**Design Chapter of Final Report (2,500 words)**

Table of Contents

[1 Requirements Analysis 2](#_Toc126417998)

[1.1 Scenarios 2](#_Toc126417999)

[1.2 Hierarchical Task Analysis 2](#_Toc126418000)

[1.3 Functional Requirements 2](#_Toc126418001)

[1.4 Non-functional Requirements 2](#_Toc126418002)

[2 Design Decisions Rationale 2](#_Toc126418003)

[2.1 Literature Review Insights 3](#_Toc126418004)

[2.2 Scenarios and HTAs Insights 3](#_Toc126418005)

[3 Prototyping 3](#_Toc126418006)

[3.1 Low Fidelity (Hand Drawn) Prototypes 3](#_Toc126418007)

[3.2 High Fidelity Prototypes 3](#_Toc126418008)

[4 Design Guidelines 3](#_Toc126418009)

[4.1 iOS Guidelines 3](#_Toc126418010)

[4.2 Android Guidelines 3](#_Toc126418011)

[5 References 4](#_Toc126418012)

# **Requirements Analysis**

This section implements the frameworks used in the field of Human Factors (HF), or Human Computer Interaction (HCI), namely scenarios and hierarchical task analysis, to develop further insight into what users may feel, experience and what they are trying to achieve by using the gamified mobile app in this project. By implementing the scenario and hierarchical task analysis frameworks, improvements can be made to the design of the app to provide a more seamless experience for the users.

## **Scenarios**

This section provides some user scenarios associated with the mobile application to be built for this project. The scenarios illustrated in this section are an unmotivated environmentalist, a curious environmentalist and a competitive non-environmentalist. The purpose of this section is to gain insight into how the users feel, what they experience and what they are trying to achieve when using the mobile application, taking into account their personal characteristics and diverse backgrounds.

### **Unmotivated Environmentalist**

### **Curious Environmentalist**

### **Competitive Non-environmentalist**

## **Hierarchical Task Analysis**

Following on from the scenarios discussed in the previous section, this section provides the hierarchical task analysis for these scenarios, offering insights into the most frequent, complex, and error prone tasks.

### **Unmotivated Environmentalist**

### **Curious Environmentalist**

### **Competitive Non-environmentalist**

## **Functional Requirements**

## **Non-functional Requirements**

## **Conclusion**

Within this section, scenarios and hierarchical task analyses were introduced and examined to illustrate user experience, reflecting good or bad design decisions. By taking into account diverse user abilities and backgrounds, as well as the most frequent, complex and error prone tasks of using the app, overall design of the app can be drastically improved. Further detail for the benefits of creating and analysing the scenarios and hierarchical task analyses will be explored in the next section on design decisions rationale.

# **Design Decisions Rationale**

The main motivators contributing to the design decisions rationale for the mobile app to be implemented are the literature review and the scenarios and hierarchical task analysis, discussed in chapters two and three respectively.

## **Literature Review Insights**

The literature review discussed in chapter two of this report examined the areas of carbon footprints and carbon footprint calculators, behavioural psychology and effective gamification design. Based on this discussion, the prioritised value-adding features which should be implemented are illustrated in figure 1 below.

<Insert excel table of lit. review features>

It is important to note that the literature review also referenced other features which could add value such as immersive gamification features (avatars, narration), but with the limited time constraint of this project and adhering to agile best practices, the features which add the most value are of the highest priority.

## **Scenarios and Hierarchical Task Analysis**

The scenarios and hierarchical task analyses discussed in section 1.1. and 1.2. provide great insight into what the users may feel when using the mobile app in this project. The scenarios provide great insight into what the users feel and may have difficulty with due to their personal characteristics such as lack of experience with technology or weaker eyesight, and

the hierarchical task analyses provide great insights into the most frequent, complex and error prone tasks. By analysing the scenarios and hierarchical task analyses, the prioritised value-adding features to implement in the mobile app are illustrated in figure 2 below.

<Insert excel table of scenarios and HTAs features>

## **Conclusion**

This section has explained how the literature review and scenarios and hierarchical task analyses drive the design decisions rationale. After analysing the prioritised list of value-adding features from the literature review and from the scenarios and hierarchical task analyses, there is heavy overlap across these prioritised lists. Various other features could be added to the mobile app at a later stage, but to deliver the most value in the given time constraints of this project, the features outlined in the previous sections will be the focus for implementation.

# **Prototyping**

***Question for Tim***

***Should I include the different versions of prototypes I had at the beginning and how they changed, or just explain how they changed through text, maybe use a table illustrating differences and version numbers.***

This section focuses on prototyping, further applying the knowledge from the field of Human Factors and Human Computer Interaction (HCI). In this section, low-fidelity (hand drawn) and high fidelity prototypes were created to visualise the users’ workflow, simulating their experience with using the app.

## **Low Fidelity (Hand Drawn) Prototypes**

The first stage of prototyping for this mobile app began with low-fidelity prototypes in the form of hand drawn prototypes. Hand-drawn prototypes were first created since they are very quick to create, effectively aid in visualising user flow and avoid the designer experiencing sunk-cost fallacy, where the designer is reluctant to abandon the prototypes because they have spent a lot of time working on the prototypes, even though they know abandonment would be more beneficial” (<https://hbr.org/2021/07/how-susceptible-are-you-to-the-sunk-cost-fallacy>).

Figures 3-9 below illustrate the original hand-drawn prototypes for the app.

Diagram

Description automatically generatedA white board with writing on it

Description automatically generated with low confidenceText, letter

Description automatically generated

Text, letter

Description automatically generatedA piece of paper with writing on it

Description automatically generated with medium confidence

A piece of paper with writing on it

Description automatically generated

Text, letter

Description automatically generatedText, letter

Description automatically generated

## **High Fidelity Prototypes**

After analysing and iterating through different versions of low-fidelity prototypes, high-fidelity prototypes were then created using the online software tool Figma. The high-fidelity prototypes provide a cleaner, crisper, more realistic user experience to further gauge feedback from users’ experience, frustrations and enjoyment with using the app.

Figures 10 – 16 below illustrate the high-fidelity prototypes for the app.

Graphical user interface, text, application, chat or text message

Description automatically generatedApplication

Description automatically generatedApplication

Description automatically generated with low confidence

Graphical user interface, text

Description automatically generated

A screenshot of a cell phone

Description automatically generated with medium confidenceA screenshot of a cell phone

Description automatically generated with medium confidence

A picture containing graphical user interface

Description automatically generated

# **Design Guidelines**

## **iOS Guidelines**

## **Android Guidelines**

# **Conclusion**

This chapter has focused on the design for the gamified mobile app to be implemented for this project. The scenario and hierarchical task analysis frameworks from the field of Human Computer Interaction (HCI) were implemented, gaining further insight into user experience when using the app. The design decisions rationale are motivated through the insights gained from the literature review and the scenarios and hierarchical task analyses. By iteratively creating the hand-drawn prototypes and then progressing to high fidelity prototypes, user flow was visualised and improvements to the overall design were made.

# **References**

<https://hbr.org/2021/07/how-susceptible-are-you-to-the-sunk-cost-fallacy>