



# Using Octalysis Framework in the Gamification Process of a Mobile Application

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## **ABSTRACT**

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In today's saturated market for mobile applications, engaging and motivating users is a challenge. This thesis explores the effectiveness of gamification in addressing these challenges, specifically the application of the octalysis framework in designing mobile applications. The main objective of this thesis was to investigate the validity and practicality of integrating selected gamification elements based on the octalysis framework to motivate users.

To achieve this objective, a practical project was undertaken to design new features for a mobile app to encourage sustainable habits in collaboration with MorrowX Oy. A double-diamond design process was used to develop new features by analysing an adaptation of the octalysis framework. The new features were designed as interactive UI prototypes and user tests were conducted to validate their effectiveness.

The results showed that the features, including the approached core drives, were motivating and satisfying to the majority of users. However, some practical obstacles were observed such as the limitations of the user testing tool and the need for further refinement of the feature implementation.

Future research could assess the lasting impact of gamification elements on user behaviour over time. Overall, this thesis contributes to a better understanding of the role of gamification in mobile app design and provides insights for improving user motivation and retention strategies.

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Key words: gamification, octalysis framework, motivation, user experience, mobile application,

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## ABBREVIATIONS AND TERMS

Octalysis Framework	A framework for Gamification & Behavioural Design introduced by Chou Yu-Kai
UX	User Experience
UI	User Interface
KPI	Key Performance Indicator
MVP	Minimum Viable Product
Maze	Online user testing tool

## 1 INTRODUCTION

In recent years, mobile applications have become an essential part of everyday life, but data shows that in the application market, more than 70% of subscribers or customers stop using a service or product within the first three months (Laura 2023). This data suggests that it is becoming more challenging to establish the uniqueness and necessity of applications, retain existing users and attract new ones.

The potential benefits of gamification for this problem have been recognised. The use of gamification in products that do not contain game elements by nature can enhance their uniqueness and help address the problem of declining user numbers. Gamification is becoming increasingly popular, but it comes with its own challenges gradually being discovered. One such challenge is that many apps that incorporate gaming elements often fail to achieve their goals due to poor design (Gartner 2012). To overcome this challenge, the Octalysis framework developed by Chou Yu-kai (Chou 2014) is expected to be used. The Octalysis framework aims to enhance user motivation by employing eight core human drives in the gamification design process. The framework is designed to attract and retain users' attention by gaining a deep understanding of the elements that drive user behaviour and utilising them to improve the design and functionality of the application.

This thesis focuses on the gamification of mobile application and the effectiveness of applying the Octalysis framework in the design process. The practical project is being carried out on commission for MorrowX Oy, a sustainability-tech start-up based in Tampere. The solution aims to provide a fun and exciting platform for users to engage in sustainable activities while actively participating.

This thesis will draw on personal interests and the knowledge of UX/UI design studied through the Media and Art Programme. Specifically, the interface will be built using the prototyping design tool Figma, which integrates elements of gamification to the end product. The purpose is to evaluate the effectiveness and practicality of the Octalysis framework through analysis and user testing.

The Octalysis framework is a useful tool for UX designers who are interested in gamification. It provides a structured approach to organising user feedback from multiple perspectives, which can be used to improve the user experience of a products. By learning and implementing this framework, UX designers can create solutions that are more intuitive, engaging, and user-friendly. It is therefore a good skill to have for UX designers to gain an understanding of the Octalysis framework to help them better incorporate user needs into their designs.

The objective of this thesis is to understand and answer the following research questions:

What is the validity and practicality of applying the Octalysis framework core drives into the gamification design process?

What are the practical obstacles in the development process of MorrowX mobile applications?

This research aims to explore the valid reasons for using the Octalysis framework in the process of designing gamification for mobile applications.

## 2 GAMIFICATION

This chapter aims to provide a clear understanding of gamification, its definition, and its evolution over time. It emphasises that incorporating game elements into mobile apps satisfies users' basic psychological needs, which results in increased engagement and a higher likelihood of becoming repeat users (Bitrián et al. 2021).

### 2.1 Gamification Definition

Gamification is a term that has been defined in various ways by different scholars. One of the most widely accepted definitions is given by Deterding in 2011, which defined gamification as “the use of game design elements in non-game contexts” (Deterding et al. 2011). This definition is considered concise and adaptable to a wide range of purposes. However, it does not clearly outline the potential outcomes and goals of gamification.

In contrast, Huotari and Hamari's definition of gamification is more descriptive. They define it as “a process of enhancing a service with affordances for gameful experiences to support users' overall value creation” (Huotari & Hamari, 2017, 25). This definition highlights that gamification is not just about adding game elements, but rather a means to enhance services and products to provide users with an enjoyable gaming experience while finding value in the application itself.

On the other hand, according to Gartner, gamification refers to “using game mechanics and experience design to digitally engage and motivate individuals to achieve their objectives” (Gartner 2014). This implies that the emphasis is on incorporating game elements to encourage people to change their behaviour and attain their goals.

Both the Huotari and Hamari definitions and the Gartner definitions capture important aspects of gamification, but their focus is different. The former focuses on user experience and value creation, while the latter concentrates on goal achievement and motivation in business. However, it is crucial to consider both aspects to maximize engagement. Therefore, the author's own definition of gamification is a balanced approach that incorporates both user experience and value creation, as well as the achievement of business goals. Ultimately,

gamification should utilise psychological principles to provide an experience that enables personal growth and satisfaction while achieving the necessary KPIs for the business.

## **2.2 History of Gamification**

Although the term 'gamification' is now widely used, the concept of applying game elements to reality has existed since the early 1900s. For instance, the Boys/Girls Scout system introduced badges and ranks for scouts to earn every time they achieved skills. In 1981, American Airlines introduced a frequent flyer programme that earned points based on the distance flown. (Harry 2019) Thus, even before the term gamification was defined, it was hypothesised that elements of "play" would be quickly and effectively internalised by humans for absorbing information and taking action. The term 'gamification' was coined in 2002 by Nick Pelling, the British-born programmer and creator of many iconic computer games from the 1980s, such as 'Frak!' (Rise up 2020). Gamification has since become increasingly popular and used in various settings. According to Gartner's 2012 prediction, 70% of organisations worldwide would adopt at least one product which includes a gamification element, and the global gamification market share would increase by USD 27.77 billion by 2026 (Gartner 2014 and Fortune Business Insights 2020).

### 3 OCTALYSIS FRAMEWORK

As mentioned before, gamification is a technique that uses game elements to increase user engagement and add value to a product. However, simply adding points, badges, and levels to the interface is not enough to fully optimise gamification. According to Gartner's 2012 report, 80% of apps that include gaming elements fail due to poor design (Gartner 2012).

To overcome these challenges, Yu-kai Chou has developed the Octalysis Framework (Chou 2014). Yu-Kai Chou is a gamification and behaviour designer and one of the earliest pioneers of gamification, having started working in the industry in 2003 (Octalysis group n.d). It helps systematise gamification design and identify specific strategies to promote user engagement. This chapter explains what the Octalysis framework is, its specific benefits and its core drives.

#### 3.1 What is the Octalysis Framework

The Octalysis Framework is a gamification framework developed by Yu-kai Chou. In his book "Actionable Gamification", Chou describes it as a model that combines game design principles and behavioural science theories. The framework aims to organise the factors that influence people's behaviour and motivation through an octagonal model. Unlike traditional systems design that focuses on functionality and efficiency, the Octalysis Framework adopts a human-centred approach that prioritises influence. (Chou 2019, 8-9 )

Yu-kai Chou's research has identified eight fundamental core drives that influence people's daily activities. These drives are critical to our motivation and decision-making processes, and their absence can significantly impact our outcomes. Chou's research has also shown that successful games effectively target specific core drives, inspiring users towards a range of different activities.

Stanford University behavioural scientist Brian Jeffrey Fogg established Fogg's behavioural model in 2007 (Fogg n.d.) which highlights the interdependence of triggers, motivations, and abilities required for the desired action to occur (Fogg 2009). Without motivation, users are unlikely to take any action, making it a crucial element in the process. Chou's research has identified different types of

motivation, including positive influences such as inspiration and empowerment, as well as negative ones such as manipulation and intimidation. Chou's study of these different types of motivation has led to the creation of the Octalysis Framework, which provides valuable insights and strategies for motivating individuals in effective ways.

