FloraFun:

Exploring Emotional Connections Between Humans and Plants Through Digital Games

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Abstract

Human interaction with plants is often silent, yet digital games provide an interactive storytelling medium to reestablish the connection between human and plants overtly. In most games, plants serve as passive elements, functioning as background aesthetics or resources rather than active emotional entities. This study explores how plants can be integrated as meaningful narrative and interactive components, fostering empathy, ecological awareness, and emotional engagement in digital spaces.

By redefining plants as dynamic, expressive beings, this research moves beyond their conventional static roles, transforming them into interactive elements that respond to player care and actions. Through *FloraFun*, a role-playing game featuring interactive plant mechanics, this study examines how plants may elicit human emotions, memory, and well-being.

Ultimately, this research seeks to further bridge the gap between humans and nature, deepening understanding and appreciation of plant life in both virtual and real-world environments.

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1. Introduction

This chapter will provide an overview of the research motivation, objectives, methodology, and scope, outlining the fundamental questions that drive the study. It will also establish the theoretical foundation and practical significance of exploring plant interactivity in digital games, setting the stage for subsequent discussions on design methodology, narrative implementation, and player experience.

1.1 Research Motivation

The distance between humans and plants is simultaneously expanding and contracting. As urbanization progresses, people are increasingly distanced from natural environments. However, their longing for greenery has led them to bring potted plants into their homes, creating a personal connection to nature within indoor spaces. When I first arrived in Canada alone, I sought comfort in nurturing different plants, using their growth to ease the unease and tension of an unfamiliar place. The subtle changes in each plant's condition affected my emotions—I felt joy in their flourishing and concern in their withering. Yet, through the process of caring for them, I experienced a sense of fulfillment and reassurance, realizing the emotional rewards of tending to life.

To express and share this experience of coexisting with plants, and drawing inspiration from literature, film, and other artistic forms, *FloraFun* integrates plants as both narrative and interactive elements in digital games. It explores non-human relations, ecological storytelling, and emotional engagement, offering a contrast to traditional game design, which is predominantly human-focused. In most games, plants exist merely as background aesthetics, resource mechanics, or symbolic motifs. In *FloraFun*, however, plants function as meaningful interactive entities, using digital gameplay to convey their symbolic and emotional roles in human life. This research is driven by the desire to redefine the role of plants in games, moving beyond their static environmental function to create dynamic, expressive, and emotionally resonant plant interactions.

Furthermore, this study is motivated by the evolving discourse on life-centered design, advocating for a shift from anthropocentric perspectives to a broader focus on non-human entities.

This research aims to contribute to non-human interaction design and interactive storytelling in games, investigating how plants can serve as mediators of human emotions, memory, and

ecological awareness. It seeks to design gameplay that encourages players to perceive plants not merely as passive objects, but as living, evolving beings, shifting the focus from how to care for plants to how plants, in turn, influence human emotional well-being.

1.2 Research Question

Through the process of caring for plants, I not only found comfort in my daily life but also learned to care for myself in deeper ways. This experience gradually awakened a sense of empathy and connection with the natural world. These personal moments led me to reflect on the broader possibilities of plants in digital games—could they become more than background elements? Could they serve as protagonists, carriers of emotion, and vessels for value transmission?

This research seeks to explore how plants can play a meaningful role in interaction and narrative within digital games, fostering emotional engagement, ecological awareness, and an understanding of non-human relations. To achieve this, the study further investigates how specific design principles can transform plants from passive background elements into dynamic, emotionally responsive entities. It also examines how plant-centered game design can encourage players to reconnect with nature through virtual experiences and extend that emotional awareness into real-life relationships with the natural world.

1.3 Scope

FloraFun explores plant-centered interactive game design, focusing on emotional engagement, ecological awareness, and non-human relations. The project aims to:

Redefine Plants as Interactive Entities: Move beyond traditional game design, where plants are passive background elements or resource mechanics, and transform them into dynamic, responsive beings capable of interaction. Introduce plant care and environmental adaptability as key mechanics.

Integrate Emotional and Ecological Storytelling: Explore how plants can serve as mediators of human emotions, memory, and well-being. Develop narrative-driven plant interactions to enhance the connection between players and plants.

Encourage Real-World Environmental Awareness: Foster a deeper understanding of plant life by bridging virtual plant care with ecological storytelling that reflects real-world environmental

values.

1.4 Methodology

In the research and development of *FloraFun*, Life-Centered Design (LCD) and Reflective Practice were adopted as the core theoretical foundations and incorporates the Experience–Reflection–Action (ERA) Cycle as a structured method for iterative design within the framework of reflective practice, to ensure the continuous optimization and refinement of the game experience. My literature review surveys existing research on emotional resonance in games, value transmission, the emotional relationship between plants and humans, and the representation of plants as a symbolic element in literary works, films, and existing games. This theoretical exploration provides broader academic support for the study within the fields of game design and environmental storytelling.

1.4.1 Life-Centered Design (LCD) Methodology

Life-Centered Design (LCD) is an emerging design approach introduced by Sydney-based UX designer Damien Lutz. In his book *The Life-Centered Design Guide* (Damien Lutz, 2022), Lutz presents the principles of life-centered design and offers speculative "future snapshots" of what the design landscape might look like if these changes were fully integrated. His goal is to raise awareness within the design community about what design can do to create a more compassionate and regenerative world, for both today and tomorrow.

LCD provides designers and creative professionals with a holistic framework for decision-making, offering opportunities and methodologies that extend beyond traditional Human-Centered Design (HCD). While HCD focuses primarily on improving human experiences, LCD expands the design perspective to encompass broader environmental, social, and non-human factors. It promotes sustainability and ecological responsibility, ensuring that design outcomes benefit not only humans but also ecosystems and non-human entities.

Some of the core principles of LCD include:

- Non-Human relations: Recognizing and integrating plants, animals, and ecosystems as active participants in the design process, rather than solely prioritizing human needs.
- Sustainability: Ensuring that design solutions consider long-term ecological impact,

minimizing environmental harm, and promoting regeneration.

- Interconnectivity: Understanding how human actions affect broader ecosystems and designing solutions that foster coexistence rather than dominance.
- Ethical Responsibility: Prioritizing ecological well-being and designing experiences that respect and integrate nature rather than serving only human convenience.

These principles were applied to *FloraFun* in several ways:

- Non-Human Representation: *FloraFun* designed plants as dynamic, interactive entities capable of responding to player actions and in-game events. Players must observe and understand plant behaviors, adjusting their care strategies based on plant responses. This encourages an active relationship between the player and plants, fostering a deeper emotional and ecological connection.
- Fostering Ecological Awareness: The game integrates narrative-driven plant decay mechanics, requiring players to restore and care for plants to progress in the storyline. The game reinforces responsible plant care practices, allowing players to develop a sense of stewardship over virtual plants, which may translate into real-world awareness.
- Sustainability Values in *FloraFun* Design: The narrative structure and plant care mechanics in the game encourage players to engage in real-world plant cultivation and interact with others, subtly fostering environmental awareness through immersive gameplay.
- Narrative-Driven Emotional Connection: The game's storytelling places strong emphasis on human-plant relationships, cultivating empathy and encouraging emotional investment. Player decisions directly influence plant growth and survival, reinforcing the emotional and ethical responsibility of plant care.

1.4.2 Reflective Practice in *FloraFun*

Reflective Practice (The Reflective Practitioner, Donald Schön, 1983) is a continuous learning and refinement process in research and design. It involves self-evaluation, feedback integration, and iterative refinement to improve design outcomes. This approach emphasizes constantly questioning design choices to ensure alignment with research goals. Refining and adjusting

elements based on self-testing and observation. Learning from past failures and successes to optimize future iterations.

Reflective practice plays a vital role in the development of *FloraFun*, as the emotional engagement within the narrative and the depth of interaction require ongoing evaluation and continuous refinement.

FloraFun integrates Reflective Practice throughout its entire development cycle, continuously improving plant interaction mechanics, narrative structure, visual aesthetics, and sound design to ensure that the game is emotionally compelling and ecologically impactful.

A key aspect of this process is striking a balance between self-reflective accuracy and personal expression, making deliberate adjustments to ensure that the game's interactive mechanics and storytelling align with its intended emotional and symbolic goals.

Following the prototype development, the reflective process critically evaluates whether the game's design choices effectively convey the intended themes and foster meaningful player interactions with plant life. This continuous reflection and refinement allow *FloraFun* to successfully integrate interactive storytelling, core values, ecological awareness, and an immersive gameplay experience.

1.4.3 Experience–Reflection–Action (ERA) cycle

The Experience–Reflection–Action (ERA) cycle is a structured reflective practice framework that facilitates continuous learning, evaluation, and improvement in research and design. Proposed by Melanie Jasper (2013), this model emphasizes three iterative phases:

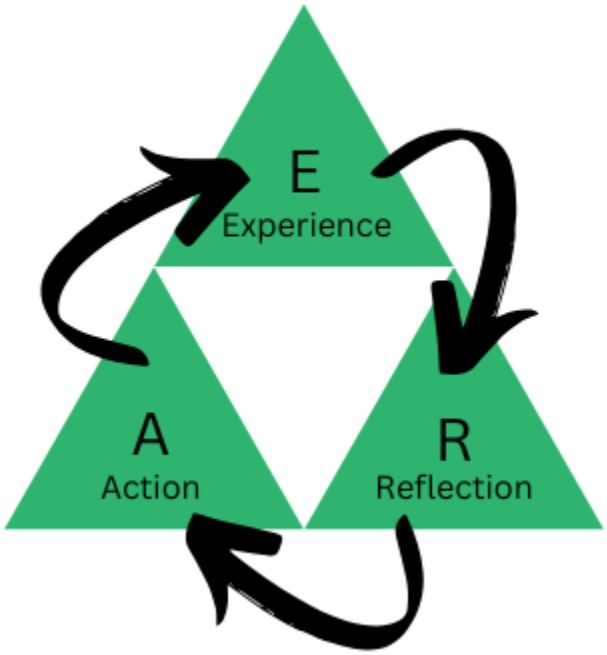

Figure 1: ERA Cycle Structure

1. Experience: Engaging with the current state of a project, observing and documenting issues, and analyzing key observation.
2. Reflection: Critically assessing the effectiveness of design choices, identifying strengths and weaknesses, and questioning how well objectives are being met.
3. Action: Implementing refinements based on reflection, making strategic adjustments to improve functionality, engagement, and alignment with the project's goals.

Application of the ERA Model in *FloraFun*:

FloraFun employs the ERA reflective cycle as a core self-testing structure of reflective practice throughout its design and development process, ensuring that gameplay interaction, storytelling, and ecological engagement are continuously refined.

In the experience phase, describe key design elements such as plant feedback, interactive storytelling, and audio-visual integration the experience phase, describe key design elements, to assess player immersion and emotional resonance.

Note the key observations and critical reflection was conducted to analyze which aspects of the game successfully conveyed the intended themes and which elements required further

refinement. In reflection phase, I also compared *FloraFun's* design with existing life simulation and storytelling games, such as *Animal Crossing* (Nintendo, 2001), to evaluate strengths, weaknesses, and areas for improvement.

In action phase, based on the insights gathered, iterative adjustments were made, including refining plant feedback animations to maintain a balance between realism and expressive interaction. Optimizing dialogue pacing to prevent information overload and improve narrative flow. Enhancing background music and sound effects to better support emotional immersion. Implementing a more structured connection between narrative choices and ecological awareness, ensuring players actively engage with environmental storytelling rather than passively receiving information.

1.4.4 Literature Review

A literature review is a critical research methodology that involves systematic analysis and synthesis of existing academic studies, theories, and industry practices. It serves as a foundational step in research by identifying knowledge gaps, contextualizing the study within a broader academic discourse, and supporting theoretical and methodological choices. Chris Hart (Doing a Literature Review, 1998) sees the literature review as producing two products: the presentation of information, ideas, data, and evidence to express viewpoints on the nature of the topic, as well as how it is to be investigated.

The literature review process typically involves identifying relevant studies, analyzing key themes and theories, conducting comparative evaluations, and synthesizing insights. In the design research for *FloraFun*, I focused on understanding how values are conveyed in games and examined existing representations of plants in digital games. At the same time, the design was informed by personal experience and emotion-driven approaches, supported by examples of human-plant relationships across various media, including literature and film

With an emphasis on interactive storytelling, ecological engagement, and emotional player responses, the literature review provided essential insights into how digital media can effectively communicate environmental awareness and non-human narratives. This process grounded *FloraFun's* design decisions, ecological themes, and narrative structure in existing academic research and industry knowledge, ensuring a more theoretically informed and contextually relevant approach.

2. Literature Review & Contextual Analysis

“If there is a trace of red on my face from childhood, it comes from that garden.” — Wang Zengqi, Renjian Caomu （Plants of the Human World, 2005）

In Wang Zengqi’s collection of essays, plants are not merely objects of natural description; they serve as vessels of memory and emotion. Through delicate and evocative prose, he paints vivid images of different flowers, their unique forms, the people surrounding them, and the subtle interactions between humans and plants. He employs multiple sensory experiences—scent, sight, and touch—to evoke nostalgic recollections of the past, revealing stories of bygone times. In his words, osmanthus leaves are thick and sturdy, pear blossoms resemble the crescent moon, gardenias appear robust and fragrant, and blooming locust flowers resemble a snowfall. As readers immerse themselves in these stories, they not only sense the vitality of plants but also perceive the emotional depth of human existence within the silent world of nature.

