Design of Usable Systems- Design Report:

Helping-Hands: Mental well-being

**CS981/CS548**

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Table of Contents

[INTRODUCION 4](#_bookmark0)

[Report Overview 4](#_bookmark1)

[ANALYSIS 5](#_bookmark2)

[Stakeholder Analysis 5](#_bookmark3)

[Users 6](#_bookmark4)

[Market Review 7](#_bookmark5)

[Context of the use 8](#_bookmark6)

[Technical and Service Requirements 8](#_bookmark7)

[REQUIREMENTS SPECIFICATION 9](#_bookmark8)

[PROTOTPYING AND DESIGN 11](#_bookmark9)

[Conceptualization of ideas 12](#_bookmark10)

[Low Fidelity Prototype 14](#_bookmark11)

[Pros and Cons of using Low Fidelity Prototyping 16](#_bookmark12)

[High Fidelity Prototype 16](#_bookmark13)

[Other design decisions 22](#_bookmark14)

[Suggestions or problems identified from user testing of high-fidelity prototype 23](#_bookmark15)

[EVALUATION 24](#_bookmark16)

[Aims and Objectives 24](#_bookmark17)

[Evaluation Method 24](#_bookmark18)

[Results and Findings 24](#_bookmark19)

[Low-Fidelity prototype testing 24](#_bookmark20)

[High-Fidelity prototype testing 26](#_bookmark21)

[CONCLUSIONS 27](#_bookmark22)

[Future Works 27](#_bookmark23)

[Conclusion 28](#_bookmark24)

[REFERENCES 29](#_bookmark25)

[Metal health issue statistics reference 29](#_bookmark26)

[Image references 29](#_bookmark27)

[Assessment Questionnaire reference 29](#_bookmark28)

[Google Calendar 29](#_bookmark29)

[APPENDICES 30](#_bookmark30)

[Appendix A 30](#_bookmark31)

[Appendix B 30](#_bookmark32)

[Appendix C 31](#_bookmark33)



# INTRODUCION

Mental wellbeing plays a vital part in overall well-being of a person’s life. It determines how we perform emotionally, psychologically, and socially. Given the significant impact one’s mental wellbeing has on every element of life, it is crucial to protect and enhance it using the right strategies. But in the recent years many people especially both the young adults and adult population are facing hardships in maintaining their mental wellbeing because of mental illnesses caused by stress, depression, anxiety, eating disorders, OCD, personality disorder, loneliness, isolation, chemical imbalances in the brain, substance use, etc. And the sad part is that most of them who are suffering from such illnesses are not aware of what they are going through. Also due to many misunderstandings regarding mental health and mental fitness, many people experience mental illness in secret and without receiving proper care. Hence awareness about one’s mental wellbeing and state is crucial to increase their chance of getting treatments on time.

Considering this burning situation that could ultimately costs lives of many young people; the main purpose of this project (Helping\_Hands) is to create an application that could help young adults and adults (18-30) by making them aware of their current mental health and state. The reason for specifically targeting young adults and adults is that according to the statistics of ‘National Institute of Mental Health’, the formerly mentioned age groups showed a combined higher percentage of mental illnesses (55.9%) in the year 2020 (referenced in references).

Promoting awareness about their mental health through this application may assist them in understanding the symptoms, locating qualified medical assistance, getting immediate timely help from their friends and family and, perhaps most significantly, eradicating the stigma associated with mental illness that forces so many individuals to suffer in silence. This in turn would improve their overall mental wellbeing.

## Report Overview

This report's objective is to provide a detailed account of the design procedure followed in the creation of Helping Hands. It includes information on the analysis, including a summary of the needs, users, context of usage, system, and technical requirements, as well as stakeholder analysis. The presentation of the functional and non-functional requirements is followed by a description of the system's design strategy. The evaluation of the finished product as well as the low and high-fidelity prototypes are detailed. The report's conclusion provides information on the ongoing work and offers recommendations for software development.



# ANALYSIS

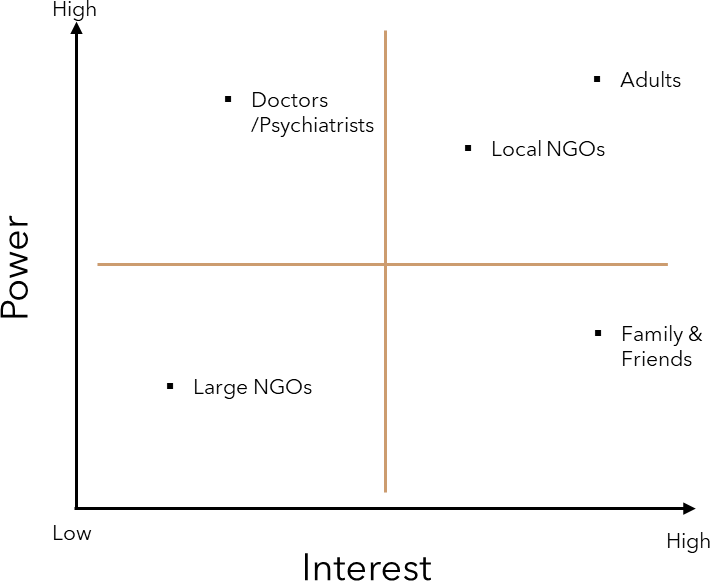
To achieve goal of promoting mental wellbeing by creating awareness of one’s mental health state, stakeholder analysis must be carried out in order to do identify the individuals or groups who could be involved with, impacted by, or able to influence the development of the system. Then, each stakeholder should be grouped categorically according to their influence and authority over the project.

## Stakeholder Analysis

Helping\_Hands identified the following categories of people as its potential stakeholders:

* Young Adults and Adults

Young adults and adults aged from 18-30 are the users of this app and they are key stakeholders. They are going to be the primary targeted users who are going to be benefited more out of all other stakeholders. Hence, they are expected to have both highest interest and highest power over the app. This shows that if the app fails to satisfy the users or if its ambiguous to use, it will ultimately result in termination of the system. So, it is crucial to keep the users (young adults and adults) at the heart of the design.



* Local NGOs

*Figure 1 Stakeholder Graph*

Local NGOs in any given community area such as Glasgow Association for Mental Health, MentalHealthMatters, etc are the secondary users of this application. These

MH Local NGOs make an effort to close the gap between community-based psychosocial therapies and hospital-based medical interventions. As they are mostly in short of social care givers and resources, they are expected to show interests in suggesting the app to youths in need to know if they are experiencing any symptoms or signs of mental illnesses. But doing this they can also influence many users to use this app which in turn contributes to its success by improving their working conditions. Hence, they have higher interest and higher power after the users.

* Family and Friends

Mental illnesses not only affect the person alone, but also their friends and family. Hence the family and friends of the sufferers are also expected to show high interest in the app but suggesting it to their loved ones. But as they are not expected to collaborate actively in any levels for the functioning or success of the app. Therefore, it’s safe to say they have relatively low power over the app.

* Doctors/Psychiatrists

Next the doctors or psychiatrists are expected to have high power over the system, as their active collaboration is needed in the proper functioning and design of the system. If they find the application to have any faults or irrelevant or dangerous to the users, it will result in the termination of the system. But on the other hand, they might not show much interest in using the app (at least in the initial development stages).

* Large NGOs

Finally large MH NGOs such as Mind, Samaritans, Mental Health Foundation are expected to show both low interest and low power over the system, as they usually have enough resources and social care workers to take care of anyone who needs support in a conventional way.

The design elements that need to be taken into account from the analysis are as follows: from the user's point of view, this system has to raise awareness of users' mental health conditions in order to enhance their likelihood of receiving care and reduce expenses. In order to do this, the system needs to be user-friendly, technologically perfect, and secure. Since there are currently a lot of mobile apps for boosting mental health, this solution needs to be competitive and appealing to customers from a financial standpoint.