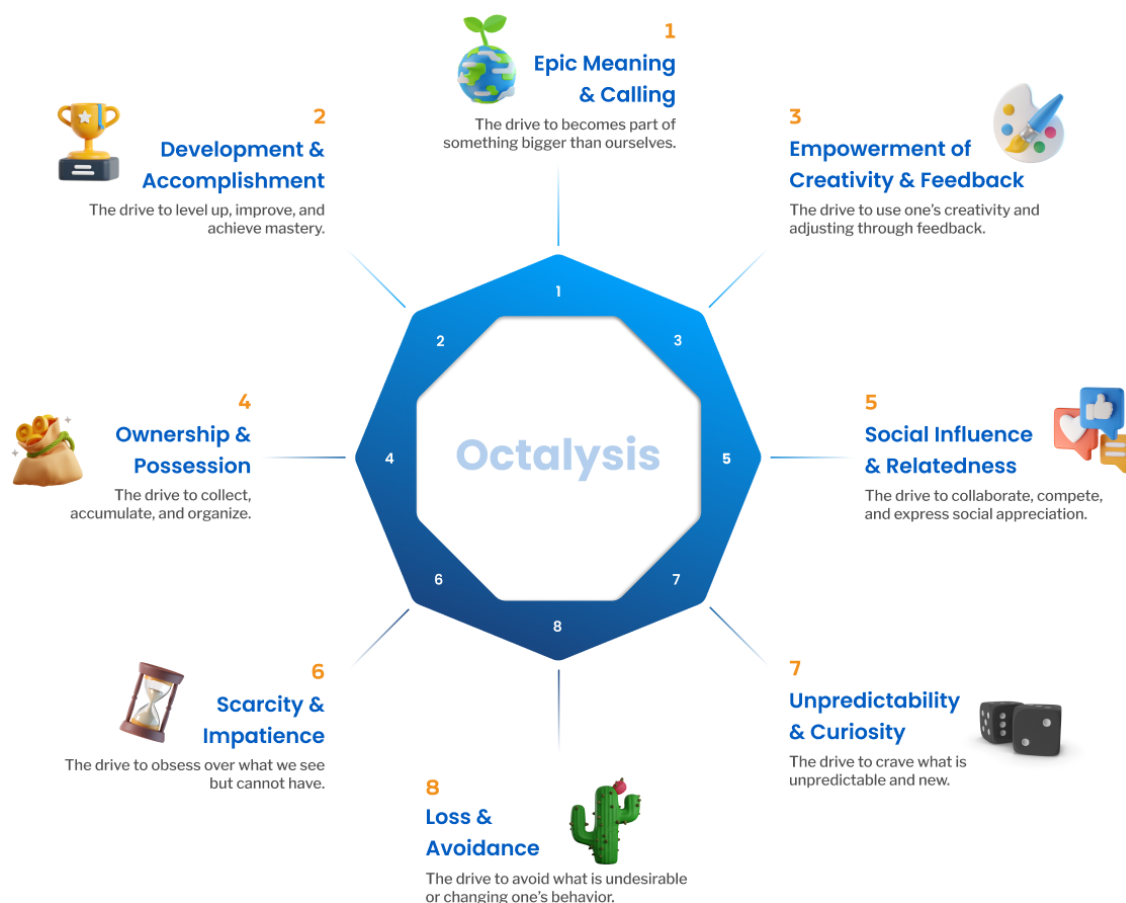


FIGURE 1. Octalysis Gamification Framework (octalysisgroup.com, 2019)

Inside the octagon in Figure 1, the Octalysis framework consists of eight different core drives. Each of these drive types has a different nature, which is described in terms of two dimensions: 'left-brain' (3 core drives placed left side of the octagon) and 'right-brain' (3 core drives placed right side of the octagon), and 'white-hat' (3 core drives placed top of the octagon) and 'black-hat' (3 core drives placed bottom side of the octagon).

The Octalysis Framework is a model that offers a comprehensive understanding of human motivation by combining elements of behavioural science, game dynamics, and social psychology. It can be used to gain insights into improving user engagement and motivation to act when designing mobile applications. In

the next section, it is explained how the Octalysis framework can be effectively used in the design of mobile applications by outlining typical techniques for each of the core drives located outside of the octagon mentioned in Figure 1.

### **3.2 Eight Core Drives**

#### **Core Drive 1- Epic Meaning and Calling**

According to Yu-Kai Chou, people feel motivated when they believe they are part of something meaningful and feel that they have been "chosen" to take an action. Wikipedia is an example of this core in action, where individuals spend time editing information for no pay but to provide content. This driving force exploits the user's desire to be part of something larger than themselves. It is about creating a narrative or purpose that motivates users to engage with a product or service. (Chou 2019, 65-67) Here are some key techniques: Narrative is a compelling story that give users a greater sense of purpose and make them feel part of a larger journey. For example, in a game, there is a story about saving the world, which can give the player a sense of epic meaning. Humanity Hero involves users feeling that they are making a positive impact on humanity through their actions. Elitism gives users a sense of superiority and exclusivity. This is achieved through exclusive rewards and status available only to the most dedicated or skilled users. Beginner's luck giving new users a boost or some form of initial success experience to make them feel competent and motivated to continue.

These are just some of the elements included in Core drive1, but all of them help to give meaning to the user's behaviour.

#### **Core Drive 2 - Development & Accomplishment**

The drive for growth, improvement, and achievement is fueled by the desire to create a sense of progress through challenges and feedback mechanisms. Accomplishment is a strong motivator, but it's important to note that the challenge must be at the right level of difficulty. According to Chou (2019, 89-91), an award is meaningless without a challenge. Kumar and Herger (2013) suggest that the challenge must be engaging, not too easy or too difficult. Here are some key techniques: Progress Bar: A progress bar visually represents the user's advancement towards a goal. For example, a language learning app might show

a progress bar that fills up as the user completes lessons. Status Points: Status points are earned by users as they complete tasks or achieve goals. These points often contribute to a user's rank or level within the system, providing a sense of accomplishment. Badges: Badges are awarded to users when they reach certain milestones or complete specific tasks. They serve as a visual representation of the user's achievements. Leaderboard: A leaderboard ranks users based on their performance or achievements, fostering a sense of competition and motivating users to improve.

Adding features like a progress bar, status point, badges, and leaderboard can help users track their progress towards their goals and feel a sense of personal development.

### **Core Drive 3 - Empowerment of Creativity & Feedback**

Empowerment of creativity and feedback allows users to express their creativity and provide feedback on their behaviour, leading to an emphasis on providing enjoyment to users. (Chou 2019, 124) Here are some key techniques: Unlocking milestones: Breaking down large goals into smaller milestones allows users to unlock new content, features, or levels as they progress, maintaining engagement. Real-time control: Users can shape their experience through custom settings, interactive interfaces, and dynamic gameplay mechanics that respond to their behaviour, enhancing their sense of ownership. Blank fill: Offering blank canvases or open-ended prompts encourages creative problem-solving, fostering cognitive engagement and unique self-expression.

By incorporating these elements into the design of interactive systems, organisations can draw on users' intrinsic motivation to create, explore and receive feedback, fostering deeper engagement and satisfaction with the overall experience.

### **Core Drive 4 - Ownership & Possession**

Ownership & Possession emphasises the human desire to possess and control valuable resources (Chou 2019, 160). Here is the key technique: Collection Sets: Tools that encourage users to gather related items or achievements, creating a sense of ownership and accomplishment.

By incorporating features like allowing users to encourage the collection of sets organisations can tap into users' natural desire to own and control valuable things. This boosts engagement, enhances ownership, and improves the overall user experience in the system.

### **Core Drive 5 - Social Influence & Relatedness**

Social influence and relatedness cover all the social aspects that affect people—like having a mentor, being accepted by others, getting feedback, making friends, and even feeling competitive or envious. When you see a friend doing something astonishing, it makes you want to do the same. (Chou 2019, 195-196) Here are some key techniques: Group Quests: Challenges where users work together in teams to achieve a common goal, encouraging teamwork and cooperation. Brag Button and Tout Flags: Showcase their achievements to their friends and community on the platform. This recognition enhances social status and self-esteem.

By including features like group quests and brag buttons organisations can use social influence to keep users engaged, build connections, and create lively communities within their systems.

### **Core Drive 6 - Scarcity & Impatience**

Scarcity & Impatience uses scarcity, urgency, and anticipation to influence user actions. It aims to create a feeling of exclusivity and anticipation by limiting access to certain resources or experiences. (Chou 2019, 230) Here is the key technique: Appointment Dynamics: Schedule events or rewards at specific intervals to keep users engaged and create a sense of importance around scheduled activities.