Throughout history, the relationship between humans and plants has been one of mutual dependence. Plants provide oxygen, allowing humans to thrive, while humans cultivate plants, fostering their growth and prosperity. However, with the rapid advancement of urbanization, the connection between people and nature has weakened. In modern society, this detachment has given rise to what is known as "Nature Deficit Disorder"(Last Child in the Woods, Richard Louv, 2005), a phenomenon where people yearn to reconnect with nature to alleviate psychological stress and rediscover inner peace. As a response, many individuals have begun incorporating plants into their living spaces, including plants, plants’ image, or furniture designed with plant feature—not merely as decorative images, or furniture designed with plant features elements but as companions and sources of emotional healing. Beyond their tangible benefits, such as flowers and fruits, plants bear silent witness to the passage of time and human emotions, marking the rhythm of life through seasonal transitions.

This profound connection between humans and plants has been explored through various media, including films, animations, documentaries, and literary works. Building upon this foundation, *FloraFun* is designed as a role-playing game that offers an interactive and immersive experience, guiding players to rediscover the emotional bond between humans and plants. The game centers around the seamless integration of plants into everyday life, presenting three narrative-driven stories alongside responsive plant characters that foster a deep emotional connection between players and greenery. Within the game, players do not merely act as caretakers;

they become companions to the plants, experiencing their growth, reactions, and interactions firsthand. Through this process, players gain an intimate understanding of the subtle yet profound dialogue between humans and plants.

2.1 Emotional Resonance and Value Transmission in Game Narratives

A number of games researchers, including Janet Murray and Katherine Isbister, have highlighted a fundamental distinction between games and other media: games provide players with the opportunity to influence outcomes through their own efforts. In films and literature, audiences are passive observers, reacting to predetermined narratives without being able to alter the course of events. In contrast, games transform players from mere spectators into active participants, where their choices and actions directly shape the game world. This interactivity creates a unique form of emotional connection, making the player's experience deeply personal and immersive. (How Games Move Us: Emotion by Design, Katherine Isbister, 2016; Hamlet on the Holodeck, Janet Murray, 1997)

2.1.1 How Games Convey Values

All games, regardless of their theme, reflect and convey human values to some extent. From notions of fairness and justice to profound reflections on survival, games construct immersive environments that allow players to experience and explore different beliefs and ideologies.

In *Values at Play in Digital Games* (Mary Flanagan, 2014), Mary Flanagan analyzes the distinctive nature of games, emphasizing their immersive qualities that enable players to actively control the experience and influence in-game situations. Additionally, digital games offer a dynamic cycle of effort, attention, and feedback, allowing players to interact meaningfully with game content. Unlike traditional media, digital games create a compelling environment where player exploration and actions are based on an understanding of systemic relationships.

The manifestation of values in games can be understood from two perspectives:

- The Designer's Perspective: Developers make design decisions based on creative intentions and technical constraints while predicting player preferences, which ultimately shape the game's inherent values.
- The Player's Perspective: Players, influenced by their personal, cultural, and contextual

backgrounds, interpret and experience the game's values differently.

For example, in *Flower* (Thatgamecompany, 2009), players guide petals through open landscapes outside the city, fostering plant growth and creating beautiful scenery. Players control the wind, directing a single petal that gathers others, triggering flowers to bloom and emitting melodic sounds. However, as the game progresses, the once-thriving landscape gradually descends into industrial decay, with environmental degradation overtaking the natural beauty. This interactive contrast conveys values of sustainability, environmental balance, and the relationship between humans and nature.

Thatgamecompany's lead designer, Jenova Chen, explains: " If you want to touch the player through your game, you have to be successful at letting them get some portion of what you are trying to say in the game." (A talk with thatgamecompany's CEO and Creative Director, Jenova Chen, 2024) Rather than directly instructing players on how to think, Flower encourages them to engage gently with the environment, subtly guiding them toward an appreciation of cooperation and ecological harmony. This design approach enables the transmission of values in a more organic and impactful manner. *FloraFun* adopts a similar approach to subtle guidance, embedding its core values within each chapter's narrative. Through experiencing the story and completing tasks, players organically extract emotional meaning and thematic significance on their own, fostering a deeper engagement with the game's underlying messages.

In traditional narratives, audiences connect emotionally with protagonists. In games, however, players directly embody their avatars, experiencing transformations within the game world. Isbister (How Games Move Us: Emotion by Design, 2016) argues that this sense of identification makes games uniquely effective in fostering emotional resonance.

Another distinctive feature of well-designed games is the player's ability to make choices and control their actions. This allows them to enter a highly immersive and gratifying state known as "flow", as described by psychologist Mihaly Csikszentmihalyi (Flow: The Psychology of Optimal Experience, 1990). He identified eight key elements that define this state, among which FloraFun actively embodies three: a challenging activity requiring skill, clear goals, and direct, immediate feedback. When players reach a state of flow, they are no longer merely engaging in entertainment—they form a deeper emotional connection with the game experience, transforming gameplay into a meaningful medium for interaction and learning.

When players achieve flow, they do not merely engage in entertainment but develop a deeper emotional connection with the experience, making games a meaningful medium for interaction

and learning. In the core gameplay design of *FloraFun*, particular emphasis was placed on selecting and applying key elements of Flow Theory. After thoroughly understanding these elements, the design process focused on translating them into gameplay mechanics within FloraFun, ensuring the creation of an immersive game environment and a memorable emotional experience for players.

2.1.2 How Non-Human Entities (Such as Plants) Become Emotional Anchors

Katherine Isbister also explores the role of non-player characters (NPCs) in achieving flow states. NPCs provide direct feedback to players during interactions. At times, NPCs assign tasks to players, guiding game progression, while in other instances, they may act as obstacles, creating challenges that influence the player's journey. She describes them as “living, breathing others”, arguing that even solitary games feel less lonely when they include virtual beings that offer support, resistance, and a sense of cultural presence.

Game designers use subtle social cues to create emotional bonds between players and non-human entities. A prime example is *Hush*（Game Studio 78, 2015）, where the game leverages one of the most primal human emotional connections—the mother-child bond. The sound of a crying baby, an instinctively compelling auditory stimulus, triggers players' protective instincts, making them fully invested in the task of caring for the child.

In FloraFun, NPCs serve as key narrative anchors, introducing stories and tasks while facilitating emotional engagement between players and plants. By empathizing with NPC experiences and completing story-driven tasks, players are provided with a platform to deepen their emotional connection with plants, enhancing the game’s narrative and interactive depth.

Another example is *Dog's Life* (Frontier Developments, 2003), which allows players to embody Jack, a stray dog, experiencing the world through a canine perspective. The game transitions from a third-person view to a first-person “dog vision”, simulating how dogs perceive their surroundings—colors appear muted, but scents are visualized as colorful scent clouds, guiding exploration. This design enables players to understand the world from a non-human perspective, fostering a deeper emotional connection with the character.

Although *FloraFun* does not allow players to experience the game from a plant’s perspective, approaching dynamic feedback design from the viewpoint of a non-human lifeform provides an

intriguing perspective. Dynamic feedback can go beyond observable visual changes in the real world, encouraging the imaginative question: If the designer were the plant, how would I respond to the player's actions?

This approach may incorporate anthropomorphic elements, but it also requires a deep understanding of plant growth patterns and biological fundamentals. The challenge lies in striking a balance between anthropomorphization and biological accuracy, ensuring a perspective that remains both engaging and authentic within the game's interactive design.

2.1.3 Personal Experience and Emotionally-Driven Game Design

Doris C. Rusch, in Making Deep Games (2016), proposes nine fundamental questions for designing purposeful and meaningful games, which effectively assist game designers in determining the value transmission within their games. Two of these questions, which focus on analyzing the game's core themes and objectives, have provided valuable guidance in shaping FloraFun as a game driven by personal emotions and experiences.

The first question concerns the core theme of the game. Is the inspiration derived from another medium, such as an adaptation from books or films? Is it based on personal experiences, or does it stem from a particular cause or advocacy? Rusch emphasizes that games grounded in personal experiences require a strong thematic focus and authenticity. The coherence and continuity of the game's narrative are achieved through an in-depth exploration of personal experiences and a design approach that respects and builds upon these experiences.

The second question addresses the purpose of the game or its communicative goal. Rusch argues that personal games, as a form of self-expression, contribute to a broader understanding of games by introducing new and diverse voices into the medium. Additionally, games driven by self-expression challenge player-centered design and iterative processes. In the context of personalized narrative-driven games, authenticity is paramount. Rusch asserts that the most impactful games do not rely on extravagant design but rather on the ability to convey genuine emotional depth. However, designing such games is not an easy task; it requires self-reflection and continuous refinement until the designer can precisely convey the intended core message.

Rusch's two fundamental questions are directly applicable to *FloraFun.* What is the core theme of the game? What is its communicative purpose?

FloraFun is not an adaptation of existing media but is instead inspired by personal experiences,

emotions, and reflections on the relationship between humans and plants, as well as ecological awareness. By grounding its narrative in real-life inspirations, the game achieves a cohesive and deeply personal storytelling structure, ensuring that players engage with genuine emotional depth rather than abstract environmental information.

Rusch describes personal games as a form of self-expression that introduces new perspectives into the medium, expanding the cultural and emotional scope of games. *FloraFun* embodies this philosophy by prioritizing emotional engagement over traditional gameplay challenges, fostering an introspective experience that encourages players to develop personal reflections on plant life and ecological awareness.

Rusch further explores questions related to game mechanics, narrative structure, and player-system interaction, emphasizing that the process of answering these questions mirrors the iterative nature of game design itself.

Seymour Papert (Mindstorms: Children, Computers, and Powerful Ideas, 1980) introduced the concept of "Object to Think With", suggesting that games can serve as a tool for players to engage with and understand the world in new ways. Games are particularly suitable for this role, as they facilitate self-directed, intrinsically motivated learning. Players are given the freedom to fail, experiment, and discover. While games may not necessarily impart extensive factual knowledge, their primary function is to stimulate curiosity and encourage players to develop a deeper understanding of specific topics.

The impact of games on behavioral and cognitive shifts is frequently discussed in game design. If a game is structured to encourage players to perceive situations from different perspectives, drawing attention to aspects they may have previously overlooked, it can effectively plant the seeds for long-term attitudinal and perceptual transformation.

FloraFun applies this concept by transforming plants into interactive entities, allowing players to understand plants through participation rather than passive information delivery. Players do not receive direct scientific explanations about plant care; instead, they develop their understanding by completing tasks, observing plant reactions, adjusting conditions, and reflecting on ecological impact. Furthermore, Papert emphasizes failure and discovery as key learning mechanisms, which are also incorporated into *FloraFun*. In task design, players attempt to rescue or care for struggling plants, encouraging them to experiment and discover solutions on their own. This approach not only conveys plant care knowledge but also helps players form an emotional connection with plants during the process. This dynamic foster a self-motivated learning experience, where players

develop a personalized understanding of plant life and sustainability through active engagement and reflection.

2.2 The Emotional Connection Between Plants and Humans

Plants are an integral part of human daily life, appearing in various forms such as roadside trees, ornamental greenery in public spaces, and household potted plants. However, in contrast to their omnipresence, plants are often overlooked in the broader scope of human existence. Once thriving in vast forests and expansive landscapes, their presence in urban settings has become fragmented and confined.

It is widely recognized that plants have a calming effect, helping to alleviate stress, induce relaxation, and improve concentration. Yet, fewer people are aware of the remarkable resilience of plants—even when a significant portion of a plant is damaged, it can often regenerate and continue to thrive. Some plant species can survive even after losing up to 90% of their physical structure, relying on a small remaining part to regenerate. The fiddle-leaf fig (Ficus lyrata) is one such example—humans often propagate it by cutting and replanting just a branch, which can then take root and grow anew. While we tend to focus on the visible, above-ground parts of a plant, it is the unseen root system beneath the surface that sustains life and enables renewal. These roots, hidden from view, are what support growth and symbolize resilience and the quiet power of regeneration. (Cutting reproduction cultivating method of Chinese banyan, 2015)

Beyond their biological functions, plants hold profound symbolic and emotional significance in human culture. In Chinese tradition, bamboo is often used as a metaphor for resilience and perseverance, while plum blossoms symbolize unwavering courage and the strength to bloom amid adversity. Moreover, plants serve as repositories of memory and emotion, carrying personal and collective meanings across generations.

2.2.1 The Role and Symbolic Significance of Plants in Human Civilization

Environmental ethicist Holmes Rolston III argues that ecosystems possess intrinsic value, independent of human perception or utility. According to Rolston, the value of nature is not contingent on its usefulness to humans but rather exists inherently within ecological systems.

Conversely, Baird Callicott suggests that nature's intrinsic value is contextualized through human perception, arguing that people project subjective emotional and ethical considerations onto nature. He posits that value cannot exist independently but rather emerges from the relationship between the observer and the observed. This perspective implies that human emotions and cultural constructs shape our perception of nature's worth.

