

Designing and Prototyping A Daily Planner and Habit Tracker for

Students and Young Adults

Umayr Hussain (200416254)

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BSc Computer Science

Supervisor – Prof. DS Kirk

**Author Note**

School of Computing, Newcastle University

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### Abstract

The aim of this project is to design and prototype a high fidelity, daily planner mobile application that supports students and young adults' wellbeing, enforces the reaffirmation of good habits and the impediment of bad habits; as well as assisting in the improvement of organization and the enhancement of students learning. I conducted research methods such as questionnaires and user interviews, to gauge an understanding of the demographic; as well as review important and relevant literature and applications to the project to ensure the design meets industry standards and follows habit formation theory/psychology.

Declaration

I declare that this dissertation represents my own work except where otherwise stated.

### Acknowledgments

I would like to thank my supervisor David Kirk, for his guidance, support, and invaluable feedback throughout the entire process.

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## **Chapter 1 – Introduction**

This project was based around developing both a daily planner and habit tracker for students and young adults in the form of a mobile application. I will go on to describe all of the research conducted, as well as justifying my choices in research methods and design rationale.

This opening introductory chapter consists of a quality aim and coherent, principled objectives which are derived from the motivation and research conducted and presented, justifying the need for a more student-orientated daily planner and habit tracker. This chapter also outlines the structure of chapters within this dissertation.

### **1.1 The Problem**

#### **1.1.1 The Situation for Students and Young Adults.**

Transitioning from upper secondary school/college to university can be very daunting for a lot of students. According to reports, only 37% of students remain at home whilst studying (AHZ Associates, 2020). This indicates that most students move out when studying at university, for almost all the students, it'll be their first time living away from their parents. This new chapter of life that students take part in will incorporate a lot more responsibility as they will be given full control over their own time planning.

Personally speaking, I know that this transition was a big step-up for me, and I certainly found it a challenge to develop a good work-life balance. Acknowledging the hardships that students face is just as important as recognizing post-university depression amongst young adults. It can take months to find a graduate level job after graduation, depending on the

industry and the level of competition (Pucci, 2022). 49% of students surveyed also admitted that their mental wellbeing declined after leaving university (Baxter-Wright & Davies, 2019). With such a steep number of graduates mental wellbeing suffering, it is important that even whilst on the career hunt they remain pro-active, staying healthy through exercise, hobbies, and socialization. Being active releases chemicals in your brain that make you feel good – boosting your self-esteem and helping you concentrate as well as feel better (Mental Health Foundation, 2021). The impediment of bad habits like laziness or smoking and the completion of good habits such as exercise can have a drastic effect on mental well-being.

Therefore, it is important for students and young adults to get in the habit of planning their days out so that their lives are well structured and organized; this new shift of authority and freedom can often give way to an abuse of power in the form of common vices that are popular within university culture, this can lead to underperformance, chronic fatigue syndrome and depression.

### **1.1.2 University Culture Encouraging the Development of Bad Habits.**

According to the Office for National Statistics, 37% of first-year students surveyed in England at university have developed symptoms of depression and anxiety (Okolicsanyi, 2020). Key factors that can lead to depression as stated by the NHS include loneliness, alcohol, and drugs (NHS, 2019). According to a survey published by the Student Organization for Sustainability, over half of students' report drinking alcohol more than once a week (53%) and most of the respondents feel as though getting drunk is a part of university culture (81%) (SOS UK, 2022). On top of all these issues that students face, literature collected from the London School of Economics states that 50-70% of students that move out whilst studying at university face homesickness (Xuan, 2022).



There are already countless daily planner mobile applications, such as Brite and Done, however they all fail in truly understanding the deep-rooted issues that are engrained in student culture. It is important to recognize these consequential issues that arise from the gain in authority associated with university, as they affect a significant proportion of the student population. Only by addressing these issues and ensuring that they are not materialized, can we assist in both improving students' organizational skills, and the development of a good work-life balance.

### **1.1.3 The Rationale and Logistical Justification of the Project.**

The goal of this project is to solve these problems by offering students and young adults a mobile application that will allow them to structure and plan their day. This will lead to improved organization, the enhancement of students learning, and the maintenance of a healthy life through exercise and nutritional needs. There are numerous ways in which daily planners benefit students, Surtrees highlights 5 of the top benefits in this Penstripe article, which include improved mental wellbeing and increased productivity (Surtees, 2022). To aid in this, the application will also prioritize the impediment of bad habits in addition to encouraging the reaffirmation and development of beneficial habits.

## **1.2 Aim and Objectives**

### **1.2.1 The Aim.**

Design and prototype a high fidelity, daily planner mobile application that supports students and young adults' wellbeing, enforces the reaffirmation of good habits and the impediment of bad habits; as well as assisting in the improvement of organization and the enhancement of students learning.

### 1.2.2 The Objectives.

1. Develop an understanding of the students' needs and the requirements needed to complete the project by completing three areas of qualitative fieldwork. Start with conducting user interviews, leading to the development of two user personas, using gained knowledge to further develop user understanding. Then create and ideate empathy maps for the previously created user personas. This should aid in the creation of a requirements document.
2. Perform further research, developing a better understanding of the students' needs through the production of a 6-question questionnaire that contains both qualitative and quantitative questions. The aim should be 20+ responses to ensure that enough data is collected and that there is no bias, selection bias, or response bias.
3. The Completion of a literature review and state-of-the-art review within 3.5 weeks. This timescale allows plenty of time for the completion of the reviews, which is essential for ensuring the effectiveness and practicality of the application. These reviews are also crucial for gaining insight into the latest research and trends in the field, and they will help inform the development of the application.
4. Ideate the basic layout of the application through the production of a low-fidelity wireframe within a time span of 6 days. This will provide a visual representation of the application's layout, which can aid in identifying design flaws and necessary changes.
5. Develop a functional and applicable habit tracker to improve student wellbeing and offer support to students. This will aid students in making positive changes in their behavior. Designing this habit tracker to track both good and bad habits is a feasible task that can be achieved through planning, testing and execution.

6. Carry out iterative usability testing after the construction of the digital prototype within the final 3 weeks of the project to evaluate and refine the app for users. This is critical for ensuring the application is user-friendly and meets the needs of its target audience. This timeframe is more than reasonable for conducting the testing and making any necessary refinements to the app.
7. Complete the dissertation write-up on the project, ensuring all other deliverables are also submitted on time. This is essential for obtaining the academic qualification. Setting deadlines and having planned out all the work in the form of a Gantt Chart will aid in ensuring that everything is handed in on time.

### **1.3 A Change in Research Methods**

Since the project proposal I have made a few changes, one key change being the creation and ideation of empathy maps and user personas instead of focus groups. The reason being that I wanted to garner a deeper understanding of the user behavior and needs. This will allow me to empathize with different personal contexts and narratives, as well as map out potential user pain points within the application. Whilst focus groups also could have worked, I feel as though I may have struggled to get honest opinions on some of the more sensitive topics, such as common bad habits that students pick up throughout their time at university. This is because during focus groups it's hard to get participants to voice their opinion freely, due to fear of being judged by others present. LaMere goes on to explain how focus groups are not a forum for tapping "true" feelings. Due to the complexity of humans and conflicting motivations. Furthermore, people often lie when they feel uncomfortable (LaMere, 2010).

## **1.4 Dissertation Structure**

### **Introduction**

Chapter 1: Introduction

This chapter is a descriptive and precise introduction to the project, including the motivation, aims, objectives and structure of the dissertation.

### **Background Review**

Chapter 2: A Qualitative Deep Dive into Habit Cultivation and Psychology

Chapter 3: A State-of-The-Art Review Surrounding Daily Planners

This section contains a reasoned deep dive into habit formation psychology and theory, evaluating strong and convincing pieces of literature as well as comparing current daily planners already available.

### **What was done, and how**

Chapter 4: Requirements Gathering & Design Planning

Chapter 5: Results, Execution, Implementation and Verification

This section consists of a descriptive analysis of methods and tools used, justifying the choice behind certain methods. It also contains the design explanation as well as the design rationale for certain choices made whilst creating the application.

### **Results and Evaluation**

Chapter 5: Results, Execution, Implementation and Verification

Chapter 6: Evaluation of The Design and Approach

These chapters contains an evaluation of my approach to the design and research, delving into what I would do differently if I was to do the project again, as well as what was done well with justification.

## **Conclusions**

### **Chapter 7: Conclusive Remarks**

This chapter is based around my conclusive thoughts of the project, including future work that could be conducted to improve upon the design of the application.

## **Chapter 2 – A Qualitative Deep Dive into Habit Cultivation and Psychology**

In 1748, David Hume proposed the notion of “habit” as a fundamental mechanism for the development of psychological and epistemological complexes (Barandiaran & Di Paolo, 2014). Throughout this chapter we will not only delve into how this notion has evolved to fit the context of mobile applications, but also study how mobile applications are used on a day-to-day basis to support self-monitoring healthcare.

### **2.1 Designing Smartphone Apps That Support Habit Formation**

To better understand how smartphone apps could help support the process of habit formation, this academic paper Katarzyna Stawarz critically examines 115 existing habit formation applications, examining common shortcomings and limitations that are popular within the field. Stawarz argues that apps and technology-based interventions in general, have the potential to provide real habit support, and present design guidelines for interventions that could support habit formation through contextual cues and implementation intentions (Stawarz K. , 2015). To ensure that these behavior-change applications have maximum impact, designers of these technologies need to understand the mechanisms of behavior change and tailor interventions accordingly (Klasnja, Consolvo, & Pratt, 2011).

At present behavior change apps are not based on behavior change literature, and apps that attempt to use behavior changing techniques tend to focus on supporting motivation and developing relevant skills rather than habit formation. These applications focus on tracking and self-monitoring. The lack of habit support might be related to the overall lack of theoretical grounding of such apps (Cowan, Van Wagenen, A Brown, & J. Hedin, 2013).

### **2.1.1 The varying elements of habit formation.**

Habits are defined as automatic responses to contextual cues. They form as the behavior is repeated in a stable context and the repetition helps to create associations between the task and its cues (Wood, 2007) Cues and trigger events support the habit formation process, as they start to drive the behavior. Stawarz goes on to mention how tasks that need to be

completed at a specified time are typically harder to remember than tasks linked to routine events. These tasks linked to routine events are also known as implementation intentions.

This relationship between task and contextual cue can naturally and automatically form over time, however it is possible to steer this process through the use of implementation intentions (Gollwitzer, 1999). Connecting this new behavior with a pre-existing routine helps develop the behavior into something that becomes second nature. For example, associating waking up in the morning with brushing your teeth is a healthy habit that has been fully automatic for most of us since a young age. Since successful habit formation is based around increasing automaticity, I see it as vital to link the most arduous habits (such as the endeavor of studying) to existing tasks in order to increase the likelihood of the habit forming.

Stawarz also mentions the power of positive reinforcement and its direct influence on habit formation. Even small successes increase the feeling of satisfaction and can strengthen the habit (Aarts, 1997). Satisfaction can also trigger the feeling of being in control, which reinforces the need to repeat the action in the future. By identifying the execution of the task with reward, users will subconsciously associate the behavior with a reward, helping aid in the process of habit formation and automaticity.

### **2.1.2 Most Applications approach to changing behavior.**

Behavior-change apps tend to focus on personal health and wellness, physical activity, and healthy eating (West, Hall, Hanson, & Barnes, 2012). These apps typically focus on regular repetition and contextual cues when attempting to increase habit formation. However, Stawarz details how these apps fail in supporting habit formation. This is because they tend to not be grounded in research.

Studies that explore the theoretical grounding of behavior change apps show that they often lack any relevance to the pertinent literature. For example, Cowan et al. (Cowan L. , 2013) conducted a content analysis of 127 Health & Fitness apps to determine the extent to which these apps are based on health behavior theory and discovered that they lacked any theoretical content. Often habit formation apps are useful for tracking habits and supporting habit development in its early stages, however they lack following the relevant theory on habit formation. Stawarz goes on to highlight the importance of teaching users about prompts, reminders, and contextual cues to support habit formation.

Apps developed by HCI researchers are no different. They tend to focus on tracking, self-monitoring and social support (Klasnja, Consolvo, & Pratt, 2011). These applications encourage users to use them on a regular basis, whilst this can be useful for habit formation, it creates a dependency on technology. An approach where Stawarz et al. (Stawarz & Cox, 2014) presented three requirements for designing apps that support habit formation. One requirement being post-completion checks, to check whether the task has been completed after the scheduled time. Another requirement being that apps should offer routine creation in the form of implementation intention, to help fit the behavior into a daily routine. Following this rule my current plan is to have the habit tracker functionality engrained into daily events



of the user. I plan on linking the two by allowing the user to tag habits in different events throughout their day. If the user keeps tagging the same habits with certain events on a day-to-day basis this should severely aid in habit formation.

Stawarz briefly mentions the difference between behavior change apps and habit formation apps, with the latter's aim being to help people repeat a new behavior. This can be a part of a wider behavior change goal. Behavior change apps tend to focus on the initial stages of the behavior change process. On the other hand, habit formation apps support repetition and maintenance of new behaviors until they reach a state of automaticity. The level of support needed for a habit to reach a good level of automaticity varies from person to person. For example, it may be more of a struggle to reach this state with studying in comparison to exercising for one person, and the opposite for another. Understanding how habit formation apps work could inform the design of features that effectively facilitate the development of new habits.