## Users

More attention should be given for the user who would be expected to use this app. As mentioned before the primary users who are targeted to use this app are young adults and the adult population. Now adays more and more people from such population are experiencing mental health issues and they only comes under the treatment radar when things are out of hands for them. So, a hypothetical user of the app is described by the following personas,

*Avi who aged 22 years is pursuing a bachelor’s degree. Right from her childhood she shows personality traits such as low self-esteem and being self-critical. Furthermore, recent pressure from academic works and her parttime job in a restaurant added to her existing burden. As she always had a troubled past, she is not aware that her recent signs of sleeplessness, anxiety, irritability, and intolerance towards others are symptoms or signs of clinical depression. As she continues to ignore the signs, she is getting worse and worse as the days goes on. Recently she couldn’t focus on her studies or personal relationships. Because of her low self-esteem Avi doesn’t want to let others know that she is struggling in life, and she wants to know if she has any mental health issues just by using an app in her mobile.*

*Ray is a social carer who works in a local Mental Health NGO, the NGO he works has only a few resources and they have many people especially young people come for getting advice and support about their mental health issues. But most of the times, Ray noticed that the people who have come for help are not aware of their symptoms or signs. In this situation Ray wants to have some kind of tool or application he can use to assess the people who need help easily. He also thinks that the initial assessment during early stages would make a big difference in people’s life and help them to get timely immediate help.*

More personas who would want to use the apps are local NGOs social care givers, psychiatrists, and large NGOs social care givers.

## Market Review

There are many mental wellbeing applications already available in the market for use, but there is a gap of not having any kind of assessments to determine if the users show signs or symptoms of potential mental illnesses.

Following is some of the applications available in google playstore:

**MyPossibleSelf** provides the greatest mental toolkits on the market. In collaboration with Priory, a global leader in mental health, we have developed interactive tools and digitally tailored cognitive behavioural therapy (CBT) coping mechanisms. It also assists in taking care of yourself and navigating the obstacles of life together. Consider the opportunities.

From **29k: Mental Health & Wellbeing**, user gets limitless access to psychological tools that have been shown effective in helping people feel good, prosper, and manage with life's ups and downs through the app. A helpful community is also available to use. Both in-app purchases and advertising are absent. It prioritises user privacy and security at all times so

you may pay attention to your mental well-being and inner growth.

*By using scientifically validated methods from Cognitive Behavioral Therapy (CBT), Mindfulness, and Dialectical Behavioral Therapy, ‘****Evolve’*** *enables you to sleep soundly, deal with depression, conquer anxiety, are becoming more productive, de-stress, and enhance your mental health to find happiness (DBT). Evolve is a welcoming mental health app that offers the LGBTQ community a secure environment.*

## Context of the use

The goal behind this app's design is that users should evaluate themselves for any indications of mental health conditions like stress, depression, etc. and should have the option to share the results with friends and family. As a result, the app must be created such that it may be utilised "on the go" with few clicks or steps. However, a balance must be struck between a comprehensive system and keeping the system understandable and user-friendly. The user should also be able to evaluate their performance for future development and locate hospitals or physicians nearby in case of an emergency.

From the NGO’s perspective, the app must be easy to use and should evaluate adults to show results for any mental illness such as stress, anxiety, and depression depending on their state of health.

## Technical and Service Requirements

For this project, there are two key technical and/or service needs to take into account. The first need is that customers have working, modern smartphones or tablets that are linked to the internet. Additionally, the programme must be designed, built, launched, and updated using the proper software. Additionally, the findings of this programme must be distributed to the contacts that the user has specified. This would necessitate the use of an email transport protocol with enabled cyber security. Additionally, the user should be able to find the phone numbers and addresses of psychiatrists and hospitals in the vicinity. To do this, a suitable cluster map implementation of the geographical area is required. We must make sure that the technical crew is properly trained in order to accomplish this.

Second, from the viewpoint of NGOs and physicians/psychiatrists, their time and effort will be necessary for this system to operate at its best. To do this, it is essential to involve

physicians and psychiatrists in the design and implementation procedures, such as creating the questionnaire and algorithm used to assess the users' mental health status*.*

# REQUIREMENTS SPECIFICATION

This chapter will clearly outline the functional and non-functional requirements of the prototype. Functional requirement of any system can be summed as that without it the system can’t be function properly as expected. This happens because it won't be able to complete a task that is necessary for it to function effectively. In short functional requirements outline what the system must produce and how it must react to various inputs. On the other hand, non-functional requirements are concerned with the method by which the system will carry out a certain function. They can appear to be less significant than functional requirements at first look, yet both are necessary for a sound system. Non- functional requirements get an influence on the system's performance but not the system's functionality. In a nutshell, system usability is the focus of non-functional needs. If non- functional needs are not satisfied, users may grow dissatisfied with the system's functionality and look for another solution.

Three sources of data were used to identify the system's functional and non-functional requirements:

1. Market analysis (assessment existing applications that promotes mental wellbeing).
2. Problem analysis (evaluating conceivable users, their environments, the service, and business needs) (section 2).
3. Two rounds of user testing and feedback utilising low-fidelity and high-fidelity prototypes (sections 4).

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **No.** | **Requirement** | **Funtional/Non- Functional** | **MoSCoW** | | | | **Source** |
| **Must** | **Should** | **Could** | **Would** |
| 1 | Assessment on mental health based on mood. | **Functional** |  |  |  |  | Problem Analysis |
| **2** | Authentication and  Authorization of the user. | **Non-Functional** |  |  |  |  | Low fidelity User  Testing |
| **3** | Option to login with Google. | **Non-Functional** |  |  |  |  | High fidelity User Testing |
| **4** | Option to login with Facebook. | **Non-Functional** |  |  |  |  | High fidelity User Testing |
| **5** | Showing quote of the day for  motivation. | **Functional** |  |  |  |  | Low fidelity User  Testing |
| **6** | Show current date and time for assessment. | **Functional** |  |  |  |  | Low fidelity User Testing |
| **7** | Selecting the assessment section based on mood. | **Functional** |  |  |  |  | Problem Analysis |
| **8** | Loading assessment  questionnaires for most | **Functional** |  |  |  |  | Problem Analysis |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | common mental health problems based on mood. |  |  |  |  |  |  |
| **9** | Interaction with the mobile  phone. | **Non-Functional** |  |  |  |  | Low fidelity User  Testing |
| **10** | Evaluate a score for mental issue based on the questionnaire results. | **Functional** |  |  |  |  | Problem Analysis |
| **11** | Save the data for reflection. | **Functional** |  |  |  |  | Low fidelity User  Testing |
| **12** | Securely save the sensitive data. | **Non-Functional** |  |  |  |  | High fidelity User Testing |
| **13** | Share the test reports with friends and family authorized  by the user. | **Functional** |  |  |  |  | Problem Analysis |
| **14** | Send the reports via email using secure email transfer  protocol. | **Non-Functional** |  |  |  |  | Low fidelity User Testing |
| **15** | Enabling the user to retake the same test. | **Functional** |  |  |  |  | Low fidelity User Testing |
| **16** | Taking tests for other mental health issues. | **Functional** |  |  |  |  | Problem Analysis |
| **17** | Get the details of nearby  hospitals and psychiatrists. | **Functional** |  |  |  |  | Problem Analysis |
| **18** | Cluster map implementation to access the nearby hospitals and psychiatrists. | **Non-Functional** |  |  |  |  | Market Review |
| **19** | Location setting in the profile  settings | **Non-Functional** |  |  |  |  | High fidelity User  Testing |
| **20** | Retrieve history data. | **Non-Functional** |  |  |  |  | Problem Analysis |
| **21** | Plot history stats into graphs | **Functional** |  |  |  |  | Problem Analysis |
| **22** | Security and privacy settings for the user. | **Non-Functional** |  |  |  |  | Market Review |
| **23** | Check-in customization for the  mood assessment. | **Non-Functional** |  |  |  |  | Market Review |
| **24** | Notifications preferences for the user. | **Non-Functional** |  |  |  |  | Market Review |
| **25** | Emergency contact addition in the profile settings. | **Functional** |  |  |  |  | Problem Analysis |
| **26** | Securely saving the user  personal details. | **Non-Functional** |  |  |  |  | High fidelity User  Testing |
| **27** | Sign out option for the user. | **Non-Functional** |  |  |  |  | High fidelity User Testing |

*Table 1 Requirements Specification*

The MoSCoW classification approach establishes the degree of requirement prioritising (Clegg & Barker, 1994) [1]. A "Must" need has a higher priority than a "Should" requirement, a "Could" requirement has a lower priority, and a "Would" requirement was not included in this prototype version. Based on data and comments offered by various sources of information, the ranking was decided. Based on whether or not the app requires this need in to function, the functionality evaluation of the requirements (functional or non-functional) was made.