Rolston challenges anthropocentric views that regard nature merely as a resource for human consumption. He highlights that human interactions with nature often reinforce the notion that value is dictated by human needs and desires, leading to a utilitarian view of the environment. Even within conservation discourse, national parks and wilderness areas are frequently justified in terms of scientific, recreational, or aesthetic value, rather than being preserved for their own sake.

From a short-term, utilitarian perspective, it might appear that nature's value exists only insofar as it serves human life. However, from a long-term, ecological perspective, nature functions as a self-sustaining system with intrinsic worth, where humans are merely a late-emerging component within a much larger evolutionary framework. Regardless of differing perspectives on intrinsic value, both Rolston and Callicott acknowledge that ecosystems do not depend on human existence, but humans are fundamentally dependent on ecosystems.

Rolston further contends that the beauty, integrity, and stability of ecosystems necessitate ethical considerations in human actions. Thus, rather than having the freedom to exploit nature without restraint, humans are morally bound to respect and preserve it.

The value of ecosystems, whether in terms of resource utilization or their emotional and therapeutic impact, is a subject worthy of repeated reflection and exploration.

In *FloraFun*, the perspective shifts from a human-centered approach to a life-centered perspective, fostering empathetic understanding of the significance of plant life. Through this lens, players are encouraged to reflect on their own personal growth by drawing parallels between human experiences and the existence of plants.

2.2.2 The Perceptive Capabilities of Plants and Their Parallels with Human Biology

In *What a Plant Knows* (2012), Daniel Chamovitz explores the striking biological parallels between plants and animals, challenging conventional perceptions of plants as passive, insentient

organisms. Chamovitz argues that from a genetic and physiological standpoint, plants share significant similarities with animals, including humans.

He states: "If we consider our closest biological relatives, they are not only chimpanzees and dogs but also begonias and redwoods."

When we gaze upon a flowering rose, Chamovitz suggests, we should not see it as an inanimate object but as a distant cousin, possessing intricate sensory mechanisms that allow it to perceive and adapt to its environment. Similarly, when observing ivy climbing a wall, we must recognize that our own evolutionary trajectory could have taken a vastly different course, and that plants represent an alternative outcome of life's diversification over billions of years.

Contrary to the assumption that plants lack sensory perception, Chamovitz's research reveals that plants possess highly sophisticated sensory systems. Through his studies on light-regulated growth genes, he discovered that humans and plants share homologous genetic sequences that enable environmental responsiveness. This suggests that, at a fundamental level, plants and animals are not as biologically distinct as we often assume.

Although plants lack a central nervous system, they exhibit sensory functions analogous to vision, smell, touch, hearing, proprioception, and even memory. Unable to move, plants have evolved complex regulatory systems that allow them to perceive and respond to their environment, enabling them to adapt to changing conditions. One example is their ability to detect light and shadow, adjusting growth based on light perception. *FloraFun* draws inspiration from this visual sensitivity. In plant placement tasks, the game simulates changes in plant growth through animated feedback based on varying light conditions in different locations. This mechanic supports interactive communication between the player and the plant, reinforcing the relationship through visually responsive design.

Plants are not passive organisms but are highly adaptive and responsive to their environment, often in ways that mirror fundamental aspects of human sensory perception. These findings also provide theoretical support for the design of plant feedback movements in *FloraFun*. The dynamic responses of plants are not entirely anthropomorphized behaviors but rather natural reactions that plants exhibit as they adapt to their environment.

However, in *FloraFun*, the visual changes in plant interactions must be carefully considered to balance natural plant responses with effective emotional feedback. The goal is to ensure that players not only see the impact of their actions but also perceive the emotions that plants convey

through their reactions, enhancing the depth of interaction and emotional engagement.

2.2.3 Horticulture and Plant Expression: How Humans Engage with and Understand Nature

Horticultural education is a practice-intensive discipline, encompassing abstract concepts, extensive knowledge, and precise technical skills. Traditional methods often struggle to effectively convey complex botanical information to learners in a way that is both engaging and applicable in practice. One of the primary challenges in horticultural education is translating intricate plant care knowledge into easily comprehensible and actionable insights for learners of varying expertise.

In *Getting Your Message Across* (2013), an essay in the Magazine *Horticulture*, Suzanne Moss highlights that effective horticultural education depends on the clear communication of abstract information. However, highly technical knowledge often presents a barrier for non-experts, making it difficult for them to fully grasp and apply key concepts.

Moss documents her observations from horticultural society activities in botanical gardens across New York, Pennsylvania, and California, where she explored how visitor intent can be identified and how educational programs can be designed to communicate gardening knowledge to the public. Her findings emphasize that enhancing the enjoyment of garden visits is crucial in engaging visitors and fostering interest in horticulture. The primary challenge lies in presenting the complexity of garden design to visitors who may be more inclined toward a leisurely experience rather than a structured learning session.

Studies suggest that interactive and enjoyable learning methods yield the best educational outcomes—the more engaging the activity, the more knowledge visitors retain. Various botanical gardens have adopted innovative approaches to address this challenge:

- Huntington Botanical Gardens employs discovery-based exhibitions to present abstract plant-related concepts, encouraging visitors to interact with and explore botanical themes.
- Brooklyn Botanic Garden focuses on practical skills that visitors can take home, offering educational experiences that cover fundamental home gardening techniques, from plant selection to soil composition and potting mediums.
- Longwood Gardens prioritizes capturing visitor attention first before guiding them

toward organic learning experiences, allowing audiences to develop a deeper appreciation for plant life.

For example, Huntington Botanical Gardens uses simple yet effective leaf labels that indicate germination dates, helping visitors easily visualize and understand the life cycle of leaves. This small but impactful design choice demonstrates how subtle modifications in presentation can significantly enhance public comprehension of plant life processes.

By incorporating interactive elements, hands-on learning opportunities, and intuitive visual cues, botanical gardens and horticultural educators can bridge the gap between theoretical plant knowledge and practical application, fostering a more immersive and accessible understanding of nature.

Inspired by engaging horticultural activities, *FloraFun* explores how plant care mechanics can be embedded into hands-on gameplay rather than relying on direct instructions. Players engage in experiential learning, discovering plant care principles through trial and observation—for example, witnessing leaves wither due to improper watering rather than being explicitly informed about the risks of overwatering. Plant feedback dynamically adjusts based on player actions, reinforcing cause-and-effect learning regarding plant health.

Drawing from Huntington Botanical Gardens' discovery-based learning model, *FloraFun* further integrates exploratory mechanics, encouraging players to observe, experiment, and respond rather than simply following predefined tutorials. Similarly, Longwood Gardens' educational approach highlights the importance of first capturing visitors' attention before guiding them into structured learning. *FloraFun* adopts this principle by utilizing engaging NPC interactions to organically introduce plant care concepts through story-driven tasks. Gradually exposing players to plant care knowledge, ensuring they absorb information progressively rather than all at once. By subtle environmental storytelling, such as NPCs sharing personal stories about their plants, making the learning process emotionally engaging rather than purely informational.

2.3 The Relationship Between Humans and Plants in Film and Literature

Throughout history, literature and film have explored the intricate relationship between humans and nature, often using plants as symbols, narrative devices, and emotional anchors. Whether in prose or on screen, plants frequently serve as silent witnesses to human experiences, reflecting themes of growth, resilience, transience, and memory. These works do not merely depict

the physical existence of plants; rather, they weave them into the fabric of human emotions, cultural traditions, and philosophical reflections on life.

2.3.1 Plant Narratives in Wang Zengqi's *Renjian Caomu* (Plants of the Human World)

In the essay collection *Renjian Caomu* (《人间草木》, 2005) by Chinese writer Wang Zengqi, plants are intricately woven into themes of seasonal change, rural life, traditional cuisine, and the emotional bond between humans and nature. Wang's work is not merely an ode to natural scenery; it is also a philosophical reflection on life, showcasing his deep understanding of nature, humanity, and existence.

With delicate and poetic prose, Wang vividly depicts the rural landscapes of his childhood—trees, flowers, streams, birdsong—all imbued with a rich sense of vitality and emotion. Nature, in his writing, is not an isolated entity but is deeply intertwined with human life and emotions, reflecting a harmonious coexistence between people and the environment. His detailed observations of how plants change across the seasons reveal an enduring reverence for nature.

More than just descriptive passages, many of the essays in *Renjian Caomu* use plants as vessels for nostalgia, carrying memories of the past and evoking deep emotions. Wang reminisces about his childhood garden through a sensory-rich narrative—filled with colors, scents, and sounds. The structure of his recollections mirrors cinematic techniques, shifting between mid-range shots, close-ups, and detailed vignettes, seamlessly transitioning between past and present. The alternating rhythms of lightness and gravity, slowness and urgency, along with the interweaving of different timeframes, turn plants into symbolic carriers of memory, evoking a sense of time's passage and personal history.

Wang Zengqi's collection of essays allowed me to see how personal experiences can be a powerful medium for expressing the emotional and reflective influence of plants on humans. While reading, I found myself empathizing with the narratives, mentally visualizing his memories of his hometown and the relationships between people.

Similarly, *FloraFun's* narrative design draws inspiration from this approach—starting from a prose-like storytelling structure, which is then transfer into an interactive narrative script. The goal is to allow players to empathize with NPC experiences, fostering emotional engagement with the plants within the story, and deepening their connection to the game's interactive storytelling and

ecological themes.

2.3.2 The Philosophy of Human-Nature Connection in *Little Forest*

In contrast, Japanese director Junichi Mori's film Little Forest adopts a minimalist, naturalistic storytelling approach, devoid of dramatic conflicts or excessive sentimentality. The film unfolds like a quiet, introspective journal, immersing the audience in the protagonist's self-sufficient rural life.

Figure 2: Screenshot of the film Little Forest

The story follows Ichiko, a young woman who, after struggling to adapt to the fast-paced urban life of Tokyo, returns to her childhood home in Komori, a remote village in northeastern Japan. Her mother has long since left, and Ichiko embraces a solitary yet fulfilling existence, reconnecting with nature through agriculture, cooking, and seasonal rhythms.

Throughout the seasons, Ichiko cultivates crops, harvests grains, and prepares meals using traditional methods, recalling the inventive dishes her mother once made for her. Each act of cooking—stewing meat in winter, fermenting rice wine in summer, baking bread at dawn, and listening to the rustling sounds of the forest at night—becomes a ritual of self-reliance and introspection. Her routine creates a private world in which she forms a symbiotic relationship with nature, allowing her to embrace solitude, rediscover herself, and heal emotionally.

The film’s detailed cinematography presents nature not merely as a resource for human survival but as a sanctuary for the soul. Little Forest explores how modern individuals can rekindle their connection with the natural world, finding solace in hands-on labor and the rhythm of the seasons. Ichiko’s transformation is likened to that of a tree—silent, resilient, deeply rooted in the earth, and growing at its own steady pace. This portrayal underscores an existential philosophy: in a world marked by cold indifference and unpredictability, nature offers stability, nourishment, and a sense of belonging.

FloraFun shares similar core values with the film *Little Forest*, particularly in its gradual emotional development and connection to nature. In the film, the protagonist's continuous voice-over narration serves as an audio diary, recording her emotional changes after returning to rural life. This mirrors *FloraFun’s* journal system, where reflection and storytelling play a key role in the player's experience.

Emotions do not arise suddenly—they emerge organically through experiences and interactions. Similarly, *FloraFun’s* quests and narrative structure unfold slowly, much like the protagonist’s life in *Little Forest*, progressively conveying its values through immersive gameplay and personal reflection.

2.4 Plants as Narrative and Interactive Elements in Games

In *Plant Play* (2023), Silvia Ruzanka explores the significance of non-human entities in games, suggesting that examining how games portray plants can offer a new perspective on our relationship with other entities that share our world. By shifting the focus from human-centered narratives to plant-centered experiences, games can reshape our understanding of interspecies interactions and encourage players to reconsider the roles plants play in digital spaces and real-life ecosystems.

Role of Plants in Games	Description		Examples
Background Elements	Plants serve as aesthetic or environmental decoration without direct interaction or narrative function.		The Witcher 3 The Last of Us
Resources	Plants are used primarily as collectible or craftable materials to serve gameplay mechanics.		The Elder Scrolls V: Skyrim Farmville Stardew Valley
Plants as Themselves	Plants are treated as living entities with natural behavior and are central to gameplay or emotional arcs.		Viridi Mutazione
Anthropomorphized Plants	Plants are heavily personified, given human or animal-like traits, often participating actively in gameplay.		Pikmin Plants vs. Zombies

Figure 3: How Plants Are Represented and Utilized in Games

In many games, plants primarily function as environmental elements, shaping the world's aesthetics and atmosphere. For example, in *The Witcher 3*(CD Projekt, 2015), plants contribute to the immersive open-world landscapes, while in *The Last of Us (*Sony Computer Entertainment, 2013), overgrown vegetation overtakes abandoned urban ruins, reinforcing themes of decay and nature reclaiming human spaces. Additionally, fungal growth plays a pivotal role in the narrative, mutating humans and driving the game's core conflict.

Indeed, as background elements, plants often contribute meaningfully to game narratives, taking on different symbolic or atmospheric roles depending on the setting. However, they largely remain non-interactive elements—part of the scenery rather than active, responsive entities within the gameplay experience.

