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Design and development of a hybrid casual game with donation-based gameplay and persuasive game elements

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Declaration of Originality

I hereby certify that I have completed this master thesis with the title:

Design and development of a hybrid casual game with donation-based gameplay and persuasive game elements

independently and using only the resources indicated. All passages that I have taken verbatim from the literature or from other sources such as websites have been clearly marked as quotations with the source indicated.

19.08.2025

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Abstract

This thesis explores the intersection of hybrid casual games and persuasive games through the design and development of *PlayForOceans*, a mobile game with donation-based gameplay aimed to support ocean cleanup projects. The work begins with a description of the ecological and social context that motivated this work, emphasizing the urgency of combating marine pollution and the potential of easily accessible game formats aiming to reach a large audience. The theoretical foundation combines insights from game studies and persuasive technologies, focusing on the concept of procedural rhetoric and the persuasive system design model, as well as market insights of hybrid casual game trends. Building on this framework, the thesis analyzes selected hybrid casual and persuasive games to identify design principles and monetization strategies that can both engage players and convey a meaningful message. These findings directly inform the design and implementation of *PlayForOceans*, which is a persuasive hybrid casual game with the goal to entertain while raising awareness and funds for real-world causes. The work concludes with a discussion of the game's potential impact, its alignment with the research question, and possible directions for future development and research.

Table of Contents

Abbreviation list

CPI	Cost per Install
D1 retention	Day-One retention
D7 retention	Day-Seven retention
eCPM	effective Cost Per Mille
IAA	In-App Advertisement
IAP	In-App Purchase
LTV	Lifetime Value
MAU	Monthly Active Users
PSD	Persuasive System Design
ROI	Return of Investment

List of Tables

List of Figures

1 Introduction

Ocean pollution is one of the biggest environmental issues in the contemporary era. Yearly, there are 11 million tons of plastic being dumped into the oceans which corresponds to 20 tons per minute (Lau, 2022). Plastic represents 80 % of the oceans' pollution, not only having an effect on the marine wildlife and its ecosystems but also having a direct impact on global warming and carbon dioxide production (Fava, 2022; Royer et al., 2018). Plastic in the ocean produces methane and ethylene, accelerating climate change and disrupting ecosystems by reducing plankton population, which plays a crucial role in carbon absorption and marine food chains (Royer et al., 2018). Moreover, microplastic has become a part in the food chain, meanwhile it can be found in food, drinks, salt and in the soil (Fava, 2022). This microplastic is carcinogenic and has therewith a direct impact on human health (Chen et al., 2024). Addressing these issues, the state of the ocean requires large-scale awareness and action, which leads to the center motivation behind this thesis.

In 2023 private donations have fallen for the third year in a row to €5 billion, which is the lowest number since 2014. Only 3.2 % of this sum was donated for environmental purpose, although environmental awareness increased to 36 % of the German population. 3.2 % of €5 billion – approximately €160 million – was donated for environmental purposes in 2022 (Statista, 2024b; Huber, 2024). As there are no sources on how much of this sum was dedicated to ocean cleanup, it must be assumed that the financial support provided is insufficient to effectively remove plastic waste from the oceans. Sources vary from USD 1 billion to USD 150 billion for the costs to clean the oceans (Boucher, 2022). Another study found that it will be around USD 87.3 billion per year to reduce marine pollution and another USD 34.1 billion per year to protect and restore marine ecosystems (Johansen & Vestvik, 2019).
Despite the increased interest in the topic, donation rates decreased, suggesting a need for alternative ways to engage people into supporting ocean cleanup and sustainable efforts.

This thesis grounded in empirically informed design research with practical focus aims to explore the potential game-based solution to environmental pollution and an underrepresented research field of hybrid casual games. This graduate project seeks a scalable approach that is not limited to a specific

audience but rather targets broad demographic groups through the medium of hybrid casual games. These games, alongside hyper-casual titles, represent one of the most widely played genres in the mobile gaming market, potentially reaching an audience of up to 3 billion players (Newzoo et al., 2024). This estimation results from Newzoo's broader definition of players as individuals who have played digital games on PC, console, mobile or via cloud services within the past six months. More conservative sources, such as Statista (2025b), estimate the global gaming population at approximately 1.9 billion, likely based on narrower engagement criteria. The thesis is based on the belief that small actions, when multiplied by millions, if not billions of individuals, can lead to significant change. By tapping into the global gaming community, games may have the potential to foster greater sense of environmental issues and drive substantial financial support for ocean cleaning initiatives.

This thesis first establishes the theoretical foundation by outlining the core concepts of hybrid casual games and persuasive games, including Bogost's (2007) definition of procedural rhetoric and the persuasive system design model. Building on this foundation, it develops the central research question and identifies the goal of this thesis. These theoretical insights are then connected to a state-of-the-art analysis of selected hybrid casual and persuasive games, examining design patterns and persuasive strategies used in those games. The findings from the analysis inform the design and development of *PlayForOceans*, documented in detail together with the chosen methodology and technical implementation. The thesis concludes by discussing the results in light of the research question and offering an outlook on potential future developments and researches.

2 Theoretical Background

This chapter sets the theoretical background and establishes a common conceptual foundation. It defines key terms and scopes as well as a basis for further analyses and developments.

2.1 Hybrid Casual Games

As mentioned by Pizzo (2023), the lack of academic research in hybrid casual games and hyper-casual games is notable. While this genre gains growing attention, industry reports and developer insights provide most up-to-date information on the market trends and design for games. Therefore, this chapter, from the origin to the monetization strategies, will mostly rely on these sources. Hybrid casual games are a subgenre in the mobile gaming market that combines hyper-casual games with mid-core/casual games.
They use simple, easy-to-learn mechanics as a core. These mechanics, originating from hyper-casual, are extended with an engaging and expanding meta-loop for higher retention of players (ironSource, 2023). These kinds of games offer a lower entry barrier for players, while simultaneously fostering long-term engagement and player retention (Piskunov, 2024).

Hybrid casual games evolved from hyper-casual games, leading some industry reports to still classify them under the same category (Curry, 2025; Levintova, 2024). Games like *Pizza Ready!* (Supercell, Inc., 2023) or *My Perfect Hotel* (SayGames Ltd, 2022) are examples for this genre and will be analyzed deeper in a later chapter. The first game that was classified as a hyper-casual game is *Flappy Bird*, published by Dong Nguyen (2013). The game reached millions of people in a short period of time, earning the developer in its prime time USD 50.000 per day with banner ads and interstitials (Hamburger, 2024). This coupling of gameplay with advertising and monetization opportunities attracted the attention of publishers due to its simplicity and financial potential. Publishers like Voodoo have specifically focused on this genre and generated 8 billion downloads with 150 million MAU (Voodoo, n.d.).

In 2022/2023 the market was saturated and acquisition costs have risen, making it harder for developers and publishers to release a sustainable hyper-casual game since its monetization mostly relies on IAA (Godley, 2024). Publishers needed to shift from hyper-casual to a more sustainable game but still having the easy-to-play instant gameplay. To counter the increase in

acquisition costs and the decrease of IAA, developers created a meta-loop for hyper-casual games, like progression systems, skins and implied possibilities for IAPs into the game (Godley, 2024). Examples for these kinds of games are *PizzaReady!* (Supercell, Inc, 2023), *My Perfect Hotel* (SayGames Ltd) and *Archero* (Habby, 2019), being one of the first of their kind.

The design of hybrid casual still relies on the minimalistic principles of hyper-casual games but with a meta layer to build up a more sustainable player base and to achieve higher retention (Godley, 2024). Hybrid casual games are generally played in portrait mode on mobile devices with one thumb control to assure a highly accessible and instant player experience (Godley, 2024).

2.2 Persuasive Games

Persuasive games are a game genre that is of special interest in the field of game studies. They are characterized by their explicit goal to influence players' attitudes, behavior or beliefs (Bogost, 2007). While they share similar characteristics with serious games – games with a purpose and not only made for entertainment – both are not the same. Persuasive can be serious but not all serious games are persuasive. Serious games, how Abt described them 1970, are those created with an "explicit and carefully thought-out educational or practical purpose" (Abt, 1987). They are primarily created to educate, rather than to influence or change players' behavior. The development of persuasive games as a distinct field is primarily grounded in Ian Bogost's "Persuasive Games: The Expressive Power of Videogames" (2007). In his book he divides persuasive games into three models:

1. Political persuasive games aim to influence political discourses and critique policies through their systems. A famous example for this kind of persuasive games is *Howard Dean for Iowa*, published in 2003 (Persuasive Games, 2003). This game, created by the developers of "Persuasive Games" founded by Ian Bogost, was the first game taking part in an official U.S. Presidential Election. In this game, as described by the developers, there were two parts. One was the map of Iowa, which was white in the beginning and was becoming red or blue in the course of the game, the more support the candidate was getting. The data were shared between all players. The second part was an instant message via ICQ, Yahoo! or similar services, that could be sent to friends and other people around. As soon as the message had been delivered, the player received a reward and a special support unit in-

game. In the course of the game, it extended beyond state borders and had a real-live impact on the spreading of the support for the candidate Howard Dean (Persuasive Games, 2003).

2. Advertising persuasive games are games to incorporate brands and consumer engagement mechanics. One famous example is *America's Army* published 2002 by the U.S. Army (U.S. Army, 2002). This game is more like a tactical shooter similar to *Battlefield* (DICE, 2011) but published by the U.S. Army with the goal to recruit and build up a better public relation. On the opposite of this model are the Anti-advert games e.g. *The McDonald's Videogame* published and developed by Molleindustria (2006). This game is a satire parody of the business practices of McDonald's. The game requires players to deforest the rainforest and steal the lands of indigenous people to plant soy beans and breed cattle (Molleindustra, 2006).
3. Learning persuasive games leverage interactivity to foster education and behavior change. These games often integrate instructional design principles to encourage retention and knowledge. *Food Force* (United Nations World Food Program, 2021) published by the United Nations (2005) is an example. It educates players on global food distribution and humanitarian aid efforts (Bogost, 2007 p. 243).

These categories illustrate how games can operate across different domains and influence players` perception. Bogost introduced the concept of procedural rhetoric to describe how games communicate through their programmatical logic with the player. For example, the environment is changing depending on certain actions the player does. Positive choices result in beneficial environmental changes, while negative ones lead to environmental damage. Some commercial games and AAA titles also engage and influence players with persuasive mechanics, although they are not labeled as persuasive games. *Dishonored* has such persuasive mechanic where the more NPCs the player kills the darker the environment gets. If the player just knocks the NPCs out and keeps them alive, the more it turns into a sunny and colorful place (Arkane Studios, 2012).

This concept is defined as "[…], the art of persuasion through rule-based representation and interactions […]" (Bogost, 2007, p. 28). Unlike traditional rhetoric, which implies language and images to persuade, procedural rhetoric relies on the mechanic of the game itself, like the example given in *Dishonored*

(Arkane Studios, 2012). Information is not passed verbally but visually through the system itself. This way the player is invited to “experience” the persuasive message rather than merely receiving it passively (Bogost, 2007, p. 47).