Requirements number 12, 14, 22 and 26 comes under cyber security features of software engineering, hence those features were not demonstrated in this prototype scope. Also, requirement number 18 is needed for the successful working of requirement 17, but the underlying technical aspects of #18 is out of this prototype scope now.

# PROTOTPYING AND DESIGN

This chapter's purpose is to outline the design methodology and procedure used to create the Helping Hands prototype. This provides a summary of each stage that was carried out, the design decisions that were taken, and details of the low-fidelity and high-fidelity prototypes.

Figure 2 depicts the eight steps that make up the design process in its entirety. More information about them is provided below.

**Problem**

**Identification**

**Stakeholders**

**& Target Users Identification**

**Requirements**

**Gathering**

**Conceptualization**

**of Ideas**

**Low Fidelity Prototype Creation**

**High Fidelity**

**Prototype Creation**

**Evaluation**

**Prototype**

**Refinement**

*Figure 2 Design Phases*

Choosing a problem to build a prototype for was the first stage in the designing process. The topic chosen for this report was mental health, as was previously noted. This topic was chosen because more and more individuals struggle with mental health concerns, and because there are numerous myths about mental health that cause people to ignore the signs in their early stages and delay receiving the necessary care. The user testing mentioned in the assessment chapter will reaffirm and validate this.

Finding the system's intended users and stakeholders is the next stage. The age groups with the highest rates of mental health concerns include young adults and adults, together with their close friends and family members, physicians or psychiatrists, small local mental health NGOs, and large international NGOs. The next step was to create some personas that would

help understand consumers and gather requirements based on their struggles, as reaching people who show signs and symptoms of mental health issues but also choose to ignore their signs due to misconceptions is difficult and outside the scope of this project.

The next step was to gather requirements. Choosing what the system should do was involved in this. The majority of the requirements were derived from market research, problem analysis, or designer concepts based on developed personas. However, some ideas for the prototype were given by the user studies that were done, in which the users were individuals who expressed interest in having their mental health status assessed. These suggestions were either added to the requirements or were explored for future development.

The next step was the conceptualization of the ideas where an initial plan was done to determine where to start the development of prototype. Also, rough sketches and drafts were made at this phase which acted as a foundation for low fidelity prototyping.

The low fidelity prototype was built after the concept was determined, the target users were chosen, and the requirements were obtained. This involves making rough draughts of the mobile application and beginning to consider how the prototype should function and appear. However, it was necessary to consider the system, application, and technological needs before creating the low fidelity displays. Before beginning to draw and develop the system, this helped gain a better grasp of how it should operate. Making certain significant decisions on the designing process was also necessary at this phase of development.

The high-fidelity prototype was designed after the low fidelity one had determined the mobile app's layout. The user research was also carried out using this prototype. More information regarding the high-fidelity prototype is provided later on in this chapter, while the findings of the user studies will be discussed in the next chapter.

As previously said, user evaluation came after the high-fidelity prototype was created. This included a number of interview-style questions regarding mental health and wellness as well as comments on the system that had been created. Users' helpful feedback for the system and intriguing responses to the questions came from this stage.

The final phase involved making small adjustments to the prototype in order to get it ready for the final submission with the aid of the evaluation.

## Conceptualization of ideas

After the desk-based analysis was completed and the first requirements were evaluated, this step was initiated. The objectives of this stage were to conceptualise user navigation and plan the design's development. It was agreed that the app should have a login page, home page, assessment page and user details page after researching various mental wellbeing apps

already on the market: the home page where the user can see various mental health issues (enabling the user to choose an option based on their mood) which leads to an assessment section (where a user answer question based on their current state). In order to highlight the many entries, point and the links between the parts, a crude structure was made (see figure 3).

Anxiety

Depression Eating disorder

System/App Login Page Home Page

Substance Use

OCD

**Assessment**

**Page (different questionnaire for different**

**illnesses)**

Personality Disorder

Profile

Help Page

*Figure 3 Crude Structure of initial design*

This stage's output allowed for some notes and a very basic draught of the screens that are described in the next section.

To have a better understanding of what should be visually conveyed on each screen, several initial freehand rough screen sketches were created after the structural flow.

In addition to seeing the screen flow patterns while a user accomplished a job, this stage's objectives were to clarify the visual draft. The first assignment was

* Picking a mental problem category based on the user's mood.
* Finishing a questionnaire for the chosen mental illness’ examination.

Because they appeared to be indicative of what users might accomplish in the programme, these two activities were picked. To keep the scope as broad as feasible at this prototype stage, straightforward activities were desired. The low fidelity wireframes were based on these initial sketches, but they highlighted more issues than they resolved. These inquiries covered a wide variety of How the user would be able to choose their options, which particular questionnaire should be made available to the user. These are essential components of the system idea; therefore, it was advantageous that these inquiries came up early in the design process. They were not addressed until stages of user testing.



## Low Fidelity Prototype

Low-fidelity prototypes frequently consist of paper and are inactive for users. They range from printouts to a collection of hand-drawn mock-ups. Low-fidelity drawings should be quicker to produce. Low-fidelity prototypes are useful for early visualisation of several design options, which encourages creativity and advancement. Another benefit of this strategy is that consumers could feel more at ease proposing improvements when utilising basic sketches. The low fidelity prototype is described in more depth in this part, along with screenshots of the sketches made for this stage that have been annotated.

The low fidelity prototype as a mobile application created for Helping Hands is made up of numerous sketches, as mentioned above. It was decided that just the assessment flow and help page will be designed here at first for young adults and adults who may be at-risk for mental health issues. Pen and paper were used to create the drawings because they were quick and simple to create. Another reason for this design was to mimic the visual elements of a phone while letting focus group users feel at ease while providing feedback on the design and arrangement of the displays. The objectives of this stage were to enable user testing early in the design process and to get a more exact notion of the visual arrangement of the screens. Paper wireframes served as this stage's main output.

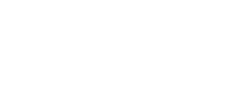
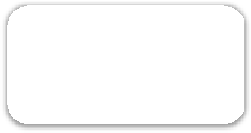
These low-quality prototypes were evaluated by focus group participants, who provided a wealth of remarks and insightful feedback. More design revisions and ideas were generated as a consequence of these interviews at this stage than at any other. The following are design changes evolved from this phase:

* There were confusions about how to navigate from one screen to another such as from selecting the mood to take assessment and to the help page. Hence the design was changed in next phase to add help section in the screen after submitting the assessment results.
* To make things more clear and easily accessible, suggestions were given to keep ‘Begin

Assessment’ and ‘Profile Settings’ option in the home page.