By using appointment dynamics, organizations can effectively use scarcity and impatience to increase the perceived value of resources or experiences in their systems. These elements create an engaging user experience that motivates users to actively participate and invest in the system to maximise their rewards.

### **Core Drive 7- Unpredictability & Curiosity**

Unpredictability & Curiosity is all about captivating users by satisfying their natural inclination for newness, adventure, and uncovering the unknown. It uses surprise,

uncertainty, and curiosity to keep users interested and eager to explore further. (Chou 2019, 269) Here are some key techniques: Mystery Boxes: Containers with random rewards that entice users to make purchases or open them for hidden treasures. The unpredictability keeps users engaged and encourages repeated interactions. Rolling Rewards: Offering users a variety of rewards on a rotating or random basis, creating excitement and uncertainty, encouraging users to continue engaging to discover valuable prizes or surprises.

By using techniques like mystery boxes and rolling rewards, organisations can captivate users' attention, encourage exploration, and keep them engaged and motivated to uncover new experiences within the system. These elements add depth, intrigue, and excitement to the user experience, enhancing overall satisfaction and retention.

### **Core Drive 8: Loss & Avoidance**

Loss & Avoidance focuses on our natural inclination to steer clear of negative outcomes and shield ourselves from loss. It centres around the fear of missing out, the urge to avert setbacks, and the drive to safeguard our current status or possessions. (Chou 2019, 307) Here are some key techniques: Progress Loss: The risk of losing achievements, rewards, or progress motivates users to stay active and engaged. FOMO Punch: Fear of Missing Out (FOMO) uses social pressure to boost user engagement by highlighting the activities or achievements of other users.

By integrating elements like progress loss and leveraging FOMO, organisations can effectively tap into users' desire to avoid loss and protect their interests. These elements create urgency, motivation, and social pressure, encouraging users to take action, stay engaged, and remain involved within the system.

### **3.3 Intrinsic Motivation and Extrinsic Motivation**

In the Octalysis framework, core drivers are used to represent the two aspects of the brain. The three core drives on the right side - creativity, social influence, and curiosity, represent the core drives of the right brain. In contrast, the left brain is responsible for logical thinking and analytical abilities, with the three core drives on the left side - achievement, possession, and scarcity, representing the core

drives of the left brain. (Chou 2019, 342) However, it's critical to note that the Left Brain/Right Brain Core Drives used in the Octalysis framework are not based on true brain science, but rather are symbolic representations. These labels simplify the framework and make it more accessible and effective for design purposes. (Chou 2019, 342-343)

Deci and Ryan's self-determination theory (Deci & Ryan 2000, 76) proposes that the left side of the brain represents extrinsic motivation, the drive to act based on external factors such as rewards, while the right side of the brain represents intrinsic motivation, the choice to act for personal value without reward.

According to Chou (2019, 347), many studies have shown that when the provision of extrinsic motivation factors is stopped, users' motivation often decreases significantly compared to before extrinsic motivation factors were introduced. Therefore, mechanisms that provide intrinsically motivating environments to people are necessary for users to engage more creatively. Intrinsically motivated users are more likely to be creative, and this is desirable for users themselves (Chou 2019, 361). Deci (2000, 76) suggests that it is necessary to ask "how to create conditions under which others can motivate themselves," instead of focusing on "how to motivate others."

### **3.4 White Hat and Black Hat**

The Octalysis framework include another vital aspect, which includes the top three core drives of the octagon. The core drives one, two and three are known as White Hat because they are constructive motivators that enable, satisfy, and fulfill us (Chou 2019, 372-373). On the contrary, the bottom three core drives: core drives six, seven and eight are considered Black Hat, which are negative motivators that can lead to addiction, anxiety, and obsession (Chou 2019, 372-373). Although these negative motivators induce an urgency to modify one's behavior, in the long run, they can make people feel like they have lost control. Hence, it is not recommended to rely heavily on them. Instead, white hat design should be employed to ensure that people feel comfortable, grow with the company, and stay for the long term. This encourages long-term engagement and ensures a positive motivational atmosphere.

### **3.5 Level 2 and Level 3 Octalysis Framework**

The Octalysis Framework provides an advanced approach to gamification with two additional levels. Level 2 focuses on optimising the user journey, through four distinct phases: discovery, onboarding, scaffolding, and endgame (Chou 2019, 40). At each stage, the core drives that require strengthening are identified. The discovery phase aims to spark user curiosity and attract their attention, while onboarding aids in a smooth transition into the experience, providing clear instructions, guidance, and initial rewards. The scaffolding phase provides users with opportunities for growth, support, and challenges to develop their skills and knowledge. The endgame phase aims to maintain engagement and provide a sense of achievement through long-term goals, mastery, and continuous rewards. (Octalysis group n.d)

Level 3 builds on Level 2 by incorporating the Richard Bartle's Four Player Types (Bartle 1996) - Achievers, Socializers, Explorers, and Killers, and tailoring the core drives to each type (Chou 2019, 44). Achievers play for points, levels, and equipment, while Explorers enjoy discovering new things, Socializers play for the enjoyment of interacting with others, and Killers want to win and take first place and they want to beat others. (Chou 2019, 44)

### **3.6 Octalysis Framework Achievements and Previous Research.**

The Octalysis Group has used the Octalysis framework to transform businesses in various sectors, from employee engagement initiatives to learning and development programs. Some significant success stories include the Brazilian financial services company CAIXA, which increased profits by approximately 46% by gamifying its employee engagement strategy (Octalysis group n.d), and the gamification of an online learning program that significantly boosted course completion rates (Octalysis group n.d). However, despite its widespread adoption in practical settings, academic research on the potential and limitations of the Octalysis framework remains limited. Weber et al. have highlights some issues, such as the framework's potential oversimplification, and its reliance on the framework in situations where extensive user research may not be feasible(Weber et al. 2022). These challenges call for further research and critical evaluation to address the gaps and contribute to a deeper understanding of the

applicability of the Octalysis framework. This way, we can increase its effectiveness in designing engaging and impactful experiences.

## 4 PROJECT METHODOLOGY

The UX team at MorrowX (referred to as "we" from here on) understands the significance of adopting a strategic approach to ensure the project's success. In this section, we will explore the Double Diamond Design Process, which is the primary framework guiding the design process of experience gamification in this project case.

### 4.1 Double Diamond Design Process

The Double Diamond Design Process model (Design Council) has become the main framework for directing the designing process of the experience gamification in this project case. (See Figure2) This research will proceed as follows:

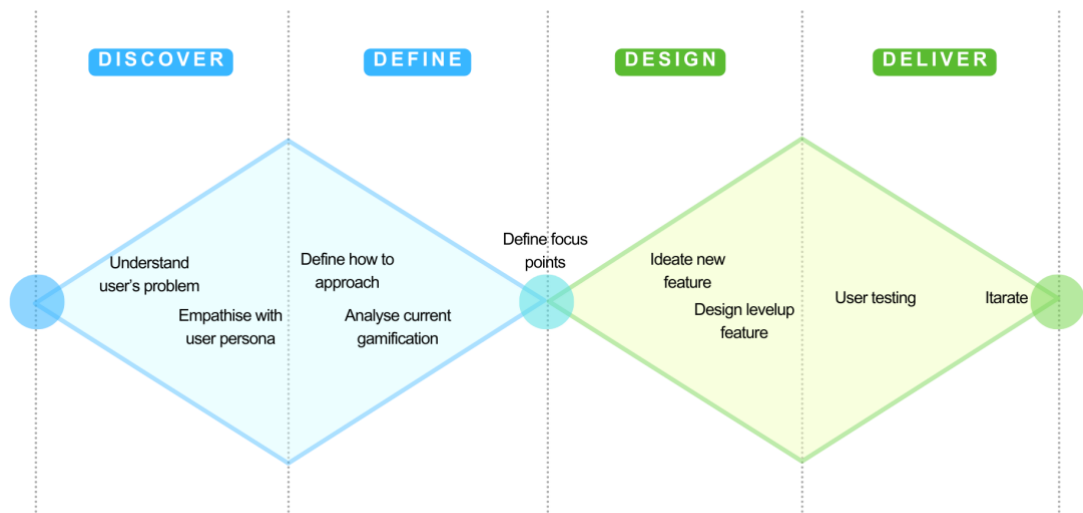


FIGURE2. The illustration of Double Diamond design model (Design Council 2005)

**Discover:** During the discovery phase, the main focus is to understand the users and the problems they are facing. This process involves creating user personas to identify their needs, challenges, and motivations related to the gamification experience. The ultimate goal is to gain a thorough understanding of the target audience and their specific pain points and desires related to the sustainability habituation and gamified experience.