### **2.1.3 A review of current habit formation applications.**

Hundreds of habit formation apps are currently available, Stawarz mentions the lack of academic research around these applications. The theoretical grounding in this area of research is also not known. Due to this Stawarz decided to conduct a study to explore whether these apps are grounded in both habit formation and behavior change research. In this study the keyword "habit" was searched in the UK version of the Apple App Store and Google Play, results were then scanned to identify apps designed specifically to support habit formation. After results were filtered, in total 115 apps ended up being relevant to the study. A list of feature categories was then created, app features were listed in detail and grouped into 14 broader categories.

To assess the effectiveness of habit formation, Stawarz and colleagues coded for whether the features of the apps supported the use of contextual cues, helped to form implementation intentions, or provided positive reinforcement. Since habit formation is a part of a wider behavior change process, features were also matched with corresponding behavior change techniques from the Behavior Changer Techniques Taxonomy (BCT Taxonomy, 2014). Based on this a list of techniques was produced that could be delivered by these applications. Items from this list were then matched with functionality of the different apps.

The overall functionality of the different apps differed due to what features were contained within them. The most popular feature was task tracking, this was available in 77% of the apps. 35% of the applications allowed users to set overall goals that could be achieved through the development of specific habits. The last important feature was the option to track the progress towards the overall goal, with 23% of apps offering this.

One key important feature that only 3% of applications included was contextual cues and helping people fit new habits into their daily routine. Two apps provided A step-by-step guidance, and only one app closely followed recommendations from the literature, which is for each habit, users had to specify a cue or activity. New habits being linked to trigger events throughout their day would help to associate this new habit with an ongoing activity that occurs on a day-to-day basis.

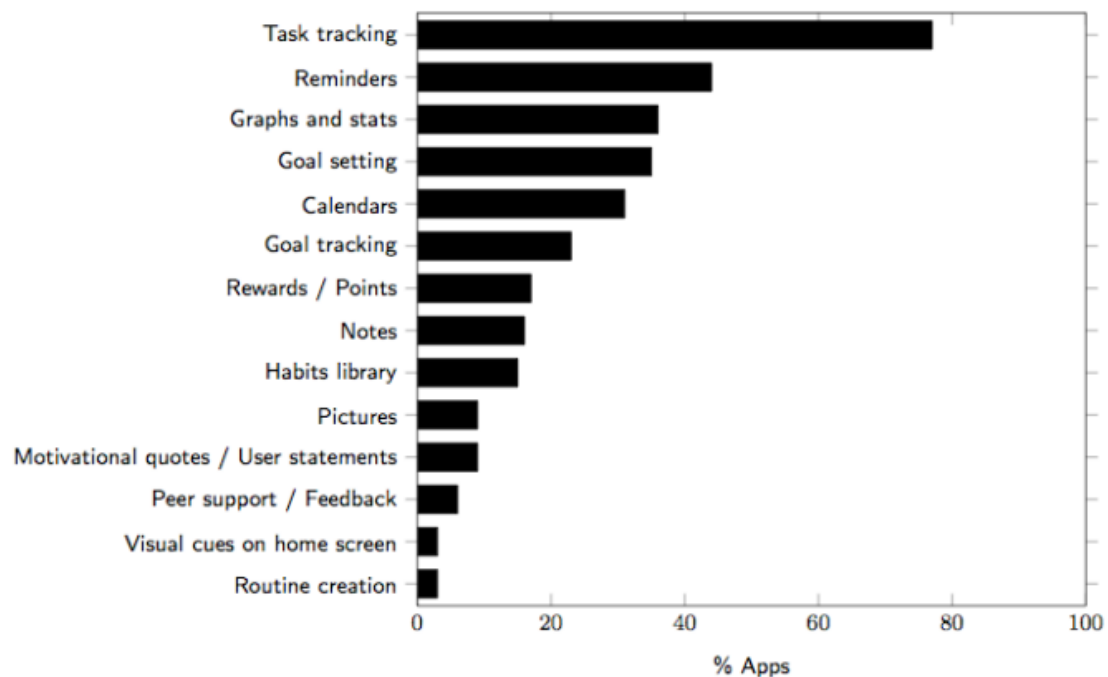


Figure 1 – A bar chart highlighting the percentage of applications that offer different features.

When dealing with actual support for habit formation, only a few features provided the relevant support following the habit formation literature. Previously discussed literature suggested that contextual cues, trigger events and positive reinforcement all support habit formation. Amongst the features that did support habit formation, those providing positive reinforcement were the most common, even though it is the least effective form of support for developing automaticity. We know this from a previous study on habit formation in the wild. This study was also carried out by Stawarz earlier in the report and delves into which type of cues are the most effective for the development of automaticity of behavior in real-life settings. Stawarz goes on to mention how some apps offer features that serve as cues to action. The issue with these cues is that they were smart phone based, straying away from the literature, and creating a dependency on the smartphone instead of helping the user build associations between the task and contextual cues.

#### **2.1.4 Design guidelines for habit formation apps.**

In the academic report, there is a section that details explicit guidance for the design of future habit formation apps. The first and most useful piece of advice that Stawarz presents is the idea of allowing users to form implementation intentions and supporting trigger events. For example, “I will do X after eating breakfast.” The ability to tag habits on to trigger events will allow users to create an association between the event and habit, leading to the user developing automaticity with the habit. To go further on this, ask the user later if the task was completed. If the user keeps forgetting to complete the habit, suggest selecting a different trigger event. The next guideline was produced through studying habit formation, which can be seen in the earlier stages of this report (Stawarz K. , 2015). This guideline is based around proper use of reminders and how to use reminders to reinforce implementation intentions. Remind users of their implementation interactions in advance by sending notifications before their selected trigger actions (Stawarz K. , 2015). This allows users to remember and will help form associations between the task and its trigger. Whilst this does create a temporary reliance on technology, once automaticity develops with the association between the habit and trigger, the user will no longer need the reminder for the habit. On average it takes 66 days to form a habit (Lally, 2010). When designing a habit tracker, one design consideration could be to automatically phase out a reminder for a habit by 66 days. The last guideline that Stawarz highlights is the avoidance of features that teach users to rely on technology. Whilst reminders and self-tracking tech can be great, it is important to follow the psychological studies completed on habit development and avoid allowing a dependency on these features to grow. If these features are not implemented properly, they can interfere with the process of developing associations between contextual cues and the task. This is a key issue with most habit trackers that are available today, they rely too heavily on technology, which leads to

habits not forming. This leads to the user not completing the habit once they stop using the application.

### **2.1.5 Comprehensive insights from the literary work.**

This paper highlighted the lack of applications that are designed to explicitly support habit formation, and the abundance of apps that are primarily focused on providing features that support self-tracking. Self-monitoring is important in the early stages of the behavior change process and is often used in interventions (Free, 2013) as it helps people understand their behavior, set realistic goals, monitor progress, and maintain motivation (Bandura, 1991). Whilst this is an important part of a habit tracker, it does not help users form associations between the task and the environment or the development of automaticity. Reminders can also be great for helping users make sure they complete their habits at the scheduled time; however, this can also lead to the user gaining a dependence on the technology if there is not actual support for habit formation. This can lead to the hindrance of the development of automaticity for new habits. Stawarz does a good job at highlighting just how important it is to also make habit formation a primary focus. Only with the correct support for habit formation can self-tracking be effective.

Throughout the quantitative and qualitative research that Stawarz and her colleagues completed, the data gathered showed that only 5 out of 14 feature categories identified in the applications could be matched with factors supporting habit formation. All features could be matched with behavior change techniques. Whilst this is also important, the lack of understanding of habit formation in habit tracking applications is widespread, with no real perfect application being known to exist. The study also highlighted the importance of event-based cues to support the development of automaticity, and the use of time-based cues to help

participants stay engaged. However almost all habit formation apps are not grounded in habit literature. Rather they provide functionality to enable tackling of task completion and reminders. Whilst this functionality is important, it means that these applications do not fully support habit formation. Apps have the potential to do so if they are designed to support identification of and reliance on trigger events for habits as well as reliance on reminders and tracking (Stawarz K. , 2015).

## **2.2 Analyzing Habit Tracker Apps and User Health Behaviors**

One source that gave me a great insight into habit cultivation and addictions was a piece of literature written by Edwin Shen (Shen & Shen, 2019), which delves into the development and thought process behind an application that supports self-monitoring smartphone usage and healthcare behaviours in daily life. The literature details how this development effort gave commodious space for an application that is capable of encouraging and instilling self-discipline and self-improvement in the user, through the use of formulated alerts and reminders set throughout the day. The app also aims to focus on helping users use smart devices more appropriately and pursue long term healthy life, to visualize the result of both addiction improvement and the development of healthy habits. This is also a key aim of the project that I am currently working on.

### **2.2.1 Current addiction management application features.**

The report delves into pre-existing mobile addiction management applications, detailing a table comparing current addiction improvement and habit development apps, such as Fabulous and Habitica. These are both apps that I have drawn a significant amount of

inspiration from for the project at hand. The table compares how the different apps tackle implementing features such as addiction treatment, management, and habit cultivation.

Whilst working on my design I will use this table as a key reference to see how similar apps tackle the development of certain features.

App	Fabulous	Habitica	AppDetox	Forest
<b>Feature</b>	Use the gamification method to practice and let users gradually develop healthy habits in the process of "intimate" and "fun."	Combine habits into RPG games and use high gamification to stimulate user motivation.	A tool to improve addiction problems by controlling application usage	A work that allows players to "keep focused and remind yourself that you do not want to use your phone when you need to concentrate."
<b>Addiction Treatment</b>	none	none	You can set usage limits for your application, such as usage time limits. The application will not be available at a specific time specified, or the number of starts will be limited.	This program focuses on the habit of no mobile phone. Improve the goal of mobile addiction by limiting jumping to other foliage
<b>Habit Cultivation</b>	1. Provide customary advice to help users find the right target. 2. Customize the project by entering the target completion degree by the user.	You can set up a habit to develop a plan and take daily development and unfinished things as a task.	none	Focus on a habit to develop: no mobile life

*Figure 2 – A screenshot of a section of the table detailing and comparing a few of the different features of the applications (Shen & Shen, 2019).*

### 2.2.2 The crucial health habits for daytime workers.

One key feature of the application detailed in the report that is of significant interest to me is the encouragement of the development of healthy habits. Shen decides to make the four most crucial health habits for daytime workers a key focus of this part of his application, these include quantitative drinking, regular meals, compliance exercises and in-good-time sleep. Taking inspiration from Shen's approach to the development of healthy habits, I have also decided to make these four items a focus of my application as they are essential for living a healthy life. Expanding on Shen's health habits for daily workers the application that is being

designed will also push a more academic agenda by making studying a preliminary habit.

This is necessary as the daily planner is for students, finding time to study can be challenging whilst at university. The development of study habits is associated with a greater ability to study under difficult circumstances, higher classroom engagement, and higher homework completion (Galla & Duckworth, 2015).

*Figure 3 - A table detailing the 4 most crucial health habits for daytime workers (Shen & Shen, 2019).*

Health Habit	Time	Quantity/Category
<b>Drinking</b>	Drinking time $T_{drinking}(d)$	Drinking water (200/400/600 ml) $T_{drinking}(d)$
<b>Dining</b>	Dining time $T_{dining}(d)$	Meal (Breakfast/Lunch/Dinner)
<b>Exercise</b>	Length of exercise $T_{exercise}(d)$	Sports category
<b>Sleep</b>	Sleeping time $T_{sleep}(d)$	Sleep length (in hours)

### 2.2.3 Shen's Habit Tracker.

The report also details interface design and the approach that Shen took on implementing three different functions, including screenshots of the main app pages and display. This will be another key reference that I will be constantly looking back at whilst building my design, as often new, refreshing ideas can spring to mind when reviewing previous academic work that is related to the current project at hand.





*Figure 4 - Shows a few of the key function pages that Shen designed for his habit tracker (Shen & Shen, 2019).*

### 2.3 Analyzing A Qualitative Study of Lift, A Habit Cultivation Application

Similar to Shen, Ian Renfree also delves into habit cultivation in this academic report detailing the role of dependency in habit cultivation applications (Renfree, 2016). Renfree establishes different techniques that are effective at supporting the repetition of new behaviours, such as streaks and reminders.

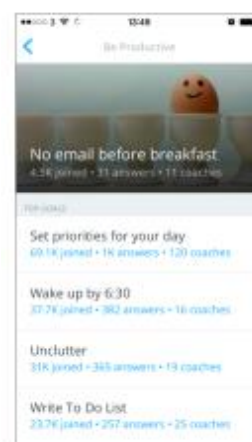
This literature states how difficult it can be to change a behaviour even when intentions are strong, “many fail at making sustainable changes; only 8% keep New Year’s resolutions” (Statistic Brain, 2018). Yet a recent theoretical analysis concluded that applications such as Way of Life and Productive marketed to support habit formation, generally do not support the key components required (Stawarz K. , 2015) (Renfree, 2016). Despite this, the study details the popularity of these applications on the app store, with them all bolstering high reviews.

### 2.3.1 A Qualitative Study on Lift

Renfree also provides an in-depth qualitative study of a pre-existing habit cultivation app, Lift. He unearths how this particular application uses several different mechanisms to motivate regular usage. One key mechanism that acts as a reward feature is streaks of behaviour, “they are built when behaviour is performed for a series of consecutive days - the number of days act as a streak.” (Renfree, 2016). When Renfree interviewed users of lift to better understand their experiences and outcomes with the application he mentions, “streaks were cited by the most participants as a key feature that helped them maintain motivation” (Renfree, 2016). Rewarding the user in such a manner, is essentially a form of gamification. This will create room for longer term behaviour changes to take place in the user’s life. We can visualize just how effective this is as the longer the streak goes on, the more inclined the user is to keep it. The activation of a fear from the user of losing a streak, is leveraging loss aversion, which is the disproportionate impact of loss versus the comparative gain (Tversky & Kahneman, 1991). After reviewing Renfree’s study I have also decided to implement streak-like feature in the design of my mobile application, to prompt users to complete their daily habits in order to keep the streak alive.