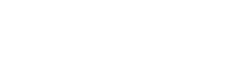
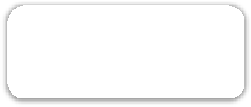
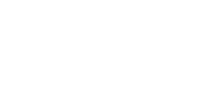
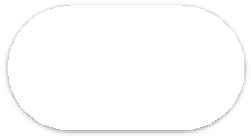
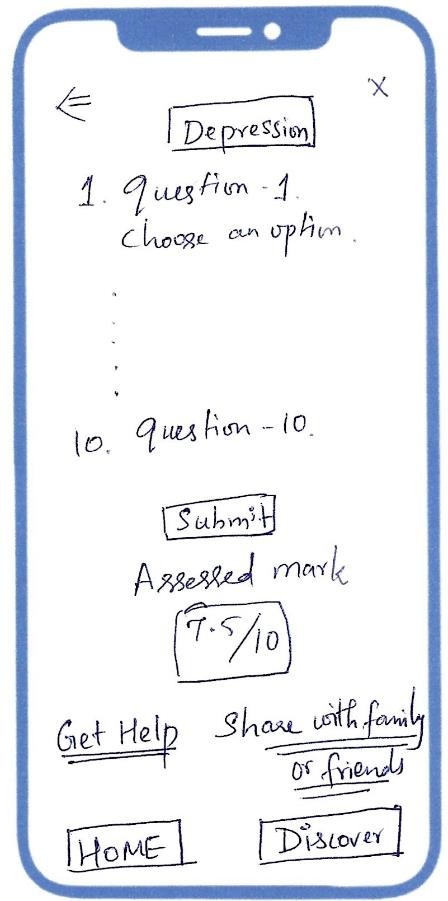
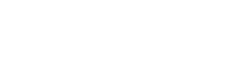
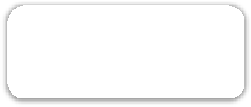
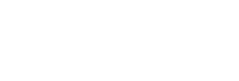
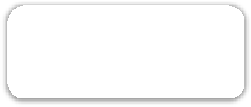
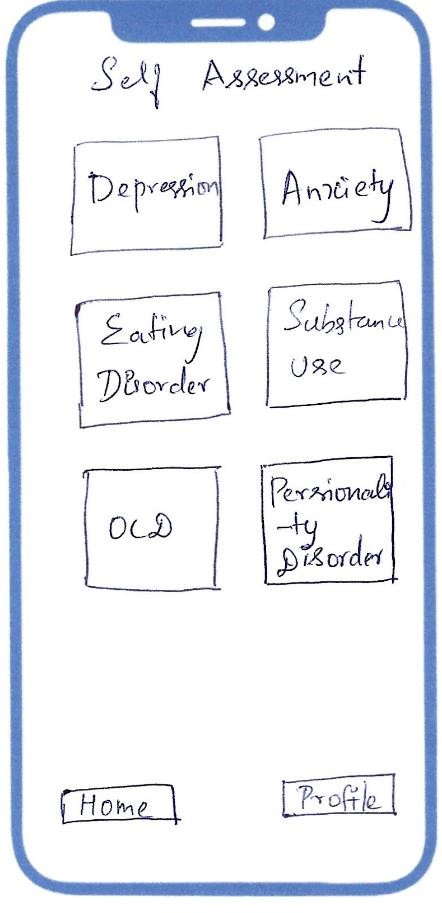
* Also, few users from the focus group expects to have reflect section where they can track their progress and improvements over the year. This suggestion was considered highly beneficial to the user and to achieve this the prototype has also needs to include the calendar option where the user can input the date and time of the assessment before taking it. Both were considered in the high-fidelity prototyping.
* Also, one user emphasized the need for having a retake option for the assessment if they want to take the test again which was also taken into account in the next phase.
* There was also a suggestion to add authentication and authorization feature to the app (Sign in and Sign Up).
* And one user gave an interesting suggestion to show a random quote of the day to the users, before they land up in the home page. It was thought that this might uplift and motivate the users.





Submit button to submit the questionnaire

* Initially it was thought to share the test results of the user’s family or friends via text message, but suggestions were made that it will be more effective if it can be shared via email rather than test, as email can accommodate more information. Also, users might be more open to share their close one’s email id than the phone number.
* Few participants also show some concern about the nature of the assessment they would take and the credibility of the same. Hence extra efforts were taken to source the questionnaires from the National Health Services website in this initial stages (referenced in reference).



Clickable pictures for

each issue

Questionnaire for

assessment

Assessment score

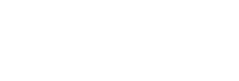
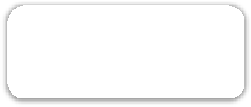
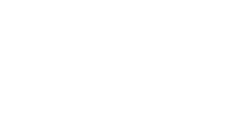
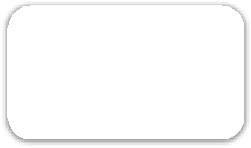
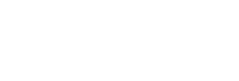
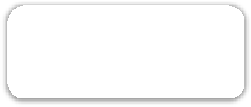
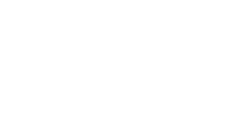
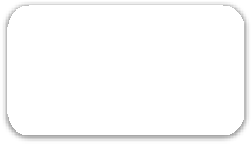
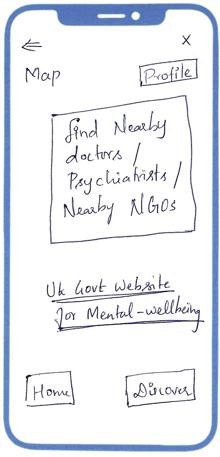
after submit

*Figure 4 Home Page (Low Fidelity)*

*Figure 5 Assessment Page (Low Fidelity)*

Button to access

profile page



Link to access Govt

web for mental health support

Maps to show nearby

hospitals location

Click home button to

load home page

Discover button to

search features in the app

*Figure 6 Help Page (Low Fidelity)*

All of these remarks and inquiries served as evidence that the conceptual and aesthetic components of the system need a full rewrite. The following phase involved this reworking. More low-Fidelity screenshots are seen in Appendix A.

Pros and Cons of using Low Fidelity Prototyping

Low fidelity prototype has the benefit of freeing the designer from any technological constraints that can limit their ability to be creative. The low-quality prototype had trouble demonstrating seamless changes between the displays. It was also clear that this iteration of the prototype would need a lot of voice-overs to describe the on-screen interaction and screen switching.

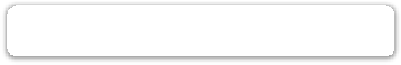
## High Fidelity Prototype

Computer-based high-fidelity prototypes often support digital screen user interactions. You can get the closest possible depiction of the user interface with high-fidelity prototypes.

High-fidelity prototypes are thought to be significantly more successful in gathering real human performance data (such as the amount of time needed to accomplish a job) and showcasing finished goods to customers, management, and other stakeholders.

The objectives of this phase were to put the suggestions from the previous phase's low-fidelity user testing into practise and to enhance and test the app's interaction. This phase also had the goal of enabling a second round of user testing, on a digital and more intricate product. The transition from paper wireframes to a digital platform also raised new design issues because each interaction parameter needed to be precisely specified. For instance, how selecting the evaluation based on mood would be interactive was a concern (selecting a section to begin assessment, then input the time and date from the calendar feature, selecting an assessment based on the mood and loading the assessment questionnaire). This stage resulted in a collection of connected digital wireframes made using the Figma software. At this point, user testing was once more conducted, but on a lesser number of people from focus group. As a result, few extra feature additions were suggested by the participants, however there were no big design changes on the concepts of this prototype and the same will be discussed in detail later on in this subsection.

Following are the screenshots of some of the prominent features of the high-fidelity prototype layout (other screenshots for the same are attached in Appendix B).

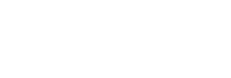
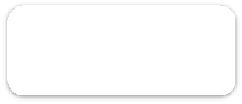
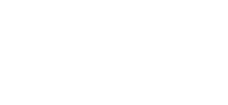
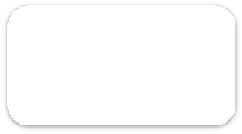
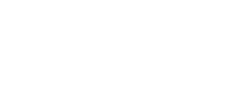
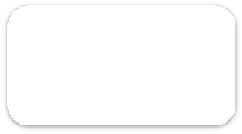
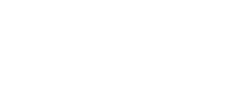
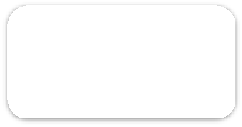
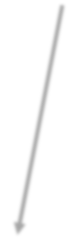
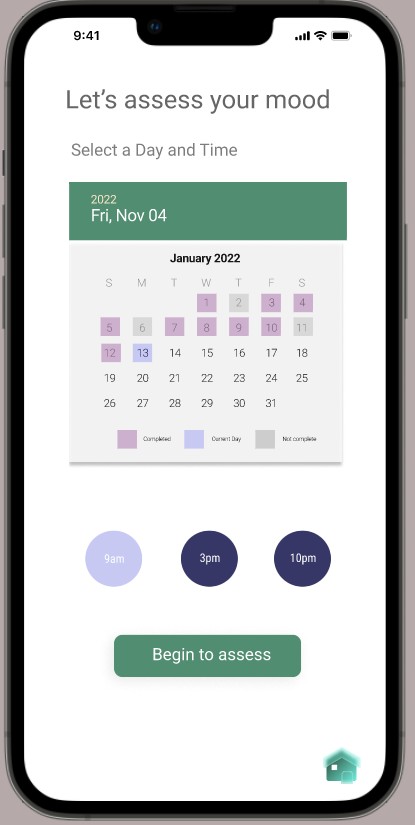
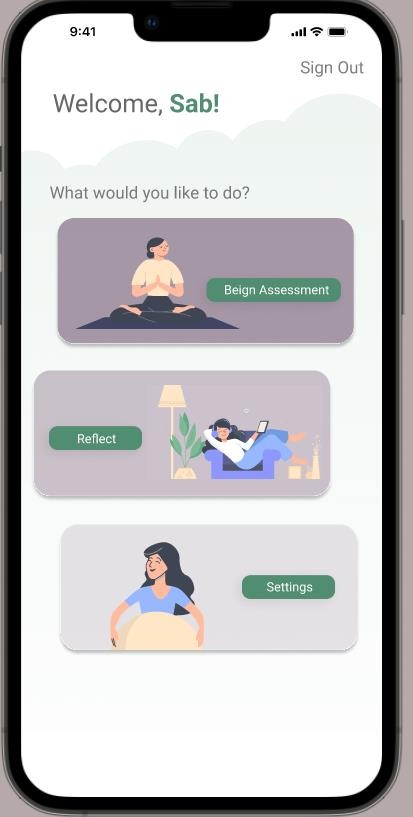