For example, a game designed to address environmental issues such as ocean pollution, the game might incorporate such an environment with a lake or an ocean full of trash and dirt. The more trash the player collects from the ocean the cleaner it gets. This would align with Bogost’s concept of procedural rhetoric, wherein players engage with rule-based representations that construct arguments through gameplay (Bogost, 2007). This allows players to witness the consequences of their actions within the gameplay itself. This concept is deeply informed by behavioristic theories like those articulated by B.F. Skinner (1965).

Through the concept of operant conditioning, behavior can be shaped by its consequences. Reward increases the likelihood of behavior, while punishment reduces it (Skinner, 1963). For instance, a game might reward players for engaging in environmentally friendly practices – called positive reinforcement – while imposing in-game penalties for actions that harm virtual ecosystems – called positive punishment (Skinner, 1963).

Persuasive System Design is a framework that outlines how interactive systems can be intentionally designed to change users’ behavior and attitudes (Oinas-Kukkonen & Harjumaa, 2009). Before the introduction of persuasive games by Ian Bogost, B.J. Fogg explored the concept of persuasive technology, researching how digital systems can influence human behavior through mechanics and design e.g. through reduction, tunneling and tailoring (Fogg, 2003). However, Bogost (2007) criticizes Fogg’s approach for relying primarily on psychological methods and aiming for behavior change without a discursive or rhetorical negotiation process. While persuasive games, according to Bogost (2007), employ procedural rhetoric to make the underlying logic and systems behind a behavior experimental, Fogg’s captology tends to focus on implementing established goals without critically questioning them (Bogost, 2007). Nevertheless, Fogg’s work laid the theoretical foundation for the Persuasive System Design framework by Oinas-Kukkonen and Harjumaa (2009), which is structured around four primary principles: Primary Task Support, Dialogue Support, System Credibility Support and Social Support (Oinas-Kukkonen & Harjumaa, 2009). Beyond Bogost’s theoretical emphasis

on procedural rhetoric, empirical evidence shows that persuasive system strategies are actively employed in games: a systematic review of 130 persuasive games reports high prevalence of Persuasive System Design used in persuasive games. However, there might be a negative relationship between the number of strategies used and overall effectiveness (Ndulue & Orji, 2022).

Category	**Principle**
Primary Task Support	Reduction, Tunneling, Tailoring, Personalization, Self-monitoring, Simulation, Rehearsal
Dialogue Support	Praise, Rewards, Reminders, Suggestion, Similarity, Liking, Social role
System Credibility Support	Trustworthiness, Expertise, Surface credibility, Real-World feel, Authority, Third-party endorsements, Verifiability
Social Support	Social learning, Social comparison, Normative influence, Social facilitation, Cooperation, Competition, Recognition

Table 1 Persuasive System Design principles. Note: this is a simplification of the Persuasive System Design principles by Oinas-Kukkonen and Harjumaa (2009)

Using these principles creates an experience that effectively influences players` behavior while maintaining enjoyment. This integration ensures that the persuasive intent is imbedded in the game rather than through external verbal impositions.

Hybrid casual and persuasive games are different from the ground up. While hybrid casual games prioritize efficient development and scalability to optimize monetization approach (ct. Chapter 2.1), persuasive games focus on embedding a meta layer that conveys a message with the goal of influencing players' behavior (ct. Chapter 2.2). While hybrid casual games as a genre describe how the game looks and feels and also its accessibility and scalability, persuasive games as genre are more a theoretical framework for delivering a message through gameplay using procedural rhetoric. While every game can be persuasive in a way, e.g. for monetization, not every game is persuasive, as the main difference is the intention to change or to influence players' attitudes, beliefs or actions (Bogost, 2007). While persuasive games incorporate the PSD, hybrid casual games incorporate that as well, with

another goal though, as the PSD – by Oinas-Kukkonen and Harjumaa (2009) – is a framework to intentionally shape behavior through interactive systems.

In conclusion the fusion of these two approaches present a promising opportunity for games for good, as the accessibility and scalability of hybrid casual games could help maximize the reach and impact of persuasive game mechanics, making meaningful messages more engaging and widespread.

3 Goal and Research Question

The goal of this thesis is to develop and design a hybrid casual game that integrates donation-based gameplay mechanics with procedural rhetoric to support ocean conservation efforts. This constructive design research explores the intersection of two previously separate domains: the accessibility and scalability of hybrid casual games and the persuasive potential of procedural rhetoric for environmental advocacy.

While existing research has extensively examined persuasive games in educational and serious gaming contexts, the application of persuasive design principles within the hybrid casual genre remains largely unexplored. This research gap is significant, given that hybrid casual games represent one of the most accessible and widely-played gaming formats, potentially reaching billions of players worldwide. By developing "PlayForOceans", this thesis demonstrates how theoretical frameworks can be translated into a functional game that serves both entertainment and environmental purposes to examine the following question:

How can procedural rhetoric be integrated within hybrid casual game mechanics to support donation-based gameplay?

4 State of the art

Research on serious games for environmental education has accelerated markedly, a recent meta-analysis by Tan & Nurul-Asna (2023) has shown an increase of research in this field with 56 studies published since 2009 and 35 of those released in the past five years. Intended outcomes cluster around knowledge gain (N = 28) and a more persuasive game approach with focus on attitude change (N = 28) and behavior change (N = 19). Beyond the amount of

studies the analysis describes recurring patterns that has been successfully used by well-known titles: immersive, learn-by-doing interactions, simulation of real environment systems and a guiding host as well as showing a spread over different platforms e.g. computer (N = 14), mobile (N = 11) and none virtual games like board games (N = 6) and cards games (N = 1) (Tan & Nurul-Asna, 2023).

Concrete effects of pro-environmental games and apps were researched by Boncu et al. (2022). This systematic review analyzed 29 studies with the result that serious games and apps, which were used to decrease energy consumption, water spending and food consumption, had mainly a short-term effect on users' behavior (Boncu et al, 2022). They concluded that a continuous use of those technologies seems to be beneficial for long-term effects (Boncu et al, 2022).

However, despite an extensive literature search no peer-review work was found that explicitly examines persuasive hybrid casual games for pro-environmental purposes, donation-based gameplay or even hybrid casual games despite their popularity. Current research is limited to findings that hyper-casual game development approaches can be applied to improve educational game development (Altun et al. 2023). In another review the author Pizzo (2023) points out the lack of scientific research in this genre, although it is one of the most popular.

The hybrid casual gaming market has shown a significant growth in 2023 of 30% in comparison to other genres (Ma, 2024). This demonstrates an increase in popularity and acceptance among players. Overall, hybrid casual games accounted for 11 % of all mobile game installs worldwide in 2024 (Statista, 2025). This shows that this genre, together with hyper-casual games (27 %), has a total share of 38 % of the market and therewith is dominating the mobile gaming market based on scalability and accessibility (Statista, 2025). However, when analyzed in terms of revenue, the results present a different outcome. Hyper-casual and hybrid casual games made approximately USD 1.25 billion in the first half of 2024 against USD 27.7 billion for casual and core games within the play and app store (Statista, 2024c).

To build upon the theoretical background, this section presents analyses of six selected games – three of them picked from the hybrid casual games genre

and three persuasive titles. These analyses aim to uncover the design patterns and potential of hybrid casual games as well as the persuasive strategies used in persuasive games. The games have been chosen by their popularity as well as relevance for this thesis. The analyses of the hybrid casual games will have their focus on core- and meta-loop, monetization, onboarding and engagement. Player engagement refers to the psychological investment and involvement a player has with a game. It includes cognitive, emotional as well as behavioral dimensions, such as attention, motivation and time spent playing (Martey et al., 2014). In hybrid casual games, engagement is often maintained through structured game loops, reward systems and gradual introduction of new mechanics which can be referred as a meta-loop (Sensor Tower & Homa, 2023). The three persuasive games will be analyzed with the focus on procedural rhetoric and the use of the PSD.

4.1 Pizza Ready! by Supercell (2023)

Pizza Ready! is a hybrid casual game developed by the Korean publisher Supercell (2023). It has been downloaded on the PlayStore over 100 Million times (Supercell, 2023). According to Supercell the game's CPI reached about $0.20 and has a D1 retention of over 35 % (Riley, 2025).

As mentioned in the theoretical background (ct. chapter 2.1), the boundary between hyper-casual and hybrid casual games is often fluid. Based on the KPIs – such as CPI and D1 retention – *Pizza Ready!* aligns more closely with a hyper-casual game (Supercell, 2023). However, it extends its LTV through a light meta-layer of shop upgrades and managing staff. The inclusion of IAPs alongside IAAs further supports its classification as a hybrid casual game. Nevertheless, it could be considered more of a light hybrid casual game.

At its core, the game allows the player to manage and grow a pizza restaurant, handling tasks from delivering pizza to various checkouts and the cleaning of tables used by the customers. Figure 1 presents a timeline of the first ten minutes of gameplay.

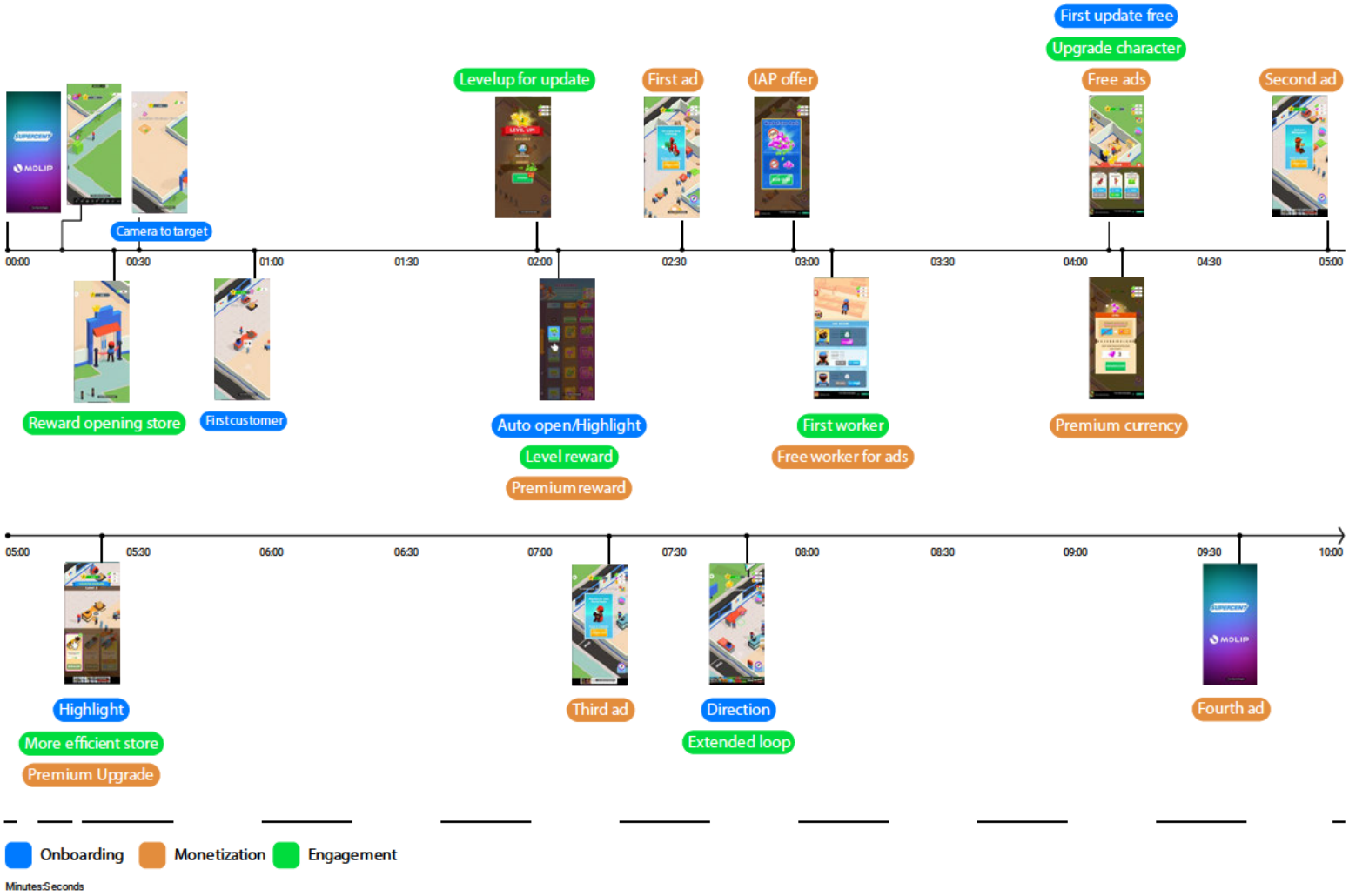

Figure 1 Ten-minutes gameplay timeline of Pizza Ready! (Supercell Inc., 2023). Note: The timeline illustrates the sequence of onboarding (blue), monetization (orange), and engagement (green) elements. Created by the author. Screenshots taken from a gameplay recording.