**Define:** Once the insights from the discovery phase have been gathered, the next step is to define and narrow down the problem and the objectives. This includes an approach to changing mindsets. Additionally, in this phase, we will analyse the gamification elements based on the Octalysis framework's core drives to understand how the current gamification element is aligned with user motivations and behaviours. The outcome of this phase is a clear definition of the problem statement, goals, and a focus point for addressing the identified challenges through gamification.

**Design:** During the design phase, the focus is on generating ideas to solve defined problems and achieve goals, expanding the second diamond to develop solutions. We will explore various gamification elements and mechanics that align with the identified user motivations and core drives. The selected features and mechanics are then refined and translated into concrete designs using a prototyping tool called Figma, which will be implemented in the gamified experience.

**Delivery:** Once the gamified experience is designed, it undergoes user testing with pinpointing areas for improvement. To assess the effectiveness and ease of use of the gamification features, user testing sessions are carried out. We employ both quantitative and qualitative data collection techniques to acquire thorough insights into user interactions. We have used the Maze online user testing tool to evaluate our Figma prototype. This tool helped us to perform user testing sessions productively and efficiently, and to acquire data-driven feedback from the participants. After completing the user testing session, we analysed the results using the detailed data furnished by Maze. This analysis enables us to gain a deeper understanding of the user's behaviours and preferences, which in turn, helps us to enhance the gamified experience.

## 5 BACKGROUND

The case company MorrowX Oy is a tech startup that was established in Tampere in the year 2022. The author has been involved in designing solutions as a UX/UI designer since March 2023. The company is developing a digital solution that encourages and promotes sustainable behaviour among individuals. The solution is designed to support small and medium-sized enterprises to achieve their sustainability targets through individuals, such as their employees and student housing tenants, entering the community and taking sustainable actions for example, eating a vegetarian lunch in the company cafeteria, commuting by bicycle and various other categories of behaviour to reduce Scope 3 to the company. The mobile app aims to provide a fun and exciting platform for individuals to actively participate in sustainable activities while aiming to achieve the following goals. Please note that in this thesis, certain information and images have been withheld to protect MorrowX's credentials. The rest of the thesis refers to this solution as an 'app'.

The app is currently in the MVP (minimum viable product) development phase, and the company is collecting pilot customer data and conducting market research to ensure that the app meets the target users' needs.

In this practical project, in order to ensure the app's effectiveness, it is going to be tested with different user groups, investigating the extent to which gamification elements can motivate users. Additionally, the app's user interface and functionality, which incorporates the gaming element based on the Octalysis framework, are being evaluated to enhance user experience.

The app's ability to encourage sustainable behaviour makes it a beneficial tool for fostering environmental sustainability and contributing to a better future.

## 6 DESIGN PROCESS

The purpose of this thesis is to examine the application of gamification theory to the app described in the previous chapter. The empirical section of the thesis explores the practical elements of gamification based on the Octalysis framework. The theoretical findings are used to collect data and develop gamification techniques that meet the needs of the app's users. The double diamond design thinking process is employed to accomplish this goal. The main objective is to design and test practical solutions that will motivate and enhance the performance of app users by incorporating gamification elements.

### 6.1 Discover Target User and Problems

The discovery phase is an important stage in the design thinking process, where the essence of the problem is revealed and solutions are found by refocusing on the needs and challenges of the target users. User research was conducted through both observation and desk research. Target users, user goals and their current problems and barriers were identified. This allowed us to assume that potential users are interested or trying to be interested in sustainability but find it difficult to change their habits due to their routine tasks and lack of correct information. The figure below summarises the user research (Figure 3).

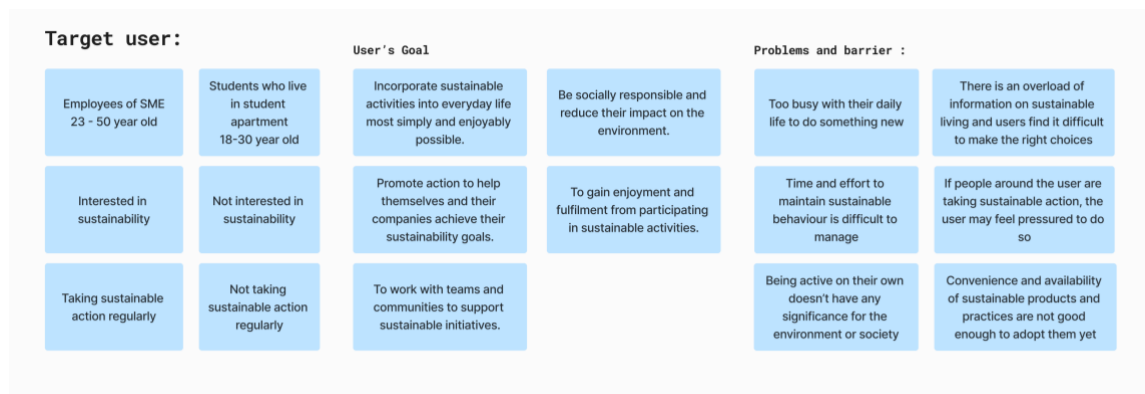


FIGURE 3. Summary of user research insights (Inano 2023).

### 6.2 User Personas and Motivations

Understanding the motivations of the target audience is important in developing effective engagement strategies tailored to their diverse needs. 4 different personas have been identified, each with unique characteristics and motivations. A persona is a fictional character that represents the user of a particular product

or service (The Interaction Design Foundation). In the UX design process, a user persona is a compilation of information about the target user's demographics, behaviours, goals and needs, which is used to articulate the user's perspective during the design and development process.

Figure 4 shows the positioning map with two indicators: whether or not they are interested in sustainability, and whether or not they are taking action in practice.

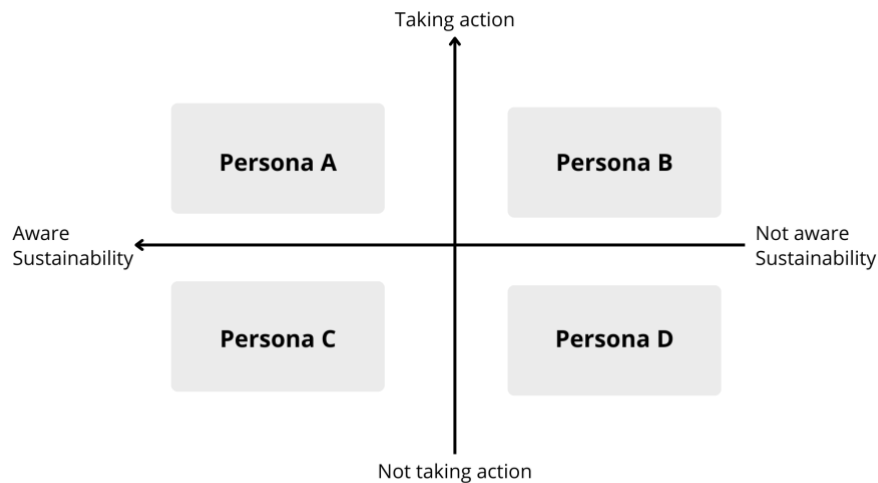


FIGURE 4. Persona Positioning Map (Inano 2023).

In addition, the personas were given personalities according to Richard Bartle's Four Player Types (Bartle 1996) which discussed in Chapter 3.5. Based on this, a detailed demographic to make it easier to imagine the user profile can be seen in Figure 5.