Some games integrate plants into gameplay mechanics, but in a limited capacity—primarily as resources. In *The Elder Scrolls V: Skyrim* (Bethesda Softworks, 2011), plants serve as

ingredients for health potions and crafting materials, reinforcing their utilitarian function rather than presenting them as dynamic, interactive elements.

In agricultural simulation games like *Farmville (*Zynga, 2009) and *Stardew Valley* (ConcemedApe, 2016), plants are commodified as crops, central to economic progression but often lacking intrinsic individuality or behavior beyond growth cycles.

Conversely, horticulture-focused games emphasize plant care and personal interaction, fostering a more empathetic and nurturing approach. In *Viridi* (Ice Water Games, 2015), players cultivate a miniature succulent garden, engaging with plants in a way that mirrors meditative and therapeutic real-life gardening experiences. Similarly, in *Mutazione* (Die Gute Fabrik, 2019), gardening is not just a mechanical task but a metaphor for tending relationships, as players cultivate plants to foster connections and heal a fractured community.

Some games go further by personifying plants as characters, giving them expression beyond their botanical nature. In *Pikmin* (Nintendo, 2001), plant-like creatures actively assist the player, blending flora with sentient qualities. In *Plants vs. Zombies* (PopCap Games, 2009), plants take on highly anthropomorphized roles, functioning as combatants in a tower-defense battle, where their strategic purpose outweighs their biological essence. Despite their visual representation as plants, these entities often lack the fundamental traits of real plants, emphasizing action and personality over authentic botanical characteristics.

Unlike many games that treat plants primarily as environmental elements, functional resources, or anthropomorphized protagonists, *FloraFun* seeks to redefine plants as expressive, interactive entities that actively participate in storytelling, emotional engagement, and the communication of ecological awareness. *FloraFun* ensures that plants are not merely part of the scenery but play an active role in storytelling. Players interact with plants as characters, responding to their growth, health conditions, and interactions with NPCs. These plants are not just decorative elements but serve as conduits for emotional storytelling and self-reflection. The game focuses on building a relationship with plants rather than simply managing them for resource acquisition.

Gardening-focused games such as *Viridi* and *Mutazione* emphasize empathy and care. In *Viridi*, the game respects real-world plant behaviors—players care for specific plants in individual pots, following clear cultivation cues and observing gradual changes over time. In *Mutazione*, players collect seeds throughout an emotionally rich narrative journey and grow a musical garden, experiencing companionship through plants. Both games associate plants with meditative experiences and metaphorical healing.

FloraFun draws inspiration from *Viridi's* realistic feedback system and *Mutazione's* use of expressive audio and story-driven progression. It aims to create plant interactions that are both dynamic and narratively meaningful. Each plant in *FloraFun* is connected to a specific story arc, often reflecting the personal growth or inner struggles of an NPC. The act of caring for these plants mirrors the development of relationships within the game, reinforcing the emotional bond between the player, the characters, and the living plants they nurture together.

At the same time, *FloraFun* avoids fully anthropomorphizing plants, as seen in *Plants vs. Zombies*, where plants are transformed into battle-ready allies or highly expressive characters. While this approach enhances engagement through action and personality, it overshadows the botanical nature of plants, making them function more like animated creatures rather than real flora. *FloraFun* explores a more delicate approach to animation, incorporating real plant biology into game interactions, ensuring that plant responses remain grounded while still conveying emotional resonance.

3. Game Development and Reflective Practice

The design and development of *FloraFun* follow an iterative optimization process combined with reflective practice, integrating the Lutz's Life-Centered Design (LCD) methodology and Reflective Practice to continuously refine the depth of narrative, plant interaction mechanics, and audiovisual experience. The game undergoes a process of implementation, evaluation, and refinement through the Experience-Reflection-Action (ERA) model (Jasper, 2013), exploring various ways to express plants within the game and transforming them from static objects into emotionally engaging interactive entities. The overarching objective of this approach is to stimulate players' ecological awareness and self-reflection, thereby enhancing their perception of plants as dynamic and meaningful components of the game world.

3.1 Concept Design

The initial design intent of *FloraFun* is to explore how plants can become interactive elements in digital games, fostering emotional connections between humans and non-human entities while encouraging players to reflect on their relationship with the ecological environment. Therefore, the conceptual design of FloraFun revolves around the emotional bond between humans and plants, the natural value of plant life, and the cultivation of ecological awareness. The game employs narrative-driven progression, interactive plant care mechanics, and an immersive environmental experience as its core mechanisms, allowing players to witness plant growth and transformation, gradually developing an emotional connection with plants and a sense of ecological responsibility.

This chapter will explore *FloraFun's* core narrative, game genre, gameplay framework, and key mechanics in detail, illustrating how it serves as a lighthearted and therapeutic plant cultivation and interactive narrative game, creating a digital platform where humans and plants coexist.

3.1.1 Game Themes and Core Narrative

FloraFun integrates narrative and interaction to create a game environment centered on the coexistence of humans and plants. The game revolves around three core themes: the emotional bond between humans and plants, the natural value of plant life, and the cultivation of ecological awareness. Through interacting with plants, adjusting environmental factors, and building relationships with like-minded individuals, players not only explore the connection between humans and plants but also internalize the idea that plants are living beings and that humans and

plants can coexist harmoniously.

Set in everyday life scenarios, the game gradually guides players to develop an awareness of plant care, recognition, and appreciation. Through immersive interactive storytelling, it encourages players to reflect on their real-world relationship with plants and fosters a deeper sense of ecological awareness and responsibility.

FloraFun combines character-driven storytelling with ecological narratives. Players take on the role of a newcomer to a small island, where they explore the environment, build social connections, and care for plants. In doing so, they gradually develop an emotional bond with plants and a deeper understanding of their significance as living beings.

The game follows a chapter-based narrative structure, consisting of three main story chapters, each revolving around one or more specific plants. Players progress by exploring different settings and completing plant care tasks, uncovering the symbolic significance of plants in human life as they advance through the story.

Chapter 1: First Encounter with Succulents – Plants as Companions

- Emotional Theme: From the loneliness of living alone to finding comfort and belonging through the care of plants.
- Narrative Approach: The game opens with the player receiving a postcard, which establishes the emotional foundation of the story. Gradually, through a simple task, the player is guided into the world of *FloraFun*. The first step involves receiving a succulent plant, ordered by the player's mother, and attempting to place it properly while decorating their new home. In this process, players learn the basics of plant care while adjusting to their new environment.
- Symbolism: The resilience and adaptability of succulents symbolize the player's ability to adjust and grow in a new environment. The process of carefully placing and tending to the plant reflects the gradual development of a sense of belonging, as well as the emotional comfort that plants can provide in times of transition.

Chapter 2: Rescuing the Philodendron – The Resilience of Plant Life

- Emotional Theme: In saving a dying plant, one comes to feel the quiet strength and

enduring will of life itself.

- Narrative Approach: The player is invited to visit their neighbor, Liu Xiaoxiao, and, in the process of preparing a gift for her, learns about her story with the philodendron. The player is then invited to participate in the rescue of the plant, gaining hands-on experience in using plant care solutions and learning key steps for plant revival. After successfully nursing the philodendron back to health, the player witnesses its revival and renewed vitality.
- Symbolism: The transformation of the philodendron from near death to full recovery symbolizes the resilience and regeneration of life, illustrating that both plants and humans experience challenges and growth. The player's careful nurturing of the plant reflects how the interaction between humans and plants is not one-sided; the revival of the plant also influences human emotions and thoughts. This chapter introduces professional plant rescue knowledge, encouraging players to pay more attention to plant health in real life and learn proper care techniques.

Chapter 3: Dada’s Plant Corner – Plants as Reflections of Emotion

- Emotional Theme: Each plant placed with care becomes a reflection of changing emotions and growing identity.
- Narrative Approach: The player meets a new friend, Dada, and helps her rearrange her plant corner. Throughout this process, Dada shares how plants have influenced her perspective on life and how caring for plants has helped her transition from anxiety to a sense of calm.
- Symbolism: The growth and arrangement of plants reflect Dada’s emotional changes and shifts in her outlook on life. The process of reorganizing her plant space is not just a physical transformation but also a symbol of self-adjustment and self-acceptance. The unrestricted growth of plants serves as a metaphor, encouraging players to reflect on the coexistence of humans and nature and to explore how to find inner balance in their own lives.

In *FloraFun*, each character’s story is intricately intertwined with plants, allowing players to understand the symbolic significance of plants within different emotional contexts. Through the perspectives of these characters, players gain deeper insight into the interaction between humans and nature, fostering a sense of emotional resonance throughout the gameplay experience.

To further enhance player immersion and reflection, the game introduces a journal system at the end of each story chapter. This journal not only enables players to record their thoughts but also presents messages from the game's designers, strengthening the emotional connection between the creators and players. The game encourages players to engage in self-expression through their journal entries, documenting their thoughts and reflections on their relationship with plants, thereby deepening their emotional engagement with the game's narrative themes.

3.1.2 Game Genre and Gameplay Overview

Player Journey Overview in *FloraFun*:

In *FloraFun*, players take on the role of a newcomer who has just moved to a peaceful island.

Upon arrival, players are guided to the local plant shop to collect a succulent pre-ordered by their mother. This marks the beginning of the first chapter, where players complete an introductory task: selecting an appropriate placement for the succulent based on its needs, such as light exposure and room layout, offering an initial experience with plant care concepts.

On the second day, players begin to meet other island residents. They are tasked with visiting the plant shop to prepare a suitable nutrient solution for a neighbor, Xiao Xiao, and through conversation, they learn about her connection to her plants. Following this interaction, players assist Xiao Xiao in rescuing an abandoned Philodendron, experiencing firsthand the essential steps of plant revival and care.

On the third day, players encounter another neighbor, Dada. Through their exchanges, players discover Dada's journey of building her own plant-filled space and her emotional shift from anxiety and self-doubt to self-acceptance. Players help Dada reorganize her "plant corner," considering the varied needs of different plants while balancing functional plant care with aesthetic design.

At the end of each chapter, players are invited to reflect by accessing the journal system, where they can read the designer's notes and record their own thoughts and experiences.

Beyond the main tasks, the game world offers additional layers of exploration: a campsite area showcasing human-nature interaction; gardening tools displayed outside the plant shop, and a small, interactive cat wandering the island.

After completing all three chapters, players can review their collected journal entries and experience the game's reflective and gentle closing sequence.

Figure 4: Screenshot of the cat in FloraFun

FloraFun is a narrative-driven life simulation game that integrates plant care, character interaction, and ecological exploration into its gameplay. Through story-driven progression, the game immerses players in its world, allowing them to gradually discover the unique characteristics of various plants and their emotional significance to different characters.

With a strong narrative simulation focus, the storyline not only helps players understand the symbolic meaning of different plants but also gradually introduces interactive ways to engage with them. As a newcomer, players have the freedom to customize their living space, placing plants acquired throughout the game in their home to create a personalized environment. By arranging plants, players can observe how different lighting and moisture conditions affect plant growth, deepening their understanding of plant care mechanics. Through the game's narrative, players gain insight into how specific plants play meaningful roles in the lives of various characters, assisting them in resolving plant-related challenges or emotional struggles. In the island setting, players also encounter a non-human NPC— a cat, which not only interacts with the player but also provides an alternative perspective on plants, adding an extra layer of ecological storytelling to the game.

The core gameplay of *FloraFun* aligns with psychologist Mihaly Csikszentmihalyi's "Flow"

Theory (Flow: The Psychology of Optimal Experience, 1990), incorporating key elements such as a challenging activity requiring skill, clear goals, direct, immediate feedback, clear goals, and a sense of control to provide an immersive emotional experience.

Each chapter in *FloraFun* presents specific tasks—such as properly placing plants to optimize their growing conditions or caring for species to advance the story—giving players a clear sense of direction. These tasks are designed with moderate challenge to maintain player focus during plant-care activities, while also supporting the narrative progression.

As Suzanne Moss notes in her analysis of horticultural education, engaging activities help learners retain key ideas. Inspired by this approach, *FloraFun* integrates enjoyable, task-based interactions to help players form memorable connections with the story. By participating in plant care through a relaxed, narrative-driven experience, players are encouraged to develop continued interest in plant interaction, while also gaining a basic understanding of plant care and establishing an initial emotional bond with the plants.

While tending to plants, players receive real-time feedback through animations (e.g., leaf color changes, blooming, or wilting) and sound cues (e.g., subtle leaf tremors, a soft chime indicating plant recovery), allowing them to quickly assess plant health and adjust their care methods accordingly. Players also have the freedom to design their living space by choosing which plants to place and where, impacting not only the plants' growth but also serving as a form of self-expression that reflects the player's personality and emotions.

As a digital game that strongly emphasizes self-expression, *FloraFun* not only offers customizable home decoration mechanics but also incorporates a journal system to enhance players' emotional engagement and personal reflection. At the end of each chapter, players can record their thoughts, emotions, and experiences, adding a personal dimension to the game. Through this journal system, *FloraFun* encourages players to extend their virtual experiences into the real world, reflecting on whether they have similar plant care experiences in their own lives and fostering a greater awareness and sense of responsibility toward plant life. More than just a personal expression tool, the journal also serves as a bridge between the designers and players, where messages from the developer's prompt players to engage in deeper reflection on their game experiences.