Assessment screens flow

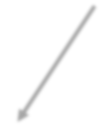
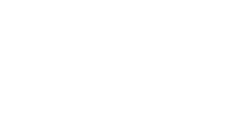
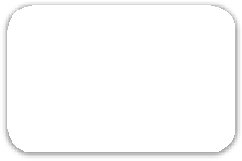
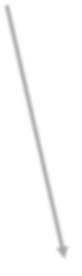
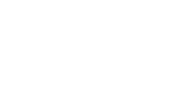
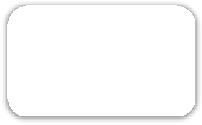
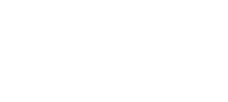
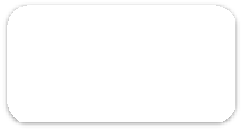
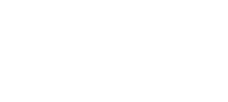
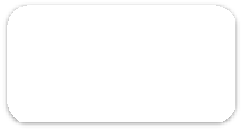
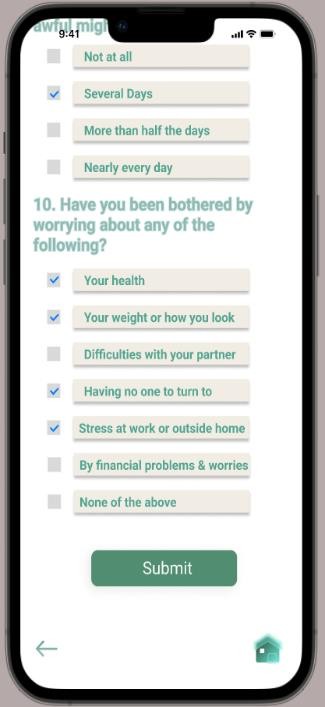
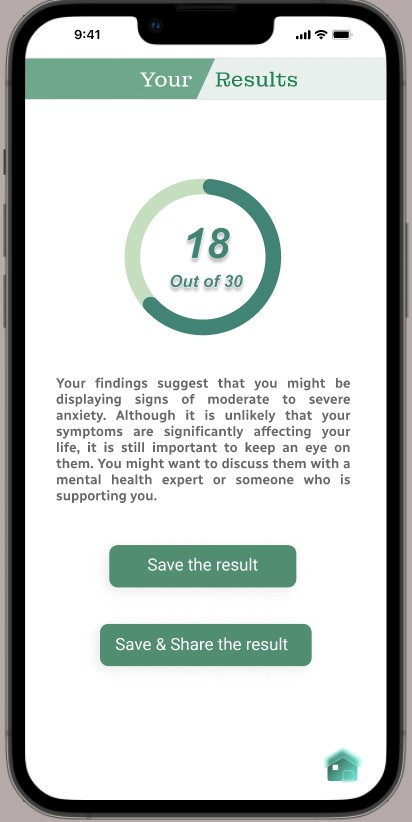
Click here to begin assessment

Select Date and Time of the assessment

Select the assessment type based on your



Click here to continue assessment



Click here to

only save the result

Score shows the

results out of 30 for potential mental

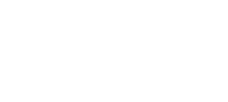
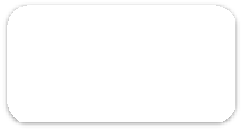
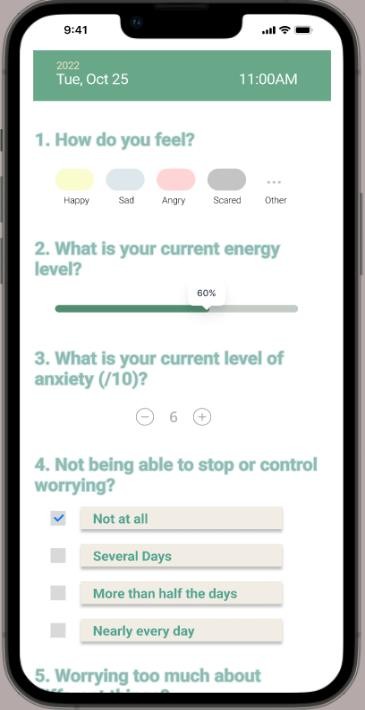
illness

Click here to save

and share the results

Click here to submit

the assessment

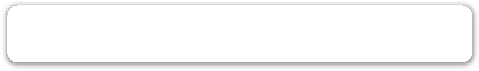


Scroll here to check all the assessment questions

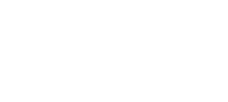
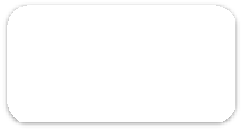
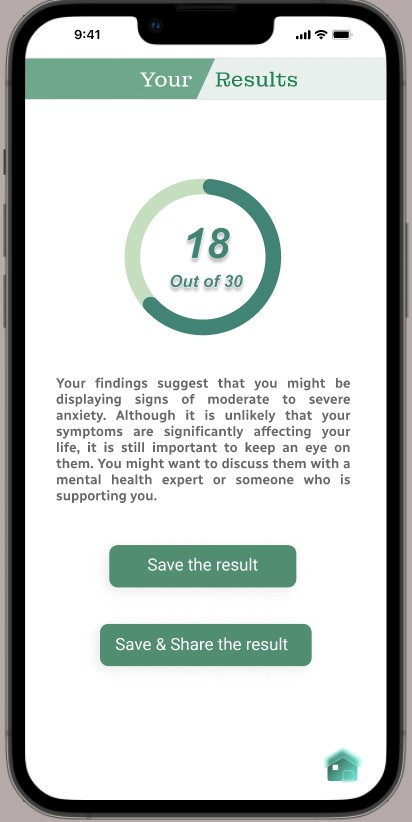
*Figure 7 Assessments Screens Flow (High Fidelity)*

The figure 7 shows the task selection, day and time entry, mood selection, assessment submission and display of scores flow from the prototype. This is deemed as an important design flow of the prototype.