NAME	PERSONA A Sofia	PERSONA B Ville	PERSONA C Mari	PERSONA D Antti
PLAYER TYPE	Achiver	Explorer	Socialiser	Killer
DEMOGRAPHICS	Sofia is a 28-year-old Marketing Assistant working at a local SME in Tampere.	Ville is a 22-year-old TAMK Student, living in TOAS shared apartment	Mari is a 35-year-old HR Manager working at a local company in Tampere.	Antti is a 40-year-old Operations Manager working at a manufacturing company in Tampere.
BACKGROUND	She commutes to work by public transport or by bicycle. In the office, she encourages her colleagues to participate in sustainability initiatives such as waste reduction and energy savings .	Ville is indifferent to sustainability and prioritises convenience and affordability in his lifestyle choices.	While she has a genuine interest in sustainability, his busy work life often makes it challenging for him to prioritize eco-friendly habits.	He lives in a family home on the outskirts of Tampere. He has multiple vehicles and summer cottage and leads a comfortable lifestyle, but shows little interest in adopting sustainable practices.
MOTIVATION	Her primary motivation is to create a positive environmental impact and she wants to visualise the impact of their actions on the environment and help establish a sustainable lifestyle.	His motivation stems primarily from saving money and opting for convenience in his daily routines.	She is motivated by his desire to reduce his carbon footprint and contribute to environmental preservation.	Antti prioritises comfort, convenience and traditional lifestyle choices over environmental concerns, so the incentive to adopt sustainable practices is virtually non-existent.
FRUSTRATION	Sofia occasionally experiences climate anxiety, feeling overwhelmed by the urgency of addressing environmental issues.	Ville's lack of awareness about the relevance of sustainability in his life may lead to frustration when faced with eco-friendly options that don't align with his immediate needs or preferences.	Busy schedules and lack of support structures make it difficult to maintain eco-friendly practices in the long term.	He is frustrated by perceived inconveniences associated with sustainable living practices, viewing them as unnecessary or incompatible with his established habits and preferences.
OPPORTUNITY	Recognising their progress and providing tangible rewards for goal attainment can serve as powerful motivators.	He is curious and eager to absorb new knowledge, making it essential to facilitate learning and discovery within the game.	Community and connection are paramount for this group, underscoring the importance of fostering cooperation and camaraderie within the game.	Increasing the competitive aspect and entertainment value within the game can capture their attention and sustain their interest over time.

FIGURE 5. Four UserPersonas(Inano 2023).

Persona A: They are interested in sustainability and are already taking positive action. Through the app, they want to visualise the impact of their actions on the environment and help establish a sustainable lifestyle. However, with new challenges and goals, their motivation would be higher.

Persona B: They are less concerned about sustainability, but they are taking action to contribute to the environment. Their motivations are to save money and time in their lives and learning tips for this will lead to an awareness of how this can lead to a sustainable lifestyle.

Persona C: Interested in sustainability, but lacks the knowledge and tools to take action. Motivated by the knowledge and information to easily take action and track positive impacts.

Persona D: They are indifferent to sustainability and less motivated to take action. They will be motivated by rewards, competition with others and dominance on leaderboards.

### **6.3 Approach to Changing the Mindset**

After defining the target user personas and understanding their motivations, the next step is to consider how we can transition individuals to the block in which persona A is located in Figure 4. Persona A can be positioned as the ideal persona that the app ultimately aims to reach, as they are interested in sustainability and are active and take action. From the perspective of personas B, C, and D, the main challenge in applying sustainable practices into their daily lives is the lack of intrinsic motivation.

Many users are not aware of the importance of sustainability. Therefore, as in the discovery and onboarding phases discussed in the Level 2 Octalysis, the first step is to attract users to the app with extrinsic motivations, such as rewards. In the app, gamification elements like characters, currency, and leaderboards are built-in to give a sense of achievement by regularly completing positive actions.

In scaffolding phase, by continuing to use the app, users who have come for rewards and extrinsic motivations will eventually develop their knowledge of sustainability and turn to intrinsic motivations to contribute to the environment and their community. Once sustainable behaviour is formed, users are more likely to

act spontaneously without external rewards. Then, the end-game phase, taking on even bigger tasks and working with others, changes each individual's mindset and sustainable behaviour becomes a natural habit. Gamification is used to turn sustainable behaviour into an enjoyable experience.

Defining specific approaches to changing mindsets during the define phase was important. Understanding the needs and challenges of users and identifying strategies to overcome barriers to their sustainable behaviour will help to set a more concrete direction for the development and implementation of the app.

#### **6.4 Analyse Current Gamification Elements**

In order to facilitate comprehension, examples will be employed to illustrate the principal mechanisms of the app. An example of how this application could be used in a university student tenancy to save electricity. The app encourages tenants to work together towards a common goal of reducing electricity usage. It offers an action list that tenants can follow to save electricity, such as wash their clothes and dishes at lower temperatures, turning off standby power for electrical appliances, and avoiding unnecessary electricity consumption. Tenants can choose the actions that suit them best and implement them to help reduce electricity usage and bills across the dormitories. The app records the actions taken by residents and calculates their impact. Whenever an action is completed, the tenants are rewarded. The app incorporates several game elements to make these app mechanisms more engaging and motivational. Table 1 provides an overview of the features built into the current app, and it analyses the extent to which current gamification elements fit into the Octalysis Framework and how they impact user engagement and motivation.

TABLE 1. Current gamification elements.

Feature name	Description	Core drives(CD)
Character	Provide a narrative and talk about the larger mission and goals that users are participating in.	CD1- Epic Meaning & Calling
Currency A	In-app currency earned by taking sustainable actions. Goes wallet and it can be used to exchange rewards in the future.	CD2- Development & Accomplishment
Currency B	Variable currency. Up to 5 points can be earned from actions and learning, decreasing by one each day.	CD2- Development & Accomplishment , CD6 - Scarcity & Impatience
Group	The same group of people, e.g. in a company, student apartment, can work toward shared goal.	CD5 - Social Influence & Relatedness
Leaderboard	Display users progress and encourage competition within the group.	CD2 - Development & Accomplishment , CD5 - Social Influence & Relatedness
Streak	Track how often users visit the app to encourage ongoing behaviours.	CD2 - Development & Accomplishment , CD8 - Loss & Avoidance
Random avatar	Avatars and usernames are given to users at random.	CD7 - Unpredictability & Curiosity
Action	Sustainable action	CD1 - Epic Meaning & Calling
Challenge	Provide users with new goals and challenges to encourage growth and achievement.	CD5 - Social Influence & Relatedness

The analysis of the gamification elements in an app reveals the areas where there are gaps in meeting user expectations. This analysis evaluates the effectiveness of the eight core drives in the Octalysis framework.

The current version of the app, Core Drive 1 - Epic Meaning & Calling, instils a sense of purpose and mission related to the environment and protecting the earth. However, there is a concern that the narrative elements of the 'character' are not emphasised enough, which may be a barrier to user immersion. Users may expect more engaging storytelling or more relatable stories.

Core Drive 2 - Development & Accomplishment, introduces several elements to increase users' self-growth and sense of accomplishment such as currencies and leaderboard. However, simply displaying progress may not be enough to intrinsically motivate users, especially when goals are ambiguous or new challenges are lacking.

Core Drive 3 - Empowerment of Creativity & Feedback, currently lacks features specifically targeting user creativity and empowerment. While feedback mechanisms for completed actions are present, there is room for improvement in providing opportunities for active participation and self-expression.

Core Drive 4 - Ownership, currently does not provide any ownership-related features.

Core Drive 5 - Social Influence & Relatedness, facilitates social communication through 'group' and 'leaderboard'. However, it may need to be improved in meeting the expectations of users who want deeper community engagement or cooperative play.

Core Drive 6 - Scarcity & Impatience, creates motivation for continued action by fostering a sense of scarcity and is reflected in the app's mechanisms indicating limited resources or the amount of 'currency B'.

Core Drive 7 - Unpredictability & Curiosity, the provision of 'random avatars' and usernames adds an element of unpredictability to the differentiation of users, but

it may not be particularly effective as it is a one-time-only feature at the beginning. It may be a limitation in adequately serving users who expect more surprises or challenging elements.

Core Drive 8 - Loss & Avoidance, maintaining 'streaks' each time a user visits the app incentivises users to avoid losses and maintain habits, as streaks reset when actions are interrupted.

Based on the analysis, there is room for improvement across some aspects of the Octalysis framework to enhance user engagement and motivation. The app needs to address the missing elements to approach user engagement holistically. Specifically, intrinsic motivation plays a pivotal role in user engagement.

Some of the key points that can enhance intrinsic motivation **include community collaboration and support, visualising and tracking impact, and enjoyment and excitement**. Based on the estimated importance of each factor in the specific context of the app, **Core Drive 2 - Development & Accomplishment, Core Drive 3 - Empowerment and Creativity, and Core Drive 7 - Unpredictability & Curiosity** were identified as the most critical motivators in the gamification system.