*Figure 4 - Lift screenshot: confirming completion of a habit.*



*Figure 5 - Lift screenshot: selecting a new habit to join.*

During the study conducted by Renfree habits and behaviours that the participants were most successful with tended to be specific and easy to perform and were often added to existing behaviour routines. For example, drinking a cup of water can be associated with going to sleep and waking up. To encourage and reinforce habit development in my own design when working on my own habit tracker functionality, I plan on allowing users to tag habits on to events throughout their day. This will help users associate certain activities with certain habits, this association will develop to a level over time where the behaviour becomes automatized. It is also important to allow users to create and schedule specific and precise habits throughout their day.

### **2.3.2 The power of reminders when used right.**

Renfree also alludes to the effectiveness of reminders, and how participants used reminders to trigger habits that needed to be performed at certain times (Renfree, 2016). This can be done through notifications, meaning that the user wouldn't even need to open the application to complete the habit. In turn, this helps users mitigate forgetfulness, as they have planned to execute this certain habit or behaviour at the given time.

There is an issue with this though, reminders scheduled throughout the day that are based purely on time, lack contextual information (Renfree, 2016). To combat this, I will design the habit tracker to allow users to schedule habits around their individual days. This will ensure that, for example, the user doesn't get their reminder to do 5 push ups whilst they are working their part time job.

## **2.4 A Study on the Usage of Mobile Applications in Daily Life Contexts**

Katarzyna Wac conducted a study in which she explores the experience of mobile applications used in different contexts of daily life, detailing the importance of how users perceive both quality of experience (QoE) and quality of service (QoS) in mobile applications, with a heavier, more substantial focus on QoE. The overarching aim of this study is to derive and improve understanding of user's QoE in different situations in their daily life environments. The way Wac goes about this is by delving into the initial data acquired and deriving a set of preliminary implications for mobile applications design from said data.

### **2.4.1 The importance of measuring quality of experience in the correct manner.**

Wac touches on how user expectations depend heavily on the user's past experiences with other applications, "Growing availability of diverse interactive mobile applications, envisaged to assist us in different domains of our daily life, make their perceived QoE increasingly critical to their acceptance" (Wac, 2011). Interpreting this approach, it denotes the importance of studying and reviewing similar applications to the application that you are designing, using them as inspiration and the foundation of your own application. Going further, the study details issues with current data evaluations of QoE that focus on an applications usability, where the studies are conducted for a limited time in very controlled laboratory environments. The issue with these evaluations is that they do not resemble users' natural daily environments. Sometimes these results can help to discover a mobile applications immediate usability design issues but are lacklustre when it comes to recovering issues that are relevant to real-life situations outside the lab. A big part of my software development process includes iterative usability testing. To ensure that I avoid a controlled

environment, I will conduct these exercises in a natural environment where the user will feel more comfortable, such as a local café.

#### **2.4.2 Similar studies on QoE and QoS carried out by other academics.**

A common trend amongst the previous literature reviewed is the relevancy and applicability that the related work section of these reports shares with the project at hand. This section of Wac's report covers a wide range of work conducted by academics. These varying reports study users' QoE and QoS of mobile applications, and how they can both be improved. One study that is relevant to the project was conducted by (Falaki, Mahajan, & Kandula, 2010), in which he measured how often users interacted with their phones. The results showed that users would interact with their phones on average 100-200 times a day, with each interaction lasting between 100-200 seconds. What's interesting about this study was that Falaki stated that the longer the user had not interacted with the phone, the less likely he/she will start interacting with it again. The reason this is relevant and interesting is due to the nature of the project. As the designer of the application this proposes a difficult conundrum, I need to ensure that the application is both gainful and interactive, whilst also limiting the number of times the user needs to open the application throughout the day. The reason for this being, the app is based around bolstering and boosting health and activity for students. If the user is constantly interacting with their phone to access the application, this will only lead to prolonged interactions involving other applications, leading to barren streaks throughout the day and encouraging lazy habits. The plan that has come to fruition is to utilize notifications to remind users of certain events and tasks scheduled throughout the day. Whilst the user will still have to interact with their phones to see the notification this should only be a quick glance, which in turn will hopefully avoid prolonged use of their phones with other applications.

### Chapter 3 – A State-of-The-Art Review and SWOT analysis

The daily planner as we know it can be traced back to 1773 by Robert Aitken, since then it has evolved and changed to suit modern needs. One of the background reviews I studied touched on how user expectations depend heavily on the user's past experiences with other similar applications, "Growing availability of diverse interactive mobile applications, envisaged to assist us in different domains of our daily life, make their perceived QoE increasingly critical to their acceptance" (Wac, 2011). Interpreting this approach, it denotes the importance of studying and reviewing similar applications to the application that you are designing, using them as inspiration and the foundation of your own application. In this section I investigate current, popular daily planner applications, delving into these applications strengths, weaknesses, opportunities and threats in the form of a SWOT analysis and heuristic evaluation.

#### 3.1 SWOT Analysis

SWOT Analysis of 4 Daily Planner Applications				
	Structured	Brite	Microsoft To Do	Yoodoo
<b>Strengths</b>	<ul style="list-style-type: none"> <li>Customization with colours and icons</li> <li>Sync data between devices</li> <li>Ability to create notes and subtasks</li> <li>Widgets as well as notification to increase focus</li> <li>Easy to create tasks, Brite over complicates this</li> </ul>	<ul style="list-style-type: none"> <li>In depth user onboarding</li> <li>Weekly view is scrollable</li> <li>20 tools in one app</li> <li>24/7 help centre, useful as application is complicated to operate</li> </ul>	<ul style="list-style-type: none"> <li>Simple yet effective application</li> <li>Accessible anywhere, just sign in with Microsoft account on any device</li> <li>Ability to easily share list, could be useful if working on group projects etc</li> <li>Customization - Change colours, theme, and background image</li> </ul>	<ul style="list-style-type: none"> <li>Time-blocks - Great productivity hack</li> <li>Ability to set reminders</li> <li>Focus tiers, great for studying</li> <li>good attempt at habit cultivation and routines</li> <li>Simple, engaging user onboarding</li> </ul>
<b>Weaknesses</b>	<ul style="list-style-type: none"> <li>Really only offers the daily planner functionality, no extra tools</li> <li>Have to pay to unlock most features</li> <li>Whilst the application is easy to use, its over-simplistic and doesn't offer much when compared to the other applications on this list</li> </ul>	<ul style="list-style-type: none"> <li>User onboarding is quite long in comparison to other apps</li> <li>So many tools, can be overwhelming when first getting used to app</li> <li>No contextual cues, even though the app has a habit tracker</li> <li>Habit tracker is underwhelming</li> <li>Have to pay for monthly view</li> </ul>	<ul style="list-style-type: none"> <li>No conventional weekly or monthly view like other apps on this list</li> <li>Can't plan for future days or weeks like the other apps</li> <li>Can't make a recurring item be on the list every day</li> <li>Really no need, just a glorified notes application</li> </ul>	<ul style="list-style-type: none"> <li>Lacks contextual cues, which is necessary for successful habit formation</li> <li>Clunky interface, not visually appealing and over-complicates the application</li> <li>No default habits, unlike competitors</li> </ul>
<b>Opportunities</b>	<ul style="list-style-type: none"> <li>Huge opportunity for expansion, if done right could easily be a improved version of these other applications, just needs more tools/depth</li> </ul>	<ul style="list-style-type: none"> <li>Already contains a lot of tools, if the application flow was addressed and the tools were more interlinked, has potential to be the best application on the list</li> </ul>	<ul style="list-style-type: none"> <li>Created by Microsoft, Instantaneously popular. A few more tools with good marketing from Microsoft could lead to this applications popularity growing</li> </ul>	<ul style="list-style-type: none"> <li>Still a fairly new and under the radar application, perhaps with some ads on the app store or sites like YouTube would give the app a massive boost in users</li> </ul>
<b>Threats</b>	<ul style="list-style-type: none"> <li>Tough market, a lot of daily planners are emerging that allow the user more personality and cater towards the users needs more.</li> </ul>	<ul style="list-style-type: none"> <li>Has too many useless tools, other applications like Yoodoo are using less but more useful tools, also expanding on these tools and providing the user with proper techniques to make these tools useful, such as time blocks and focus tiers</li> </ul>	<ul style="list-style-type: none"> <li>Advancement of technology - as tech improves, most daily planner/habit tracker applications also function as to-do lists. This application can quite easily become outdated if it is not modernized to include more tools</li> </ul>	<ul style="list-style-type: none"> <li>Falling into the category of "another daily planner app". Needs proper marketing, personality, and identity to prosper in this modern day in age</li> </ul>

### 3.2 Heuristic Evaluation Checklist for Yoodoo

I decided to perform a heuristic evaluation following Jakob Nielsen's ten usability heuristics on one of the daily planner applications that was a part of the SWOT analysis. This allowed for the furthering of my evaluation and understanding of the application and of the tools that play a part in daily planner apps. The reason I went with Yoodoo was because it is the application that is most like the one that I am designing. It acts as a daily planner as well as a habit tracker. It is also a lot less popular than the rest of the applications, so it should have more flaws that need ironing out. By performing the heuristic evaluation, I can avoid the shortcomings of this application in my own design.

#### Heuristics Checklist



##### Visibility of system status

Keep users informed about what is going on, through feedback within a reasonable amount of time.

Checklist	Yes	No	N/A	Severity Rating
Does every interface begin with a title/header that describes page contents	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	0
Is selected icon / element highlighted from other icons / elements which are not selected in the application	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	0
Is there visual feedback when objects are selected or moved?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	0
Is the current status of an icon and element clearly indicated?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	0
Is the user being informed of the system delay's (more than 400ms) via feedback?	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	




##### Match between system and the real world

Speak the users' language and follow real-world conventions, making information appear in a natural and logical order.

Checklist	Yes	No	N/A	Severity Rating
Are icons concrete and familiar?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	1
Does the product use computer jargon and technical language?	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	0
Do menu choices fit logically into meaningful categories?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	0
Does the product automatically enter dollar/rupee symbol for monetary values	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	0
Does the product automatically enter commas in numeric values greater than 9999?	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	


Figure 5 - Screenshot of Heuristic evaluation checklist.



### User control and freedom

Users should have "emergency exit" to leave the unwanted action in case of a mistake

Checklist	Yes	No	N/A	Severity Rating
In case of multiple menu levels, is there a way to go back to previous menus?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	0
Can users cancel out the actions that are in progress?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	0
Do prompts imply that the user is in control?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	0
Are users prompted to confirm actions that have drastic, destructive consequences?	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	0



### Consistency and Standards

Users should not have to wonder whether different words, situations, or actions mean the same thing.

Checklist	Yes	No	N/A	Severity Rating
Are form fields case sensitive (when applicable)?	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	
Are all the icons labeled?	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	2 Sometimes icons can be misleading
Does the UI avoid heavy use of all uppercase letters on a screen?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	0 This is not present at all throughout the app
Have industry standards been followed consistently in all screens within the product?	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	3 Fairly big issue, app seems outdated and not very functional. Usability issues are prone and the flow isn't the best.

Figure 7 - Screenshot of Heuristic evaluation checklist.




### Help Users Recognize, Diagnose, and Recover From Errors

Error messages should be expressed in plain language

Checklist	Yes	No	N/A	Severity Rating
Are prompts brief and unambiguous	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	0
Do error messages suggest the cause of the problem?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	0
If there is an input error, does the product highlight the error/formfield?	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	2 The product tells the user the form field but does not highlight it, the user has to find the formfield themselves
Are prompts stated constructively, without overt or implied criticism of the user?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	0

Figure 6 - Screenshot of Heuristic evaluation checklist.






### Error Prevention

Even better than good error messages is a careful design which prevents a problem from occurring in the first place.

Checklist	Yes	No	N/A	Severity Rating
Are the icons/actionable items intuitive?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	0
Are the menu items non generic?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	0
Do icons have captions?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	0
Are all links recognizable?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	0




### Recognition Rather Than Recall

The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be easily visible.

Checklist	Yes	No	N/A	Severity Rating
Do similar items interact and behave in same way?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	2
Is size and color of components consistent?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	0
Does the layout follow user's mental model?	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	3
Is all the information needed to complete an action available upfront?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	0


Figure 8 - Screenshot of Heuristic evaluation checklist.



### Flexibility and Minimalist Design

Shortcuts-unseen by the novice user-may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users.

Checklist	Yes	No	N/A		Severity Rating
Does the system provide shortcuts for efficiency?	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	One shortcut is creating a routine, other than that every time you add a task or habit have to fill out the full form, cant clone habits.	2
Are the shortcuts customizable?	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>		
Does the system provide mutiple options/ ways to complete an action?	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Very linear application, only one way of doing something	2
Does the system scale for new users as well as advanced users ?	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	Not a nice application to use for new users	2




### Aesthetic and Minimalist Design

Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.

Checklist	Yes	No	N/A		Severity Rating
Is only (and all) information essential to decision making displayed on the screen?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>		0
Does each icon stand out from its background?	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>		
Are meaningful groups of items separated by white space?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>		0

Figure 9 - Screenshot of Heuristic evaluation checklist.



### Help and Documentation

Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation.

Checklist	Yes	No	N/A		Severity Rating
Is the help function clearly visible?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Help is available in settings.	0
Can users easily switch between help and their work?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>		0
Can users resume work where they left off after accessing help?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>		0
Is there context-sensitive help?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	Yes in some scenarios, however not in others. Such as the timeline switch to monthly view etc	2

Figure 10 - Screenshot of Heuristic evaluation checklist.