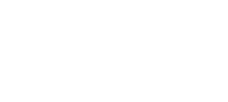
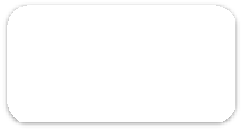
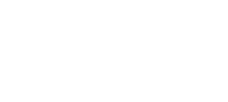
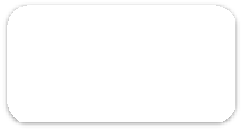
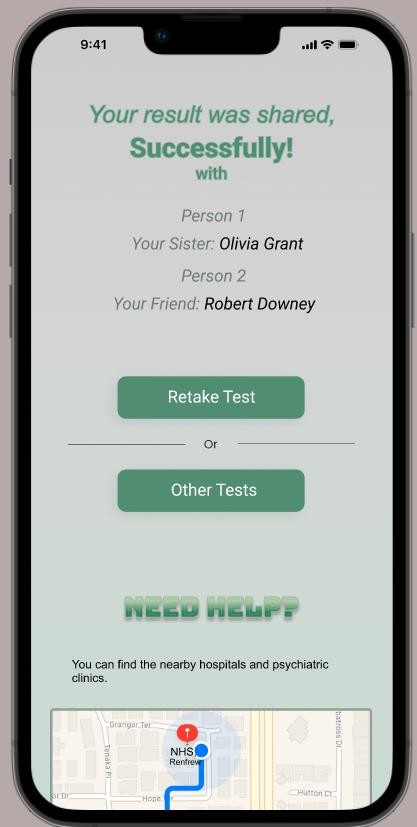
An intriguing feature added in the assessment flow is the addition of calendar inspired from google calendars which enables the user to input the time of their assessment in an any given day. Also, a scrolling feature in the assessment screen which makes the user read a lot of information by scrolling rather than clicking, which is quicker and doesn't interfere with focus or the speed at which the page loads. Upon submit, an algorithm (the app will use in the future) will calculate a score based on the users’ choices to indicate if the user shows any signs of chosen mental illness.



Flow after submitting the assessment



Click here to save and share the results

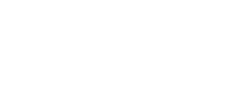
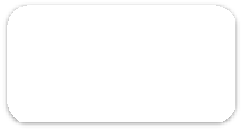
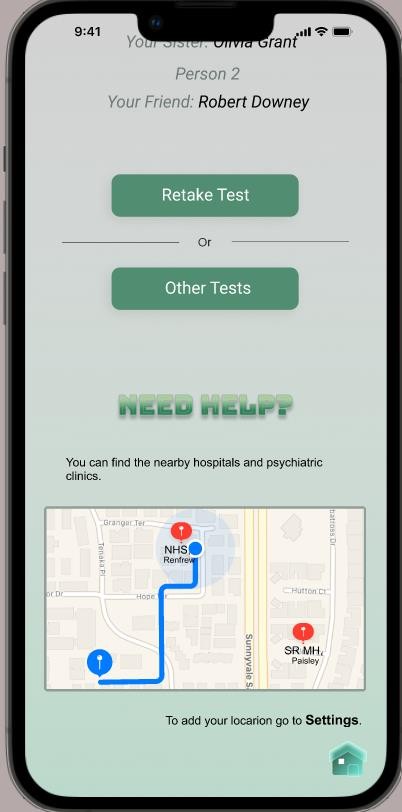


Click here to retake

the same test

Click here to take

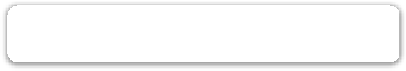
other tests



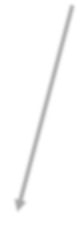
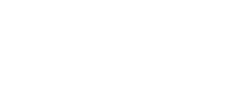
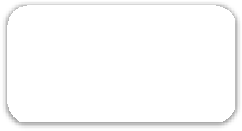
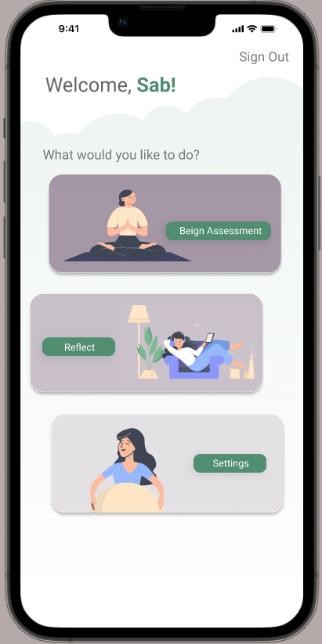
Check the map to see the nearby hospitals or doctors

*Figure 8 Save & Share assessment flow (High Fidelity)*

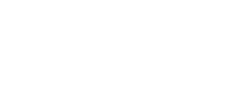
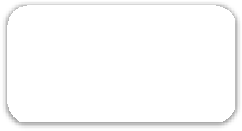
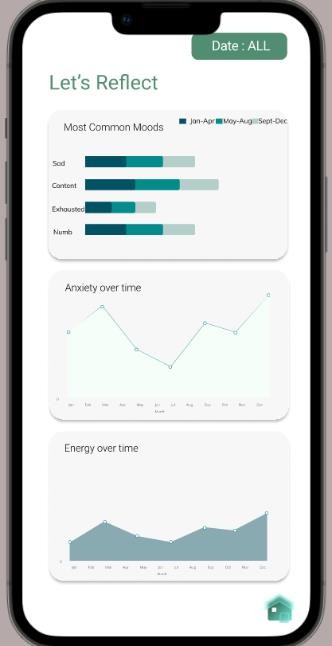
The figure 8 shows the Save & Share the assessment results flow, where clicking on ‘Save & Share the result button will share the assessment results to 2 email Ids which were set by the user in the emergency contacts list in profile information. The results page also has options to either retake the same test (enabled by the ‘Retake Test’ button) or take other tests if they feel other moods. There is also a help section added where the user can see the nearby hospitals or doctors based on their location.



Reflection of past activities flow



Click here to open the reflect section



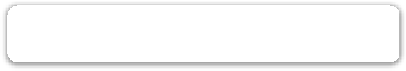
Reflection information screen

*Figure 9 Reflection of past activities flow (High Fidelity)*

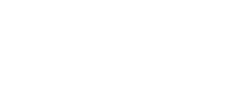
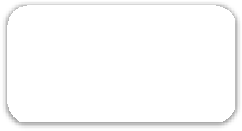
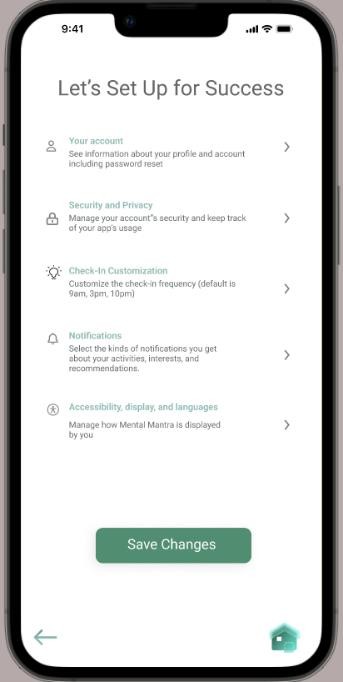
Figure 9 shows the reflect flow, where the user can click on reflect button to see the history of their mood and scores over time. This feature is expected to let the user know of their and motivate them. This might also help during any treatment periods, as this shows the mood changes and score trends of a user over time which may be referred by doctors or psychiatrists.

Figure 10 shows the profile settings flow, where user can input all their personal details such as name, age, gender, etc along with name, email and relationship of their two emergency contacts. Email of the emergency contacts will be used to share the user’s assessment results, if they choose to share it. Also, user can add their location in the personal details page which will be used to show nearby hospitals in the help section we have discussed earlier.