## 6.5 Design and Prototyping

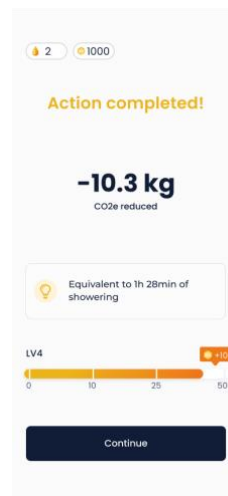
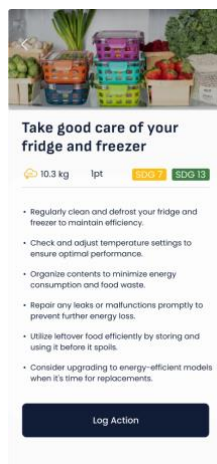
Based on the above research and analysis, new features for this app will be developed from Core Drive two, three and seven, and will ideate features that are more motivating and engaging for the users. We have hypothesised that there is potential to further increase user engagement by enhancing elements such as enhanced user customisation and progress visualisation, as these act on users' low motivation and lack elements to encourage sustained use.

To support the hypothesis, a new feature using the selected core drives will be implemented. One idea proposed is to introduce a feature that visualises the level of 'symbols' as they grow. The 'growth feature' will allow users to 'level up' based on the 'currency A' they earn from taking the 'actions'. This feature is expected to increase user engagement by encouraging 'currency A' accumulation through actions and growing 'symbols', the deliverables for each level. The system will

break down the larger goal of achieving sustainability into smaller, achievable goals, ensuring that users do not lose motivation along the way. This new feature is considered to be valuable to encouraging sustainable behaviour by combining a system of 'levelling up' and 'symbolic growth'.

Further development involved the creation of a high-fidelity user interface using the Figma prototype design tool. This was designed to add new functionality to an existing application. The new functionality works as follows:

1. Users earn a "currency A" by taking sustainable action.

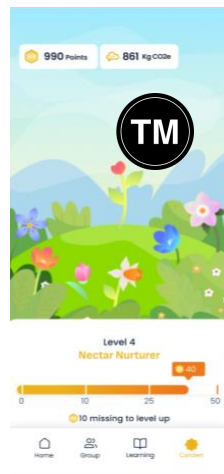


PICTURE 1. UI of action detail screen (Picture on the left hand side).

PICTURE 2. UI of action completion screen (Picture on the right hand side).

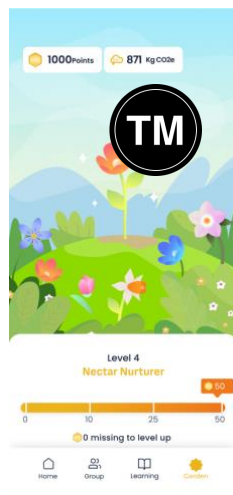
2. The feature includes four levels of growth for a "symbol". Users work towards a new symbol by achieving small milestones at each stage. This process stimulates a desire for development and progress (core drive 2).

Please note that the graphic element "TM" in the screenshots is blocking confidential material from the MorrowX.



PICTURE 3. UI of symbol growth space screen.

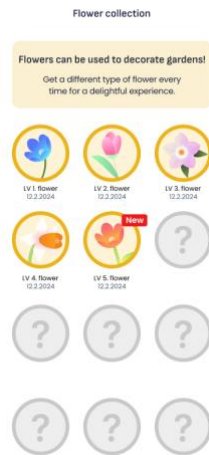
- Once the user accumulates enough "currency A," they can move on to the next level (See picture4). The key element of this feature is that the type of symbol is randomised each time. This unpredictability creates an enjoyable experience for the user and stimulates curiosity (core drive 7). Users can also share these symbols with their friends, which promotes social connection (core drive 5).



PICTURE 4. UI of symbol reach to the next level (Picture on the left hand side).

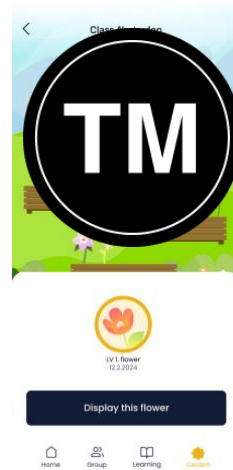
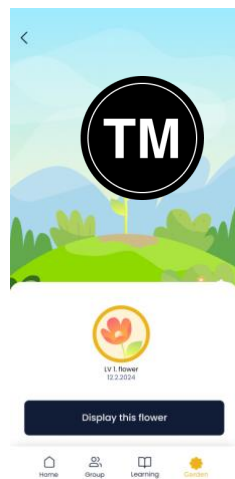
PICTURE 5. UI of level up (Picture on the right hand side).

- Users can view collections of symbols they have collected in the past.



PICTURE 6. UI of symbol collection screen.

- The symbols can be used to decorate their own 'symbol growth space' (See Picture 7) or displayed in a common space of a group to which they belong (company, school, family, etc.) (See Picture 8). This promotes core drive 3. By choosing to decorate the common group, users feel that they



are playing an active role in a greater sense of significance, contributing visibly to the group.

PICTURE 7. UI of own symbol growth space screen (Picture on the left hand side).

PICTURE 8. UI of group's symbol growth space screen (Picture on the right hand side).

## 6.6 User Testing

To assess the practicality and validity of the Octalysis framework, user testing was needed. The process involves observing how potential users interact with the app and their overall evaluation of the app. Users are given a specific task

and are asked to perform a series of actions using the newly introduced functionality to achieve a goal in the app. The attributes of the user and the nature of the given task are then quantitatively evaluated. This involves the completion of a questionnaire that includes a numerical evaluation of the usability and effectiveness of the product. Additionally, an open-ended questionnaire will also be conducted to obtain feedback that is not limited to a numerical rating, as well as qualitative research. The main purpose of this process is to identify areas where improvements are needed and to ensure that the product is meeting the needs and expectations of users. By understanding how users interact with the product and what feedback they receive, the development team can make the necessary adjustments to improve the overall user experience.

The most suitable method for this particular case was to use the online user testing platform Maze. Maze is a tool that allows for both quantitative and qualitative research to be conducted, as well as presenting the results of the tests in the form of detailed statistics. The survey duration is two weeks. The target user group will include employees and students, and will therefore include people with backgrounds ranging from 18 to 40 years old. They are divided into categories based on whether they are interested in sustainability and taking sustainable action regularly. The test expects 30 participants. According to a study conducted by Nielsen and Landauer in 1993, five testers can identify 80% of known usability problems. Participants will be recruited from various sources, including Tribe, Platform6 (Tampere start-up community), TAMK students and staff, the author's UXUI Instagram account, and the author's network. This will allow for feedback from a diverse range of perspectives. By collecting data from such a diverse group of users, it is possible to understand how the app's functionality is engaging and to identify areas for enhancing the design and functionality of the app. (See the Appendix 1 for the questions posed)

The test was designed to cater to users who will be using the app for the first time. It focuses on discovery and onboarding, as explained in Level 2 Octalysis. The main objective of this test is to check whether users will find the app attractive and motivating enough. The test aims to validate two hypotheses. The first hypothesis states that by activating core drives two and seven in the Octalysis framework through the 'Level Up' function, user growth and achievement can be

promoted. The second hypothesis states that activating core drives three and five through the 'decorate symbol' function will nurture user creativity. The ultimate goal of this test is to demonstrate that integrating appropriate gamification elements and ensuring a good user experience can inspire sustainable behaviour, even among users who do not regularly engage in sustainable actions. Beyond the anticipated outcomes, we look forward to extracting valuable insights from the data and feedback to inform future research endeavors.

## 7 THE SURVEY RESULTS

The user test had a total of 100 participants and 41 of them completed to the last question. The completion rate was overall lower than the author's expectations, but achieved the expectation of receiving responses from 30 people.

The survey results show that 50% of the respondents are in the age group of 21-30 years, followed by 24% of those under 20, 23% of those aged 31-40 and 3% of those aged 40 or above.



FIGURE 5. Age distribution of survey respondents.

85% of the respondents are interested in sustainability, out of which 47% are interested but have not yet taken any action towards it. However, 11% of the respondents who are not interested in sustainability are still taking positive action.

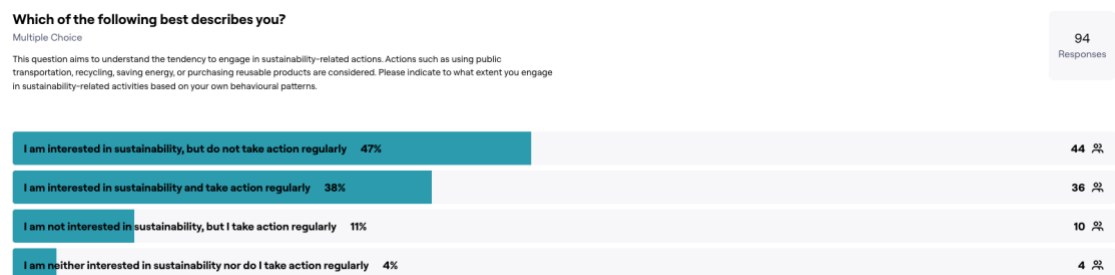


FIGURE 6. Level of interest and action in sustainability among survey respondents.