3.2 Game Development and Reflective Practice

The design and development of *FloraFun* are centered on self-expression. As a result, the game did not follow the traditional user testing process commonly used in game development. Instead, it was refined through continuous self-reflection (Reflective Practice) to ensure that its narrative structure effectively conveys the emotional connection between humans and plants, the natural value of plant life, and the cultivation of ecological awareness. Throughout this process, the game not only enhanced plant interaction mechanics and audiovisual elements but also shifted its perspective from a human-centered design approach to a focus on non-human entities. This transformation allows plants to move beyond being mere background elements or resources and instead become interactive entities that foster emotional resonance with the player.

3.2.1 Overview of the Game Design Process

This flowchart illustrates the game design and development process of *FloraFun*, emphasizing the application of Life-Centered Design (LCD) and Reflective Practice in game creation. The development process begins with the establishment of the game concept, followed by the gradual integration of LCD principles, prototype development, iterative reflection, and ultimately, the final implementation and optimization.

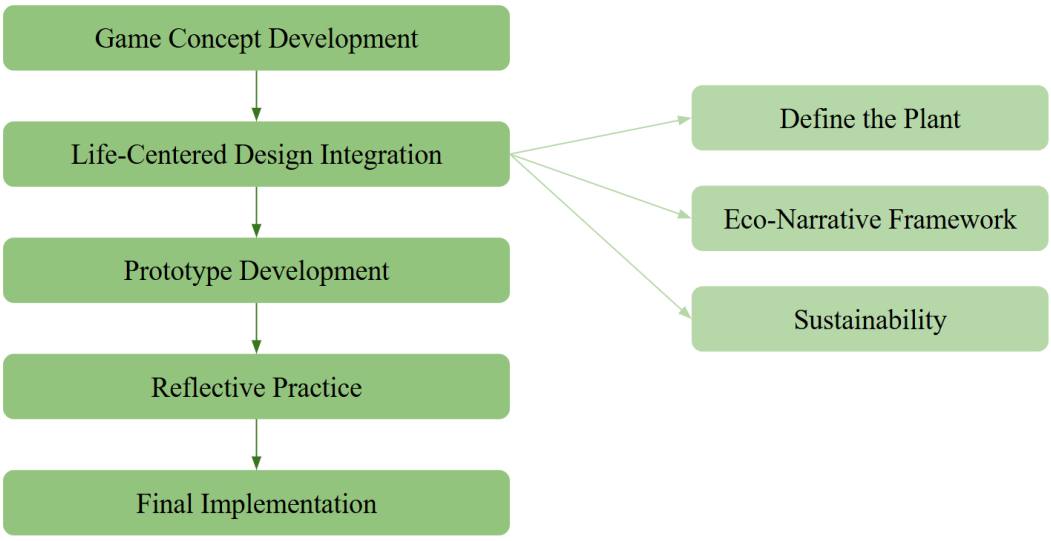

Figure 5: The flowchart of the game design and development process of FloraFun

Game Concept Development:

The core objective of *FloraFun* is to enable players to experience stories, engage in plant care, and interact with the environment to establish an emotional connection with plants, ultimately encouraging them to reflect on the relationship between humans and nature. Based on this goal, the game defines its core mechanics, plant interaction models, and narrative framework, ensuring that plants are not merely background elements but dynamic interactive entities within the gameplay experience.

Integration of Life-Centered Design:

This phase serves as the core of *FloraFun's* design process, focusing on how to grant plants and human relations, ecological value, and emotional resonance—positioning them as essential elements of the game experience rather than mere visual decorations or functional resources. In *FloraFun*, plants are designed as responsive entities that react dynamically to environmental changes and player interactions, much like the NPCs or the player character themselves.

The plants chosen for the game are drawn from species that, in my personal life, have evoked strong emotional experiences. These plants played meaningful roles during important moments of reflection, transition, or healing. I distilled those emotional shifts and personal value transformations into the game's narrative, allowing the plants and their surrounding environments to drive story progression. In this way, plants are not only narrative devices but active participants and co-narrators within the storytelling structure.

Throughout the narrative development, I intentionally alternated perspectives between the human and the plant, aiming to break free from anthropocentric thinking and instead consider the state and value of plant life on its own terms. This perspective aligns with Holmes Rolston's ecological philosophy, which argues that nature and plants possess intrinsic value beyond their utility to humans. In *FloraFun*, plants are not passive or decorative—they are participants in life, and in the game, they act as quiet guides, influencing the beliefs and behaviors of other characters. Rather than viewing plants solely in terms of human benefit, the game invites players to connect empathetically and experience the subtle emotional and spiritual value that plant life offers through daily interactions.

Moreover, the game's representation of sustainability is subtle and narrative-driven rather than didactic. For example, in one storyline, an abandoned plant-based biosystem is rediscovered and revived, symbolizing the potential for ecological restoration. Players take an active role in the recovery of these plants, experiencing a sense of accomplishment that quietly encourages real-world environmental awareness. Through these interactive moments, *FloraFun* fosters a personal

connection with ecological care—one that motivates continued interest in nature through emotional fulfillment rather than obligation.

Prototype Development:

During the initial development of *FloraFun*, the team outlined chapter objectives and determined the core values they wanted to convey, shaping the game into a medium for self-expression and ecological reflection. The game's dialogue and narrative elements are derived from real-life experiences, artistically refined to authentically and emotionally depict the relationship between humans and plants. And various plant animations were designed, such as subtle leaf movements, blooming flowers, and wilting reactions, allowing players to visually perceive plant states in response to their actions. Also, sound design complements visual feedback, with gentle leaf-rustling sounds and soft melodies when a plant recovers, enhancing the sense of immersion and emotional engagement.

Reflective Practice:

In the reflective practice phase, Jasper's Experience-Reflection-Action (ERA) cycle model is applied to continuously evaluate and refine the game design, ensuring that plant interactions are more dynamic and that emotional expressions resonate with players. Through early gameplay testing, observe whether plant interaction feedback is clear and whether emotional expressions are accurately conveyed.

A self-assessment of both positive and negative aspects of the game experience is conducted, addressing key questions:

- Are plant responses vivid enough to convey emotions?
- Does the narrative effectively communicate the relationship between humans and plants?
- Do interaction mechanics allow players to intuitively understand ecological elements?

Following this evaluation, plant interaction feedback is further refined, including adjustments to animation timing and enhancements to visual and auditory cues, making plants feel more lifelike. The goal is to ensure that players can truly experience the connection between plants and humans, ultimately fostering a deeper understanding of the relationship between humans and ecological systems.

Final Implementation:

In the final stage, the game strikes a balance between immersive experience and core value delivery, ensuring that *FloraFun* not only possesses a compelling narrative foundation but also provides a seamless interactive experience. Ultimately, the game forms a comprehensive digital system that expresses the interactive relationship between humans and plants.

3.2.2 Experience Phase

Following the prototype development and initial implementation of *FloraFun*, the process was guided by Jasper's reflective questions: What did I do? What happened? By documenting key findings and summarizing preliminary experimental results, the groundwork was laid for subsequent reflection and optimization.

During the prototype development phase, three key aspects were established: the construction of the game's core narrative framework, the definition of plant interaction elements, and the experimentation with sound design.

The core narrative of *FloraFun* draws from personal experiences, initially recorded in a prose format and later dramatized and adapted to better suit interactive storytelling in a game. To enhance the clarity and directness of emotional expression, the prototype development phase identified three core values that shaped the game’s narrative:

- Recognizing one’s adaptability to the environment through connections with plants
- Experiencing challenges and understanding the resilience of life
- Transitioning from anxiety to tranquility, fostering self-identity and personal growth

To ensure the effective delivery of these core values, unnecessary details were removed, refining the narrative structure to center around plants. The dialogue structure was adjusted to avoid excessive descriptive prose, emphasizing plants as emotion carriers. During player-NPC interactions, the role of plants was carefully balanced to ensure they were not just visual or narrative scenery but pivotal elements in story progression and emotional development. Through chapter-based progression, players were able to experience various plant-related stories, gradually forming deeper emotional connections rather than passively receiving information.

In the initial definition of plant interaction mechanics, particular focus was placed on how player actions influence plants and how plants provide emotional feedback. Plant responses were designed to be conveyed through animation effects and changes in material color, ensuring player actions instantly affected plant conditions, enhancing interactivity.

Two different animation approaches were explored to determine the most suitable emotional tone for the game:

Figure 6: Exaggeratedly realistic animation processing of plant changes in the real world

- Realistic exaggeration—an approach that amplifies real-world plant reactions, such as extreme leaf wilting, to make plant health states more visually obvious.

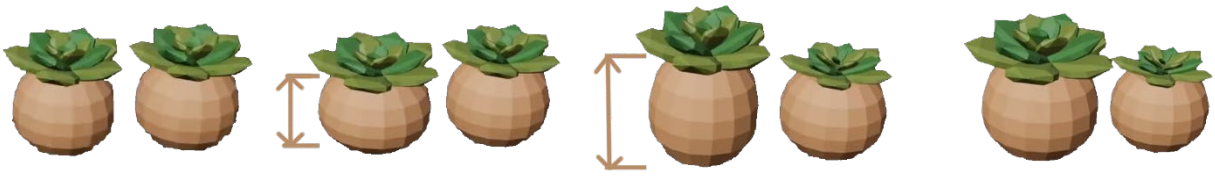

Figure 7: Animation processing of plant changes incorporating anthropomorphic elements (including vase deformation)

- Anthropomorphic expression—a style that incorporated subtle emotional dynamics into plant animations, allowing plants to exhibit expressive movements beyond strict biological realism.

During the sound experimentation phase, real-world natural sounds were recorded and synthesized to create immersive environmental audio, including wind, bird calls, and water droplets. This sound layering process aimed to imbue the game environment with a sense of vitality.

For plant feedback audio design, designed emotionally expressive and engaging sound cues that allowed players to perceive plant status changes through sound. Ensured that plant interactions generated subtle, yet distinct, auditory feedback, enhancing emotional engagement and gameplay responsiveness.

For background music composition, the game's main theme melody was conceptualized, and

multiple versions of audio files were composed. These versions share the goal of seamlessly integrating with the natural ambiance while conveying a sense of life and emotional depth.

3.2.3 Reflection Phase

Following the completion of *FloraFun's* prototype development, this phase focuses on reviewing the overall experience of the game's core narrative, 3D visual assets, and sound assets. Through self-reflection, the evaluation examines whether the game successfully aligns with its initial core objectives and whether it effectively conveys the intended emotional expressions.

By conducting a comparative analysis with established life simulation games, particularly *Animal Crossing* (Nintendo, 2001), insights were gained into *FloraFun's* strengths and areas for improvement. This led to proposed optimization strategies for narrative structure, visual aesthetics, sound design, and player emotional engagement.

Narrative Reflection:

In *Animal Crossing*, players also take on the role of a newcomer, engaging in construction, exploration, and interactions with multiple NPCs to gradually uncover their individual stories. The game's narrative design is structured around light, non-linear storytelling, avoiding long, text-heavy dialogues. Instead, multiple short interactions gradually piece together the NPCs' backstories. Furthermore, NPCs in *Animal Crossing* not only interact with players but also engage with each other, creating a dynamic and interconnected world. NPC personalities, preferences, and narratives are not explicitly presented but are instead gradually unlocked through player-driven exploration.

In contrast, *FloraFun's* NPC-driven stories are relatively independent, with little connection between characters, making the game world feel more like a collection of isolated narratives rather than a cohesive community ecosystem. Additionally, since the narrative primarily emphasizes the relationship between plants and the story, NPC characterization lacks depth, leading to less distinctive personalities and weaker emotional connections between players and NPCs.

Regarding dialogue pacing, the adaptation from prose to in-game dialogue resulted in overloaded textual information, causing slow pacing and excessive information density, which in turn impacted player immersion.

Visual Reflection:

Figure 8: Screenshot of the game FloraFun

FloraFun adopts visual elements inspired by adorable and therapeutic game aesthetics, featuring soft color palettes and charmingly stylized 3D models. The primary focus of analysis in this phase was on how plant animations contribute to emotional engagement.

In the prototype stage, in designing the visual feedback of plant responses, two different animation approaches were explored to identify the most suitable style for the game's overall vibe and emotional tone. The first approach involved realistic exaggeration, where plant reactions were overly dramatized to replicate real-world biological processes, leading to unnatural growth behaviors that diverged from realistic plant development cycles. The second incorporated elements of anthropomorphism motion, where expressive elements were integrated into plant animations, enhancing emotional connection but inadvertently diminishing the plant's identity as a non-human entity.

While anthropomorphic animation helped strengthen emotional engagement, it also risked undermining the authenticity of plants as living organisms, making them feel too human-like rather than clearly botanical.

Audio Reflection:

The sound experiment phase tested the use of real-world environmental sounds, but directly

implementing these in the game led to a jarring effect, disrupting the harmonious integration of sound within the game's atmosphere.

