also referred to as live-service games, GaaS titles are characterized by the continuous delivery of content throughout the product's lifecycle —whether through micropayments for expansions, season passes, or subscription models (Dubois and Weststar, 2022). This strategy allows for an extended commercial lifespan of the product and sustained user engagement through regular updates, enhancements, and special events (Hussain *et al.*, 2023).

Although free-to-play models are often portrayed as accessible due to the absence of an upfront cost, they fundamentally depend on monetization strategies to achieve profitability. As a result, developers have implemented mechanisms specifically aimed at converting users into paying customers. In many instances, these strategies have been criticized for their intrusive or aggressive nature and for encouraging consumption patterns commonly referred to as "predatory monetization practices" (Davidovici-Nora, 2014).

Strategies such as the use of in-game currency —virtual tokens purchased with real money to acquire items within the base game— or the purchase of loot boxes, in which the contents are randomized and only revealed upon opening, have become widespread (Ivanov *et al.*, 2021). This diversification of revenue models has raised concern within the academic community regarding their potential impact on consumers, particularly concerning random reward mechanisms

that may foster compulsive spending behaviours (Zendle and Cairns, 2018). These mechanics are intentionally designed to be highly engaging, offering reinforcements and rewards that encourage prolonged and repetitive use (Spicer *et al.*, 2021), which previous studies have found to resemble the psychological mechanisms used in gambling (Hidalgo, 2019).

As a result, several countries, including Belgium, the Netherlands, and the United Kingdom, banned or restricted certain microtransactions such as loot boxes to protect younger audiences (Arjona and Muñoz, 2020). Meanwhile, others such as Spain are debating regulatory frameworks prohibiting minors from accessing randomized reward systems in video games (Ministerio de Derechos Sociales, Consumo y Agenda 2030, 2024), and have more recently launched a nationwide awareness campaign —*"Menos loot boxes, más real gamers"* ["Fewer loot boxes, more real gamers"]— to inform young players and their families about the risks of these monetization mechanics (Ministerio de Derechos Sociales, Consumo y Agenda 2030, 2025).

Against this backdrop, marked by increasing complexity in monetization models and the sustained expansion of GaaS, it becomes essential to examine how the most profitable video games currently implement these strategies, and what implications they hold both for the industry and for player experience. The significance of this research line is reinforced by examining which titles generated the highest revenues in 2024. In the market of PC and consoles Simon (2024), a video game market analyst at Newzoo, highlights: *EA Sports College Football 25* (EA Sports, 2024), *EA Sports FC 25* (EA Sports, 2024), *Fortnite* (Epic Games, 2017), *NBA 2K25* (2K Games, 2024), and *Black Myth: Wukong* (Game Science, 2024). In the mobile sector, Clement (2025), a senior industry researcher at Statista, points to *Honor of Kings* (Tencent Games, 2015), *Monopoly Go!* (Scopely, 2023), *Royal Match* (Dream Games, 2021), *Roblox* (Roblox Corporation, 2006), and *PUBG Mobile* (Tencent Games, 2018) as major benchmarks. Except *Black Myth: Wukong*, all these titles operate under the GaaS model, making them highly representative case studies for assessing the current state of the industry.

This analysis aims not only to map some of the contemporary forms of exploitation within the video game industry but also to provide a foundation for identifying the ethical, psychological, and economic implications of such practices. To this end, the study draws on the theoretical framework of dark patterns as applied to gaming. Originally, these patterns were defined as deliberately crafted strategies employed by developers to elicit negative player experiences that conflict with the players' own interests —often without their fully informed consent (Zagal *et al.*, 2013). In their foundational work, the authors situated these patterns within a broad interpretative framework of persuasive design and advocated for the cultivation of manipulation literacy: a critical competency that enables players to recognize when they are being persuaded or coerced into actions that may not align with their best interests. They argue, accordingly, that "once players are literate enough to understand the effects of a pattern so that they can give consent (or the games follow the disclosure principle), the pattern is no longer dark" (Zagal *et al.*, 2013, p. 7).

However, this perspective on literacy as a solution has significant limitations. Critics argue that awareness alone is often insufficient to counteract these

mechanisms. Drawing on foundational work regarding cognitive biases (Tversky and Kahneman, 1974), this counterargument posits that because many dark patterns are designed to target subconscious or heuristic-based cognitive processes, they can remain highly effective even when the user is consciously aware of the manipulation attempt.

Over time, the term dark pattern has become established in the field of digital interaction to describe design elements that manipulate or deceive users into performing actions they would not normally undertake. Although recent scholarship has questioned the precision of the term —arguing that it entails a degree of moral ambiguity— alternative labels such as deceptive design, manipulative design, or deceptive/manipulative pattern have been proposed to address these concerns (ACM, 2025).