The participants in the test were tasked with taking a series of five tasks as a series of flows. As table 2 shown, the task 1 required navigating through four screens to complete the action. However, the very first of these screens had a very low performance with a completion rate of only 62%, and it took 42 seconds to complete. Additionally, 90% of people misclicked during this task. Task 2 involved moving two screen to get new symbols. Interestingly, there were no

dropouts other than those who dropped out during Task 1. The duration spent on the task and the miss-click rate was also low, making this the most successful task of the five. Task 3 required participants to confirm that a new symbol had been set and a new level started, and to go to the screen for the collection of symbols. There were two dropouts during this task, and the missclick rate was as high as 64%. This was due to some people getting lost looking for the correct button. Task 4 was to select the most recently obtained symbol. Similar to Task 2, no one dropped out during this task, and the time taken was relatively short. Task 5 involved choosing whether to display the chosen symbol in their own symbol growth space or in the group to which they belonged, which involved a maximum of four screen moves. Two people were dropout during this task, but it can be said to have been intuitive, as the time taken was only 9 seconds and the number of missed clicks was low (15%). The next chapter will analyse these results in more detail.

TABLE 2. Task completion metrics and performance among user test respondents.

Task	Task 1: Complete an action	Task 2: Obtain a new symbol	Task 3: Find the symbol collection screen	Task 4: Select the most recently acquired symbol	Task 5: Choose where to display the symbol
Completion rate	52%	100%	95%	100%	94%
Average duration	58s	11s	17s	9s	9s
Avarage misclick rate	45%	6%	64%	25%	15%

Many of the respondents have rated the app satisfaction with 4 (30%), followed by 5 (26%), 3 (23%), 2 (16%) and 1 (5%). 29% of the respondents would recommend the app to a friend with a rating of 3 (29%), followed by 5 (25%), 2



Which of the following describe how you felt while using the app (select all that apply)?

Multiple Choice

51  
Responses

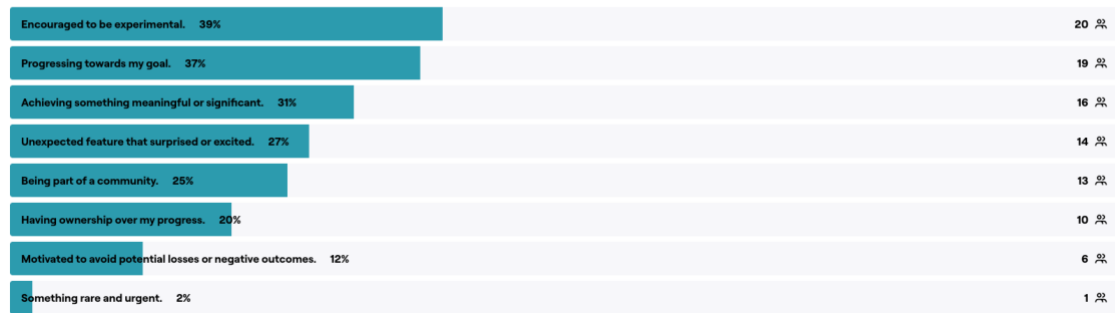


FIGURE 9. Distribution of respondents' feelings while using the app.

## **8 EVALUATION OF THE USER TEST RESULT**

This chapter presents the analysis of the user tests that were discussed in the previous chapter. The following three sections provide suggestions for improvement based on the analysis. Firstly, the impact of gamification elements on user motivation is evaluated according to the hypotheses that were set up. Secondly, the relation between sustainability awareness and satisfaction rate. Thirdly, the feedback on the UI design is evaluated. Then, the feedback on the user testing set-up is evaluated. To conclude, the summary of the nine improvements found in this chapter will be presented at the end.

### **8.1 Impact of Gamification Elements**

The findings from user testing based on the hypotheses outlined in chapter 4.4 indicate that the 'level-up' feature is capable of stimulating core drives 2 - Development & Accomplishment and core drive 7 - Unpredictability & Curiosity, and motivating users. It also appears that the 'decorate symbol' feature is able to activate core drives 3 - Empowerment of Creativity & Feedback and core drive 5. According to the emotion-based feedback, high number of votes were raised, particularly in relation to core drives 3, 2, 1, 7 and 5, indicating that these elements were highly valued. Interestingly, Core drive 1 - Epic Meaning & Calling received high ratings, possibly because the app's concept itself played an essential role to stimulate the feeling of achieving meaningful action, and the added gamification features may have boosted this effect even more. Furthermore, core drives 6 - Scarcity & Impatience and core drive 8 - Loss & Avoidance, which were not targeted by these features, received low voting rates, indicating that the added gamification elements are having the desired impact.

The feedback for the 'level-up' feature was mostly positive. Testers found the element of gamification to be motivating, as it gave them a sense of satisfaction as they progressed and new symbols grew up. The animations provided a visual representation of their progress and were appreciated. However, some testers expressed concern that they may lose interest in the long term. To address this issue, possible solutions include making certain types of symbols time-limited or providing information about the symbols when they appear.

The feedback on the 'decoration symbol' feature was mixed. While some testers found the feature helpful in supporting their contribution to the community, they also wanted more customisation options for their space. To address this concern, we could introduce an additional feature that allows users to unlock new items to customise their space as they progress through the levels. Another solution could be to enable the space field to evolve as the level increases. On the other hand, some testers expressed a desire for rewards that they could use in their real life. This feedback confirms that new users are usually motivated by external rewards. To cater to the needs of new users, future tests should focus on approaches aimed at offering extrinsic rewards.

## 8.2 Relation Between Sustainability Awareness and Satisfaction Rate

This part aims to assess the relationship between sustainability awareness and satisfaction to determine if there is a correlation. Additionally, it explores how gamification elements encourage sustainable behaviour among users who have not yet taken action. According to Figure 10, the group interested in sustainability but have not yet taken action rated the app's features the highest with a rating of 5 (25%), followed by the group that was neither interested nor had taken action (20%). This suggests that the app's features are particularly effective for users who have not yet taken action.

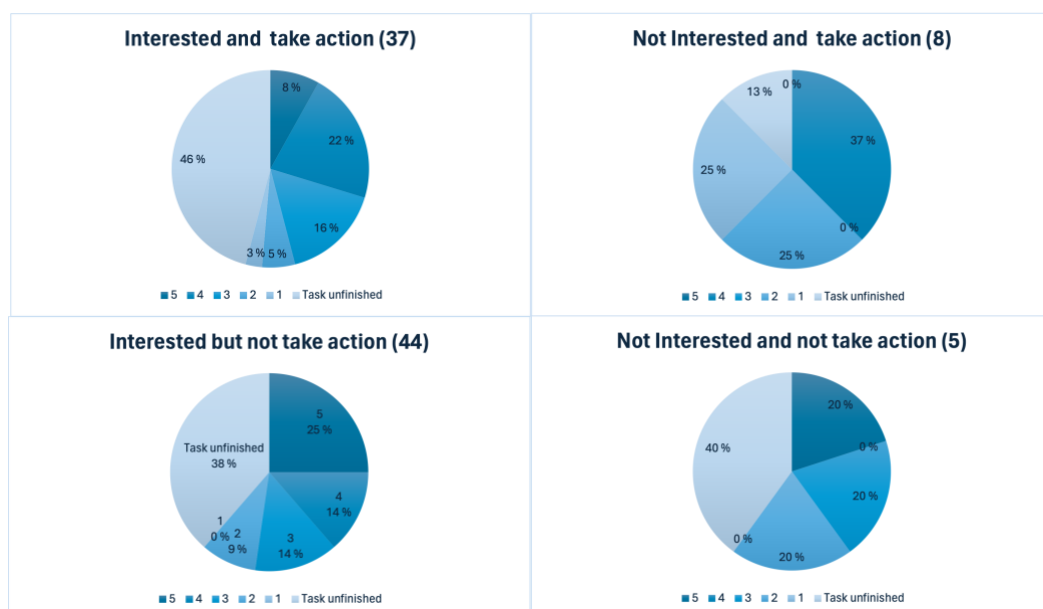


FIGURE 10. Satisfaction ratings by sustainability awareness.