Environmental sounds enhanced immersion, but when triggered too suddenly, they created a disconnect between the digital and real-world environments, making the experience feel incohesive. Plant interaction sound effects need more vibrant emotional feedback, providing a more suitable representation of plant vitality. Background music lacked depth, as the use of a single instrument limited its expressiveness, and its emotional tone focused primarily on a soothing and harmonious atmosphere, lacking dynamism and emotional shifts that could better support narrative progression and core thematic values.

Player Expression and Emotional Engagement:

During the gameplay experience, it became evident that players were primarily passive recipients of the story, with limited opportunities to express their own experiences and emotions. This lack of an expressive outlet created a gap in emotional participation, as players were absorbing the game's themes rather than actively engaging in emotional reflection.

Although players might naturally develop their own thoughts and reflections during gameplay, to effectively reinforce the research objective of enhancing emotional engagement, the expression of emotional value should be a two-way interaction. Players should have a space to record and express their experiences, strengthening their emotional connection with the game.

This insight underscores the potential for expanding player participation beyond passive storytelling, ensuring that *FloraFun* provides meaningful avenues for self-expression, reflection, and deeper immersion in the human-plant relationship.

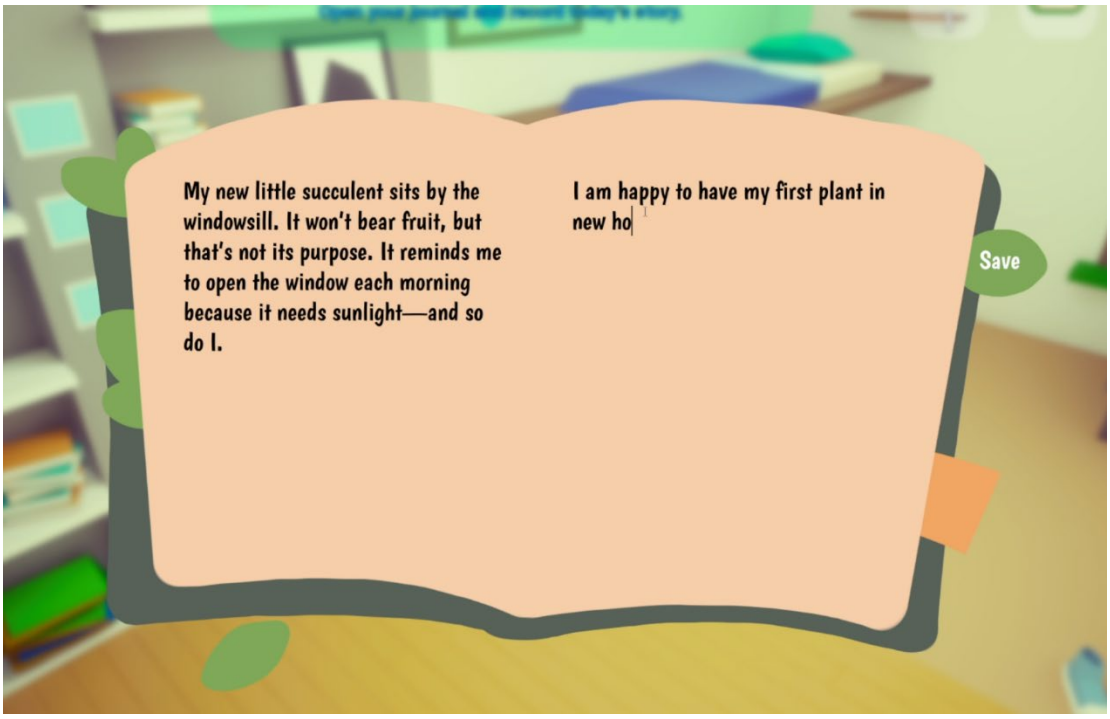

Figure 9: Screenshot of the in-game journal system

3.2.4 Action Phase

Based on the analysis and consolidation from the Reflection Phase, this stage focuses on the comprehensive adjustment and optimization of *FloraFun* to maximize emotional expression and the transmission of ecological awareness. By refining interactive storytelling, plant animation feedback, sound design, and user interface navigation, the goal is to achieve an optimal balance between immersive experience, emotional resonance, and ecological education.

In the narrative optimization process, improvements were made to address issues such as high information density, independent NPC interactions, and weak connections between chapter tasks and storytelling:

1. Streamlining interactive dialogue to ensure a smoother pacing, preventing players from feeling overwhelmed by excessive text, which could disrupt immersion.
2. Integrating key information within tasks so that players gradually acquire story details rather than receiving large amounts of background information all at once.
3. Enhancing NPC interactions by establishing connections between them, creating a

more cohesive community-like atmosphere that strengthens player immersion.

4. Strengthening the link between chapter tasks and interactive storytelling, ensuring that story progression naturally leads into plant-related interactions.

For plant animation feedback, particular focus was placed on adjusting animation timing, introducing natural anthropomorphic expressions, and refining plant details to enhance their sense of life and interactivity. The growth rhythm of real plants was studied to fine-tune animation timing, ensuring that changes appear natural rather than abrupt or unrealistic. Subtle dynamic reactions were incorporated while respecting the natural properties of plants, adding lifelike details without over-exaggeration.

Regarding sound design, improvements included seamlessly integrating environmental sounds with the main musical theme to prevent abrupt audio transitions. Background music was adjusted to convey emotional progression, enriching the storytelling experience. A wider range of instruments was incorporated to create layered compositions, enhancing the depth and emotional expression of the narrative.

Figure 10: Screenshot of the UI in game FloraFun

Finally, game guidance and user interface design were refined to improve game accessibility and ease of play. Enhanced UI design ensures that the interface remains clear and user-friendly. The layout of interactive elements was adjusted to ensure that task objectives, system prompts, and plant-related information are presented intuitively, preventing players from feeling lost within the interface.

By implementing these optimizations, *FloraFun* enhances player engagement, emotional immersion, and ecological understanding, creating a cohesive and meaningful interactive experience.

3.3 Visual and Audio Design in Game Art

The visual and sound design of *FloraFun* plays a crucial role in shaping an immersive experience, enhancing emotional resonance, and conveying ecological storytelling. The game adopts a warm, soothing art style, combined with delicate dynamic plant feedback and atmospheric music, allowing players to experience the vitality of plants through visual, auditory, and interactive elements.

Through nature-inspired color palettes, dynamic plant response mechanisms, and emotionally expressive sound effects, *FloraFun* constructs a warm and vibrant game world, guiding players to establish an emotional connection with plants while immersing them in a relaxed and enjoyable atmosphere of exploration.

3.3.1 Visual Style

Figure 11: FloraFun *scene setup in Unreal Engine*

FloraFun adopts a soft, low-poly artistic style, blending naturalism with elements of fantasy to create a warm and tranquil visual experience.

The overall color palette features warm, natural pastel greens, soft blues, and earthy wood tones, establishing a relaxed and comforting atmosphere. The environment, plants, and character designs emphasize rounded and organic shapes, avoiding overly realistic or sharp designs. This approach maintains a balance between realism and stylization, fostering an engaging and exploratory game world. The game's lighting system focuses on daytime illumination, incorporating soft warm lighting to enhance gameplay and evoke a sense of warmth and immersion.

The plant design style remains faithful to real botanical forms while utilizing low-poly modeling techniques. This ensures that each plant maintains recognizable characteristics while enhancing visual appeal and gameplay engagement.

The game world of *FloraFun* consists of both outdoor and indoor environments, both designed to emphasize the harmony between humans and nature.

Outdoor Environment: The island landscape is lush with vegetation, featuring varied architectural designs, a small amusement area, and outdoor camping sites, portraying the

coexistence of humans and nature. The combination of land and water elements reinforces the theme of ecological balance. Additionally, the island's top-down shape resembles a leaf, symbolizing the importance of plants within the *FloraFun* world and reinforcing the game's core thematic vision.

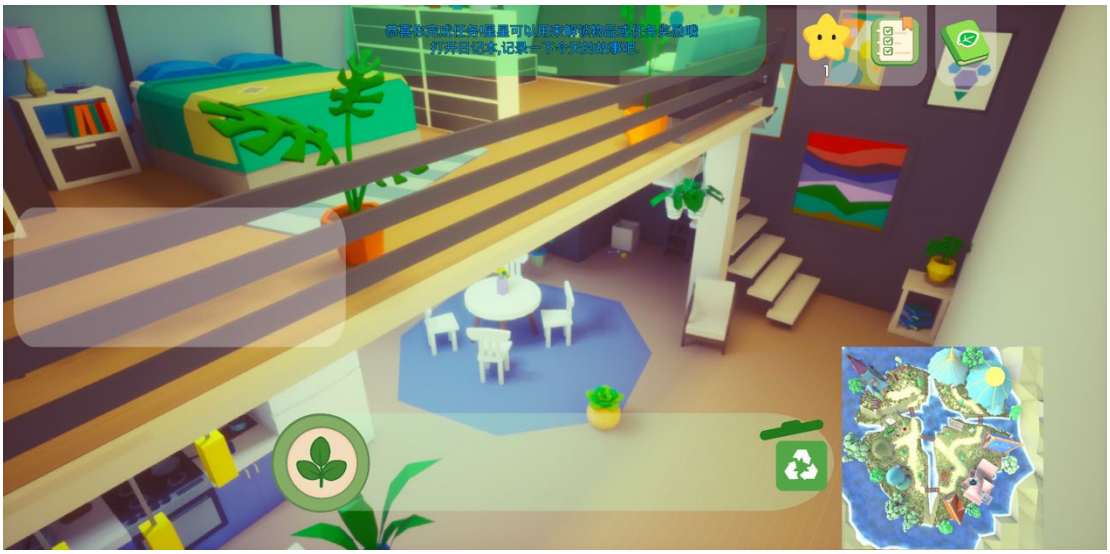

Figure 12: Screenshot of Dada's room in game FloraFun

Indoor Environment: Includes the player's room and NPC spaces, such as Xiaoxiao and Dada's rooms. Each room's design aligns with the character's background and personality, featuring carefully placed windows and furniture arrangements to support game progression in later chapters. The furnishings are primarily wooden, maintaining a simple yet clear aesthetic that highlights the seamless integration of plants into the living environment.

3.3.2 Plant Dynamic Feedback

In *FloraFun*, plants are not merely static visual elements but interactive living entities that provide dynamic feedback based on the player's care and actions. The growth and health of plants are directly influenced by environmental factors, enabling players to observe, interact with, and understand plant needs, thereby fostering a deeper emotional connection.

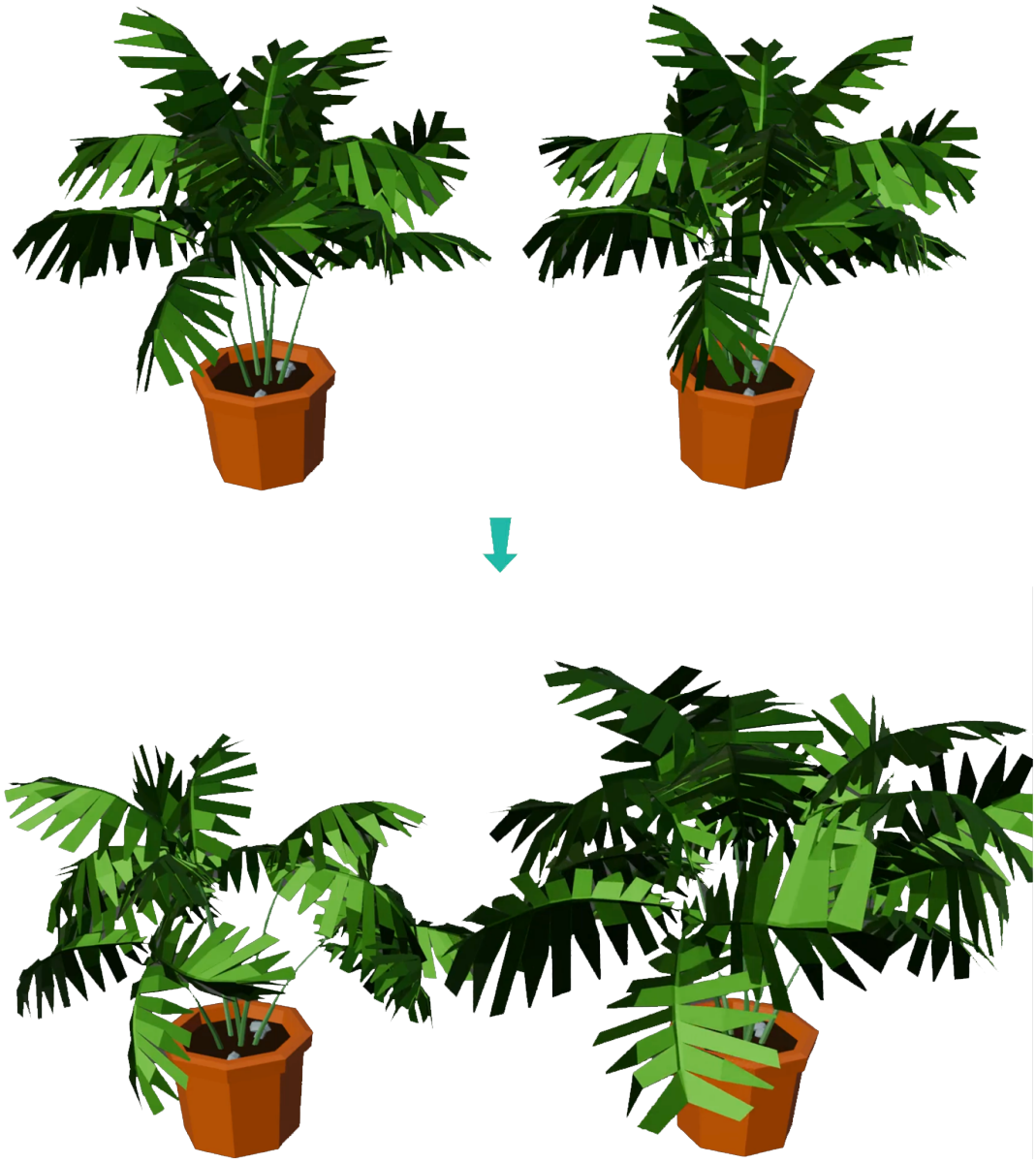

Figure 13: Comparison between satisfied and unsatisfied plant states: unsatisfied plants show sparse or even smaller leaves, while satisfied ones exhibit lush and thriving foliage