Nevertheless, this study chooses to retain the term dark pattern, in alignment with established academic literature that uses it to describe unethical or overtly harmful interface design practices from a consumer perspective. Consequently, the general objective of this research is to analyse the design and monetization strategies implemented in the most profitable video games today, in order to identify, classify, and assess recurring patterns —both traditional and emerging— that structure the gameplay experience under the GaaS model. This approach seeks to offer a critical perspective on commercial exploitation practices in the context of contemporary interactive digital entertainment. To achieve this general aim, the study proposes the following two specific objectives:

- SO1. To design a taxonomic framework of monetization-oriented design mechanics by analysing and systematizing previous theoretical models, with the goal of developing a conceptual tool to identify both established and emerging monetization patterns in video game design.
- SO2. To apply this taxonomy to the analysis of the top-grossing video games of 2024, selected based on their revenue volume and alignment with the GaaS model, in order to detect the presence and recurrence of monetization-driven design mechanics.

This dual objective —both theoretical and empirical— will allow for the observation of the persistence of well-established commercial strategies, as well as the identification of emerging patterns within current monetization logics. Through this analysis, it will be possible to evaluate the extent to which traditional exploitative gameplay strategies are preserved, adapted, or reformulated, thereby contributing to a critical understanding of recent transformations in video game design and their broader implications for players.

METHODOLOGY

This research is structured in two distinct methodological phases, each aligned with the specific objectives defined for the study. It combines an initial literature review phase with a second phase focused on the analysis of design categories,

based on the identification of recurring patterns in selected video games. As previously mentioned, the sample includes nine of the ten highest-grossing video games of 2024. These titles were selected due to their economic relevance and their representativeness of the Game as a Service (GaaS) model: *EA Sports College Football 25* (EA Sports, 2024), *EA Sports FC 25* (EA Sports, 2024), *Fortnite* (Epic Games, 2017), *NBA 2K25* (2K Games, 2024), *Honor of Kings* (Tencent Games, 2015), *Monopoly Go!* (Scopely, 2023), *Royal Match* (Dream Games, 2021), *Roblox* (Roblox Corporation, 2006), and *PUBG Mobile* (Tencent Games, 2018).

The first specific objective (SO1) —to design a taxonomic framework of monetization-driven game design mechanics— was addressed through a structured review of both academic and technical literature. The review focused on dark design patterns, monetization strategies, and persuasive design in digital games. This stage led to the development of an analytical tool organized into four thematic blocks (temporal, monetary, social, and cognitive-emotional), with observable indicators designed for subsequent application. However, during the refinement phase for empirical application, it was determined that the cognitive-emotional aspects were more accurately described as the *intended outcomes* or *goals* of mechanics within the other three blocks, rather than a distinct category of directly observable mechanics themselves. To ensure the framework's rigor and focus on observable mechanics, the final tool applied in the analysis was consolidated to the temporal, monetary, and social dimensions.

The second specific objective (SO2) —to apply the proposed taxonomy to the analysis of the most profitable games of 2024— was tackled through content analysis of variables and categories, using a binary coding logic (presence/absence of each pattern). This quantitative approach was complemented with brief qualitative notes on the context and implementation of the patterns observed. The analysis was grounded in direct observation of gameplay and monetization dynamics within each title.

To ensure the validity of the analysis, clear criteria for identifying and coding each pattern were established, based on the findings from SO1. The application phase (SO2) was grounded in direct observation of game interfaces, progression dynamics, monetization strategies, and social interaction mechanisms across all selected titles. For each identified pattern, concise qualitative annotations were included to contextualize its specific implementation.

RESULTS

As previously outlined, the findings of this study are organized around two complementary objectives. First, we present the taxonomy developed through the theoretical review, which offers an analytical model for identifying game mechanics linked to monetization strategies. This framework serves as the foundation for the second section, which addresses the empirical application of the taxonomy to the selected video games. Here, we examine patterns of recurrence, divergence, and adaptation within the current industry context.

Proposed Taxonomy of Dark Game Design Patterns

The structure of the proposed taxonomy is organized into three thematic blocks —temporal, monetary, and social— drawing initially from the classification system provided by the website DarkPattern.games, which has been substantiated by the work of Zagal *et al.* (2013). Building upon this foundation, we introduce an updated taxonomy that incorporates both their contributions and subsequent research, with the aim of revising and expanding the conceptual framework for analysis.

The taxonomy is composed of three elements: category, which defines the key concept; descriptor, which explains its meaning; key reference, which identifies the academic source(s) that have studied or validated each pattern. These categories are analytically distinct but not mutually exclusive, some patterns involve, simultaneously, temporal, monetary and social components (e.g., time-gated content that can be skipped with payments or competitive pressure linked to paid upgrades). In such cases, the pattern is placed under the dimension that best captures its primary logic.