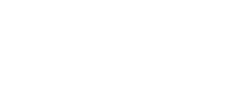
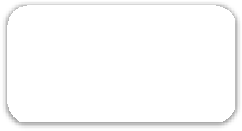
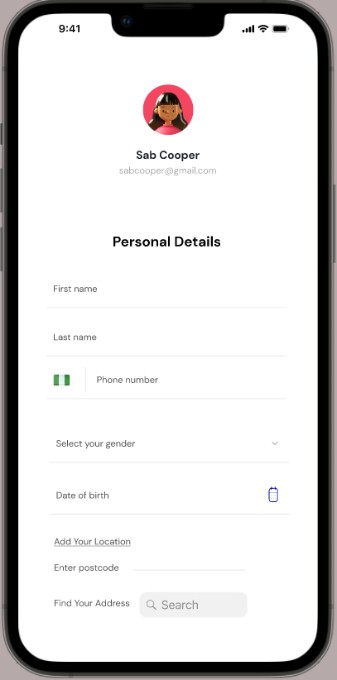
s



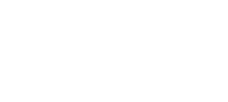
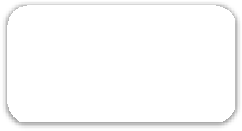
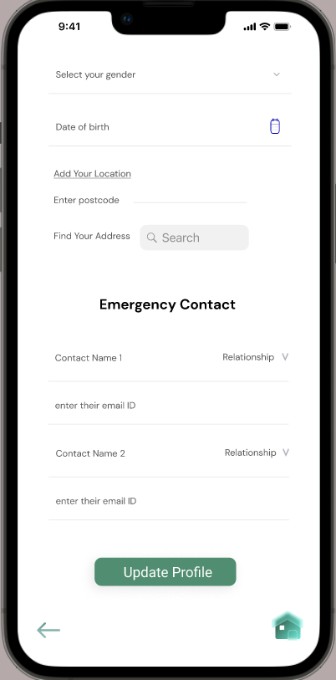
Profile settings screen flow



Click here to open your account details



Scroll down to see all the profile information



Click here to update the profile changes

*Figure 10 Profile settings flow (High Fidelity)*

Other design decisions

*Choice of Colour*

Various shades of colour green were used in all the screens of the prototype including the layout, buttons and texts. Because it is believed that colour green is calming, natural and motivating. Sources from the website verwellmind.com emphasizes this by saying that its hues may relax people into unfamiliar environments. In one research [2], those who exercised indoors while watching a green-overlaid film of outside space experienced a "green workout effect." When watching the same

film without an overlay, participants felt less exertion and had less mood disruption. Although some people find the colour green to be calming, others claim it inspires them.

*Scroll Option in assessment and profile details page*

As mentioned in previous section, scroll option in mobile phones tend to not bore the users and also could reduce the screen loading issues caused by networks, if user has to navigate between many pages. This notion inspired the design to adapt scrolling features.

*Iphone layout for the prototype*

To keep the design more professional and to give an impression of how various screens would look like in actual mobile phone screens, the protype was designed on an iphone layout. This was one of the highly users appreciated features of the prototype.

*Home and Back button in various screens*

Also, to facilitate an easy navigation between screens and make the home page accessible from anywhere in the app, a home button and skip button was added on almost all screens of the prototype. This would enable a free movement in the application.

*Submit boxes*

Submit boxes are used in many places throughout the design such as in assessment screen as update button, ‘Update Profile’ button in the user profile screen and ‘Save Changes’ button in the profile settings page. All submit buttons are placed at the bottom centre of each screen to enable easy access to the users.

*Likert Scales for assessment questionnaire*

Variety of Likert scales like rating bar, customised option choices and colour coded answers were used to encourage the users to answer all the questions and make the questionnaire visually appealing to them.

Finally various pictures and graphs used in the prototype are sourced various websites referenced in the reference section.

Suggestions or problems identified from user testing of high-fidelity prototype

* Options to login using google or facebook in addition to sign in or sign-up using email and password: Two participants made this wonderful suggestion to add the option on to the login page. This suggestion was taken into consideration and was thought to be beneficial for the user. Hence the change was made accordingly.
* Securely saving the sensitive data: Few participants raised questions on how the sensitive information such as assessment results after submission, but this feature is more on the technical aspect than the design aspect. So, this comment from the participants is left for future considerations.
* Another useful suggestion from a user was adding the location information in the profile settings itself, so it will be easy for the system to identify the nearby hospitals and doctors. This change was made in the prototype refinement.
* Finally, almost all participants asked to add a sign-out button in the home page to securely sign out of the system. This was also added to the prototype.



# EVALUATION

The objective of this chapter is to provide a summary of the evaluation procedure carried out for the system under development. Prototype evaluations were carried out in two stages (for the high-fidelity prototype and the low-fidelity prototype). These two analyses used similar approaches but had various goals, objectives, and conclusions.

## Aims and Objectives

The primary goals of the low-fidelity prototype evaluation were to learn more about prospective content and overall low-fidelity usability. The goal was to determine whether the functions advertised on the app were actually desired and beneficial as well as whether the interface was simple, pleasant, and easy to use. Testing the system's visual user interface was one of the additional goals of the second round of evaluation using high fidelity prototype.

## Evaluation Method

A low-fidelity prototype comprised of paper wireframes was used for the first evaluation (blue and white). And the high-fidelity prototype, which was a set of interactive, digitalized wireframes—was subjected to the second assessment. 8 members of a focus group (students in computer and information sciences) who comes under the age category of young adults and adults were requested to participate in the evaluation (same individuals were asked to participate in both low fidelity and high-fidelity testing). In addition, those who didn't exactly fit the age criteria were questioned on the app's overall design and usefulness. The participants were invited to go through the prototype and provide feedback on any features or general design flaws. In- depth information was also gathered using semi-structured interview questions.

In Appendix C, you'll also find the Participant Information Sheet and the Consent Form that each use had to sign before taking part in the interview, together with the entire interview questions and structure.

## Results and Findings

Low-Fidelity prototype testing

When asked if they experience or ever experienced any mental issues such as anxiety, depression, personality disorders etc, some of them answered yes, some no or maybe as shown in figure 11. And when asked if they agree that such mental illnesses affect their mental wellbeing, the answers were predominantly strongly agree as shown below in figure 12. Responses to these two questions shows the potential need for this system.

Graph plots of questions shown in the Figures 11, 12, 13 and 14 have options Yes, Maybe and No for the users to choose. In addition, the first level of low fidelity user testing has an open-ended question for feedbacks and suggestions from the participants.

Are you experiencing or ever experienced any mental health problems?

Do you agree that mental health issues affect mental wellbeing?

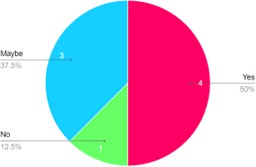


*Figure 11 Question 1 (Low Fidelity) Figure 12 Question 2 (Low Fidelity)*

From the figure 13, it can be seen that majority of participants thought the assessment can be helpful to know about their mental health status. Also figure 14 shows the proportion of participants that would be willing or not to share their assessment to friends or family can be helpful.

Do you feel the assessment section can be helpful?

Do you feel a notification to friends/family about your mental health can be useful to get help?



*Figure 13 Question 3 (Low Fidelity) Figure 14 Question 4 (Low Fidelity)*

Also, when asked for feedbacks and suggestions for the low-fidelity prototype design, there were a lot of suggestions which were already discussed in the previous section (Prototype and Design section). Most recurring comments for this open ended questions are to add a history or reflect section, to add an authentication login screen, option to retake the assessment, to have a home page in the system where all options like ‘begin assessment’, ‘reflection’ and ‘Settings’ can be accessed, use of close ones’ email instead of text message so detailed information about the

result can be shared and also a suggestion to add something like a motivation quote of the day. All these answers to the open-ended questions further improved the high-fidelity prototype design. From the feedbacks perspective 2 participants felt that the flow of taking the assessment from low-fidelity design is not very clear and couldn’t interpret how the interaction and navigation will be from choosing the mood to take the assessment. So, the high-fidelity design was expected to solve this confusion, as it can visually show the navigation to the users. Another feedback is that people were showing concerns about the credibility of questionnaire the app is going to use and for the same reason, questions were sourced from NHS to use on the app.

High-Fidelity prototype testing

Participants were requested to utilise the app prototype in this phase of the user testing. This phase demonstrated that users comprehended the functionality and intent of the system, but more crucially, they offered insightful criticism and suggested other features that should be taken into account. All fresh concepts were given as requirements in the section under "Requirements," which came from high fidelity user testing. Some of the useful suggestions were enable login using google and facebook, adding a sign out button, including location info in the settings section and there were many questions about saving the user data securely, but security was considered beyond the scope of the prototype at least at these early stages of development.

Participants were required to provide comments on the overall system at the conclusion of the user testing. The prototype received overwhelmingly good reviews from the public, as seen in Figure 15 - 18.

The prototype is aesthetic and well designed. Navigation in prototype is smooth and interactive



*Figure 15 Question 1 (High Fidelity) Figure 16 Question 2 (High Fidelity)*

Features of the prototype are easy to undestand. Prototype’s concept can be helpful



*Figure 17 Question 3 (High Fidelity) Figure 18 Question 4 (High Fidelity)*

Graph plots of questions 15, 16, 17 and 18 have options of Strongly Agree, Agree, Neither Agree nor Disagree, Disagree, Strongly Disagree for the participants to choose from. Also, this high-fidelity user testing, interview questions have an open-ended question for getting participant feedback and suggestions.