The game starts with the player character standing beside a pack of money, an arrow directing the player to collect the money. In this scenario the onboarding directly starts and the player has instant gameplay without a long tutorial. This is common for hybrid casual and hyper-casual games (ct. Chapter 2.1). After the player picks up the money, the arrow directs the player to a buy-area where the player spends the money and opens up a shop. The camera zooms in and the player is granted experience points. All of this occurs within the first 20 seconds of gameplay, demonstrating the game's fast pace. The overall onboarding till the first customer appears is taking place within the first one minute.

Within the next minute of gameplay, the player's level increases by simply expanding the shop with one item, reinforcing the reward loop with minimal effort. Upon leveling up, the game introduces its first monetization opportunity. A pop-up window appears, offering basic reward reaching a new level alongside the option to purchase a premium pass that provides additional reward for each level gained. This approach exemplifies a core strategy of hybrid casual games: using early progression to familiarize players with monetization mechanics early in the session, while maintaining a low barrier to engagement.

Approximately 30 seconds after the first upgrade, the player unlocks a new area, within which the player has to unlock the Human Resources (HR) office, visualizing an expanding light meta-loop. Before being able to fully access the HR office, the player is prompted an interstitial ad. This interstitial is framed with a message such as "I am making a delivery. Will be back in 15 seconds", presenting the interruption as a rewarded pause which the player has to actively start by pressing "Get $30". This marks the first moment of friction of the game, where the player is taken out of the game in order to watch an ad. Nevertheless, the perceived reward attempt seems to justify the disruption. After the 15 seconds advertisement the player is offered a "No Ads" pack to remove forced ads like interstitials and the banner ad, which appears shortly after – effectively using the friction to upsell a monetization option. This game perfectly demonstrates that during the first two minutes, the focus is on onboarding and engagement, allowing the player to become familiar with the game environment and core loop.

The game continues to evolve by expanding the restaurant with new areas such as drive-in station, while interstitial ads begin to appear approximately every 90 seconds – each accompanied by minor rewards. In later gameplay (not shown in Figure 1) the loop continues to scale through additional areas, more staff and takeaway service. These systems, although simple, aim to increase session length and D7 retention by gradually introducing depth through expanded tasks and larger environments. The balance between rewarded interstitial ads and none-rewarded interstitial ads, with the frequency rising with every minute in the game, combined with pop-ups showing up for the ads-free pack, reflects a common monetization strategy in hybrid casual design: presenting friction as an upsell. This tactic will be compared across the analyzed hybrid casual games in order to explore optimal balances between gameplay flow and monetized interruption. Visually, *Pizza Ready!* adopts a cartoonish art style, characterized by high contrast between background and foreground elements and exaggerated animations (e.g. characters carrying oversized stacks of pizza boxes). These choices contribute to an approachable and humorous tone, reinforcing the game's accessibility and casual appeal.

4.2 My Perfect Hotel by SayGames Ltd. (2022)

My Perfect Hotel, published by SayGames (2022), has reached over 100 million downloads on the Google Play Store to date. While no official KPIs such as CPI or D1 retention have been publicly released by the publisher, valuable insights are available through industry analyses. One such analysis, conducted by three UA managers on the Two & a Half Gamers show, uses third-party tools such as data.ai to evaluate the game's performance and monetization strategies (Two & a Half Gamers, 2023). As previously outlined (ct. Chapter 2.1), industry analysts like these are often the only available source of performance metrics for hybrid casual games. While such data may lack the precision of first-party KPIs, they still provide a useful framework for understanding the game's scalability and hybrid casual classification. In the case of *My Perfect Hotel*, the absence of publicly available CPI data is partially offset by reported session lengths of around 20 minutes and an estimated D1 retention of approximately 55%. These figures suggest that the game leans more toward the casual end of the spectrum rather than fitting squarely within the hybrid casual category (Two & a Half Gamers, 2023). This observation is further supported by the timeline analysis of its monetization and progression mechanics, which will be discussed in detail below.

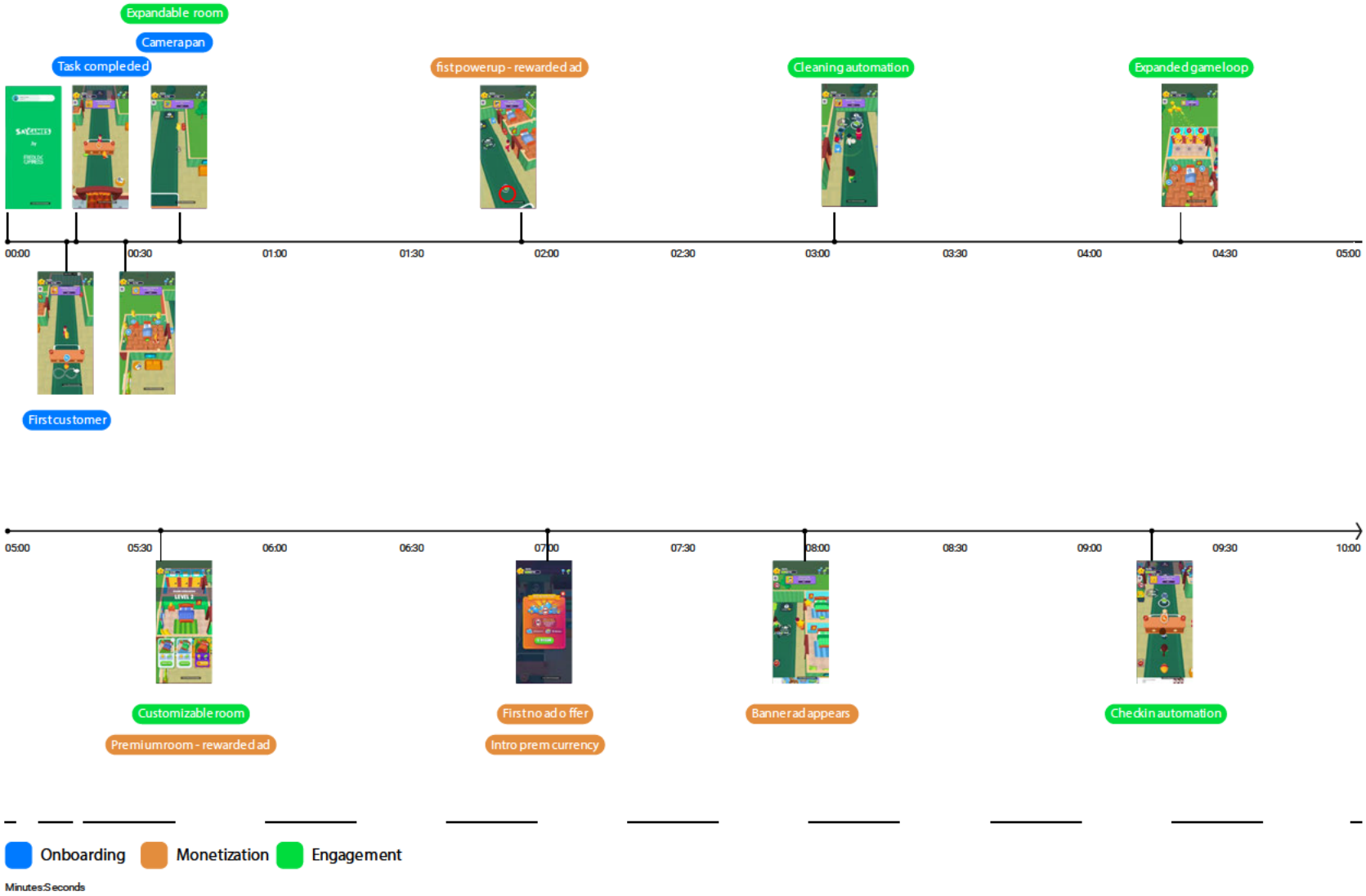

Figure 2 Ten-minutes gameplay timeline of My Perfect Hotel (2023). Note: The timeline illustrates the sequence of onboarding (blue), monetization (orange), and engagement (green) elements. Created by the author. Screenshots taken from a gameplay recording

In *My Perfect Hotel*, the gameplay begins immediately with the arrival of the first customer, placing the player directly into the core loop without delay. Within the first 30 seconds the player is prompted with a simple task: to serve the guest by walking to the reception desk. Upon task completion the camera follows the customer into his room, where he is seen lying down to rest. This visual cue introduces the cleaning mechanic, as the room becomes dirty after each use. The player is then required to manually walk to the room and interact with three designated cleaning points, each for approximately two seconds. Shortly after completing this, a second customer arrives, prompting the player to repeat the check-in process. The pace quickens as a third customer appears immediately after and the camera pans to an upgradeable area of the hotel, signaling to the player that the hotel is expandable and progression is tied to investment and growth (ct. Figure 2). All of these interactions take place within the first 45 seconds of gameplay, highlighting the fast onboarding process typical of hybrid casual games (Godley, 2024). The player is quickly exposed to the game's primary loop: checking in guests, cleaning rooms and expanding the hotel.

The gameplay continues with an emphasis on serving guests and cleaning rooms while gradually introducing new features. Around the two-minute mark, the player encounters the first monetization opportunity in the form of a rewarded ad. A power-up appears that offers a temporary speed boost or soft currency, if the player chooses to watch an ad. Notably, this ad opportunity is not presented as a forced interruption but instead as an optional in-game element that the player must actively approach. This reflects a soft upsell design, where ads are framed as tools for accelerating progress rather than as friction, which is consistent with best practices in hybrid casual monetization (Godley, 2024).