This evaluation was completed using a template sourced from Figma by Zeta design (Zeta).

## **Chapter 4 – Requirements Gathering & Design Planning**

This chapter will cover the requirements gathering and planning of the project. This consisted of user interviews, questionnaires, user personas, empathy maps, the requirements document, and high-fidelity wireframes. The chapter also justifies my choice in methodology and techniques, as well as assessing both strengths and limitations of the approach in relation to the project.

### **4.1 User Interviews**

#### **4.1.1 Introduction to the participants.**

To kickstart gathering requirements for the digital design and wireframes, I carried out three user interviews amongst young adults. I made sure that the interviewees were diverse so that I could get a well-rounded overview of young adults and students daily routines. Two out of three of the interviewees were students aged 19, one male one female. The last interviewee was a female graduate aged 23 that is currently looking for a permanent career.

#### **4.1.2 Setting the tone with the introductory question.**

I started off with an opening introductory question asking the interviewee to tell me about themselves and their studies. Introductory questions are good for getting to know the user, and as stated by Yale University, linking the project to the user in a well-formed introductory question is good for user research (Yale University, 2022).

- Tell me about yourself? (Year of study, age, degree, etc...)
  - First year student
  - Studying Dentistry
  - Completing 2nd degree
  - Netball
  - Dentistry and medics netball team

*Figure 11 - Answers from one interviewee for introductory question.*

#### **4.1.3 Following up with qualitative questions.**

The following questions took a more qualitative and in-depth approach, focusing on the interviewees daily lives and activities that go on throughout their schedules. I also made sure to check how often and at what time the interviewee uses their mobile throughout the day.

The reason I asked this question is because I plan to design this application in an efficient manner, catering towards the user's current screen-time activity. The data collected suggested that whilst user's use their phones continuously throughout the day, they often try to avoid them as they see it as a distraction. Therefore, I plan on setting up the application to be used/updated once a day, any reminders of habits or activities can be sent to the user through notifications.

- Tell me about yourself? (Year of study, age, degree, etc...)
- What does a day in your life typically look like? Can you walk me through it?
- Do you feel as though your typical day lacks structure? If the answer is yes, why do you feel this way?
- How often do you check your phone? Is there any specific times during the day where you are normally active on your phone?
- Can you think of a time where you had poor time keeping? would a daily planner have helped avoid this?

*Figure 12 - Highlights the qualitative questions asked on the questionnaire.*

#### **4.1.4 Key Observations**

One key observation from these interviews was the recurring theme of the distraction and disruption of work that mobile phones cause. All participants mentioned their own struggle with lowering their screen time and switching their phones off to avoid procrastination while studying. It is important to consider this when designing the application, as it has to be designed to require minimal use from the user. To help aid in this, reminders and notifications will help alert users of activities coming up, this way the user doesn't necessarily have to open their phone every time they have an activity to complete.

### **4.2 Questionnaires**

#### **4.2.1 Why questionnaires?**

Moving on, I required both qualitative and quantitative data to produce a solid requirements document, so I opted for questionnaires as my next research method. I decided to produce a 6-question questionnaire and disperse it amongst colleagues, library goers and student friends. This led to the demographic mainly being students, in particular computer science students. The reason why I feel questionnaires are an important research tool is because they are effective and avoid time issues. Questionnaires can also remove certain constraints, for

example they can get rid of a geographically constrained stakeholder base. This is important when designing something as often ideologies and thoughts in one area of the world/country differ massively in comparison to other areas.

#### 4.2.2 An example of a good qualitative question asked.

One specific qualitative question that provided great insight into user expectations and needs was presented as “Is there any features you expect from a daily planner tool?”. I feel as though the question garnered the best responses out of all the qualitative questions, with a lot of these features being implemented into the daily planner tool. Such as the notifications, reminders, the ability to add tags to activities, and the ability to create and repeat events. This was perhaps due to the succinct way the question was presented, it allows the user to understand what is being asked, leading to them answering in detail. The clarity and relevance of the question may also play a part in the deeper insight that I gained into user expectations.

Is there any features you expect from a daily planner tool?

17 responses

Notification 5 mins before next activity/appointment
Ability to create events, checklists, notes. Ability to repeat events. Possible to change view (from monthly to weekly etc). A 'free time' tracker recording how many hours you have dedicated for your events each day.
Calendar, to-do lists, notes
The ability to group events by category, add tags, schedule something at intervals.
N/A
No ads, most features to be free, graphs and visual details where applicable
Be able to separate things, either in groups or by colour coding, rather than just labels.
No
The ability to set reminder notifications

*Figure 13 - A qualitative question taken from the questionnaire.*

#### **4.2.3 One issue with questionnaires.**

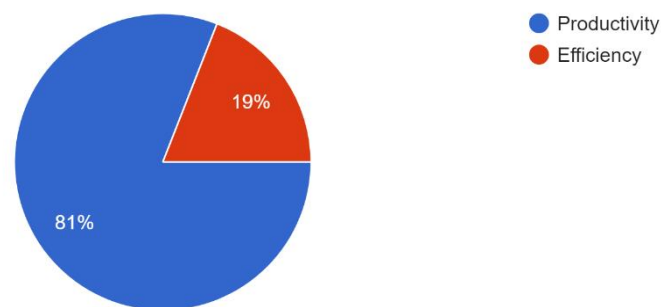
One limitation of questionnaires is the inability to fully capture emotional responses or feelings from the respondents. I feel as though this was quite a big issue, as whilst a lot of the answers I received were conclusive and well written, I still struggled to fully understand the users' thoughts and feelings when reviewing some of the answers to the questions. If I hadn't previously completed user interviews or independent research and relied solely on questionnaires I feel as though the requirements document may have turned out completely differently, with no deep understanding of the user requirements being present.

#### **4.2.4 An example of a good quantitative question asked.**

An example of a good quantitative question that gave an insight into how I was going to go about setting up and designing the interface of the application can be seen in figure 7. I was unsure of what potential users would value more, productivity or efficiency when using a daily planner application. The result clearly indicated that productivity is something that should be prioritized. This informed the design in a drastic way, leading to the application being more in depth and intricate than originally planned. One way the app developed was the ideation of the young adults help page, which gives tips to young adults and students. This was intended to help users bolster their productivity.

What would you value higher from a daily planner tool, productivity or efficiency?

21 responses



*Figure 14 - A pie chart highlighting a quantitative question asked in the questionnaire.*

#### **4.2.5 Going forward using questionnaires.**

My main takeaway from questionnaires going forward is to avoid generic questions. This was specifically an issue within the quantitative questions and led to certain questions not providing any real use or deeper level of understanding when writing up the requirements document. This was certainly a pitfall of my own creation, going forward I will plan out and focus on quantitative questions more, as it is easy to overshadow them due to the level of detail required from the qualitative counterpart.

### **4.3 User Personas**

#### **4.3.1 Why user personas?**


I decided to differentiate from my original plan, writing up 2 user personas instead of conducting focus groups. The reason for this being that I wanted to ideate a clear picture of the different specific user types. I used answers from the user interviews that were previously conducted to influence and help build up the personas.



The user personas assisted in truly developing a deeper understanding of the demographic and helped aid in the design of the application. One key area that the User Personas specifically helped in was the default activities and habits that come built-in with the application.

#### **4.3.2 How user personas helped inform the requirements and design rationale.**

Another reason why I decided to create user personas was the relevance to the project. Not only was I able to gather information surrounding requirements for the application, but I was also able to make some design choices and decisions that influenced the design planning phase and eventually the actual design itself. For example, whilst developing the user persona that is shown in figure 8, I realized that most students' timekeeping and planning is poor but becomes significantly worse during stressful periods in their life such as exam season. This helped in the formulation of the article section of the design. This section was later planned out to consist of various articles that help students and young adults combat issues such as fatigue, laziness, and poor planning.


**Jason**

LIVING SITUATION	YEAR	EDUCATION	LOCATION	AGE
Student halls	1st year	UG in Economics	Newcastle upon Tyne	18

---

### 📖 Story

Jason is a 1st year student who recently moved out into uncatered student halls. Whilst he enjoys living away from home, it's proven to be a big step up. He struggles with time keeping and meal planning, often feeling as though time slips away from him throughout the day. He also finds that during stressful periods such as exam season his day lacks structure and he falls further behind on work. Jason also struggles to find enough time throughout the day to complete a sufficient amount of work, leading to him falling behind on his studies. Before moving out, Jason enjoyed playing sports like cricket and working out in the gym, he hopes that he can join the university's cricket team at some point in the future once he finds time for extra-curricular activities. Jason has also begun to develop lazy habits and has found himself avoiding physical exercise, leading to him gaining weight.

### 🎯 Goals

- Plan out everyday to provide more structure throughout university life
- Improve diet and overall health
- Stay on top of university work

### ✓ Needs

- Improved meal preparation
- More time focused on studies
- Time for exercise
- Find more time for extra-curricular activities


### 😊 Wants

- Develop a healthy habit of physical exercise every day
- Join a gym
- Improved/optimised study times throughout the day

### 👹 Fears

- Becoming lazy and gaining weight
- Falling behind on university work due to poor time keeping
- Not improving diet

Figure 15 - User persona created for requirements gathering and design planning.


**Laura**

LIVING SITUATION	YEAR	EDUCATION	LOCATION	AGE
Student house	2nd year	UG in Dentistry	Newcastle upon Tyne	19

---

### 📖 Story

Laura is a 2nd year student studying dentistry. She lives in a shared house with 3 other students. She enjoys netball in her spare time, playing on the universities dentistry team. She feels as though every day is different, and hard to structure due to spontaneous events popping up, especially since her schedule is already quite busy. She also feels that the freedom associated with university can lead to her easily falling out of routine. She tries not to use her phone too much as she is easily distracted, and turns it off in an attempt to improve focus during studying. She wishes her diet was better, as she resorts to microwave meals too often. She is anxiety prone during exam periods as she is aiming for a high grade at university.

### 🎯 Goals

- Plan out everyday to provide more structure throughout university life
- Free up more time during the day
- Stay on top of university work

### ✓ Needs

- Less distractions/reasons to use her phone
- More time focused on studies
- Time for netball

### 😊 Wants

- Better meal planning and nutrition
- Improved/optimised study times throughout the day

### 👹 Fears

- Not performing well enough at university
- Falling behind on university work due to poor time keeping

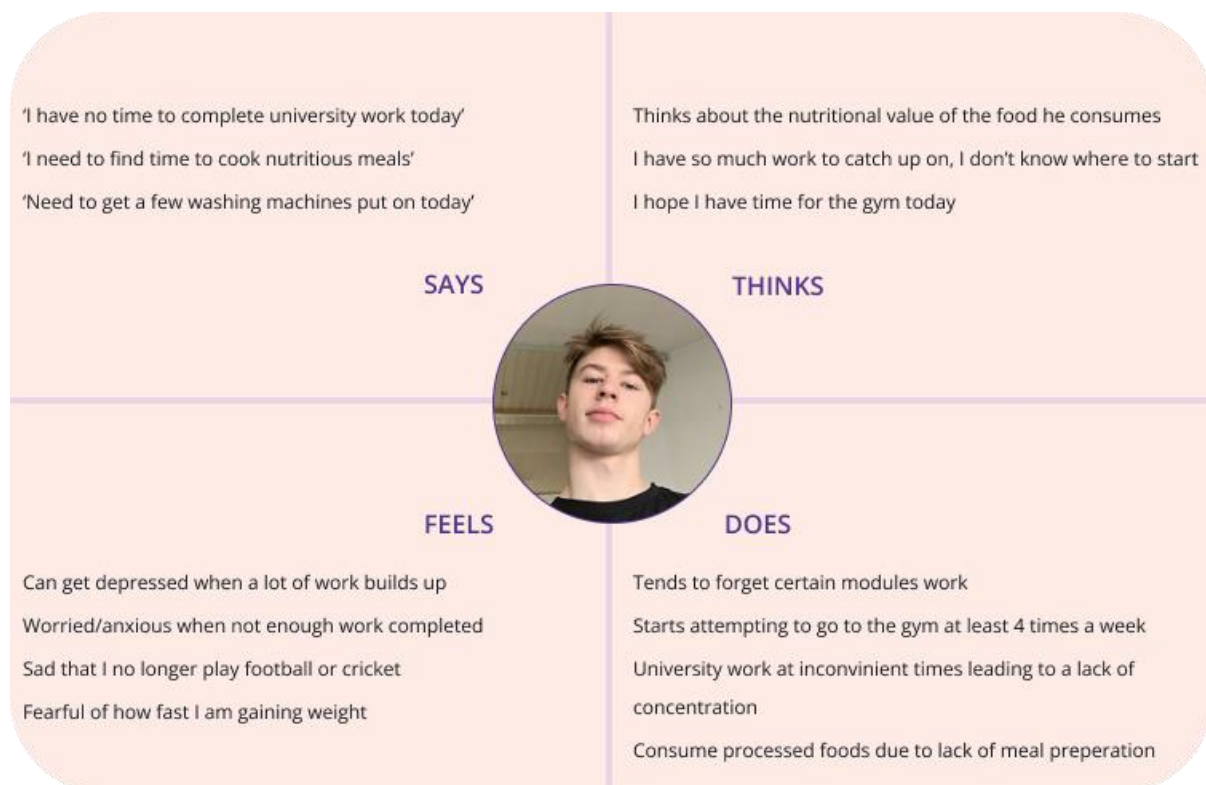
Figure 16 - User persona created for requirements gathering and design planning.