Temporal Patterns

Temporal patterns refer to design strategies intended to artificially prolong gameplay and/or foster repetitive behavioural habits. In addition to patterns already identified in the literature, we introduce a new category, "automated play", which adapts insights from Schüll's ethnography of machine gambling interfaces in Las Vegas (2012, p. 175) to contemporary digital games. Whereas Schüll describes how machine features such as auto-play and auto-hold sustain continuous, low-friction wagering cycles, we conceptualise automated play as a dark pattern that delegates core gameplay loops to the system in order to maximise "hands-off" time-on-task in GaaS titles.

Table 1. Types of temporal patterns

Category	Descriptor	Key reference
Playing by appointment (imposed schedule)	The game sets specific time slots to access certain content or rewards, such as limited-time events, fixed schedules, or day/night cycles.	(Veiga *et al.,* 2025)
Daily rewards	Players are encouraged to log in regularly through cumulative rewards for consecutive sessions and/or penalties for inactivity (e.g., progress reset, bonus loss, etc.).	(Veiga *et al.,* 2025)
Task repetition (Grinding)	Repeating low-variety tasks is the only way to progress or unlock new content and upgrades.	(Goodstein, 2021)
Infinite game (or impossible to complete) *-Infinite Treadmill-*	Players are kept in an endless loop of tasks with minimal progress, incentivizing constant play without a clear goal or endpoint.	(Zagal *et al.,* 2013)
Lack of pause/save options	Players are unable to pause the game or save their progress without penalty or loss.	(Krassen and Aupers, 2021).
Forced waiting	Artificial wait times that can be skipped by making payments or watching ads.	(Lewis, 2014)

Category	Descriptor	Key reference
Automated play	The game delegates part of the play loop of the system (e.g. auto-questing, auto-battle, etc.), enabling continuous progression or reward accrual with minimal input.	Authors' proposal based on Schüll (2012, p. 175).

Source: Author's elaboration based on key references.

Monetary Patterns

Monetary patterns are techniques designed to induce players to spend more money than they initially intended, through deceptive incentives, opaque pricing structures, or psychological mechanisms that encourage compulsive spending.

Table 2. Types of monetary patterns

Category	Descriptor	Key reference
Proprietary currency	The value of in-game items is obscured by using an intermediate virtual currency.	(Brignull *et al.*, 2023)
Waste aversion	Offering small leftover amounts that encourage players to spend more real money.	(Zagal *et al.*, 2013)
No spending limit	Players are allowed unlimited purchases with no restrictions or clear warnings, encouraging excessive spending	(Zagal *et al.*, 2013)
Pay to skip	Paying to bypass processes within the game that normally require waiting time.	(Lewis, 2014)
Pay to win	The game offers clear competitive advantages in exchange for payment, disrupting fair gameplay.	(Maisenhölder, 2018).
Subscriptions or recurring fees	Recurring payments designed to generate pressure, anxiety, or fear of missing out, rather than providing constant value to the player.	(Hamari *et al.*, 2020)
Loot boxes	Virtual elements in games that offer random rewards and can be purchased with real money.	(Zendle and Cairns, 2018)
Artificial scarcity	Informing users that a limited quantity of a product is available, increasing its perceived value.	(Mathur *et al.*, 2019)
Anchoring tricks	Manipulating value perception through artificial comparisons that make prices appear "reasonable" by contrast, prompting higher spending.	(Niknejad *et al.*, 2024)
Value degradation	Players must keep spending or investing effort to avoid falling behind due to new items or content that render previous investments obsolete.	(Zagal *et al.*, 2013)
Accidental or unconfirmed purchases	Designing interfaces that mislead users into clicking or confirming a purchase without fully realizing what they are doing.	(Brignull *et al.*, 2023)

Source: Author's elaboration based on key references.

Social Patterns

Social patterns exploit players' relationships with others to encourage continued engagement with the game. These patterns often appeal to obligation, peer pressure, competitiveness, or even manipulation of social networks to attract more users.

Table 3. Types of social patterns

Category	Descriptor	Key reference
Social obligation	Pressure to keep playing due to being part of a group whose collective progress depends on individual actions (e.g., defeating bosses or achieving group milestones).	(Krassen and Aupers, 2021).
Social pyramid and forced recruitment	Requiring players to invite new users as a condition to earn rewards or unlock features that enhance their status.	(Dahlan and Susanty, 2022)
Incentives for antisocial or disruptive behavior	Encouraging players to deceive, manipulate, or betray others in order to advance in the game.	(Zagal *et al.,* 2013)
Competitive pressure	Exploiting players' competitive drive by pushing them to spend more money to climb or maintain positions in leaderboards.	(Veiga *et al.,* 2025)

Source: Author's elaboration based on key references.