At minute three, the player hires his first worker – a cleaner responsible for maintaining the rooms. This marks the game's shift from manual labor to a more idle oriented gameplay loop. While the player still participates actively in cleaning, the cleaner's efficiency improves with upgrades, gradually shifting the core loop toward automation. Around minute five the player gains access to upgrade options for the first hotel room, enabling higher earnings per guest. These upgrades include both standard improvements and the option to unlock a premium room through a rewarded ad, exemplifying the game's strategy of offering faster progression via ad-based monetization.

The first moment of friction occurs at minute seven, when the game presents a "No Ads" pack. This monetization offer also introduces two forms of hard currency included with the pack. Since this is a skippable pop-up rather than a forced interstitial ad, it constitutes a soft friction moment, designed to upsell without interrupting the session flow. At minute eight a banner ad appears for the first time, signaling the beginning of the game's ad-based monetization cycle (ct. Figure 2). This approach differs significantly from *Pizza Ready!*, which introduced interstitial ads and monetization options within the first few minutes (Supercell, 2023). The delayed appearance of friction in *My Perfect Hotel* correlates with its higher average session length and superior D1 retention. The first forced interstitial ad occurs at minute twelve – beyond the scope of Figure 2 – but will be addressed in the later comparative analysis of hybrid casual monetization strategies.

4.3 Aquarium Land by Homa (2022)

Released in early 2022 *Aquarium Land* by Homa (2022) emerged during a pivotal shift in the mobile gaming industry (ct. Chapter 2.1). At this time, the hyper-casual market was transitioning toward hybrid casual design, blending accessible gameplay with deeper progression systems and retention mechanics. As of today, the game reached over 50 million downloads on the PlayStore (Homa, 2022).

As one of the early examples of this trend, *Aquarium Land* exemplifies the hybrid casual model by combining simple core gameplay – such as fishing and collecting – with light management mechanics like aquarium expansion, fish collection, staff hiring and the operation of multiple aquariums (Aquarium Land, 2022).

In a post-launch case study, Homa Games reported on the game's evolution from soft launch to global release, emphasizing design changes made to increase player engagement and LTV. The reported D1 retention rate of 45% further supports its classification as a hybrid casual game, as it surpasses typical hyper-casual benchmarks and indicates early player investment (Homa, 2022b).

Figure 3 Ten-minutes gameplay timeline of Aquarium Land (2022). Note: The timeline illustrates the sequence of onboarding (blue), monetization (orange), and engagement (green) elements. Created by the author. Screenshots taken from a gameplay recording

The gameplay in *Aquarium Land* begins immediately after the loading screen, placing the player directly into the core loop. Within the first 30 seconds, the player is prompted to move his character and serves the first customer by collecting fish and placing them into the aquarium tank (ct. Figure 3). This action unlocks the second tank upgrade introducing the first layer of progression. By minute one the player is already managing customers and unlocking fish, setting a fast pace for onboarding (ct. Figure 3). At 1:20, the player is presented with a character upgrade screen, followed directly by a second IAP offer. These early monetization prompts occur before the player has fully explored the game's system, showing that *Aquarium Land* introduces friction early.

By minute two, a collectible fish mechanic is explained and the aquarium becomes expandable. A rewarded unlock option appears at 2:30, offering premium fish in exchange for watching an ad, although the first one is free. While this mirrors the soft upsell technique seen in *My Perfect Hotel*, it happens earlier in the session and is followed by a second interstitial ad at 2:45. The game continues layering monetization and engagement: at minute three the aquarium is expanded, and shortly after, at 4:30, the third interstitial ad is shown. Despite the early and repeated ad placements, the game sustains player engagement through continuous upgrades, rare fish introductions and expanding tank options (ct. Figure 3).

At minute six, the first hard currency reward is introduced, followed by a free tank fill and another rewarded premium item, reinforcing the game's emphasis on optional monetization mechanics rather than forced paywalls. The fifth interstitial appears at minute 8:30, indicating a higher ad density than in *My Perfect Hotel*, yet balanced by frequent unlockable and exploration features. By minute ten, the player can unlock custom tanks, one for soft currency, the second for a rewarded and the third for hard currency, highlighting the game's hybrid casual identity through its mixture of progression and monetization opportunities (ct. Chapter 2.1).

4.4 Comparative Analysis of Hybrid Casual Games

Having explored three successful hybrid casual games individually, a comparative analysis can reveal parallels as well as notable divergences in how hybrid casual games are structured and monetized.

Figure 4 visualizes the interstitial ad frequency across 30 minutes of gameplay of the three hybrid casual games – *Pizza Ready!*, *My Perfect Hotel* and *Aquarium Land*. Purple dots represent each interstitial ad placement, yellow stars indicate when IAP offers are presented and the red dot shows the average for the first interstitial (5.6 minutes) (Supercell, Inc., 2023; SayGames Ltd, 2022; Homa, 2022; ct. Figure 4).

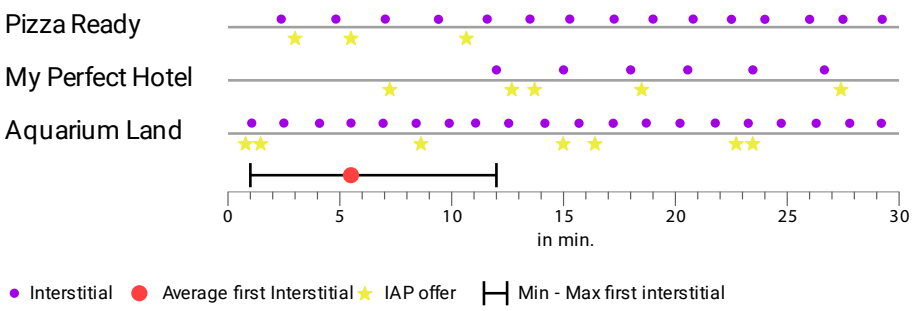

Figure 4 Monetization strategy of hybrid casual games. Frequency of interstitials and IAP offers

Among the three hybrid casual games *Aquarium Land* shows the highest frequency in displaying interstitial ads – showing the first one at minute one. Suggesting a short-term retention focus, more into the direction of hyper-casual games while *My Perfect Hotel* has a late friction appearing at minute 12, indicating a more retention and IAP-oriented approach, as at minute seven, the first no-ads pack appears (Figure 4).

Pizza Ready! is taking another approach by having its first interstitial friction displayed at minute three, followed by a no-ad offer. Each interstitial is initialized by a prompt offering a reward to the player, when they return, although the player cannot cancel the interstitial or the reward. This is more a soft friction. *Pizza Ready!* justifies the break of the game by rewarding the player with a gift for watching an ad. As for *Aquarium Land* they offer – before the first ad appears – a no-ads pack, justifying the friction (ct. Chapter 3.3). This also aligns with the Persuasive System Design principles such as reward-based reinforcement, where players are offered meaningful benefits before

encountering involuntary ad breaks, albeit used in a monetization context (Oinas-Kukkonen & Harjumaa, 2009).

For developing a hybrid casual game, this suggests that introducing monetization around five to six minutes strikes a balance between retention and ad revenue. Layering IAP offers or in game rewards before interstitials can further reduce perceived friction and support long term engagement.

4.5 Papers, Please by Lucas Pope (2013)

Papers, Please is a dystopian document-inspection game in which the player takes on the role of an immigration officer in the fictional state of Arstotzka (Pope, 2013). The core loop of the game is to inspect documents which are handed by immigrants to the player and the player has to decide whether the immigrants can pass or the entry will not be granted. Each day new rules will be added to immigration policy due to political decisions the state has made. At the end of each day, the player receives a paycheck which must be spent on family needs, such as when the child gets sick or the family needs heating or food. The height of the paycheck is dependent on the decisions the player is making. Correct decisions result in no consequences, while wrong decisions lead to punishments such as warnings or pay cuts (Pope, 2013).

At its surface, the game appears as a bureaucratic puzzle, but beneath this gameplay lies the procedural rhetoric as Ian Bogost (2007) defines as "[…], the art of persuasion through rule-based representation and interactions […]" (Bogost, 2007, p. 28; Morrissette, 2017). The game uses its mechanical structure to create persuasion rather than explicit messaging. The player faces economic pressure through daily wages based on processing accuracy. New regulations appear daily, simulating bureaucratic complexity and the authoritarian control. Correct decisions, according to the rules, may harm innocent immigrants, while wrong but compassionate choices threaten the players' family (Pope, 2013).

Papers Please (2013) exemplifies Bogost's (2007) concept of procedural rhetoric through its rule-based systems. As Bogost states, "Procedural rhetoric is a subdomain of procedural authorship; its arguments are made not through the construction of words or images, but through the authorship of rules of behavior, the construction of dynamic models" (Bogost, 2007, p. 29). The game does not tell the player that bureaucracy is dehumanizing – it makes

them experience dehumanization through gameplay, as demonstrated in Formosa`s et al. (2016) systematic analysis of the game's ethical engagement mechanisms. The player must process people as "cases" as stated by Formosa et al. (2016) rather than individuals to survive economically.

Using the Persuasive System Design framework outlined in Chapter 2.2, *Papers, Please* implies several key principles efficiently. The game implies reduction by simplifying complex moral decisions into binary choices (approve/deny), while using tunneling through its daily structure that guides the player through increasing difficulty of moral decisions (ct. Table 1). *Papers, Please* by Pope (2013) utilizes simulation by allowing the player to observe the immediate link between cause and effect with regards to his decisions on both immigrants and the player's own family (Oinas-Kukkonen & Harjumaa, 2009; ct. Table 1). The game also employs operant conditioning principles as described in Chapter 2.2. Wrong decisions result in wage deductions and warning – called positive punishment, the addition of a negative stimulus – following the rules removes the threat of a punishment – negative reinforcement, either taking away a negative stimulus or the absence of a negative stimulus (Skinner, 1963).

A study by Peña et al. (2018) researching if games where the player takes a role of an immigration inspector found that playing *Papers, Please* significantly decreased players' intentions to help immigrants, reduced their subjective norms toward pro-immigrant behaviors, and lowered their self- efficacy regarding immigrant assistance. However, the authors note that this represents a "boomerang effect" – the game's designer intended to increase empathy through satirizing totalitarianism, but the procedural experience of playing an immigration inspector had the opposite effect. As the researchers explain, "If *Papers, Please* designer intended to increase empathy through satirizing totalitarianism, then their findings imply that this effort backfired (i.e. boomerang effect)" (Peña et al., 2018, p. 692). This demonstrates how procedural rhetoric can be more powerful than intended narrative messages, as players internalized the systematic behaviors rather than the satirical context. This progression demonstrates how systems shape behavior – validating the core argument of procedural rhetoric while highlighting the importance of careful design when creating persuasive environmental games.

4.6 ECO by Strange Loop Games (2018)

ECO by Strange Loop Games (2018) is a multiplayer ecosystem simulation game where players must work together to build a civilization, explore new technologies in order to destroy a meteor heading towards the planet. The game puts the player on a spherical voxel-based planet with different biomes and nothing but a tent to build tools (Strange Loop Games, 2018). *ECO's* system is developed in a sense that if the player e.g. cuts down too many trees the ground will dry out and wildlife will disappear, if too many animals are hunted, they will be extinct and if players are fishing too much, this resource will be gone as well (Strange Loop Games, 2018). The game does not tell this information directly but the players learn about the ecosystem's interconnections because they have to, all data is visualized and if pollution is being ignored the game will be harder to play. This is what Bogost (2007) describes as procedural rhetoric. The game is not telling by written words but by exploring the game the players will discover how the system works.