## 4.4 Empathy Maps

### 4.4.1 How empathy maps work in tandem with user personas.

After creating both user personas, I moved onto creating empathy maps for each persona. The user personas helped to tell who the actual demographic was whilst the empathy maps dived deeper, allowing me to analyse the user's attitudes and behaviours whilst tackling issues that they deal with on a day-to-day basis. I was able to develop an understanding of how said personas might be feeling at a particular time throughout their day.

When used together, empathy maps and user personas create a more comprehensive and accurate representation of the user. This in turn gave me the opportunity to design the application in a more user-centric and aligned way with the needs of the target audience. By using these tools together, I was able to create more effective and impactful design solutions.



*Figure 17 - An example of an empathy map that was created for requirements gathering and design planning.*

## 4.5 The Requirements Document

### 4.5.1 The Functional Requirements

While developing the functional requirements document, I drew upon insights from prior user research and my independent investigations, which included the state-of-the-art review and background analysis. Ensuring that this document was concise, lucid, and succinct was crucial as it served as a key reference during the design and prototype implementation stages.

Something that I noticed when analyzing Shen's report on the analyzation of habit tracker applications (Shen & Shen, 2019) and in my own research surrounding similar applications in the state-of-the-art review was that most of these applications have a specific and detailed user onboarding setup. This introductory convention is shown to be effective at grabbing users' attention and keeping them engaged as well as allowing for the set-up of the application and user preferences to be complete. Data shows that retention rates go up by 50% with strong app onboarding (Tasyürek, 2021). Due to this I decided to include app onboarding as one of my key functional requirements, the plan being to hopefully increase user retention and engagement.

<b>FR1 – Onboarding and Personalization</b>	An introduction to the application with a quick setup. Personalization allows the user to customise the application with different colours for different activities. find out the users sex, name and sleep pattern, this will help to customize the app to the user preferences.
---	---

*Figure 18 - Screenshot from the functional requirements document.*

<b>FR2 – Daily Planner</b>	This allows users to add and delete activities for any given day. It should also have the ability to switch between a weekly and monthly view. Supporting reminders and notifications to develop habits should be engrained within the functionality of the planner.
<b>FR3 – Habit Tracker</b>	Allows the users to create, edit and delete habits they want to track. Should have a streak functionality to show the user how many consecutive days they have completed the habit. Support reminders and notifications to encourage habit completion. Habits should be tagged in activities, this well help develop cognitive automaticity. Include base habits that all users should complete to remain healthy. The habtt tracker should also track both negative and positive habits, as highlighted from the questionnaire.

Figure 19 - Two functional requirements pulled from the requirements document.

Functional requirements (FR) 2 and FR3 were for the most part developed through research into other applications, however a few of the features/requirements of both the daily planner and habit tracker were pulled from the questionnaire. For example, one quantitative question that was asked on the questionnaire was based around the type of habits that users feel should be tracked, this included positive, negative or both. 61.9% of respondents answered both so it led to one of the requirements of the habit tracker to be allowing users the ability to track both their negative and positive habits.

What type of habits do you feel need tracked?

21 responses

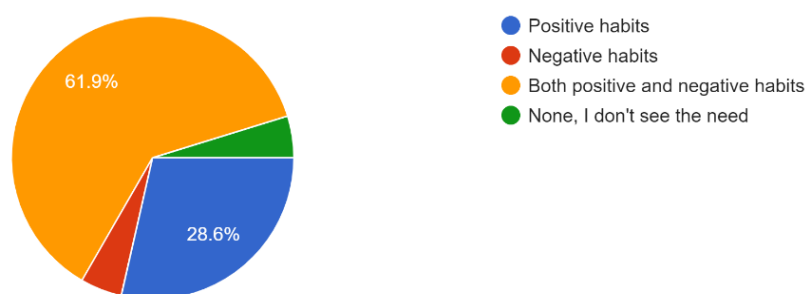


Figure 20 - A question on the questionnaire asking users what type of habits they feel need to be tracked.

Another key functional requirement was the creating/editing of activities. One feature of this application was the automatic inclusion of Shen's 4 crucial health habits (Shen & Shen, 2019) upon initialization of the application. During the report, Shen emphasizes how important the habits of drinking, exercising, sleeping, and dining are to daytime workers, and how nailing these 4 habits can lead to increased productivity, organization, and mental wellbeing.

<b>FR4 – Creating/Editing Activities</b>	Should come with pre-created activities that all users should complete, tagged with Shens 4 crucial health habits. Users should have the ability to tag habits within activities, to complete at the same time as the activity. Offer users the ability to create and edit activities, as well as personalize the colour. Users can add activities to their daily planners, they should be able schedule the activity to occur as frequent as needed automatically through the applications functionality. Habits should automatically delete after 66 days.
--	--

*Figure 21 - Screenshot of a functional requirement from the document.*

Within FR4, I also included the feature of habits being tagged with activities that the user would schedule throughout their day. The reason for this being to improve with the development habits through the increasing of automaticity. This idea is called a “contextual cue” and was previously discussed in the first part of the deep dive into habit cultivation in Stawarz research article (Stawarz K. , 2015). Contextual cues tie in closely with habit formation theory and psychology. This is because association between certain tasks and habits can help to increase the likelihood of the habit being developing automation. Associating certain activities with the same habits every day will eventually lead to these habits being able to be completed without the user even noticing. The reason that I decided to have habits delete themselves after a 66-day streak is because during this article Stawarz mentions that habits theory suggests the maximum amount of time a habit takes to develop full automaticity whilst the habit is being associated with an activity is 66 days.

The last functional requirement that I want to mention is FR6, the young adult help page.

This page is a key section of the app, as the application is being designed for students. Within this page there will be various articles and blog posts surrounding the application and young adults' lives. Some examples of articles could include how students can maximize opportunities after they graduate, easy, healthy, and quick meals, and how students can utilize the application to increase productivity.

<b>FR6 – Young Adult Help Page</b>	A page dedicated to articles pulled from the internet that support student well-being. Should be a diverse range of sources that gets updated frequently. Should also include a few base articles that teach the user how to use the app, how to maximize productivity through the app, etc...
------------------------------------	--

*Figure 22 - A functional requirement screenshotted from the requirements document.*

#### 4.5.2 The Non-Functional Requirements

I also decided to produce a document surrounding non-functional requirements. Whilst the application has no plans to be fully built as of now, in the future if I do decide to construct the app, this document will prove to be vital to the system's success, ensuring the app meets users' standards.

I am also prototyping the app through Figma; therefore, I can animate things such as the way the app will flow, the usability of the application, the performance (How are the apps transitions set up?), and the maintainability. These are all things that need to be considered, to ensure that even the prototype is created correctly following requirements that the system will need.

<b>NFR1 – Performance</b>	Performance should be good within the app/prototype, with fast load times and smooth transitions between pages. The app should maintain responsiveness not matter what page the user is on, as well as have minimal latency.
<b>NFR2 – Usability</b>	The prototype should have an intuitive user interface, that is easy to navigate no matter the user skill level. The prototype should have clear labels and cues, as well as a consistent layout and colour scheme within the design. This will help to maintain a cohesive user experience.

*Figure 23 - Screenshot showing 2 non-functional requirements for the application.*

## 4.6 High-Fidelity Wireframes

As a visual representation of the intended design and functionality of a digital product, wireframes are an essential part of the user experience design process. I was able to envision the flow of the programme and its pages using wireframes, which provided a blueprint for the general structure, hierarchy, and interactivity of the application. High-fidelity wireframes made it possible to experiment with various colour schemes and graphics to see what looks good together and what doesn't.

### 4.6.1 Visualizing user onboarding.

I visualized how the page flow would look during user onboarding; this can be linked back to my first functional requirement. It was important that I asked easy to answer questions to keep the user attentive and engaged, whilst also gathering information to help customize the application to the user's needs. If user onboarding is too long, you risk overloading users with too much information leading to them getting bored and becoming less engaged with the application (Strizic, 2022). The main questions that needed to be asked during the user onboarding process for this particular application where the users sleep pattern and gender. This helps us set up a base for a few of the applications features such as the activity planner functionality and habit tracker.



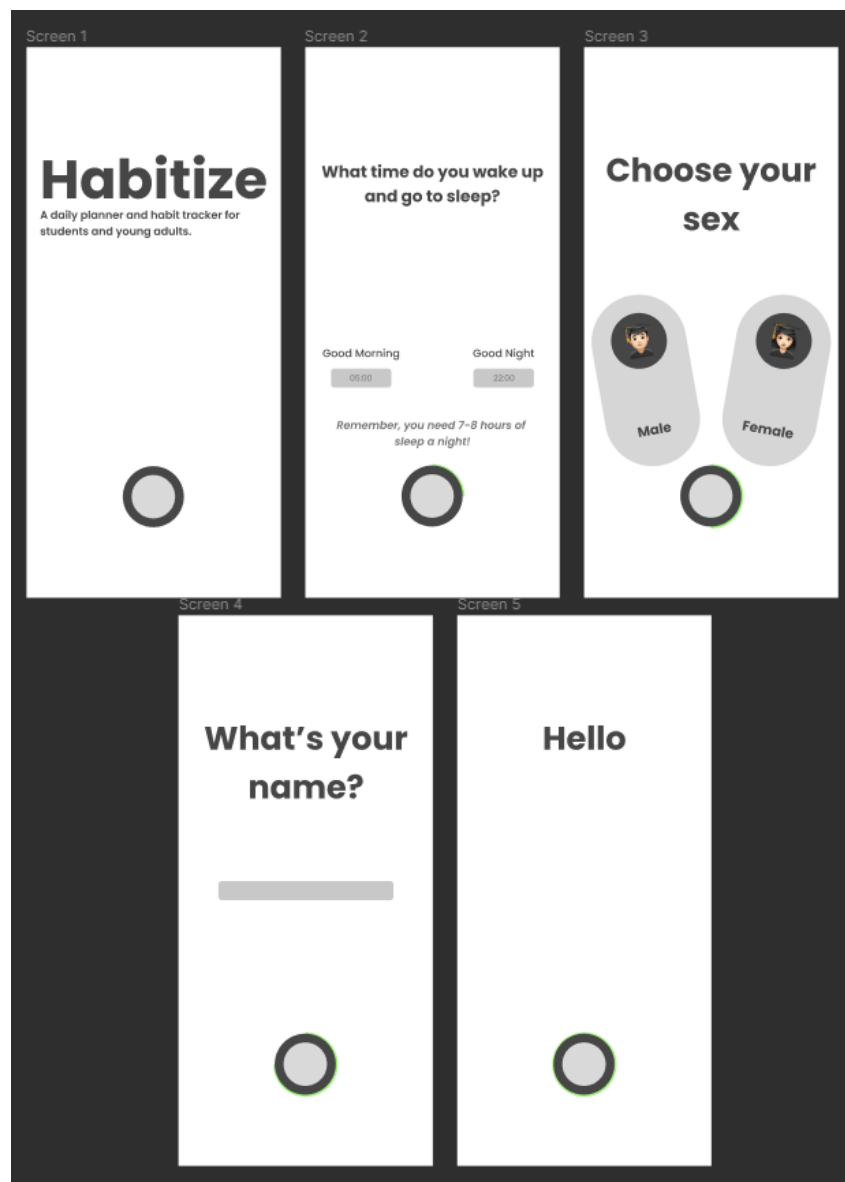


Figure 24 - Figure shows user onboarding process through high fidelity wireframes.

#### 4.6.2 Ideating the daily planner section of the design.

I then went on to ideate the flow of the calendar/activity planner section of the application, attempting to follow the requirements set out in FR4 whilst also ensuring that the application flow was smooth and straightforward to follow. Figure 17 shows how I went about linking

habits to activities throughout the day. Following contextual cues and habit formation theory, this should significantly help users develop automaticity.

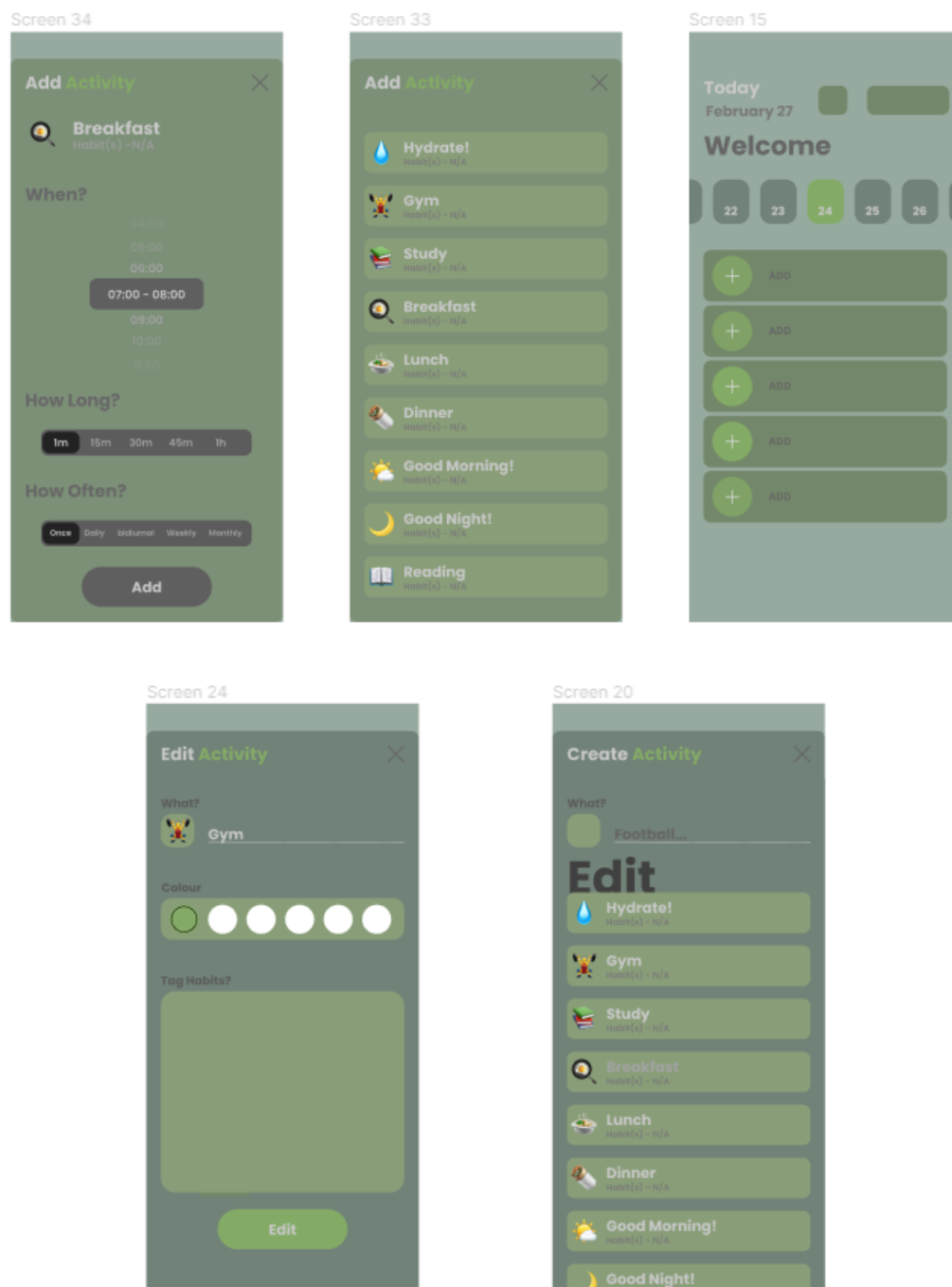


Figure 25 - High-fidelity wireframes for the calendar and daily planner functionality of the application.