Content Analysis

The content analysis involved the systematic identification of dark patterns in a sample of non-mobile games (console and PC) and mobile video games. The analysis focused on elements related to monetization, progression systems, and persuasive design. A comparative approach was employed to evaluate the frequency and intensity of these patterns across platforms, with the goal of identifying both common trends and platform-specific practices that may influence player behaviour.

The procedure was organized into three phases: first, a comparison was conducted among console and PC games; second, the same analytical framework was applied to mobile titles; and third, a cross-platform comparison was carried out to highlight key differences and similarities in the implementation of these mechanisms. To support the visual component of the analysis and enhance interpretability, a table is included summarizing the presence or absence of each identified pattern across the selected games.

Temporal Patterns Analysis in the Sample

Console titles such as *EA Sports College Football 25*, *EA Sports FC 25*, *NBA2K25*, and *Fortnite* exhibit various temporal dark patterns. All analysed games incorporate scheduled events ("playing by appointment") and daily login rewards to foster habitual engagement. Weekly challenges in *Fortnite* or limited-time promotional events in *EA Sports FC 25* and *NBA2K25* generate a sense of urgency and reinforce the Fear of Missing Out (FOMO), as illustrated in Figure 2.

Grinding —repetitive tasks required to achieve an in-game objective— is a constant across all games, particularly prominent in Ultimate Team modes by Electronic Arts and Fortnite's Battle Pass. These systems are often coupled with an infinite treadmill design: continuous updates and seasonal content (e.g., *Fortnite* seasons or yearly editions of sports titles) create a perception of never-ending advancement. While offline modes may allow pauses, online modes generally restrict or penalize them. Moreover, wait times and countdowns are frequently

used to subtly enforce a logic of persistent connectivity, further amplified when automated play options keep the progression loop running even when the player is only partially engaged.

Figure 2. Screenshots from MyTeam and Battle Pass systems

Source: *NBA2K25* (2K Games, 2024) and *Fortnite* (Epic Games, 2017).

In the mobile segment, titles such as *Honor of Kings*, *Monopoly Go!*, *Royal Match*, *Roblox*, and *PUBG Mobile* also exhibit a particularly intensive use of temporal dark patterns. Daily rewards emerge as a key mechanic for user retention —for instance, in Royal Match, users receive prizes simply for logging in daily, fostering habitual play and appealing to FOMO.

Monopoly Go! employs limited-time events and collectible stickers that are only available on specific days, encouraging users to log in frequently and engage for extended periods. Grinding is also a prominent feature, particularly in *Honor of Kings* and *PUBG Mobile*, where significant playtime is required to unlock characters, cosmetics, or abilities —unless users choose to pay—. The infinite treadmill pattern is deeply embedded in these games through perpetual levelling systems, regular content updates, and time-limited events. In Roblox, for example, user-generated content and ongoing events continuously draw players back, reinforcing a cycle of sustained engagement. In several of these titles, automated play tools reduce the friction of grinding by letting the system repeat low-variety tasks on behalf of the player, effectively stretching session length and normalising background, semi-attentive play.

Additionally, most mobile titles impose waiting periods to progress —removable through in-app purchases— and restrict pausing during online sessions. Games like *Honor of Kings* and *PUBG Mobile* demand full-session attention, artificially prolonging playtime and encouraging longer engagement. Altogether, these mechanisms are deliberately designed to extend session duration and stimulate monetization through player retention, with automated play acting as a bridge between temporal and monetary pressures by keeping players connected and progressing even when their engagement is largely passive.

Table 4. Analysis of temporal patterns in the sample

Patterns/ Video Game	EA Sports College Football 25	EA Sports FC 25	Fortnite	NBA 2K25	Honor of Kings	Monopoly Go!	Royal Match	Roblox	PUBG Mobile
Playing by appointment	yes / seasonal events	yes/ events & comps.	yes. Battle Pass	yes. My team	yes. Timed events	yes. Reset loops	no	yes. Game-specific	yes/ timed missions
Daily rewards	likely	yes	yes	yes	yes	yes	yes	yes	yes
Grinding	yes	yes	yes	yes	yes	yes	yes	yes	yes
Infinite Treadmill	yes	yes	yes	yes	yes	yes	yes	yes	yes
Can't pause or save	yes (online)	yes (online)	yes (online)	yes (online)	no pause	no	no	yes	No pause
Wait to play	Timers possible	yes	Time-limited	yes	yes	Wait or pay	Lives system	Timers	Wait or pay
Automated Play	Limited (simulated plays)	yes	no	yes	yes	yes	no	no	yes

Source: Author's elaboration.