This can help bridge the gap between interest and action, as the gamification elements will motivate them to take action regularly. The results also show that

we were able to address their needs and motivations during the design process. On the other hand, those who are already taking action have an awareness of and motivation for sustainable behaviour and have established their behaviour patterns. Therefore, we believe that they may be less interested in these features as they are satisfied with their existing behaviour patterns.

It has been suggested that feedback on certain features can be used as educational content for individuals who are looking to take action. For instance, feedback such as

- *"This app can be beneficial for people who need the motivation to start something"*
- *"I believe this app can raise awareness about the issue,"*
- *"I would like to use it for the whole university."*

These comments highlight its capacity to inspire positive change. Leveraging this feedback as educational content can further empower individuals seeking to initiate sustainable practices. These could lead to further research targeted towards specific user groups. These results indicate a positive response and the potential for future development of the app.

### **8.3 Feedback on UI Design**

Based on the feedback received, it has been identified that the prototype's UI design has a core problem. Users found it confusing to navigate and not intuitive. During the user testing phase, it was observed that on the very first screen of the UI, the symbol growth space screen (Figure 3) had a high misclick rate of 90%, indicating that users were uncertain about where to click. Several participants dropped out of the testing process due to unclear navigation and button naming. Furthermore, screens with strong visuals, like characters and symbols, resulted in a higher miss-click rate, which could lead users off track.

To address these issues, it is necessary to simplify the UI without losing the effectiveness of gamification. Clear navigation, organisation of information, and visual prioritisation should be ensured so that users can navigate without getting distracted.

#### **8.4 Feedback on User Testing Setup**

Many people commented that there were problems with the user testing process. One of the main issues was that the task screen size was not optimised for some mobile devices. Also, the free version of the Maze was limited in giving enough information about the purpose and tasks to the user. To avoid these problems, testing the mobile device screen with several people in advance and providing short and clear instructions and guidance is important. It should also be noted that most of the participants were new to the Maze, so it would have been helpful to provide a detailed overview of the app and its purpose in the invitation. Although Maze collected a rich amount of quantitative data and feedback, it would have been more effective to test the features in person in addition to using the online tool. By implementing these improvements, user testing results can be more accurate and effective.

#### **8.5 The Summary of the Points of Improvements**

The following nine improvements were proposed based on the results of the user test:

1. Implement time-limited availability for symbols.
2. Provide information about the symbols' growth.
3. Offer unlockable items for customising the space.
4. Create an evolving space field based on the user's level.
5. Conduct further research for specific user groups.
6. Design a simple UI with effective gamification.
7. Ensure clear navigation and visual prioritisation.
8. Prioritise mobile screen testing with concise guidance.
9. Add in-person testing as an additional measure.

Although these changes were not feasible to implement in this project, it is desirable to consider improving the app and conducting continuous user testing.

## 9 DISCUSSION

This research was based on the fact that gamification can effectively increase user engagement and motivation. This thesis explores the efficacy of the Octalysis framework in app design processes. The Octalysis framework is designed to stimulate user motivation and potentially improve performance. However, not all of its elements were utilised in this study. The author emphasises the importance of effectively deploying core drives based on research. The effectiveness of this deployment varies depending on the project setting and the specific test. Therefore, the results from this study can only suggest that the Octalysis framework may stimulate user motivation and improve performance. Further research is needed to prove its effectiveness since its impact varies depending on the project and the situation. This study aimed to answer two research questions raised in the introduction.

The first question was about the *validity and practicality of applying the core drives of the Octalysis framework in the gamification design process*. The Octalysis was integrated into the Double Diamond Process to assess its validity and practicality. The results showed that the framework was effective in identifying areas for improvement, investigating user motivation, and proposing new features based on core motivational factors. User testing confirmed that the new features proposed by the framework were indeed motivating for users. Additionally, it was observed that targeting several core drives within a small number of features can reach different types of users. Throughout the design process, it was suggested that the Octalysis framework can be effective when detailed user profiles are available, and their motivations can be analysed more deeply. Furthermore, it can be used iteratively during the feedback phase and market research for existing features to identify necessary improvements. Furthermore, it can be used iteratively during the feedback phase and market research for existing features to identify necessary improvements. Overall, the Octalysis framework can be seen as useful tool for identifying and prioritizing the core motivational factors of user engagement in gamification design.

The second research question was about *the practical obstacles and success factors in the MorrowX mobile application development process*. An obstacle was

the fact that only one workflow feature was tested during user testing, which may have made it difficult for users to provide accurate feedback on motivational and emotional changes throughout the app. Additionally, the app was in the MVP phase with no real users, making it difficult to identify real groups of users and the need to target a wide audience. A further consideration is that as the testers would only use the app this one time, it was not possible to experiment with long-term effects. Success was the ability to collect a sufficient number of testers and feedback. Furthermore, the tests revealed a good affinity between sustainability and gamification. The gamification elements incorporated in the project were in line with internal motivational factors such as autonomy and a sense of achievement, which kept users motivated.

As a recommendation for future research, initiatives to improve the accuracy of apps and user testing to further demonstrate the effectiveness of apps, as identified in the previous chapter. Moreover, while the study focused on the direct effects of app usage, it is essential to delve deeper and understand the behavioural changes and sustained engagement of app users over time. In particular, it is crucial to gain insight into how gamification elements impact user motivation and willingness to participate in sustainable practices. Additionally, analysing patterns of app retention rates and sustained use can provide valuable insights into the effectiveness of sustainability-promoting mobile apps. Furthermore, conducting further research on the effectiveness of the Octalysis framework and gamification in promoting sustainable behaviours would be highly beneficial, given the limited amount of previous research in this area.

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elearning](https://www.riseup.ai/en/blog/gamification-elearning)

## APPENDICES

### Appendix 1. User Testing Form

1(1)

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#### QUESTION

#### What is your age?

 <20 21 - 30 31 - 40 >40

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#### Which of the following best describes you?

This question aims to understand the tendency to engage in sustainability-related actions. Actions such as using public transportation, recycling, saving energy, or purchasing reusable products are considered. Please indicate to what extent you engage in sustainability-related activities based on your own behavioural patterns.

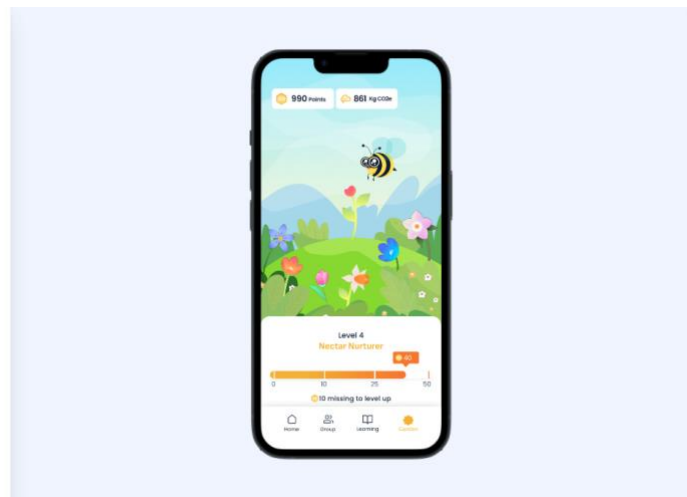
 I am interested in sustainability and take action regularly I am interested in sustainability, but do not take action regularly I am not interested in sustainability, but I take action regularly I am neither interested in sustainability nor do I take action regularly

## TASK

**Complete the action required to reach the next level and decorate garden with collected flower.**

**Try to complete the following tasks:**

1. Complete an action titled 'Switching 1 light from Incandescent to LED'.
2. Obtain a new flower badge.
3. When the bee plants a new seed find the flower collection screen.
4. Select the most recently acquired flower badge.
5. Choose where to display the flower: in your personal garden or the group's garden (invited by school or company).



## QUESTION

**How satisfied were you with your experience using this feature?**



## QUESTION

**How interested would you be to recommend this app to a friend?**



Not at all.

Very much!

## QUESTION

**Which of the following describe how you felt while using the app (select all that apply)?**

Achieving something meaningful or significant.

Progressing towards my goal.

Encouraged to be experimental.

Having ownership over my progress.

Being part of a community.

Something rare and urgent.

Unexpected feature that surprised or excited.

Motivated to avoid potential losses or negative outcomes.

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QUESTION

**Please share your opinion of the app**

1. Do you see yourself using the app regularly in the long term? Why or why not?
2. What aspects of the “level-up” and “decoration” features motivated you during testing?
3. What other thoughts have you about the experience?

Type your answer here