It was during this phase that I began to experiment with different palettes and colours to help give the application an identity. I decided to go for an earthy feel within the app, with this

feature having a green theme. The colour green represents feelings of refreshment, peace, and rest. This synchronised nicely with the name of the application ‘Habitize’ and the application itself.

#### 4.6.3 Ideating the habit tracker and help page flow.

The last set of high-fidelity wireframes that I produced covered the young adults help page and the habit tracker functionality. I decided to set up a contrasting yet aesthetic theme for these sections, choosing sunset red for the colour. Whilst constructing these wireframes I continued to use the requirements document as a reference. Users can create, edit, and delete habits, there is a streak functionality built in on each habit page as well as base habits that all users should be completing to live healthy lives, as researched by Shen in the report (Shen & Shen, 2019).

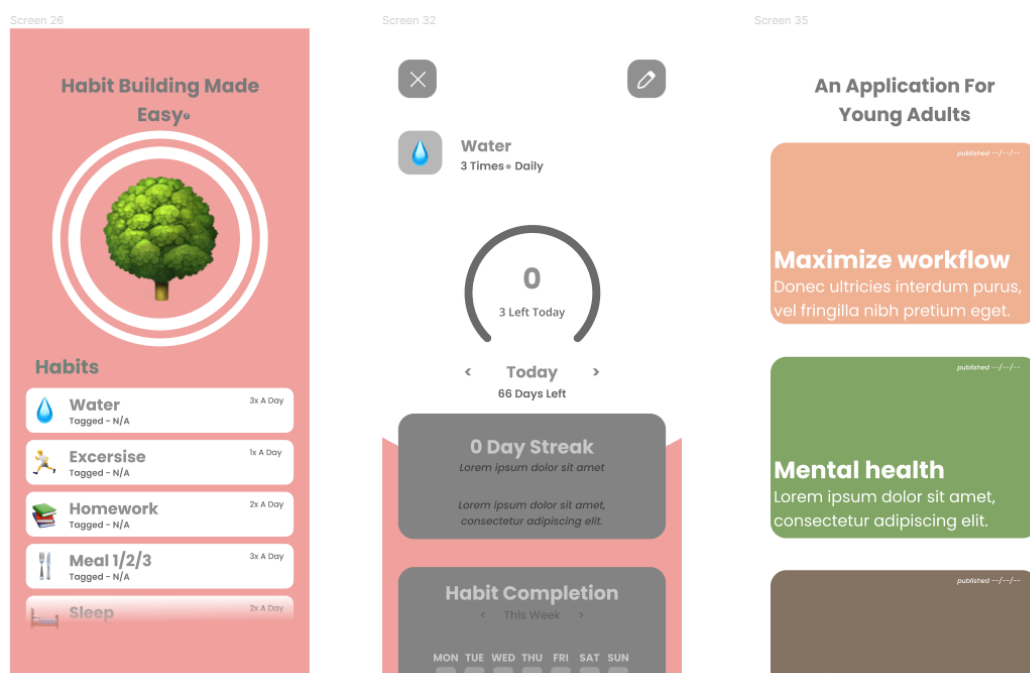


Figure 26 - Screenshot of high-fidelity wireframes ideating the habit tracker and young adult help system functionalities.

#### **4.7 Conclusive Thoughts on Requirements Gathering and Design Planning**

In UX research and design it is important to carry out requirements gathering and design planning to help follow design standards and meet user expectations. Previous literature can give great insight into what works and what doesn't, and research methods such as user interviews and questionnaires can help gauge an understanding of the demographic that the design is being aimed towards. It can seem mundane and pointless to give so much attention and time towards planning, but it is necessary. Afterall, HCI studies how humans interact with computers, through current theory and work that has already been carried out in the past by other academics, we can avoid design pitfalls and shortcomings.

I was happy with how this phase of the project went overall. Both the requirements document and high-fidelity wireframes turned out excellent and I feel as though my knowledge within UX research has broadened significantly. One area that I would approach differently would be questionnaires. Whilst a lot of the questions I asked garnered useful results, a few of the quantitative questions were essentially useless due to the phrasing and style of question being too generic. In future work I will ensure that the quantitative questions asked are insightful, and that all the questions give room for useful responses.

## **Chapter 5 – Results, Execution, Implementation and Verification**

This chapter contains an explanation and justification of the choices that I made in phase 2 of the project, which included designing, prototyping, and testing the application.

### **5.1 User Onboarding**

The first part of the design focused on user onboarding, covering the first functional requirement surrounding user onboarding. I decided to keep user onboarding short, sticking to 3 key questions based around the users sleep pattern, their gender, and name. by keeping the questions simple and easy to answer, users should remain engaged and be able to complete onboarding without losing interest or getting bored. The reason that the first two questions are based around the users' gender and sleep pattern is because they are directly influenced by Shen's healthy habits for daytime workers (Shen & Shen, 2019). Through these questions, I was able to set up the start and end of the users' day, ensuring that the user gets enough sleep. The onboarding question surrounding the users' gender well as set up certain habits such as how much water the user should drink a day (this varies depending on gender). By setting up a strong, simple yet effective user onboarding process, I can help user retention rates increase by as much as 50% (Deniz Tasyürek, 2021).

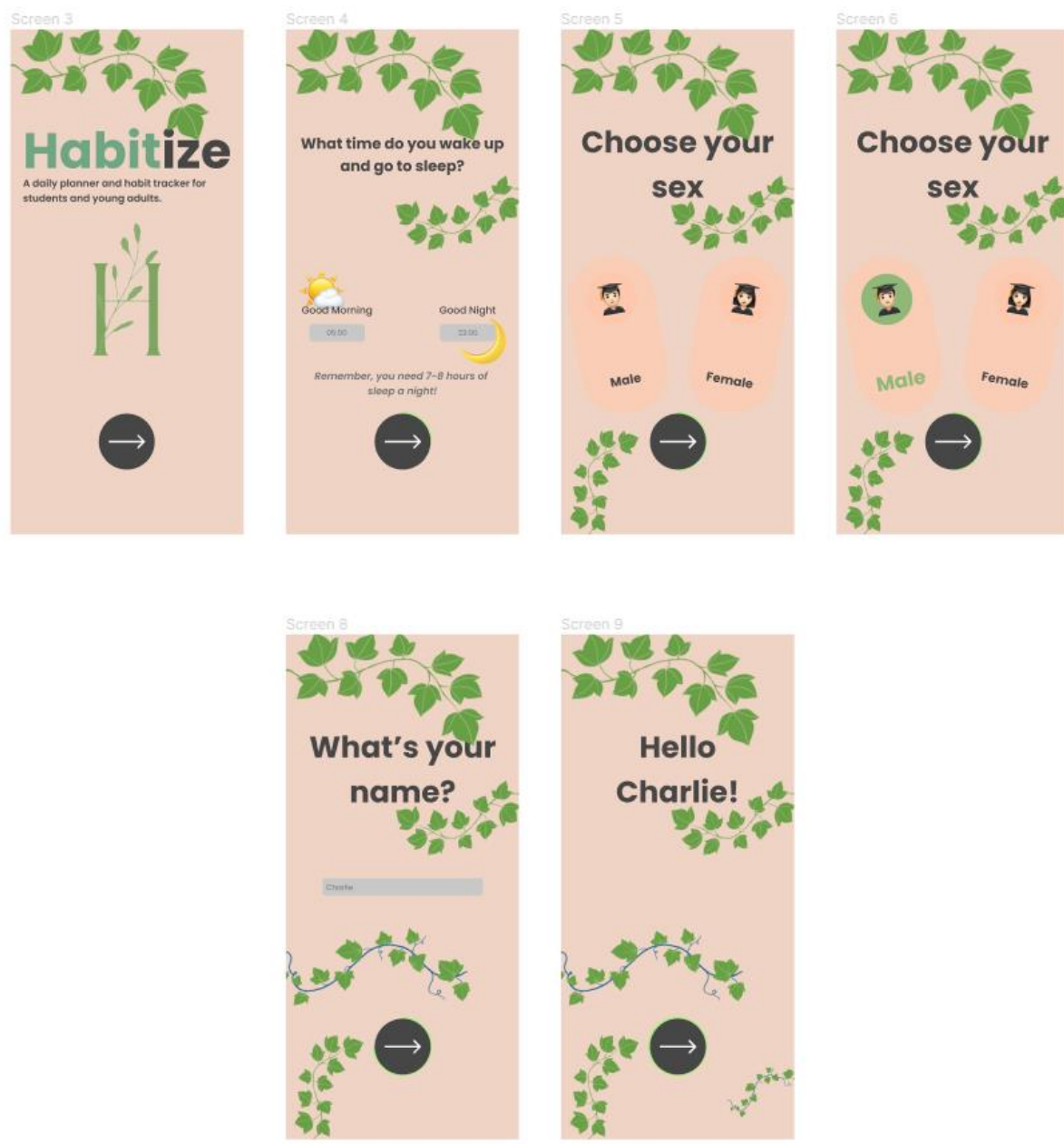


Figure 27 - Complete user onboarding process.

## 5.2 The Daily Planner and The Creating/Editing/Adding Activities Functionality

The next part of the design was creating the actual calendar section of the application. Whilst creating this section the main areas of reference were the questionnaire, user personas and functional requirements document. I already had a rough layout of the pages in the form of the high-fidelity wireframes, from there I expanded on certain functionalities to ensure that user standards were met.

The first page that was designed and prototyped was the core calendar page. This page acted as a base for other functionalities to expand upon, in the form of pages and buttons.

Throughout the design of the daily planner functionality, I strived for simplicity and consistency. In terms of information, this section of the application is extremely dense and interactive. To avoid the user becoming overwhelmed I aimed to reduce their short-term memory load as much as possible. This is one of eight rules on interface design proposed by Ben Shneiderman, He is one of the founding fathers of the multi-disciplinary field that is HCI and has produced amazing studies surrounding software psychology. Shneiderman mentions how humans are only capable of maintaining around five items in our short-term memory at one time, therefore interfaces should be simple, with proper information hierarchy, prioritizing recognition rather than recall. This ideology of the prioritization of recognition is backed by other academics, such as Jakob Nielsen. In fact, it is one of Nielsen's ten usability heuristics for interface design.

### 5.2.1 Weekly view to monthly view.

This button allows users to switch from a weekly view to a monthly view page as highlighted in figure 21. This ability is common in most daily planner applications, however I made sure to make this functionality easy to access. This was due to one response to a question on the questionnaire surrounding the issues with an existing daily planner tool that they previously used. The answer mentioned a lack of convenience for simple functions such as changing from weekly to monthly view. Taking this into consideration, whilst productivity was already a key focus of mine, I realised that efficiency and usability are key aspects to also take into consideration. Even if at surface level users don't see the need to focus on these aspects, in order to develop a successful application with correct proportions and information density, these must be a preliminary focus during the design stage.

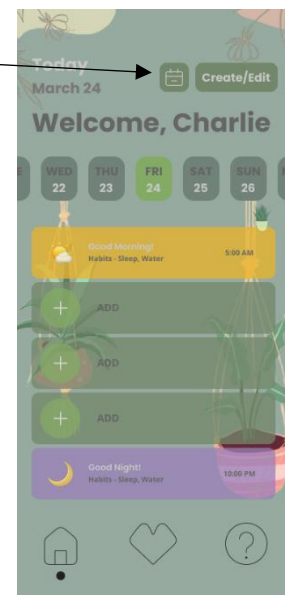


Figure 28 - The final design of the daily planner page.

Do you already use a daily planner tool? If yes then what do you like/what would you change about the tool?

(Type 'no' if applicable)

20 responses

Yes, one issue I have with the tool is the over complication of certain features. When switching to monthly view you have to go into the settings then confirm that you want to switch. this seems very complicated considering its a fairly standard and easy task.