In contrast to mobile games, console-based titles tend to employ dark patterns more subtly, primarily through grinding and progression systems linked to microtransactions, such as *MyTeam* or *Ultimate Team*. Mobile games, by contrast, exhibit a higher concentration of dark patterns, often relying on more aggressive mechanics —such as enforced waiting times, mandatory daily rewards, automated play modes, and limited-time events— that push users toward constant engagement. While console titles appeal to competitive commitment and long-term player investment, mobile games exploit daily routines and impulsive consumption behaviours. Both models aim to foster player retention, but they do so with differing levels of intensity and psychological pressure.

Analysis of Monetary Patterns in the Sample

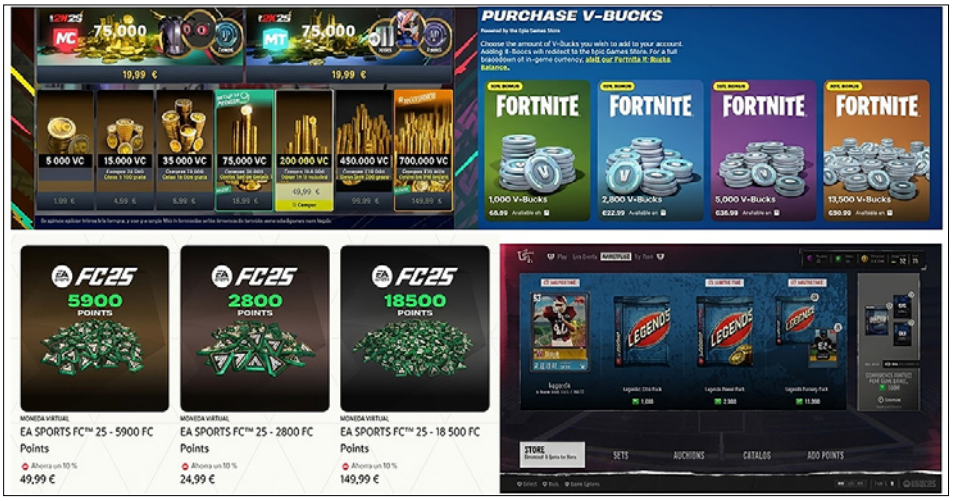
In the analysed console and PC games (*EA Sports FC 25*, *EA Sports College Football 25*, *NBA 2K25*, and *Fortnite*), the widespread implementation of virtual currencies —such as FC Points, Ultimate Team Points, CF Points, MTP, VC, or V-Bucks— stands out as a core transactional mechanism. None of these titles impose spending limits, and all enable pay-to-skip mechanics, allowing players to purchase upgrades, levels, or rewards without completing the required in-game challenges.

Pay-to-win dynamics are also evident, particularly in *EA Sports FC 25, College Football 25, and NBA 2K25*, where acquiring high-performing players through microtransactions grants tangible gameplay advantages. These systems frequently exploit waste aversion, using non-adjustable balances or opaque in-

game currency conversions to encourage further purchases —often through exclusive bundles, default options, or item exchanges that obscure the real-world monetary value—, as illustrated in Figure 3.

Across all titles, randomized reward systems (loot boxes or card packs) are present, along with anchoring techniques that present high-priced bundles as reference points to influence consumer behaviour. Artificial scarcity is also strategically deployed, offering limited-time access to exclusive players or event-related items. Additionally, value degradation affects older cards or items, which lose their utility or appeal after periodic updates, especially in sports titles like *EA Sports FC 25, College Football 25,* and *NBA 2K25*.

Figure 3. Screenshots of virtual currency systems



Source: *NBA2K25* (2K Games, 2024), *Fortnite* (Epic Games, 2017), *EA Sports FC 25* (EA Sports, 2024) and *College Football 25* (EA Sports, 2024).

In the mobile games analysed (*Honor of Kings, Monopoly Go!, Royal Match, Roblox*, and *PUBG Mobile*), all employ virtual currencies —such as diamonds, coupons, stickers, Robux, coins, or UC— and include randomized reward systems (loot boxes) where users have no prior knowledge of the item they will receive, as shown in Figure 4. None of the titles impose spending caps.