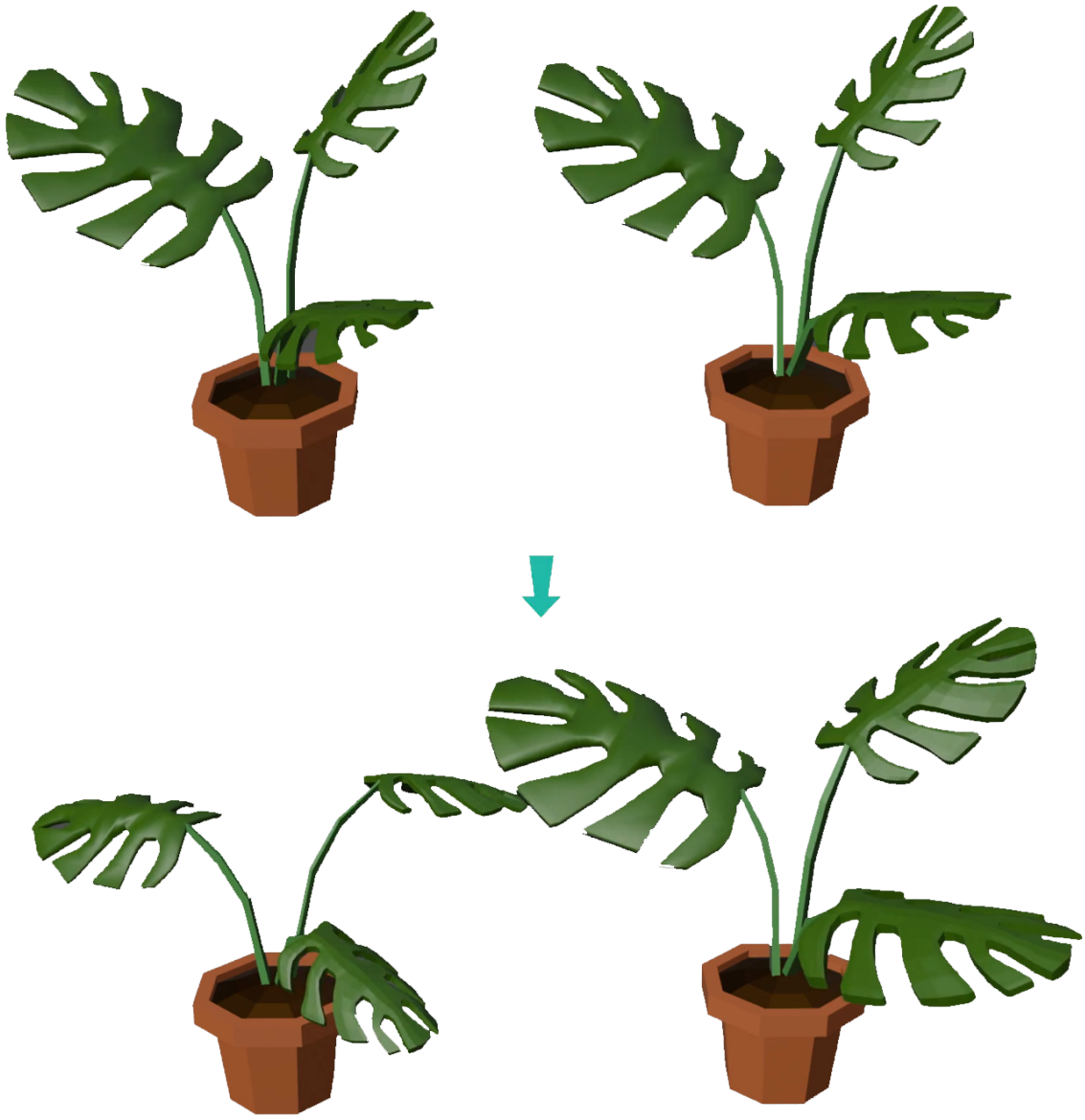

Figure 14: Comparison of Monstera's feedback between satisfied and unsatisfied plant states: unsatisfied plants have smaller, drooping leaves, while satisfied ones display open, expansive growth

Figure 15: Screenshot of the monstera's satisfied response in FloraFun

The visualized dynamic changes of plants primarily respond to environmental variations, such as light exposure and humidity levels. When placed in an optimal environment, plants transition from a neutral state to a more vibrant or growing state. Conversely, when placed in unsuitable conditions, they wither or deteriorate.

FloraFun primarily conveys plant health through leaf condition changes, as leaf appearance serves as a key indicator of plant well-being in real-life plant care. For example: Color changes may indicate nutrient deficiencies or overexposure to sunlight.

In real-world plant care, severe cases may require removing the plant from its soil to inspect its root health. However, in *FloraFun*, the animation design intentionally simplifies extreme cases, focusing instead on common visual plant responses. This ensures that players can intuitively perceive plant health conditions and take appropriate care measures without overly complex interventions.

3.3.3 Sound Effects and Background Music

In *FloraFun*, sound effects and music are not merely tools for atmospheric enhancement but key design elements that deepen immersion, guide player emotions, and strengthen plant interaction experiences. Through meticulous sound design and emotionally progressive

background music, the game ensures that players receive natural auditory feedback, fostering a stronger emotional connection and enhancing the authenticity and depth of plant interactions.

The sound effects in *FloraFun* are primarily derived from artistically processed natural recordings, ensuring that each interaction produces a realistic auditory experience that seamlessly integrates with the environment. Plant interaction sound design includes pick up a plant triggers a subtle rustling sound, conveying the organic nature of plant life. Each step of plant rescue operations is accompanied by context-specific sounds, such as the crisp snap of pruning branches or the gentle flow of water during rinsing. To strengthen the emotional bond between players and plants, interactive sound cues are introduced, including pleasant audio feedback when a plant is placed in an optimal environment; subtly tense audio cues when a plant is placed in an unsuitable location.

The diversity of sound effects and their meticulous processing allow players to fully immerse themselves in the narrative while experiencing the emotional shifts brought about by plant interactions.

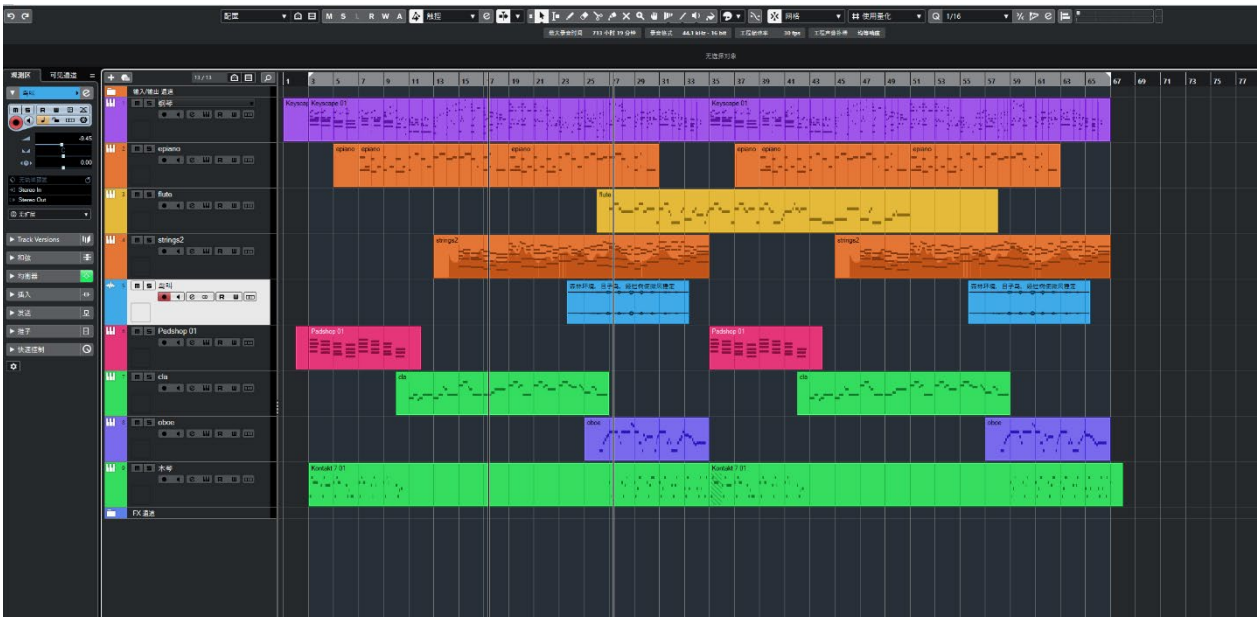

Figure 16: Production tracks of background music in FloraFun

The background music in *FloraFun* is not merely a passive atmospheric filler but an active storytelling device. Its melodic progression helps players experience the game's emotional evolution.

The soundtrack primarily features warm and lighthearted melodies, creating a relaxing and immersive atmosphere. A diverse range of instrumentation is used, including soaring flutes to evoke a sense of freedom and tranquility. Gentle strings to establish a soft, comforting ambiance. Fresh, natural piano notes to accentuate introspection and warmth. Mellow oboes reinforce deeper emotional undertones. Subtle natural environmental sounds, such as soft bird calls, are integrated into the composition, ensuring a seamless fusion between the music and the game world.

The background music is designed to express the three core values of the game's narrative, allowing players to experience a gradual emotional transformation through music. The flowing, life-filled melodies guide players through a transition from sorrow to hope, from stillness to vitality, reinforcing emotional engagement and immersion.

By intertwining sound design and music composition with narrative progression, *FloraFun* ensures that auditory elements are not only complementary to gameplay but actively enhance the emotional depth of the player experience.

3.4 Findings and Reflections

Throughout the development of *FloraFun*, Reflective Practice was consistently applied, incorporating the ERA Reflection Cycle (Experience – Reflection – Action) for continuous optimization. The core methodology of the development process revolved around identifying issues, reflecting on them, and making iterative improvements. Even after the final version was completed, further analysis of the gameplay experience continued, leading to potential areas for refinement. These efforts aim to enhance the emotional expression of plants in digital games, strengthen narrative interactivity, and deepen ecological awareness.

3.4.1 Key Design Challenges

During development, *FloraFun* encountered multiple design challenges, primarily revolving around core game mechanics, including narrative design, plant dynamic feedback, sound design, and the user experience of the journal system.

Since *FloraFun* aims to convey emotions through plants, one of the biggest challenges was integrating storytelling with gameplay mechanics, ensuring a progressive emotional engagement while subtly delivering ecological awareness. In many games, a well-crafted narrative can compensate for visual limitations, just as outstanding visuals can mitigate narrative shortcomings.

However, *FloraFun* seeks to maintain a refined visual style while positioning plants as key elements in storytelling. Thus, the main narrative challenges were:

How might plants serve as both interactive elements and narrative-driving forces?

How might ecological awareness be naturally embedded into the storytelling process rather than being passively delivered as information?

In *FloraFun*, plant dynamic responses are important for establishing direct emotional interactions between players and plants. The primary challenge was enhancing plant expressiveness without contradicting biological realism: If plant feedback is overly exaggerated (e.g., instantaneous wilting or blooming), it disrupts realistic perception, affecting player immersion. If plants are overly anthropomorphized, they may lose their intrinsic botanical identity. Thus, *FloraFun* required a delicate balance, ensuring that plant feedback is intuitive yet remains biologically plausible, while simultaneously enhancing emotional engagement.

Beyond visual feedback, *FloraFun* faced the challenge of creating subtle yet effective sound cues to enhance immersion and help players perceive plant conditions through auditory feedback. How can sound effects be designed to provide delicate, immersive feedback without overwhelming the player? How should the main melody and background music be composed and refined to align with the emotional journey of the game? What combination of instruments and layering techniques will best support the storytelling and emotional depth of the experience?

These considerations led to multiple iterations of sound selection, melody composition, and emotional calibration to create a layered, narrative-driven soundscape.

Memorable emotional experiences are often linked to significant moments of reflection. To reinforce *FloraFun's* emotional impact, the journal system was introduced not just as a recording tool but as a channel for emotional exchange between players and game designers.

However, this presented additional design challenges. How can players be encouraged to actively use the journal system rather than passively ignoring it? How can the journal system be designed to be more interactive and engaging? How should journal entries be structured to strengthen the emotional connection between the player and the game’s storytelling?