Figure 29 - A answer pulled from the questionnaire.

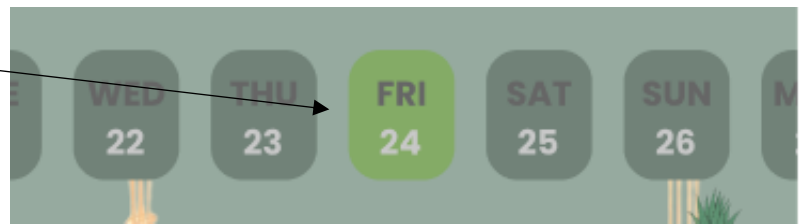


Figure 30 - The design for the monthly view page.



### 5.2.2 Design rationale behind scroll feature.

I decided to go for a scroll feature to navigate between days whilst in weekly view. One reason for this was because it helped bring the



*Figure 31 - Scroll feature built into weekly view functionality.*

design alive, making it more interactive. This feature worked significantly better in comparison to a static weekly view. By doing this, users can also expand past 1 week and easily scroll to future dates in the calendar. This is more versatile and effective than a static weekly view, if the user wanted to schedule an activity for 9 days in advance, they can simply scroll. If this feature only showed a static week, the user would have to expand to monthly view and find the date, which would result in time wasted and application inefficiency. In turn, this feature helps to reduce the users' short-term memory load when navigating this section of the application, prioritizing recognition over recall.

### 5.2.3 Creating and editing activities.

When creating and editing activities I wanted to make sure that the user could easily cancel their request if they changed their mind or made a mistake. All the pages that extend off the base page have this option, to permit easy reversal of actions. Once again supporting recognition over recall, the X is located in the top left of each screen. This reversal of actions is also one of Shneiderman's golden rules and helps increase memorability and usability of the application.

Pre-created activities for the user, linked with associated base habits of the application. These base activities and habits are essential for living a healthy life and are based around Shen's four health habits for daytime workers (Shen & Shen, 2019).

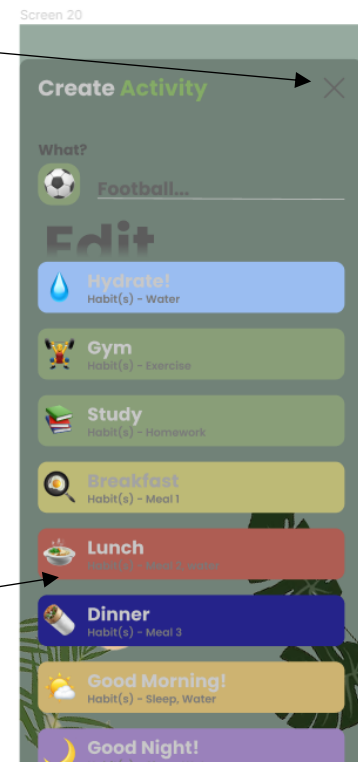
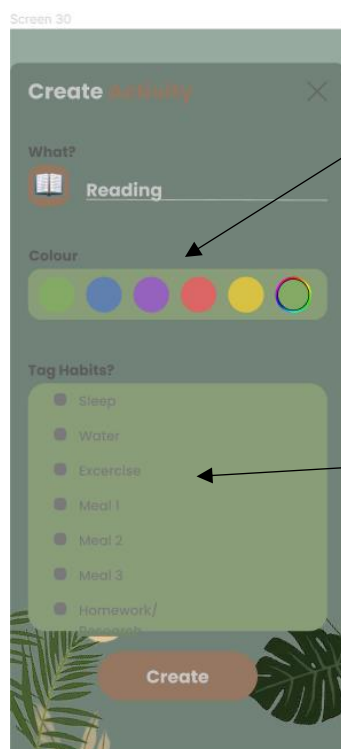


Figure 32 - Shows the first page of creating an activity.



Personalisation of activity colour, a part of FR1. This helps the user associate certain activities with different colour as well as giving the user some control as to the colour scheme of their application.

The ability to tag habits within activities to develop automaticity.

Out of 115 habit formation applications that were reviewed by Stawarz and colleagues, only 3% offered contextual cues. This is surprising as they play such a big part in habit formation and

habit psychology/theory. I decided to implement contextual

Figure 33 - Shows the second page of creating an activity.

cues for habits in the form of activities, as Stawarz recommends. She also mentions how this type of contextual cue is the best for developing automaticity with habits, as certain events that occur every day will become directly linked with healthy habits (Stawarz K. , 2015).

### 5.2.4 Adding activities to the daily planner.

One of Nielsen's usability heuristics, user control and freedom, easily reverse any action that the user wants to. This is available on all pages, allowing the user to get back to the base page with ease.

Initial page is set up to the same format as the edit activities page.

Prioritising recognition over recall, one of Nielsen's usability heuristics.

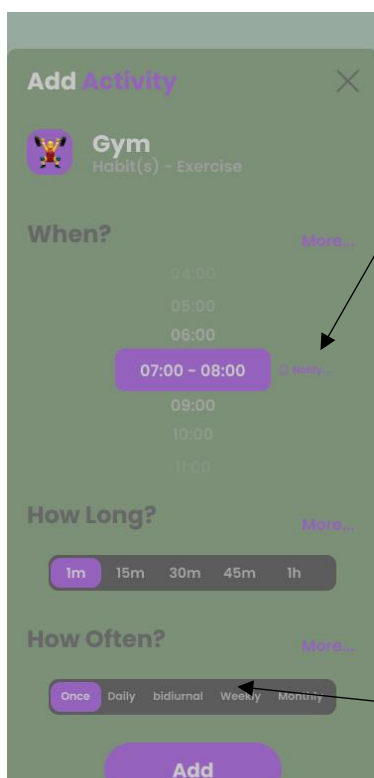


Figure 35 - Allows the user to set the activity up before adding to their schedule.

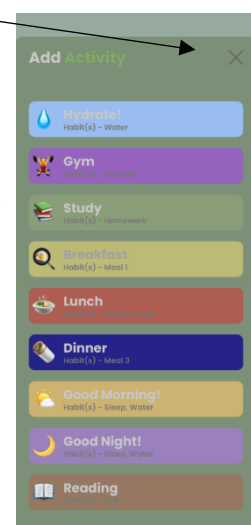


Figure 34 - Showcases select activity to add page.

The ability to set a notification/reminder for an activity. The qualitative study on

lift conducted by Renfree (Renfree, 2016) that was analysed earlier focuses on the importance of reminders and how to execute them right. Renfree writes about how most applications lack contextual information when users are setting up reminders, leading to them being ineffective.

To combat this, the user can set up how often they want the activity to occur around their own context. For example, the

user can schedule going to the gym to occur in a bidurnal cycle, giving room for rest days.

### 5.3 Designing the Habit Tracker

#### 5.3.1 The home page for the habit tracker feature.

Shows how far the user is through completing their habits for the day. This allows for the user to see their progress throughout the day, and is a form of “gamification”. As Renfree explains in his qualitative study on Lift, this will create room for longer term behaviour changes to take place in the user’s life (Renfree, 2016).

The blips represent the colours of the various activities that the user has tagged the habits in. This component is another tool that should help users recognize and associate certain habits with activities, increasing automaticity.

Habit select area set up in a similar manner to activity select/create areas. Prioritising recognition over recall,

one of Nielsen’s usability heuristics. Users can see how often the habit needs to be done for it to be completed, as well as what activities the habit is tagged in.

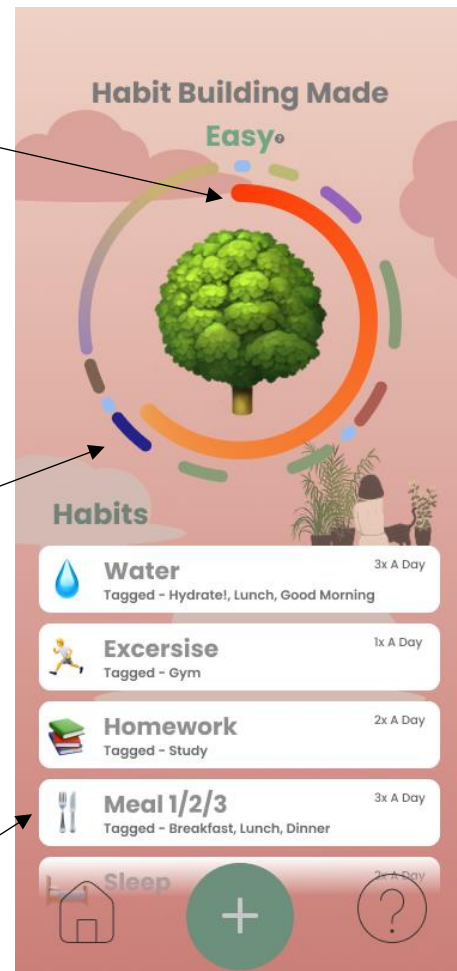


Figure 36 - Shows the design for the home page of the habit tracker feature.

Shen's key health habits are included automatically within the application. These are core habits that are essential to living a healthy life, therefore every user should aspire to complete them.

### 5.3.2 Habit tracking and statistics page.

The highlighted areas on figure 36 show forms of light gamification setup to also help users track progress. The aim is to keep the user engaged with their habits to help develop long term habit cultivation. Renfree highlights how crucial the streaks feature is for habit formation, he goes on to explain how the longer the user keeps the streak alive, the more likely they are to keep completing the habit. This is because the user becomes fearful of losing the streak as they have worked consistently over what is a long and growing timespan to help the habit grow and nurture, therefore they don't want to lose said streak (Renfree, 2016). The inclusion of statistics was commonplace amongst all the apps covered in the SWOT analysis, research shows this helps aid in habit formation as the user can track their progress through statistics and graphs. Therefore, I decided to make it a part of my application.



*Figure 37 – The design for individual habit tracking and statistics page.*

All habits automatically delete after a 66-day streak, unless the user specifies otherwise. The idea for this design consideration was pulled from Stawarz's design guidelines, covered in the background review. She mentions that once automaticity develops with the association

between the habit and the trigger event (in this case the activity linked to the habit), the user no longer needs the reminder for the habit. The association should be strong enough that full automaticity should be achieved (Stawarz K. , 2015). According to Lally, on average this should take a max of 66 days (Lally, 2010).

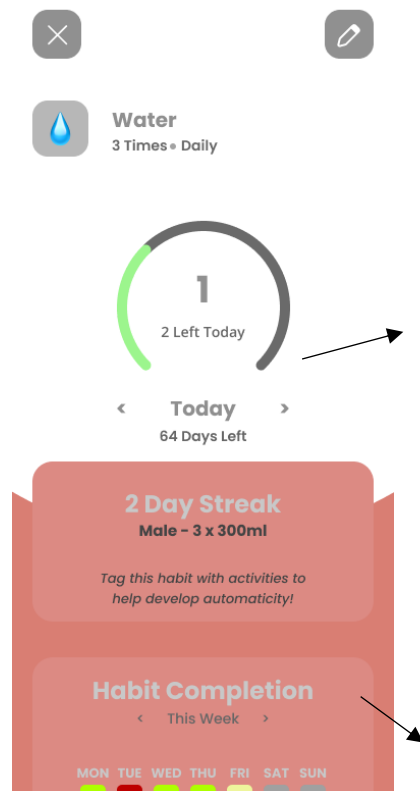


Figure 38 - The design for individual habit tracking and statistics page.

The reason I decided to setup the progress bar in this manner was to allow the user to see how much progress they made on a specific day. For example, if this user was to go back to Tuesday, they would see that they failed completing the habit. The progress bar would highlight which how many times they missed the habit in the day and at what specific times they failed to complete the habit. This allows the user to ensure that in the future they don't miss the habit planned out for a given time, assisting in error prevention on behalf of the user.

For the statistics I decided to go with different scrollable panels. The design is setup to create space for more panels down below detailing different statistics.

### 5.4 The Young Adults Help Page

This page I was designed with the user demographic in mind. As discussed in my motivation section, a lot of students and young adults struggle with the transition into adulthood. This section aims to help users with different aspects of their life. The section contains articles pulled from the internet and properly credited, as well as application specific articles such as “how to maximize the application for workflow throughout the day”. This section also has scrollable panels, like adding activities to the user’s calendar and the habit statistics section. This setup is common amongst all the features of the application, to help develop recognition over recall.



Figure 39 - The design for the young adults help page.

*All the design interfaces where prototyped as shown in the demonstration, ideating the flow of the application if it where to be fully developed.*

### **5.5 Conclusive Thoughts on The Design**

Throughout the design I used numerous resources, mainly referencing pieces of literature studied on habit theology, the state-of-the-art review, and the functional requirements document that I produced to help guide the design. One key goal of mine was to make the application flow and run low maintenance after the initial setup. The reason for this being as Stawarz highlights the importance of following psychological studies completed on habit development to avoid dependency on these features growing in her design guidelines. She writes about how most applications available today fail to implement their features properly, leading to an interference with the process of developing associations between contextual cues and the task (Stawarz K. , 2015).

### **5.6 Usability testing**

Once I completed the prototype, I decided to conduct usability testing with two of the interviewees from the user interviews. This is a massive part of the software development cycle and is a great tool for gaining insight into future changes that I could make with the design of the application. I decided to conduct usability testing with both users in person and moderate it. Throughout the 4<sup>th</sup> study Wac talks about the importance of measuring quality of experience (QoE) in the correct manner. Wac mentions issues with current data evaluations of QoE that focus on an applications usability. These studies are conducted for a limited time in very controlled laboratory environment. This does not resemble the users' natural daily environments. Sometimes these evaluations can help to discover a mobile applications immediate usability issues, but are lacklustre when it comes to recovering issues that are relevant to real-life situations outside the lab (Wac, 2011). Due to this I decided to host this part of the project in a local café, so that the interviewees felt more comfortable. I also set no



time restriction and lightly moderated the testing, to not interfere too much with the users' initial experience with the application.