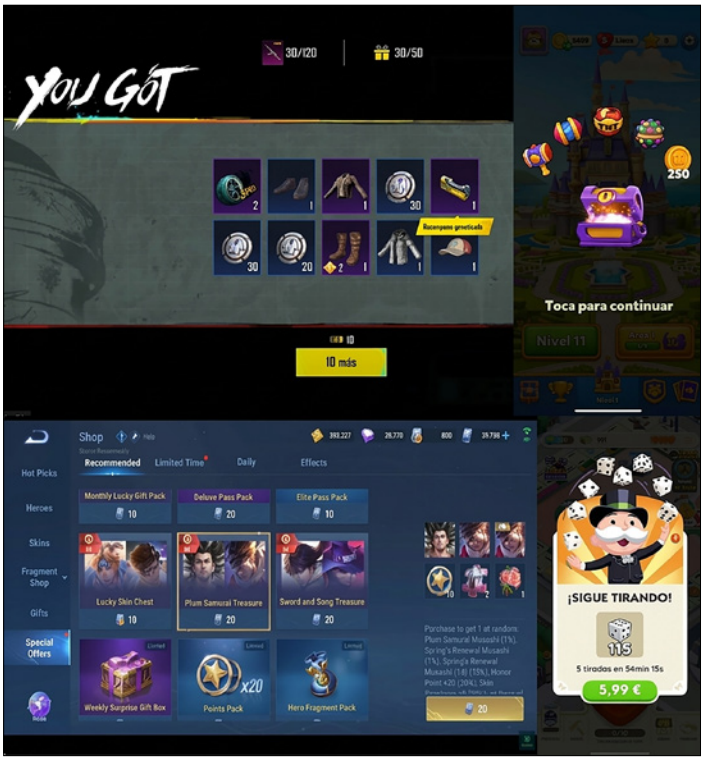
Pay-to-skip and pay-to-win mechanisms are systematically present, granting access to power-ups, exclusive heroes, or gameplay advantages through direct payments. For instance, *Honor of Kings* allows players to purchase heroes outright, while *Royal Match* offers boosters that simplify level progression without skill-based effort. Across all titles, waste aversion strategies are evident —through multiple currencies, leftover balances, or non-intuitive conversion rates that encourage repeated spending.

Artificial scarcity is a consistent tactic, often deployed via limited time offers or exclusive content windows. Anchoring tricks are also common, such as “best

value" bundles or first-time buyer discounts that frame higher spending as more advantageous. Value degradation appears in all mobile games studied, where older items or power-ups diminish in utility after content updates.

Additionally, accidental purchases have been identified in several titles, facilitated by streamlined interfaces or the absence of confirmation steps in the payment process. Four out of the five games analysed include optional subscription models —offering seasonal benefits, VIP passes, or exclusive perks—. *Roblox* is the only exception, lacking a native subscription system within its core monetization structure.

Figure 4. Screenshots of loot box systems



Source: *PUBG Mobile* (Tencent Games, 2018), *Royal Match* (Dream Games, 2021), *Honor of Kings* (Tencent Games, 2015) and *Monopoly Go!* (Scopely, 2023).

Table 5 compares the monetization patterns observed in console/PC and mobile games included in the sample. As shown, nearly all titles display a very high presence of most patterns, with universal use of pay-to-skip, artificial scarcity, anchoring tricks, and value degradation techniques. None of the analysed games implement explicit spending limits. In this regard, *Roblox*, *PUBG Mobile*, *Honor of Kings*, and *Royal Match* exhibit an almost complete monetization profile. In contrast, Fortnite stands out for its distinct and less aggressive approach,

being the only title that does not employ pay-to-win mechanics, loot boxes, or accidental purchases.

The widespread and cross-platform use of monetization techniques —often implemented without adequate safeguards against overspending or impulsive purchases— raises significant concerns, particularly given the popularity and high visibility of the games analysed. These findings highlight how the gaming industry has increasingly normalized such practices as central strategies for maximizing revenue.

Table 5. Analysis of monetary patterns in the sample

Patterns/ Video Game	EA Sports College Football 25	EA Sports FC 25	Fortnite	NBA 2K25	Honor of Kings	Monopoly Go!	Royal Match	Roblox	PUBG Mobile
Currency Type	Ultimate Team Points	FC Points	V-Bucks	Virtual currency	Diamonds and Coupons	Coins and Dice	Coins	Robux	UC (Unknown Cash)
Waste Aversion	Yes – leftover currency	Yes – unspent points	No	Yes – leftover currency	Yes – multi-currency	Yes	Yes	Yes	Yes
Spending Limit	No	No	No	No	No	No	No	No	No
Pay to Skip	Yes – buy packs	Yes – FC Points	Yes – skip levels	Yes – buy packs	Yes – direct unlocks	Yes	Yes	Yes	Yes
Pay to Win	Yes – stronger players	Yes – team advantage	No	Yes – MyTeam cards	Yes – early access heroes	Yes	Yes	Yes	Yes
Subscriptions	No (EA Play optional)	No (EA Play optional)	No	Yes – Season Pass / MyTeam Pro	VIP options	Yes – season pass	Yes – pass	No	Yes – Royale Pass
Loot Boxes	Yes – Ultimate Team packs	Yes – Ultimate Team packs	No	Yes – MyTeam packs	Yes – chests and draws	Yes	Yes	Yes	Yes
Artificial Scarcity	Yes – limited players	Yes – event content	Yes – rotating shop	Yes – limited-time cards	Yes – limited-time skins	Yes	Yes	Yes	Yes
Anchoring Tricks	Yes – MVP bundles	Yes – price packaging	Yes – V-Bucks packs	Yes – "Best Value" VC offers	Yes – first-time offers	Yes	Yes	Yes	Yes
Value Degradation	Yes – new players > old	Yes – meta shift	Yes – seasonal reset	Yes - seasonal reset	Yes – power creep	Yes	Yes	Yes	Yes
Accidental Purchases	Possible – quick confirm	Yes – minimal UI checks	No	No	Yes – simplified UI	Yes	Yes	Yes	Yes

Source: Author's elaboration.