Centered around resource extraction, gathering, crafting and governance it is crucial for the game to play together in order to achieve the goal and rescue the planet by destroying the meteor. This will be achieved by researching technologies and building new production lines with the goal to build lasers to shoot at the meteor in order to destroy it and to save the planet. By doing so the players have to take care of the environment. As they advance in technology it is inevitable to harm the environment. However the players have to act accordingly in order to protect it, otherwise they will not reach the goal (Strange Loop Games, 2018). As the game has a very advanced tech tree to research, the game relies on cooperative gameplay, as for one player the game would be too complex to finish as a qualitative study by Fjællingsdal and Klöckner (2019) has shown. In their study one participant tried to play alone but found the complexity overwhelming, which mirrors how real-world environmental challenges require interdisciplinary cooperation (Fjællingsdal & Klöckner, 2019). The research found that *ECO* addresses one of the biggest barriers to pro-environmental problems: the feeling that individual efforts are insufficient to combat environmental problems (Fjællingsdal & Klöckner, 2019).

The game further implements all four categories of the Persuasive System Design framework created by Oinas-Kukkonnen & Harjumma (2009). For primary task support, the game uses reduction by breaking down complex

environmental management into specific tasks like monitoring pollution levels or managing resource extraction quotas. It employs tunneling by guiding players through increasingly complex environmental challenges as their civilization develops – starting with basic resource management and progressing to sophisticated policy-making. The game uses simulation by showing immediate cause-and-effect relationships between player actions and environmental consequences, allowing players to observe directly how deforestation affects animal populations or how industrial pollution impacts water quality.

For dialogue support, *ECO* provides rewards through successful environmental outcomes – when players balance development with conservation, they see thriving ecosystems and ultimately prevent the meteor disaster (Strange Loop Games, 2018). The game offers suggestions through its data visualization systems that warn players when pollution levels become dangerous or when species populations are declining. These environmental alerts serve as reminders that guide players toward more sustainable behaviors without being explicitly prescriptive.

The game demonstrates strong system credibility support through its real-world feel, using scientifically-based ecosystem simulations that mirror actual environmental processes. *ECO's* expertise is established through its development funding by the U.S. Department of Education and collaboration with environmental educators, lending authority to its environmental messaging (Institute of Education Sciences, 2019). The game's credibility is further supported by third-party endorsements from educational institutions and its integration into actual classroom curricula.

ECO emphasizes social support mechanisms that make environmental protection a collaborative achievement rather than individual burden. The game includes social learning through shared environmental data that all players can access and discuss. It features social comparison through visible individual environmental impacts – players can see exactly who is contributing to pollution or conservation efforts (Strange Loop Games, 2018). The democratic policy-making system creates normative influence, where community pressure and shared decision-making shape individual behavior. Social facilitation occurs as players work together toward the common goal of stopping the meteor while maintaining environmental health. This social

dimension is crucial because it addresses what research identifies as a major barrier to environmental action: the feeling that individual efforts don't matter (Fjællingsdal & Klöckner, 2019).

Research on *ECO's* educational impact provides evidence for its persuasive effectiveness. The Institute of Education Sciences (2019) study with 88 students found that playing *ECO* for 2-4 weeks led to significantly higher scores on environmental attitudes and systems knowledge compared to control groups. Students who played the game showed better understanding of concepts like data analysis, economic development, and environmental strategy, although basic content knowledge didn't improve significantly.

The study also analyzed chat logs from gameplay sessions and found that students engaged in sophisticated discussions about environmental systems. They conducted investigations using in-game data, coordinated with each other to manage different aspects of the ecosystem, and engaged with the game's social systems for collaborative problem-solving (Institute of Education Sciences, 2019). This suggests that *ECO* succeeds in creating what the developers call "motivation-machines" – environments where learning happens naturally because the knowledge becomes necessary for success (Strange Loop Games, 2020).

ECO demonstrates how multiplayer games can address environmental issues through collaborative problem-solving rather than individual behavior change. The game's procedural systems force players to engage with concepts like carrying capacity, pollution thresholds, and species interdependence through direct gameplay consequences. The meteor threat serves as a procedural metaphor for climate change urgency, creating time pressure that forces players to balance immediate survival needs with long-term sustainability. This approach makes environmental education feel relevant and urgent rather than abstract and distant, while demonstrating that environmental challenges require institutional responses and collective action rather than just individual choices.

4.7 Terra Nil by Free Lives (2023)

Terra Nil, developed by Free Lives (2023) and published by Devolver Digital, represents a paradigmatic example of environmental persuasive games with real life impact that is a reverse city builder (Free Live, 2023; Williams, 2023). The game puts the player in the role of a planet restoring corporation that has the goal to restore wastelands on various planets (Free Live, 2023). Unlike traditional city builder that prioritize expansion and resource extraction, *Terra Nil's* core mechanics center on environmental restoration though three distinct phases: from landscape purification (Figure 5) to rich soil (Figure 6), biome creation (Figure 7) through climate control, which will automatically reintroduce wildlife on the planet and in the final step players have to recycle and deconstruct every man-made infrastructure (Figure 7).

Figure 5 Terra Nil Start. Own screenshot

Figure 6 Terra Nil Midgame. Own screenshot

Figure 7 Terra Nil endgame. Own screenshot

The game's environmental message operates primarily through procedural rhetoric, as this is the core mechanic of the game to terraform the planet to its natural appearance (Free Live, 2023; Bogost, 2007). *Terra Nil* does not tell players how important nature and environmental restoration are; instead, it

demonstrates the interconnected complexity of ecosystems through direct experience interactions. Rather than driving progress through extraction and demolishing the game's progress and strategy relies on strategically placing purification buildings to heal soil, clean water and building water systems and biomes in order to establish a sustainable environment for the ecosystem to grow and reintroduce wildlife (Free Live, 2023). The final step of the game is to dismantle everything the player has built, restoring the planet and leaving no trace of human presence. This mechanic communicates a profound message about humanity's relationship with nature, suggesting that the highest form of environmental responsibility involves knowing when to step back and allow natural systems to function independently from human impact.

Using the Persuasive System Design framework, *Terra Nil* implies all four categories of persuasive principles (Oinas-Kukkonen & Harjumaa, 2009).
As for the primary task support the game employs reduction by breaking down the complexity of environmental restoration into manageable tasks which are introduced sequentially through its progress from soil purification and water systems over vegetation and finally wildlife introduction. Tunneling is also used through *Terra Nils'* three-phase structure, guiding players though increasingly environmental challenges while maintaining clear objectives at each stage (Free Live, 2023).

The game also employs dialogue support through its dynamic visual feedback as well as a "The Beginner's Guide to Ecosystem Restoration" presented in a leather-bound journal. It provides detailed information about different biomes, species requirements and restoration techniques that serve both gameplay instruction and environmental education (Common Sense Media, 2023; ct. Table 1).

The system credibility is supported through realistic ecological simulation and connection to actual environmental conservation projects. The connection to real-world conservation work through the Tree-Nation partnership lends authority to the game's environmental message with whom they planted 45,528 trees around the world (Free Live, 2023; Game World Observer, 2023).

Though this game is a single player experience, it incorporates social support through real-world charitable components like the donation of 8% of the

games stream profit to the Endangered Wildlife Trust in South Africa (Williams, 2023). This connection between gameplay and real-world environmental actions create a tangible link between player engagement and actual conservation outcome.

Terra Nil's impact has also been recognized within the Serious Games community with the result of receiving the "Most Innovative Game" award at the Games for Change event in New York (Xueyang, 2023). This recognition highlights *Terra Nil's* success in demonstrating how games can move from virtuality to real world impact and raising awareness through its gameplay and charitable integration.

5 Development Design Documentation

This chapter outlines the design process and implementation of the game *PlayForOceans*, which will be a hybrid casual game integrating procedural rhetoric and the use of the Persuasive System Design framework. As this game is intentionally designed to persuade the player, it can be seen as a persuasive hybrid casual game. Based on the findings in the previous chapters, this chapter presents the applied methodologies, core gameplay systems, technical implementation and monetization strategies used to align with the games' core message: raising awareness and fundings to support ocean cleaning, conservation and rehabilitation.

While not all features are implemented due to time constrains of this thesis, the documentation will cover both realized and planned elements that together form a playable persuasive hybrid casual game. If not stated differently all screenshots are made by the author.

5.1 Methodology

This research employs a practice-based research approach as outlined by Candy and Edmonds (2018) to investigate persuasive hybrid casual game design through the development of *PlayForOceans*. This methodology uses the game development process as the primary site of investigation, where theoretical frameworks are tested and evaluated through practical implementation. Practice–based research is particularly suited for design-oriented inquiries where knowledge emerges through the act of creating rather than through observation or experimentation alone (Candy & Edmonds, 2018).

Building on the theoretical foundations established in Chapter 2 and the analyses of existing games in Chapter 4, the development process applies insights from both hybrid casual monetization strategies and persuasive game design principles. The analyses of games such as *Pizza Ready!*, *My Perfect Hotel* and *Aquarium Land* provided concrete design patterns for hybrid casual engagement mechanics, while the examination of persuasive titles like *Papers, Please*, *ECO* and *Terra Nil* reveal practical approaches to implementing procedural rhetoric and persuasive systems design principles.

Key development decisions and implementation challenges encountered during this process were documented to provide transparency about how theoretical concepts were operationalized in practice and where unexpected tensions or limitations emerged. This documentation enables reflection on both the potential and constraints of integrating persuasive mechanisms within hybrid casual games.

Through this methodology, the research investigates how procedural rhetoric can be practically integrated into hybrid casual game mechanics to support donation-based ocean conservation, with the implemented game systems demonstrating both the possibilities and the limitations of this integration.

5.2 Game Design Document

As for the purpose of this thesis the following Game Design Document (GDD) will be a light GDD as it will focus only on the most important features and topics of the game which are important for the thesis' purpose.

The following design pillars serve as the core creative values that are guiding the development process of *PlayForOceans*. They reflect the intersection of persuasive games and hybrid casual game structure, ensuring that both player engagement and message remain central throughout the development (Table 2).

Accessible	Impact	Meaning	Hope
The game must be playable with one thumb and require no prior gaming experience	The game should visualize and communicate that the player actions have a real-world impact	Monetization must align with game's ethical goal and should offer value to the player as well as communication to real-world effects	The aesthetic should be welcoming and optimistic, using high contrast and a cartoonish, playful visual language

Table 2 Design Pillars PlayForOceans

The accessibility of hybrid casual games is crucial as for the games' scalable potential. It should be playable by everyone regardless of gender, believes and culture (Chapter 2.1). Accessibility also supports the persuasive goals of the game that environmental responsibility should be a task for many regardless of their background.

The game should visualize its impact through the play on real-world events. Systems like a karma leaderboard, as karma is the hard-currency of the game and will be discussed later, it can be directly linked to playtime and therewith monetization of the game and can visualize how much a player has contributed to real-world donations. This design leverages the Social Support and Self-Monitoring principles from the Persuasive System Design model, through social comparison, cooperation and public recognition. The idea behind this leaderboard is to reinforce the players that they are not acting alone and isolated, but collaborate together.