To start with I noted down initial impressions and asked the interviewees if there was anything missing from the application.

#### Student 1

- Struggled with understanding app flow.
- Young adults help page should have a search bar so the user can search for articles.
- Liked how the applications features where different colours (*Could also assist in recognition over recall of the different features?*).
- Taskbar is lacklustre, could do with more pages.

#### Student 2

- Understood app flow without any assistance.
- Mentioned a settings page for more customizability and preferences within the application.

Figure 40 - Shows interviewees initial impressions during the usability testing.

I then moved on to ask the user to complete specific tasks, such as changing the colour of the activity gym and adding it to the planner. Below is some feedback after completing the task.

#### Student 1

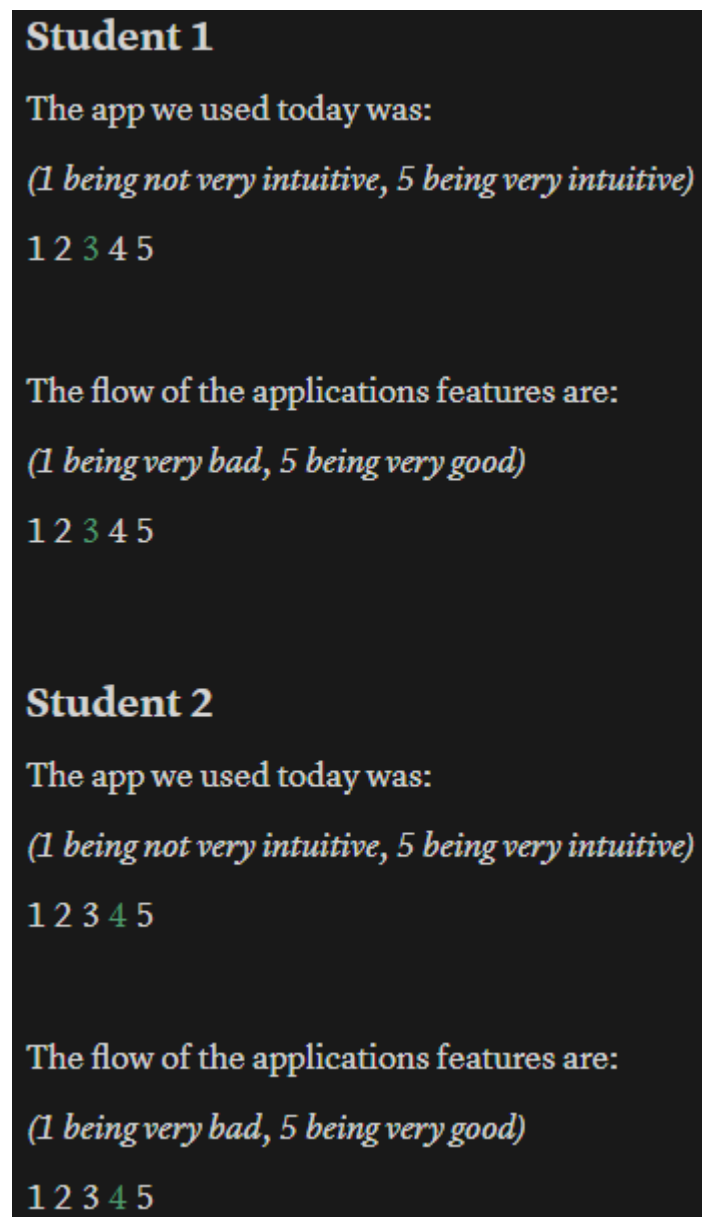
- Thought it was unique to be able to tag habits.
- Mentioned adding a description for each activity, that the user could change.
- Mentioned the ability to create habits straight from the tag habits section of editing an activity, as well as the original method.

#### Student 2

- Felt as though these features should have been combined, rather than separating the add feature from the create/edit feature.
- Mentioned that the app felt one dimensional. Whilst they liked the flow, they feel as though adding multiple ways to complete certain tasks such as adding the ability to edit tasks from the add task feature as well as the create task feature would go a long way in increasing usability.

Figure 41 - Feedback and improvements for the daily planner.

The conclusive questions asked to the interviewees details their experience with the application and the flow of the application.



**Student 1**

The app we used today was:  
*(1 being not very intuitive, 5 being very intuitive)*

1 2 3 4 5

The flow of the applications features are:  
*(1 being very bad, 5 being very good)*

1 2 3 4 5

**Student 2**

The app we used today was:  
*(1 being not very intuitive, 5 being very intuitive)*

1 2 3 4 5

The flow of the applications features are:  
*(1 being very bad, 5 being very good)*

1 2 3 4 5

Figure 42 - Shows conclusive questions asked to interviewees.

Overall usability testing gave me great insights into improvements of the application that I completely overlooked, especially surrounding the daily planner. For future work on the design, I could implement these improvements to help app flow and improve usability within the application.

## **Chapter 6 – Evaluation of The Design and Approach**

It is important to evaluate and reflect on completed work in general, but principally, it is important in the multi-disciplinary field that is HCI. This is due to constant evolution and refinement. It allows us to learn through and from experience towards gaining new insights of self and practice (Finlay, 2008).

### **6.1 Requirements Gathering and Design Planning**

At the start of the project during the pre-planning phase I focused on requirements gathering, using user interviews, questionnaires, user personas, empathy maps, and wireframes to gauge an understanding of the user demographic. I then combined this knowledge with insight gained into the topic through both the background review and state of the art review to formulate a functional requirements document. Together, this section covers the first 4 out of 7 objectives, based around developing an understanding of the users' requirements and standards, as well as gaining insight into the latest research and trends within the field, helping to inform the design of the application.

For the most part I was satisfied with my approach to this phase. It was crucial that I made a well thought out plan when tackling research, as it is the foundation of the project and will ultimately affect the outcome of the design. I found the user interviews and questionnaire to be extremely useful when it came to garnering an understanding of the users standard when it comes to daily planner applications. With the creation of the user personas and empathy maps really aiding in reinforcing these standards within the functional requirements document.

I picked out the research methods specifically for the task at hand, ensuring I got both qualitative and quantitative responses to questions that I deemed important to the project. With that in mind, I feel as though my quantitative questions were poorly formed and I didn't truly maximize the value that I could have pulled from them. This is especially apparent on the questionnaire, 2 out of the 3 qualitative questions received responses that were very one-sided, and perhaps could have been seen as self-explanatory. This was a massive overlook from me, I was too focused on nailing the qualitative questions that I completely overlooked the quality of the quantitative questions, leading to what could be deemed as useless information. Going forward I will make sure that I plan out these questions more appropriately to fully utilise the value that they can provide to UX research projects.

Do you think a habit tracker is appropriate in a daily planner tool?

21 responses

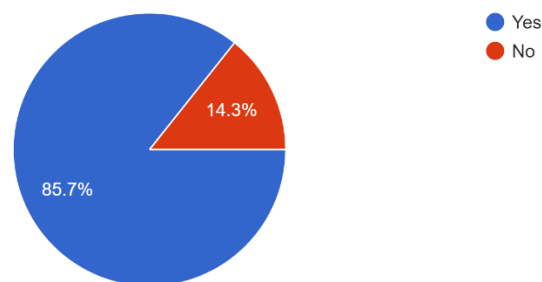


Figure 43 - A quantitative question on the questionnaire.

What would you value higher from a daily planner tool, productivity or efficiency?

22 responses

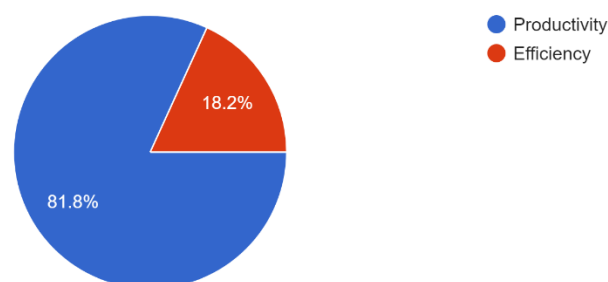


Figure 44 - A quantitative question on the questionnaire.

The background review was crucial for understanding habit psychology and theory, and how to reinforce habits through technology. All the pieces of literature reviewed surrounded this topic yet were diverse and offered unique perspectives on habit cultivation and theory. For example, one piece focused on a qualitative analysis of a pre-existing habit cultivation, another on the importance of quality of experience and one on a comparison of habit features within different applications. The state-of-the-art review instead focused on the daily planner, using analytical techniques on popular pre-existing applications such as a comparative SWOT analysis and a heuristic evaluation on one of the applications from this analysis. This gave great insight into what works within daily planner applications and helped me to understand the current industry standards. One example of this is the rationale behind the weekly view scroll feature. This scroll feature was implemented into each application reviewed in the SWOT analysis in some way, therefore it set the precedent for this portion of the interface.

One step of this process that played a big part in the production of the design of the application was the high-fidelity wireframes. These helped to ideate the layout of the application, providing a visual representation of the application flow and interfaces. This was objective 4, for the most part I feel as though this objective was complete to a high standard. However, I only assigned myself 5 days to complete these wireframes. Whilst this may have been long enough to complete low-fidelity wireframes or paper prototypes, it certainly wasn't long enough to complete high-fidelity prototypes. This is due to the nature of the wireframe and the level of detail that is ideated. If I was to produce high-fidelity wireframes in the future for a UX experience, I would double the time I designated on this project, giving 10 days for the completion of this task.

## 6.2 Execution and Implementation

The execution of the design is arguably the most important area of reflection and evaluation, the reason being the iterative nature of design and improvement of design over time. Even immensely popular applications that have been around for years go through design evolutions and changes, think of Instagram and Twitter. Therefore, it is important to evaluate and reflect on my own design to find flaws, imperfections, and changes. This can be seen as the software development process. This covered objective 5 and was achieved by planning, testing, and execution.

One aspect of the design that I felt could do with improvement and refinement is the young adults support section. Whilst the inclusion of this would be beneficial for young adults and students due to the opportunity to access useful and applicable articles, the area feels lacklustre and could very easily be overshadowed by other areas of the application.

A design choice that I don't regret, but wish I considered more was the idea to split the creation and editing of activities from the adding of activities to the calendar and user's schedule. This was also mentioned during the usability testing phase when the interviewees were asked to change the colour associated with an activity and add it to the schedule. The logical approach was to split the two up, this would create space for the ability to directly link habits with an activity, encouraging contextual cues which help in habit formation as discussed in chapter 2. This meant that the functionality of adding, creating, and editing activities wasn't bulky and brick-like, but more spacious and professional to help the application flow easier. Upon evaluation however, perhaps I could have merged these aspects. This would mean that users could directly link habits when adding the activity, rather than the

habit already being linked with the activity previously. This design decision would also make more sense from a practical view, as with the current system certain activities are linked with habits permanently unless the user explicitly edits the activity and removes the link with the habit. The new system would allow the user to schedule their habits with different activities daily. The former/current method follows habit theory more closely though, as certain activities should always be linked with the same habit to help encourage automaticity. However, the latter would help the application flow more smoothly and avoid tricky/awkward interactions when trying to schedule a habit with a different activity.

### **6.3 Usability Testing and Future Work**

Usability testing was a great tool for completing the software development cycle, and presented issues with the application that I previously was unaware of. I was able to evaluate and moderate user experience with the different features of the application, as well as see how well the app flowed and what could be changed to improve application flow. This covered objective 6, ensuring that the application is user-friendly and meets the needs of its target audience. This ultimately led into the final objective as well, which was ensuring that everything for both the project and the project write up was complete on time, with all deliverables being handed in before their respective deadlines.

Overall I felt that usability testing went well, I was able to witness how first-time users interact with the design and prototype. This ultimately highlighted what was well, and what could be improved. I learnt a lot about how the application flow could be improved and enhanced, by avoiding a sole linear route for features and offering the users multiple ways at completing tasks within the application. The users both highlighted how the difference of colours depending on the functionality was a nice touch, perhaps subconsciously showing

that users enjoy both recognition and association. One area that I could have improved on within the usability testing section would be the inclusion of a query/task based around the habit tracker functionality, to delve into future work for that segment of the application. Due to time constraints I was unable to complete this.



## **Chapter 7 – Conclusive Remarks**

This project has deepened my understanding of UX design and research. Reviewing literature produced by academics has taught me how to prioritize information and I have learnt a lot about the implementation of research methods that were a part of the project. This being especially prevalent in user interviews and questionnaires. Through both the completion of these methods and the evaluation of the effectiveness of my approach I was able to pick out what was done well and areas that could have been done better, such as the quantitative questions asked during the research phase of the project. I have learned a significant level of detail within Figma, the program used to create the design and prototype. My design skills have improved as well as the logistics behind my rationale for certain design choices.

Concerning the primary objective of this project, I have effectively developed a high-fidelity daily planner mobile application that supports student wellbeing, the reaffirmation of good habits and the impediment of bad habits. This was achieved by dividing the design into three key components: the daily planner, habit tracker and young adults help page. This approach enabled me to align with the overarching aim of the project and ensure that its purpose was not deviated from.

Furthermore, the process of conducting usability testing has provided me with valuable insights on potential future enhancements that could be integrated into the design. These improvements mainly focus on optimizing the applications flow, but also include minor details such as the addition of a settings page or a more comprehensive taskbar. Additionally, the applications design could be further expanded by integrating and incorporating common

features found in habit-building and daily planning applications, such as a focus timer or a to-do list.

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