Social Patterns Analysis in the Sample

Console and PC games in the sample display strong competitive pressure among players. Moreover, their social patterns reveal greater heterogeneity in design, leading to differentiated implementations: *EA Sports FC 25* and *NBA 2K25*, for instance, reinforce social engagement through collaborative modes such as Clubs or Rush. *Fortnite*, by contrast, introduces more aesthetic and social dynamics, such as inviting friends and sharing achievements. This link is established in previous academic literature based on Kowert's (2020) exploratory review of the negative consequences of online gaming, for example, explicitly identifies toxicity and harassment as prevalent and documented problems within multiplayer gaming culture. This phenomenon is largely facilitated by the 'online disinhibition effect' fostered by pseudo-anonymity (Suler, 2004).

Therefore, building on this established evidence, our analysis defines this risk as moderate to high based on the convergence of three observable features present in all sampled games: the persistent, zero-sum nature of their ranked competitive modes; the use of pseudo-anonymous player identities, which facilitates this disinhibition; and the inclusion of unmoderated or minimally moderated real-time communication channels (both voice and text chat).

In the mobile game ecosystem, social pressure is often encouraged through rankings, shared rewards, and team functionalities. *Honor of Kings* and *PUBG Mobile* integrate complex social frameworks, from clan-based structures to recruitment bonuses. *Royal Match* and *Monopoly Go!* implement friend-invite systems to unlock rewards, as illustrated in Figure 5, which depicts the specific reward-based notification prompts presented to the player. For its part, *Roblox* adds an additional layer of complexity by featuring user-generated games that replicate real-life social interactions.

Figure 5. Screenshots of friend-invite systems

Source: *Royal Match* (Dream Games, 2021) and *Monopoly Go!* (Scopely, 2023).

Overall, the mobile games in the sample stand out for amplifying competitive pressure and promoting constant participation, often tied to monetization mechanics or prolonged engagement strategies. While the most competitive mobile titles (like *PUBG Mobile* or *Honor of Kings*) share the same high risk of direct antisocial behaviour as their PC counterparts, the social pressure in casual titles (*Royal Match*, *Monopoly Go!*) often manifests differently. Here, the mechanics appear less focused on direct toxicity and more on leveraging social obligations, guilt and FOMO to drive both engagement and in-game purchases.

Table 6 compares the use of social patterns in both console/PC and mobile games. The data show that eight out of the nine titles promote high or very high levels of competitiveness, while seven games include pyramid-like mechanisms that incentivize player recruitment. This reflects a consistent logic of social pressure aimed at maximizing engagement, although the implementation differs across platforms. Console and PC games tend to prioritize direct competition, whereas mobile games are more likely to construct social networks built on rewards, rankings, and invitation-based systems.

These differences stem from both the technical characteristics of each platform and their underlying business models: the premium console/PC model promotes competitive excellence, while the mobile free-to-play (F2P) model optimizes retention through persistent, highly incentivized social structures. As a result, mobile games not only replicate familiar social behaviours but also instrumentalize them to support continuous monetization —blurring the boundaries between play, social bonding, and consumer behaviour.

Table 6. Analysis of social patterns in the sample

Patterns/ Video Game	EA Sports College Football 25	EA Sports FC 25	Fortnite	NBA 2K25	Honor of Kings	Monopoly Go!	Royal Match	Roblox	PUBG Mobile
Social obligation	low	high	medium	high	high	medium	medium	medium	high
Social pyramid scheme	limited	encouraged	yes	moderate	moderate	yes	yes	yes	yes
Encourage antisocial behaviour	yes	yes	moderate	yes	yes	yes	not evident	yes	yes
Competition	high	very high	high	high	high	medium	high	high	high

Source: Author's elaboration.

DISCUSSION AND CONCLUSIONS

This research illustrates how the Games as a Service (GaaS) model has not only established itself as a commercially effective strategy but also represents a broader paradigm shift within contemporary digital culture —reshaping the relationship between producers and consumers of game content. Within this evolving framework, persuasive monetization practices have assumed a central role, influencing not only the economic structure of gaming but also the psychological and social behaviours of modern players.