Meaning focuses on the ethical significance of in-game actions, especially how the game handles monetization strategies. The monetization is not designed to distract or encourage compulsive spending, but rather to reinforce the core message of environmental care. Hard-currency, which is called Karma in *PlayForOceans*, can be earned through small actions, like rescuing an animal which are trapped in trash, through rewarded video ads and a third monetization option that has not been discussed yet, rewarded surveys, as well as IAPs which can be bought. Importantly to mention, that the game will avoid dark patterns – a design technique intended to pressure player into unwanted purchases or engagement. This technique includes urgency timers, misleading buttons or fake discounts (Zagal et al., 2013). Instead the game focuses on player's trust, transparency and values. This also aligns with System Credibility Support principles of the Persuasive System Design framework, especially trustworthiness, real-world connection and surface credibility. Monetization therewith supports the persuasive message, enhances player's experience and maintains the ethical integrity of the game.

The fourth pillar emphasizes the importance of the tone and visual design. The visual design draws from hybrid casual aesthetics – playful, cartoonish and high-contrast – to remain appealing to a vast majority of players, rather than delivering an apocalyptic message and tone. The ocean will turn from a trash brown liquid to a colorful blue area so players directly will get a feedback in-game about their action which leverages Dialogue Support principles such as praise and liking (ct. Chapter 2.2). This pillar reinforces the belief that change is possible, encoring long-term engagement through emotional renewal rather than anxiety.

The game *PlayForOceans* is structured around three interconnected loops (Figure 8). The core loop forms a short loop, where the player navigates through a polluted ocean controlling a trash-collecting ship with one-thumb control. When the capacity of the ship is reached the player will be directed back to the harbor where the trash will be delivered to a processing facility in order to process the trash in small pieces to directly sell them or to process them into a more valuable product with the goal to sell it for a higher price. To allow a fast pace the player is able to switch between water and land seamlessly. When the player is on water a ship is controlled, on land the player has a character – this feature will be outlined later in the development documentation.

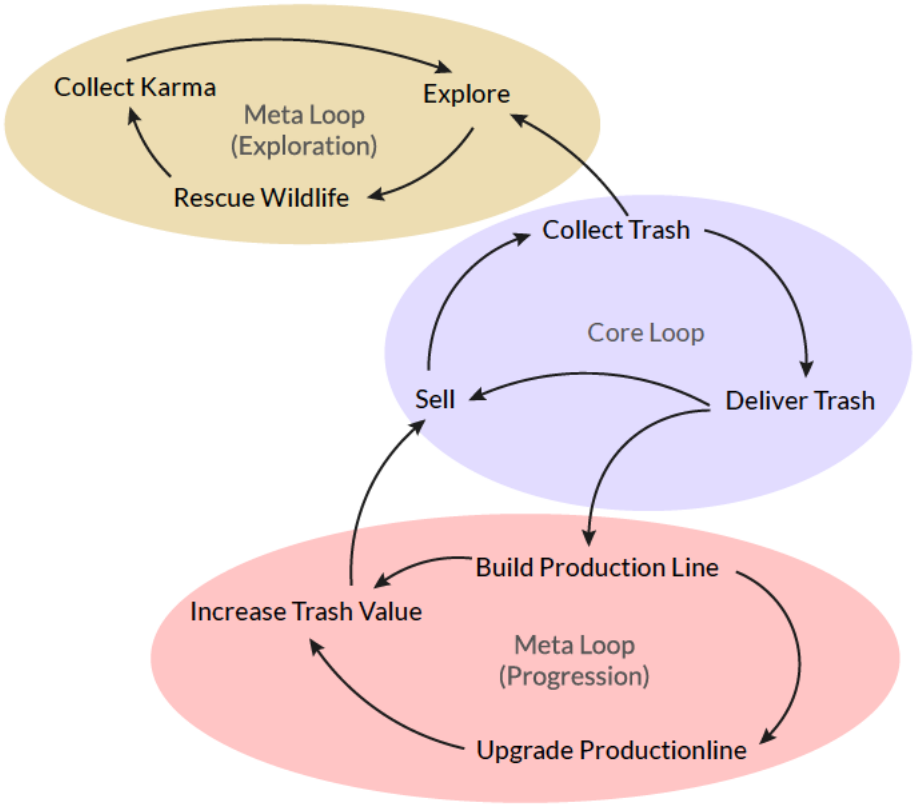

Figure 8 Game loops of PlayForOceans. Note. The Core Loop (blue) involves collecting and delivering trash to sell it for value. The Meta Loop (Progression) (red) uses earned resources to upgrade production lines and increase trash value. The Meta Loop (Karma) (yellow) represents the emotional and persuasive layer, where players explore, rescue wildlife, and earn Karma.

The core loop in *PlayForOceans* serves two key rhetorical functions. First, the act of collecting trash results in a visibly cleaner ocean and the gradual restoration of marine ecosystems. This mechanic reinforces the hopeful message that environmental regeneration is still possible and that small efforts can lead to systemic recovery. Second, the mechanic of selling trash transforms something seemingly worthless into something valuable,

encouraging players to reconsider their assumptions about waste, consumption and sustainability.

Together, these systems express procedural rhetoric (Bogost, 2007): the idea that meaning can emerge through interaction, not just narrative. In this case, the player's simple, repeated actions – such as picking up a single bottle – are framed as ecologically significant. Within the Persuasive Systems Design (PSD) model, this loop reflects the principles of Primary Task Support, particularly reduction and simulation, by turning complex environmental issues into clear, tangible and responsive systems of action and feedback.

The Meta Loop (Exploration) (Figure 8; Yellow ellipse) describes an explorative loop, focusing on creating surprising moments passively while cleaning the ocean. While collecting trash as part of the Core Loop the player randomly explores small islands or points of interest scattered around the ocean or sea. These locations will have wildlife and with a probability they will be trapped in trash or fishing nets the player has to remove in order to free the trapped animals. Freeing the animals will reward the player with a small quantity of Karma, the games' hard-currency. Karma will mainly be earned through IAAs especially rewarded ads and other monetization strategies that will be discussed later in this chapter. The points of interest will evolve over time, the more the player collects the cleaner the ocean will get resulting in evolving ecosystems on the island, reappearing animals and plants.

The third Meta Loop in *PlayForOceans* focuses on long-term progression and therewith engagement through production upgrades and economic scaling. As the player collects and sells trash in the core loop, her is earning money – the games soft currency – enabling him to reinvest into expanding and upgradable processing facilities, such as recycling stations, automating task through NPCs and therewith increasing the value on transformed trash, resulting in an ever-improving way to clean-up the ocean and creating a feedback loop that increases its impact over time – supporting the persuasive message that recycling is a valuable good. This loop reinforces hybrid casual conventions by offering long-term goals as outlined in Chapter 4. In terms of Persuasive System Design it supports self-monitoring, rewards and system credibility encouraging players to see the tangible results of their actions and staying engaged with the recovering process over extending sessions.

5.3 Technology Stack and Development Environment

For the development of *PlayForOceans* Unity 2022.3 with the Universal Render Pipeline (URP) was used. Unity was selected for its robust support for Android and iOS devices as well as its mobile ready render pipeline and the use of Shader Graph. All game assets were created by the author. No third-party game assets were used with the exception of the water shaders' normal map. UI, textures and other 2D assets were made using Adobe Illustrator to assure scalability if needed due to the vectorized graphics Adobe Illustrator relies on. For 3D assets Blender was used, as well as for rigging and partly animations.

The backend for the game was developed using ASP.NET Core to create a RESTfull API in order to support global leaderboard functionality. The non-relational MongoDB was used as database to store players' Karma score. The backend itself is hosted by Kontor Business IT GmbH based in Lübeck. The hosting infrastructure including the server are placed in a certified datacenter located in Hamburg. The infrastructure provides direct administrative access. This way of hosting ensures GDPR compliance by keeping all user data within the European Union, in contrast to common solutions such as AWS, Firebase or Azure. As the leaderboard is not real-time but operates through asynchronous API requests, scalability and latency were not critical concerns. Player data is submitted during key events such as rescuing an animal. As the UI in-game will be updated an asynchronous API call will safe and store the data, without the player noticing. This architecture enables a secure backend that supports the game's social goals.

5.4 Water Shader – Procedural Rhetoric through visual Feedback

As the oceans' water is the main and most prominent element of the game, the shader of the water was one of the first assets being implemented using Unity Shader Graph, which is a node-based shader editor to create shaders and preview them in real-time. In keeping with the game's hybrid casual identity, the water needed to appear stylized and cartoonish, yet also convey a sense of real-world materiality to support its persuasive message of ecological change.

As performance is crucial for mobile devices the depth and clarity of the water was achieved using scene depth sample (Figure 9). The screen-space depth node outputs a greyscale gradient, whereas black represents closer surfaces

and white represents more distance objects. Combining that with a lerp-node taking in two colors, shallow and deep water can be created without the need of true transparency.

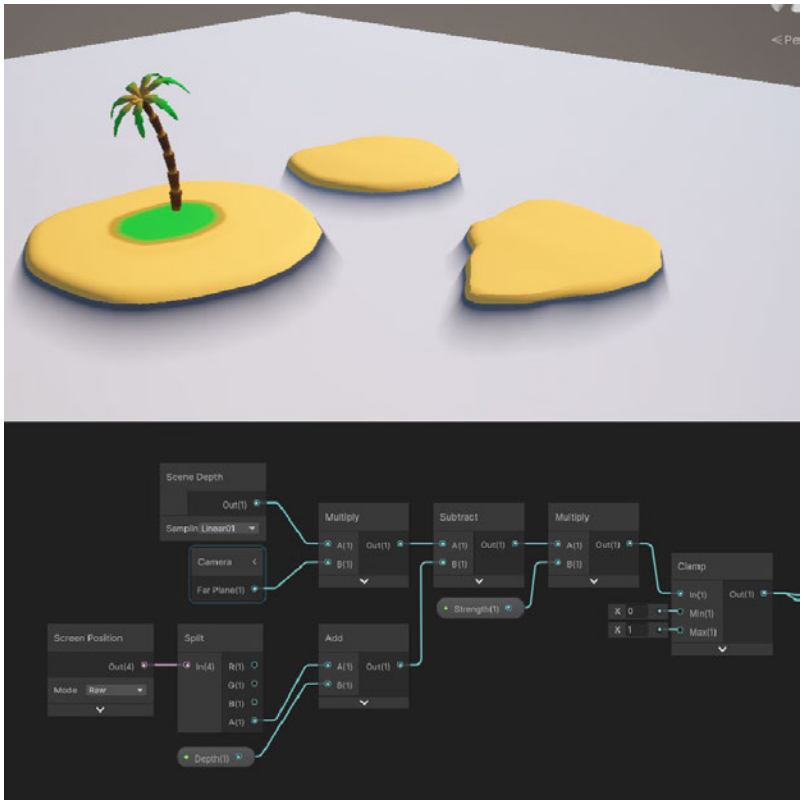

Figure 9 Water shader depth sample

The same approach was used for the foam lines, though using a step node to achieve hard edges and two Voronoi noises for the air bubbles (Figure 10).