The journal system serves as a symbolic correspondence between the player and the storyteller, mirroring a letter exchange that deepens emotional engagement. Finding the right approach to structure and design journal entries was key to ensuring meaningful player reflection and

connection with the game.

These challenges drove continuous optimization in *FloraFun*, aiming to achieve the ideal balance between emotional expression, immersive gameplay, and ecological awareness.

3.4.2 Iterative Optimization Experience

In addressing the design challenges encountered during the development of *FloraFun*, reflective practice was applied, leading to the accumulation of valuable insights. Just as a well-structured academic argument requires a clear thesis to guide supporting evidence, game design also necessitates a well-defined objective to prioritize development processes and determine which tasks can be efficiently executed in parallel.

FloraFun underwent a significant transformation in its design direction—shifting from an education-focused game to a more personally driven emotional expression. This transition prompted the designer to re-examine fundamental questions: Why create this game? What personal emotional experiences led to the selection of this theme? What core values should the game ultimately convey?

As a result, *FloraFun's* research focus was redefined—not simply as an educational tool but as an exploration of how plants, as non-human entities, can establish emotional connections with humans and how they can deepen players' ecological awareness. This transformation not only enhanced the depth of emotional expression within the game but also expanded its value as a medium for environmental awareness and ecological understanding.

During the early development phase, a significant portion of visual assets was completed, yet many were not included in the final version of *FloraFun*. The primary reason for this was an initial lack of a deeply refined and clearly articulated research focus, leading to early content misalignment with the final core concept. The clarity of core values directly influences design decisions. Establishing a well-defined research direction and narrative objective early in development can effectively prevent wasted resources and redundant revisions.

Furthermore, removing user testing provided an opportunity for a purer emotional expression. In conventional game development, user testing is a core step in the iterative optimization process. However, in the development of *FloraFun*, traditional user testing was intentionally excluded, positioning the game as a medium for self-expression, focusing entirely on conveying the

designer’s personal emotional values.

In the initial design phase of *FloraFun*, the primary target audience was myself. This project was conceived as a creative practice rooted in personal emotional experience and self-exploration, aiming to respond—through the medium of digital games—to my own emotional connection with plants. Therefore, adopting Reflective Practice as the primary methodology, combined with the ERA Cycle, aligned closely with the original intent of the research.

This decision led *FloraFun's* narrative and interaction refinements to rely primarily on the designer’s iterative self-reflection, allowing the game to maintain a highly personal and intimate quality, akin to an unreleased film or a collection of essays infused with the creator’s emotional perspective, rather than being shaped by external market demands.

However, as the project progressed, particularly in the effort to convey ecological awareness and foster players’ emotional reconnection with nature through gameplay, I gradually recognized the limitations of relying solely on the designer’s personal reflection. The absence of extensive user testing also introduced challenges—some aspects of the game might be difficult for players to fully comprehend, or certain expressions may contain blind spots that the designer, being overly familiar with the content, might overlook.

Thus, I have come to realize that self-expression-driven game design requires a more rigorous reflective structure to prevent developers from overlooking potential communication gaps due to over-familiarity with the content. Regularly revisiting the core objectives ensures that each element of the game—storytelling, visuals, and interactions—accurately conveys the intended emotional message.

During the development of *FloraFun*, the ERA Reflection Cycle helped establish a systematic reflective mechanism, preventing subjective cognitive bias during self-evaluation.

In the Experience phase, the current version of the game was tested, and issues were documented. In the Reflection phase, an analysis was conducted to determine which aspects failed to effectively convey emotional goals and where narrative and interaction remained disjointed. In the Action phase, optimizations were implemented based on reflections, such as adjusting dialogue pacing, enhancing plant feedback animations, and refining the emotional progression of background music. Compared to one-time user feedback, continuous reflection and iteration also contributed to maintaining consistency in emotional expression throughout the game.

Upon further reflection, it became clear that *FloraFun’s* current potential audience remains

relatively narrow, limited primarily to players who share similar emotional experiences or those with an existing interest in plants. If *FloraFun* aims to more effectively achieve broader goals—such as ecological education or attracting a wider range of players—future iterations may require the integration of systematic player testing and user research. These processes, combined with qualitative and quantitative data analysis, would enable a more comprehensive understanding of how players interpret the game's narrative and plant interaction systems, as well as how emotional and cognitive responses are formed during gameplay.

3.4.3 Future Improvement

Although *FloraFun* has been optimized in terms of plant interaction, narrative-driven emotional engagement, and sound design, there is still room for further enhancement. To reinforce plants as symbols of living entities and to deepen the emotional and interactive experience, the autonomy of plants in *FloraFun* can be further developed. Currently, plants primarily respond to player actions, meaning that without direct interaction, they remain static visual elements that lack autonomous behaviors. In future iterations, plants could be designed to undergo self-adjusting growth changes, allowing them to develop and adapt to their environment even in the absence of player intervention. Just like sunflowers naturally orienting themselves toward light, many green plants exhibit subtle self-regulating behaviors in response to their surroundings. Similarly, *FloraFun's* plants could develop personalized traits, evolving distinct growth patterns based on how players care for them. Well-cared-for plants might bloom faster and develop more vibrant, expansive leaves. Neglected plants might enter a self-protection state, where their leaves become thicker and waxier to conserve moisture. By enabling organic plant growth rather than relying solely on player actions, the game world will feel more authentic and immersive, allowing players to perceive plants not merely as task objectives but as interactive life forms, further enhancing the game's ecological education value.

Currently, *FloraFun's* story-driven emotional experience follows a linear three-chapter structure. While each story carries emotional depth, player choices do not influence the narrative outcome. In future iterations, a branching narrative system could be introduced, where different choices lead to different emotional consequences, allowing for a more profound player connection with the game.

Integrating varied outcomes based on incorrect care. Instead of a fixed progression, the game

could allow mistakes in plant care to lead to different endings, reinforcing the fragility of plant life. These negative experiences are not meant as punishments, but as opportunities for players to experience a more realistic plant care journey, emphasizing empathy and responsibility.

Allowing players to determine the course of the story, introduce key decision points where players can choose whether to assist an NPC in caring for a particular plant—leading to different narrative outcomes. Let players decide how to care for a sick plant, influencing its final condition (recovery, wilting, or unique transformation). By allowing plant life changes to become memorable moments, players can form stronger emotional connections with plants.

Additionally, the journal system is expected to make further improvements. Currently, it serves as a personal record-keeping tool, but it could evolve into a broader platform for sharing emotions and plant growth experiences beyond the game itself.

FloraFun could host a database storage for player reflections where players could have access to their entire plant care journey, allowing them to review past experiences. For instance, a player might be able to revisit an entry like, "Two weeks ago, my succulent was wilting, but after learning the correct watering technique, it has now recovered," reinforcing a sense of accomplishment and observational skills. It might also establish a community interaction feature where players could view other players' reflections within the journal system, enhancing game interactivity and emotional resonance. A "Plant Story Wall" could display various plant growth records from different players, creating an experience like a shared community garden. Non-player characters (NPCs) could even respond to journal entries, adding another layer of immersion to the interaction.

Within the development process of *FloraFun*, the ERA Cycle of reflective practice effectively supported the creation of a prototype centered on personal emotional expression.

Exhibiting *FloraFun* at OCAD University offered valuable external perspectives and highlighted critical methodological implications. Audience feedback revealed several strengths of the game, including its charming character design, richly detailed exploratory environments, and plant-related tasks supported by educational cues. Many players expressed that the experience felt like reading an interactive and dynamic personal storybook authored by the designer. Successfully completing plant placement tasks—especially after multiple attempts—provided a clear sense of achievement and encouraged continued engagement.

However, the exhibition also illuminated the difference between designing a game for oneself and designing for others. Although no formal, systematic user research or data collection was

conducted during the exhibition, informal player feedback surfaced several notable issues. For example, some players felt that parts of the dialogue lacked dynamism; players questioned whether the storyline alone was strong enough to sustain their long-term engagement; and certain tasks were confusing, reducing satisfaction. Players expressed varied expectations about how plants should respond within a digital space, revealing a gap between the designed interaction logic and players' intuitive understanding.

These observations reveal how design outcomes vary between reflective practice and user-centered design methodologies. While reflective practice successfully shaped a project grounded in personal meaning and authenticity, the approach falls short of being able to predict broader player expectations, cognitive patterns, or emotional responses. If *FloraFun* is further developed to serve a larger audience, user testing, player research, and iterative design based on audience feedback will be integrated in steps. Systematically integrating user feedback would not only refine the narrative structure, gameplay mechanics, and emotional pacing but could also expand *FloraFun* from a personal life simulation into a deeply emotional and widely relatable platform.

Through a thoughtful balance between personal expression and community engagement, *FloraFun* could help a broader range of players experience the quiet resilience of plants, explore their own emotional landscapes, and build meaningful connections between the digital and natural worlds.

4. Conclusion & Future Work

In *The Little Prince*(Antoine de Saint-Exupéry, 1943), his rose is unique to him—not because there are no other roses, nor because she is the most beautiful, but because of the time and love he has devoted to her. Through this connection, she becomes irreplaceable. Similarly, people continuously form emotional bonds with countless things in life, investing time and energy in certain objects, which in turn shape their attitudes and values. The Little Prince has his rose, and *FloraFun* has its carefully designed plants, waiting to build emotional connections with players.

4.1 Research Summary

This study, through the development and design of *FloraFun*, explores the emotional expression of plants in digital games, their role in interactive storytelling, and their potential for fostering ecological awareness. The research aims to redefine the role of plants in games, transforming them from static environmental elements or collectible resources into living entities with emotional feedback and interactive objects. Through the final version of *FloraFun*, this study answers the question of how plants can become meaningful interactive objects and narrative elements in digital games.

Throughout the research process, this project adopted a Life-Centered Design (LCD) approach, aiming to inspire players to pay attention to the often-overlooked presence of plants in their daily lives. By fostering empathy toward these silent life forms, the game encourages players to reflect on their own emotional worlds, and ultimately, to take ongoing interest in the plants around them. The broader hope is to contribute to a future where plants are treated with greater respect, care, and recognition.

Instead of relying on conventional user testing, the development process applied Reflective Practice guided by the Experience–Reflection–Action (ERA) Cycle. This allowed the game to remain rooted in personal experience and emotion, while undergoing continuous refinement. The project also drew inspiration from a wide range of literary works, films, and games that explore plant narratives, in order to present the emotional and symbolic value of plants in a more personal and meaningful way within the digital medium.

Furthermore, *FloraFun* incorporated a diary system as part of its game mechanics, creating a space for emotional dialogue between designer and player. Even in the final implementation stage,

the design was critically evaluated to ensure that the plants played a meaningful interactive role and effectively conveyed the intended emotional and ecological resonance.

Ultimately, this research not only explores how plants can serve as emotionally impactful interactive elements in digital games but also contributes a new approach to integrating ecological storytelling with emotional experiences in game design through practice-based research.

Key Contributions of the Study:

1. A deeper exploration of the role and meaning of plants in games: *FloraFun* explores how plants can become central narrative elements through game storytelling, NPC interaction, and responsive feedback mechanisms. This approach offers a potential departure from traditional human-centered game design, proposing an alternative where non-human life plays a meaningful, active role in narrative and interaction.
2. Designing dynamic plant feedback in games: By studying and simulating real plant growth patterns, this study develops an interactive model that combines natural plant behaviors with emotional feedback, ensuring immersive plant interactions without excessive anthropomorphization.
3. Innovatively integrating the diary system with player self-expression: The diary system allows players to not only experience plant growth in-game but also record their personal emotional reflections, enhancing immersion and individualized player experiences.
4. Expanding ecological awareness through implicit learning in games: *FloraFun* subtly introduces ecological consciousness through game tasks such as plant care and environmental changes affecting plant health, encouraging players to internalize an awareness of plant life and reflect on human-nature relationships.

4.2 Potential Applications

Although *FloraFun* explores plant interaction, emotional storytelling, and ecological education, its potential applications extend far beyond its current form.

Due to its unique emotional engagement approach, *FloraFun* could be adapted for ecological

education, embedding emotional memory points that help integrate knowledge with ecological values. Learning through practical engagement has been shown to enhance knowledge retention, making *FloraFun's* interactive plant mechanics a potential framework for improving environmental education outcomes.

The diary system could evolve into a space for plant enthusiasts to share their personal stories, drawing inspiration from in-game chapters to encourage users to share similar real-life memories or experiences. By allowing players to view and engage with other users' reflections, *FloraFun* could function as a digital tool to help address Nature-Deficit Disorder, fostering emotional connections between people and strengthening their connection to nature.

FloraFun's plant feedback system could be extended beyond digital storytelling and adapted for augmented reality (AR) applications. Players could simulate plant care scenarios within *FloraFun* before applying learned techniques to real-world plant cultivation. This system could provide real-time feedback and guidance for users experiencing plant care challenges, making *FloraFun* a functional tool for real-world horticultural education and problem-solving.

FloraFun's future need not be limited to its current form. The game has the potential to become not just an exploration of human-plant relationships but also a groundbreaking digital ecological storytelling medium that fosters human-nature connections through interactive experiences.

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