One of the most striking findings is the convergence between certain design techniques employed by top-grossing video games in 2024 and those traditionally associated with online gambling environments. This phenomenon —a veiled gamblification of game design— maximizes monetization through psychological reinforcement and intermittent reward systems, while simultaneously raising ethical concerns about behavioural manipulation in play environments that obscure their true economic intent. These findings align with a growing body of academic literature. This connection stems from foundational work such as Schüll (2012), who argued that machine gambling is explicitly designed not just for winning, but to "keep them in the zone" of uninterrupted play. This same logic, which seeks to keep users in a frictionless, semi-automatic loop of interaction, is now visibly embedded in modern game design (Zendle and Cairns, 2018; Spicer *et al.*, 2021).

Within the sample, titles such as *Monopoly Go!* and *Royal Match* utilize limited energy systems and near-miss mechanics that encourage compulsive repetition and spending to bypass wait times. *Honor of Kings* and *PUBG Mobile* incorporate roulette wheels, loot boxes, and time-limited events with exclusive rewards —mechanisms designed to heighten urgency and exploit FOMO dynamics. Even in sports games such as *EA Sports College Football 25*, *EA Sports FC 25*, and *NBA 2K25*, monetization expands through modes like Ultimate Team, where acquiring players via randomized packs or simulated transfer markets closely mirrors gambling logics.

In developing a taxonomy of monetization mechanics, this study also reexamines the pervasive use of the term microtransactions in both industry and academic discourse (Davidovici-Nora, 2014; Arjona and Muñoz, 2020; Hamari *et al.*, 2020; Ivanov *et al.*, 2021). This term, we argue, functions euphemistically —obscuring the cumulative and often opaque nature of digital spending by framing costs as negligible, discrete units. As an alternative, we propose the terms fragmented monetization or atomized payments, which more accurately reflect the underlying economic logic: dividing total expenditure into multiple transactions —regardless of individual cost— while emphasizing high frequency and the perceptual dilution of financial impact.

In this context, the prevalence of dark patterns —spanning both temporal and monetary dimensions— has become increasingly normalized. These include daily login rewards, infinite progression systems, pay-to-win mechanics, loot boxes, and the use of ambiguous virtual currencies. Such design techniques are not merely intended to extend playtime but also cultivate consumption behaviours that, in some cases, verge on compulsive, particularly among younger audiences.

Social mechanics further reinforce user retention and platform loyalty. Ranking systems, cooperative tasks, and recruitment-based rewards create environments of social pressure, where continued participation becomes entangled with group dynamics and digital reputation. Rather than enhancing the gameplay experience, these mechanisms often intensify user dependency and normalize externally imposed expectations within multiplayer settings.

Within this landscape, mobile games emerge as particularly fertile ground for the intensification of the Games as a Service (GaaS) model. Their ubiquitous accessibility, low barriers to entry, and persistent presence through push notifications and daily incentives foster fragmented and habitual engagement. In many of the analysed titles, autoplay or auto-battle systems further reduce friction, enabling background progression and encouraging "hands-off" time-on-task. These operational dynamics result in more frequent play sessions and heightened exposure to monetization strategies, positioning mobile platforms as experimental spaces for deploying dark patterns. In contrast to console or PC games —which typically require longer, more immersive sessions— mobile titles promote instant gratification and reinforce short-cycle consumption throughout the day.

Taken together, these persuasive design strategies contribute to a gameplay experience increasingly shaped by commercial logic. Players may lose control over their time and decision-making within systems where reward and spending mechanisms are often obscured. This reality underscores the urgent need for an ethical discourse on the boundaries of persuasive design, as well as a shared responsibility among developers, regulators, and scholars to promote more transparent, equitable, and user-respecting digital environments.

Despite these contributions, this study has several limitations that should be acknowledged. The sample focuses on a small number of top-grossing GaaS titles, which means that the findings may not generalise to indie games, niche genres, or less commercially successful products. Moreover, the analysis is based on direct observation of design features and does not incorporate player-centred data on how these mechanics are experienced in practice. Future research combining taxonomic analysis with surveys, experiments, or qualitative interviews would help to refine the proposed categories and to assess their concrete impact on different player groups.

In addition, future research should explore user self-regulation strategies, particularly among vulnerable populations such as adolescents and young adults. Insights from psychology (Bernaldo-de-Quirós *et al*., 2021; Labrador *et al*., 2023) on impulse control and digital behaviour provide a valuable bridge between game studies and clinical or psychoeducational interventions. In this sense, progress toward a healthier digital leisure culture will require a genuinely interdisciplinary approach —integrating psychology, communication, and game design— guided by a strong ethical commitment to user protection, media literacy, and sustainable design practices.

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