Figure 10 Shallow and deep water with foam

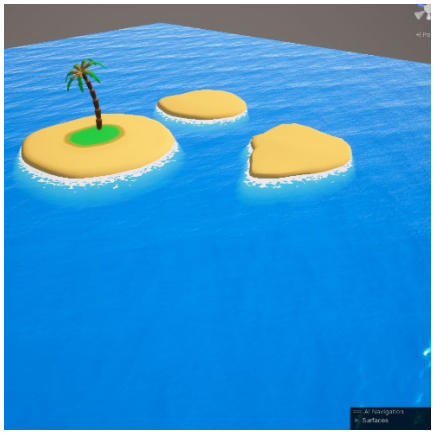

Figure 11 Normal maps added

To simulate wave motion, two normal maps with different scale were added and animated in opposite direction. These were layered and blended to create a subtle ripple effect. The normal strength is also tied to the screen-space

depth, in order that wave intensity is reduced in shallow areas to maintain visual clarity (Figure 10).

To express the persuasive message that ocean cleanup leads to visual improvement, a parameter *ClearLvl* as part of the shader was added. This float-value linear interpolates between the visual clearance shown in Figure 11 and fully polluted brown (Figure 12).

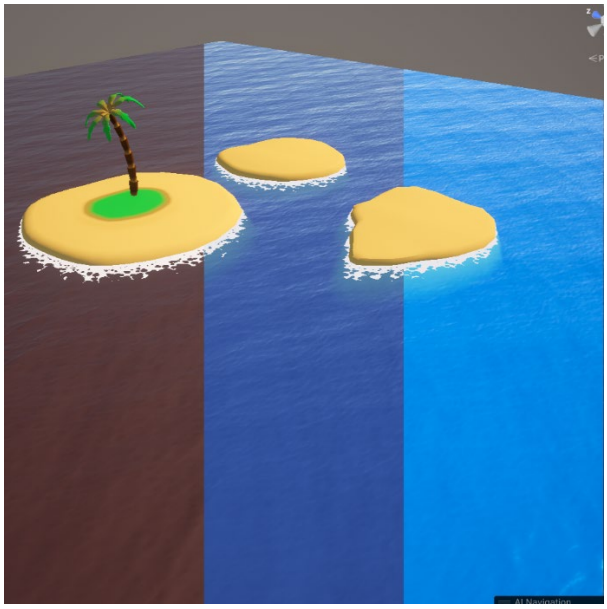

Figure 12 Ocean states FLTR: polluted, half cleaned, cleaned

When the player collects trash out of the water the color will transition from the muddy brown (Figure 12, left) to a vibrant clear water (Figure 12, right). This transition is not just a visual aesthetic, it forms part of the game's procedural rhetoric. Instead of telling the players what effects their actions have, the game will show it visually through the materials' transformation as a direct metaphor for environmental recovery.

5.5 Trash and Ocean Generation

From the beginning of the development it was clear that the ocean and its associated trash had to be generated procedurally. Manually placing every object would not only have been labor-intensive, but also incompatible with the scalable, systemic gameplay expected in a hybrid casual game. The generation system of the trash and ocean underwent three iterations until its finalization.

In the first iteration, the ocean was implemented as a single flat plane surrounded by a spline-based border. The trash was placed using Unity's

`Random.Range()` function. While this method produced a basic level of spatial variety, the result was a homogenous and artificial distribution. The same random value was used for the rotation, leading to many trash items having nearly identical orientations (Figure 13).

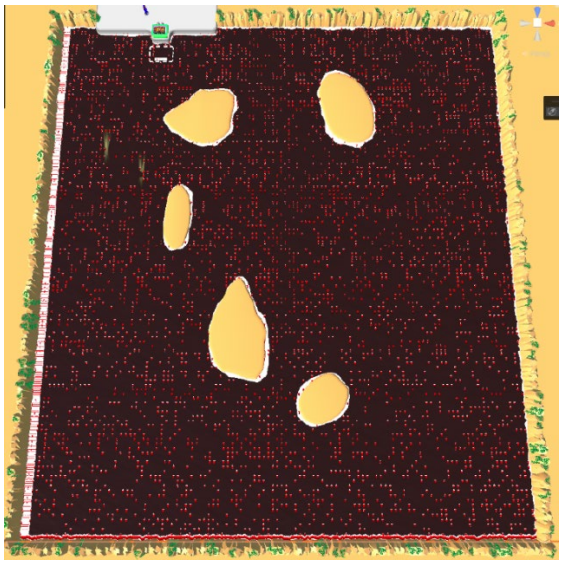

Figure 13 First iteration trash spawn

The second iteration used Unity's `Mathf.PerlinNoise(x, y)`, where a value between 0 and 1 is returned by giving a x and y value. This approach resulted in a similar result as Figure 13 with a better result in random rotations though. The downside of the build-in `PerlinNoise` was that it is not capable of taking in a seed value, so the noise would not stay the same when restarting or loading the game.

For the third iteration an open-source library `FastNoiseLite` was used for the `PerlinNoise`. This one worked better as the previous approaches. The `PerlinNoise` returned a value between -1 and 1 giving a x and y value. The frequency of the noise can be edited as well as the seed. This enabled a more organic distribution and a deterministic generation perfectly aligning aesthetics goals with gameplay needs. This approach was mixed with the dependency of the spawn possibility with the spawn locations' distance towards the center of the ocean. As closer as the spawn point is to the center of the plane the higher the possibility of spawning is. This resulted in a trash patch like generation (Figure 14).

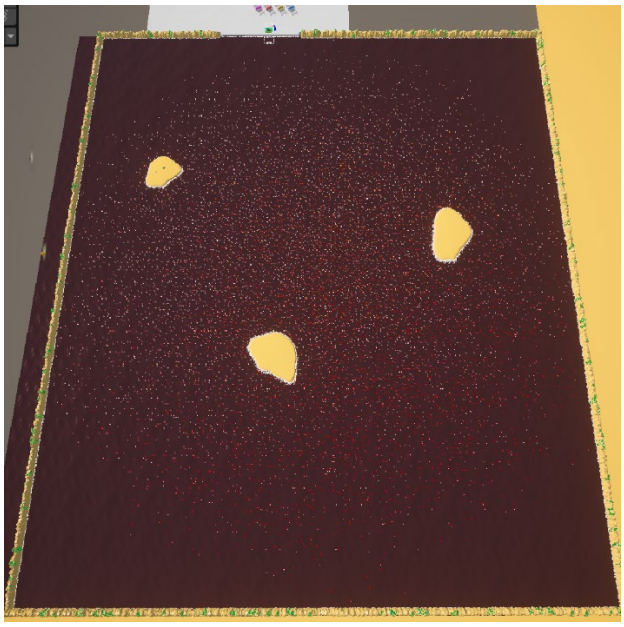

Figure 14 Third iteration trash patch

Ultimately the plane was removed and a chunk-based lake was implemented. In the beginning of the generation chunks are spawned within the spline border. After they are generated the islands will appear randomly on the lake. When both of these steps are finished, each chunk will spawn trash based on the third iteration. This approach was needed as the performance of the game was crucial. Though the player only visually sees a portion of the trash on screen, the rest will also render. With a chunk-based approach the trash will not render if not needed (Figure 15).

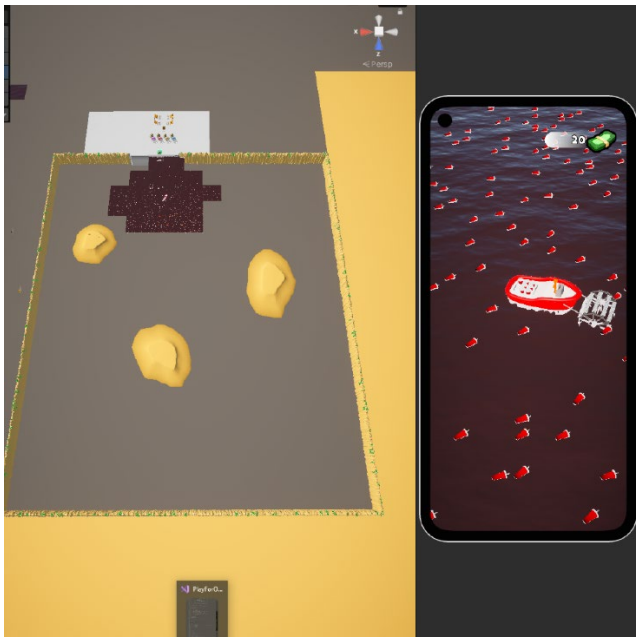

Figure 15 Player view with chunks

This approach doubled the framerate from ~30FPS to ~60FPS, which is crucial for mobile development (Figure 16). Through the use of this approach the size

of the ocean could be doubled with around 40,000 pieces of trash without losing performance.

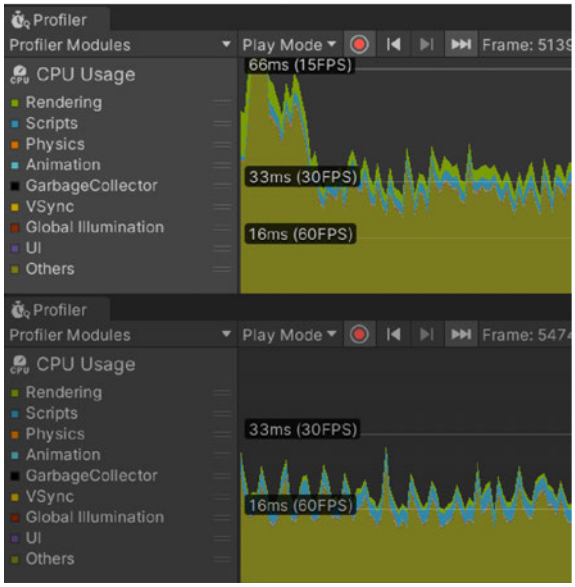

Figure 16 Performance comparison. Note: Top: Without chunks. Bottom: Chunk-based ocean

The trash itself is represented and inspired by real-world environmental data. The trash models were intentionally designed based on the most commonly found ocean waste items (Ocean Conservancy, 2023). Instead of modeling cigarette butts and straws, which are most common, but too tiny for the players to see in the game, cigarette packs are designed to resemble well-known tobacco brands, as well as cups with straws that should link to well-known fast food chains (Figure 17).

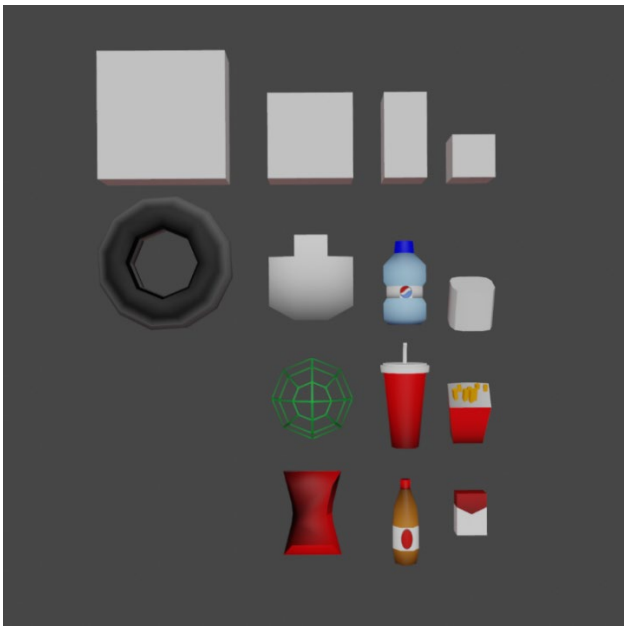

Figure 17 Trash models

These items are based on data from the Ocean Conservancy Report (2023), where plastics account for over 80% of all marine debris.

5.6 Trash to Product

After the trash has been collected by the player, the player is prompted to return to the harbor, where the player will deliver the collected trash into a crusher (Figure 18).

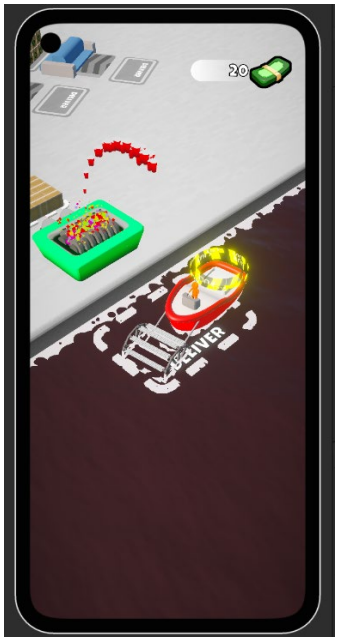

Figure 18 Trash delivery

This way the collected trash will be refined into recyclable material as shown in Table 3.

Trash Type	Refined Material	Final Product
Plastic Cups	Plastic Grain	Toys
Cigarette Butts	Fiber	Shirts
Tires	Shredded Rubber	Flip Flops
Fishing Nets	Recycled Nylon	Eco Bags

Table 3 trash to product

This transformation should reinforce the persuasive message that everyday waste can hold value if recycled probably. For instance, the use of shredded tires to produce flip flops reflects real-world examples such as Code Effort Private Limited in India which recycles cigarette butts (Dwivedi et al., 2023).

Trash, refined material and the final product is abstracted through a *BaseRessource* class that is a *ScriptableObject* (Figure 19). This approach offers flexibility in accessibility and scalability. The resource types could easily be extended without the need of the ship or player inventory to be changed as those will only deal with the *BaseRessource*.

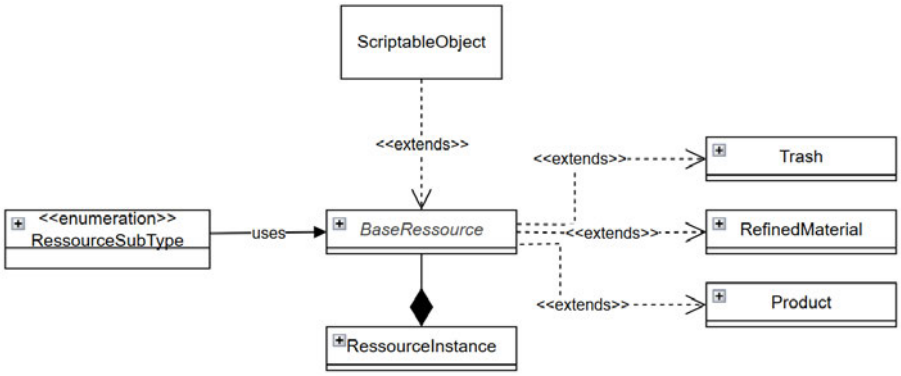

Figure 19 UML class diagram of resource system

5.7 Donation-Based Gameplay

The monetization strategy of *PlayForOceans* is closely interwoven with its persuasive and ethical objective. Rather than serving purely as a financial mechanism, monetization becomes an integral part of the gameplay experience, designed to contribute directly to ocean cleanup efforts. This approach, designed here as donation-based gameplay, transforms time and engagement invested by the player into tangible real-world impact, avoiding the use of dark patterns or exploitive monetization strategies (Zagal et al., 2013). The hard currency Karma, which symbolizes the ecological good and measures player's contribution, is earned in small amounts through gameplay actions e.g. rescuing animals which are trapped in fishing nets. The primary source to earn this hard currency are still IAA, IAPs and the third rewarded surveys.

Rewarded surveys provide players with either temporary removal of interstitial advertisements (24 hours per completed survey) or significant Karma reward. Surveys are not commonly used in hybrid casual games, though they are one of the highest-performing monetization forms in terms of eCPM, often outperforming rewarded video advertisements. Industry analyses have shown that offerwall-based formats, including surveys, can reach eCPMs several times higher than rewarded videos, with some providers reporting an

average eCPMs $400 depending on targeting and survey length in comparison to $12 average eCPM for rewarded ads (Ristic, n.d.). This not only increases the revenue but also aligns with the ethical goal of the game's monetization.

Interstitial ads are implemented using a soft friction model inspired by the findings presented in chapter 4.4, specifically the monetization pacing observed in *PizzaReady!* (ct. Chapter 4.4; Supercell, 2023). When an interstitial is triggered, the player is prompted with a choice of either skip the advertisement break using the hard currency Karma or watch an ad rewarding the player with soft currency as well as a small amount of Karma. However, the interstitials can never be skipped for free, as advertising remains a crucial source of revenue. This ensures a steady monetization flow without excessively disrupting gameplay and communicating directly with the player the necessity of advertisement in order to have a real-live impact. Rewarded video advertisements are also available through power-ups e.g. magnetize the boat, in which the boat will pick up every trash in a specific radius for a small period of time. Those power-ups can also be bought using Karma.

The overarching goal of this monetization strategy is that players are not required to spend their own money in order to contribute to ocean conservation and cleanup projects. Instead, their contributions are generated through the time they spend in the game and their willingness to engage with monetization features. Approximately 30% of the game's profit will be donated to selected NGOs, such as *4Ocean*, ensuring that the economic success of *PlayForOceans* is directly tied to its persuasive mission. This aligns with the example set by *TerraNil*, which has given away 8% of its profit to environmental cause, but *PlayForOceans* integrates this model within its core (Free Lives, 2023; 4ocean, n.d.).

The design of the donation-based gameplay system is informed by the Persuasive Systems Design model (Oinas-Kukkonen & Harjumaa, 2009). Primary Task Support is achieved through reduction (simplifying the act of environmental contribution into accessible gameplay mechanics) and simulation (visually representing a cleaner ocean as progress is made). Self-Monitoring is facilitated by Karma tracking. Social Support is encouraged through a global leaderboard displaying individual and collective Karma totals, reinforcing the persuasive principle that collaborative effort leads to meaningful impact. System Credibility Support is addressed through

transparent reporting of donations, visible NGO partnerships, and verifiable milestones on the game's website.

Optional IAPs supplement the system by providing players with direct means of supporting the cause through purchasing Karma bundles or cosmetic upgrades. While not the primary focus of revenue generation, these purchases accommodate players who wish to make an immediate and more substantial contribution. Combined with rewarded surveys, rewarded ads, and soft-friction interstitials, this layered monetization strategy offers multiple avenues for player engagement while maintaining alignment with the persuasive and ethical goals of the game.

6 Discussion

The initial question guiding this thesis asks: How can procedural rhetoric be integrated within hybrid casual game mechanics to support donation-based gameplay? The work approached this through a combined analytical and practical design-based methodology. The analytical phase examined existing hybrid casual games and persuasive games, identifying key mechanics, monetization patters, and rhetorical strategies. The development phase translated these insights into a light design document for *PlayForOceans*, in which persuasive mechanics and ethical monetization were deliberately integrated into the gameplay.

Initially, procedural rhetoric was intended to be limited to the environmental feedback of clearing ocean water as a result of player actions. However, incorporating the PSD model expanded the persuasive dimension and during the work on this thesis the idea and the concept of this game expanded its persuasive dimension. The framework introduced additional layers of influence, such as self-monitoring through Karma tracking and social comparison via a leaderboard. This shift boarded the rhetorical scope beyond the original concept, resulting in a more holistic persuasive system.

The donation-based concept developed for *PlayForOceans* positions monetization as an intrinsic persuasive element rather than a detached commercial layer. In this game, Karma functions as hard-currency, earned primarily through monetization-related actions and in small amounts through gameplay. This dual role of Karma directly ties monetization to the persuasive

goal of supporting ocean cleanup projects. The design seeks to reconcile two conflicting priorities: sustaining the revenue necessary for a free-to-play title and maintaining ethical alignment with the game's message and goal. *Pizza Ready!* by Supercell (2023) informed the integration of interstitial ads adopting a soft-friction and communicating with the player that monetization is a necessity for the game and its goal. It still remains a possibility, that some players might perceive such ads as coercive, this tension underscores the importance of transparency of the game.

The inclusion of rewarded surveys and offerwalls distinguishes *PlayForOceans* from typical hybrid casual monetization strategies. As industry data indicates that such formats can achieve significantly higher eCPM than rewarded videos, potentially allowing fewer monetization events to yield comparable revenue. In the system, completing a survey would either award substantial Karma or remove interstitial ads for 24 hours, offering a meaningful choice and reinforcing the connection between engagement and contribution. While theoretically promising, the real impact of rewarded surveys on player, retention, revenue and perceived fairness cannot be determined without playtesting.

From a technical perspective performance was one of the main challenges during the development process. A central visual and persuasive element of the game is the presence of large quantities of trash in the ocean. In the current state of the game, these objects are static to preserve performance, but this limits physical interaction. Dynamic, physics, floating like trash objects could significantly enhance the games' feel and reinforce the message, but implementing such systems for mobile devices would require advanced optimization techniques. Unity's Entity Component System could offer such solution for large numbers of interactive objects. This system will be implemented beyond this thesis.

It is important to acknowledge that the scope of this thesis was limited and due to time constraints not everything was fully implemented. As a result, the interpretations discussed in this thesis establish a theoretical framework through comparative analysis, creating a foundation for future empirical validation through player behavior studies. Further investigations should focus on the persuasive and monetary effectiveness of donation-based gameplay, its impact on retention, and the game's influence on real-world

environmental behaviors. Looking forward, *PlayForOceans* can serve as a framework for further research into ethical monetization, large-scale persuasive games or hybrid casual games, as this field has barely been researched within games studies. The game will be developed further and tested beyond this thesis. Success in this domain will rely on balancing commercial viability with persuasive integrity, maintaining player trust and delivering an engaging gameplay experience that makes the player's in-game actions feel impactful.

7 Conclusion

This thesis set out to explore how procedural rhetoric can be integrated within hybrid casual games with donation-based gameplay with the focus on the development. Through the comparative analyses of existing hybrid casual games and persuasive games and the design and development of the game *PlayForOceans*, the project demonstrated that persuasive and ethical monetization can be deliberated into a free-to-play format, though its efficiency is untested. The design offers a practical foundation for future empirical research into the effectiveness of donation-based games.

This work contributes to the field of game studies by showing that commercial hybrid casual games and persuasive intent are not inherently incompatible. If developed and evaluated further, *PlayForOceans* has the potential to serve as both an engaging hybrid casual title and as a credible means of supporting real-world ocean cleanup efforts.

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