Some of the most encouraging comments made by users

* "If the application is built and made available in the future, I will probably use one to examine

my symptoms and signals of my bad mood swings."

* "I think it's a good idea to monitor our emotions throughout time."
* "The inclusion of a friend or family member in the notice is quite helpful, as the friend is

probably more crucial for assisting the person to obtain assistance if required."

Overall, the user evaluation showed that the prototype's design was successful, and the concept should be taken into consideration for a future actual product.

# CONCLUSIONS

Looking back at the development of Helping Hands and the assessment findings, it appears that the output is a successful one and that the concept behind the system is one that should be taken into account when creating a genuine, functional mobile application.

## Future Works

If this prototype were to be put into use, the needs that weren't built at this point in the development process should be built now. The following are some of the most crucial elements that need to be put into practise in the future designs:

* + Considered the security of storing sensitive data using cyber security approaches.



* + Adding other mental moods in addition to the ones we now have for choosing to extend the reach
  + Adding various screens with various information for users and friends or family members.
  + Add a feature to let the users directly call the psychiatrists and doctors directly from the help page.
  + Options to zoom in the graphs in reflect section for better visibility.

The enhancement of the prototype with the requirements needed to move on with more user testing would be the following phase in the development process. However, the next user review should involve more people, from other demographics and fields, as well as perhaps some professionals who might provide a more knowledgeable opinion. Moreover, since the application was created to help them, and their opinions are the most useful, actual persons with mental health issues or who are predisposed to developing such disorders should be interviewed rather than utilising Personas.

Following the completion of the subsequent user review, the prototype should be adjusted appropriately, and the actual application should begin to be implemented. As developing a system, it should be done in a way that makes it simple to make changes when necessary.

## Conclusion

In conclusion, the concept for the Helping Hands prototype worked well and was beneficial for a health issue that doesn't get enough early attention.

The system's development process was quite fascinating and thrilling, and it provided important insight into how a product should be designed. To guarantee that the intended outcome is achieved, each step from considering a concept to approaching, the stakeholders, requirements, users, context of usage, system and technical needs, and process of producing the prototypes and assessing them was crucial.

In conclusion, the designer wishes that this prototype will be realised in the future and will assist people in regaining their joyful lives and understanding of their mental health.

1. Clegg, D. & Barker, R. (1994) *Case Method Fast-Track: A RAD Approach*.
2. *Akers A, Barton J, Cossey R, Gainsford P, Griffin M, Micklewright D.* [*Visual color perception in*](https://doi.org/10.1021/es301685g)[*green exercise: positive effects on mood and perceived exertion*](https://doi.org/10.1021/es301685g)*.* Environ Sci

Technol. *2012;46(16):8661-8666. doi:10.1021/es301685g*

## Metal health issue statistics reference

[**https://www.nimh.nih.gov/health/statistics/mental-illness**](https://www.nimh.nih.gov/health/statistics/mental-illness)

## Image references

[**https://www.freepik.com/premium-vector/mental-health-vector-**](https://www.freepik.com/premium-vector/mental-health-vector-logo-icon-design_31081045.htm)[**logo-icon-design\_31081045.htm**](https://www.freepik.com/premium-vector/mental-health-vector-logo-icon-design_31081045.htm)[**https://www.health.org.uk/newsletter-feature/improving-mental-**](https://www.health.org.uk/newsletter-feature/improving-mental-health-services-it%E2%80%99s-everybody%E2%80%99s-business)[**health-services-it%E2%80%99s-everybody%E2%80%99s-business**](https://www.health.org.uk/newsletter-feature/improving-mental-health-services-it%E2%80%99s-everybody%E2%80%99s-business)[**https://www.hindustantimes.com/lifestyle/health/is-depression-**](https://www.hindustantimes.com/lifestyle/health/is-depression-more-common-in-women-expert-busts-top-myths-about-depression-101666168241052.html)[**more-common-in-women-expert-busts-top-myths-about-**](https://www.hindustantimes.com/lifestyle/health/is-depression-more-common-in-women-expert-busts-top-myths-about-depression-101666168241052.html)[**depression-101666168241052.html**](https://www.hindustantimes.com/lifestyle/health/is-depression-more-common-in-women-expert-busts-top-myths-about-depression-101666168241052.html)[**https://www.shutterstock.com/search/anxiety-disorder**](https://www.shutterstock.com/search/anxiety-disorder)[**https://www.news-medical.net/health/What-is-an-Eating-**](https://www.news-medical.net/health/What-is-an-Eating-Disorder.aspx)

[**Disorder.aspx**](https://www.news-medical.net/health/What-is-an-Eating-Disorder.aspx)

[**https://www.alamy.com/concept-of-drug-addiction-and-**](https://www.alamy.com/concept-of-drug-addiction-and-substance-dependence-as-a-junkie-symbol-or-addict-health-problem-with-cocaine-heroin-cannabis-alcohol-and-prescription-image222499484.html)[**substance-dependence-as-a-junkie-symbol-or-addict-health-**](https://www.alamy.com/concept-of-drug-addiction-and-substance-dependence-as-a-junkie-symbol-or-addict-health-problem-with-cocaine-heroin-cannabis-alcohol-and-prescription-image222499484.html)[**problem-with-cocaine-heroin-cannabis-alcohol-and-prescription-**](https://www.alamy.com/concept-of-drug-addiction-and-substance-dependence-as-a-junkie-symbol-or-addict-health-problem-with-cocaine-heroin-cannabis-alcohol-and-prescription-image222499484.html)[**image222499484.html**](https://www.alamy.com/concept-of-drug-addiction-and-substance-dependence-as-a-junkie-symbol-or-addict-health-problem-with-cocaine-heroin-cannabis-alcohol-and-prescription-image222499484.html)[**https://www.istockphoto.com/de/vektor/ocd-**](https://www.istockphoto.com/de/vektor/ocd-zwangsst%C3%B6rung-gm1053020482-281325766)[**zwangsst%C3%B6rung-gm1053020482-281325766**](https://www.istockphoto.com/de/vektor/ocd-zwangsst%C3%B6rung-gm1053020482-281325766)[**https://stock.adobe.com/uk/search?k=%22personality+disorder%2**](https://stock.adobe.com/uk/search?k=%22personality%2Bdisorder%22)[**2**](https://stock.adobe.com/uk/search?k=%22personality%2Bdisorder%22)

## Assessment Questionnaire reference

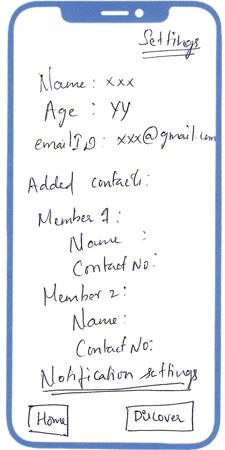
[**https://www.nhs.uk/mental-health/self-help/guides-tools-and-**](https://www.nhs.uk/mental-health/self-help/guides-tools-and-activities/depression-anxiety-self-assessment-quiz/)[**activities/depression-anxiety-self-assessment-quiz/**](https://www.nhs.uk/mental-health/self-help/guides-tools-and-activities/depression-anxiety-self-assessment-quiz/)

## Google Calendar

[**https://www.google.com/calendar/about/**](https://www.google.com/calendar/about/)

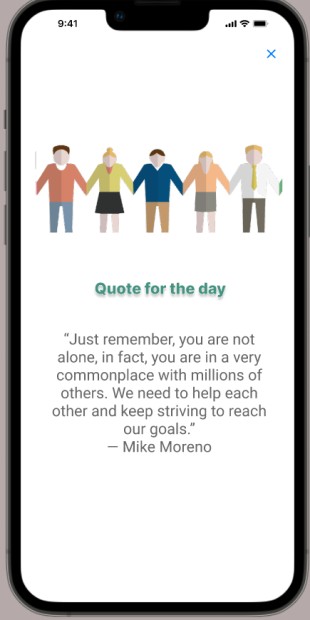
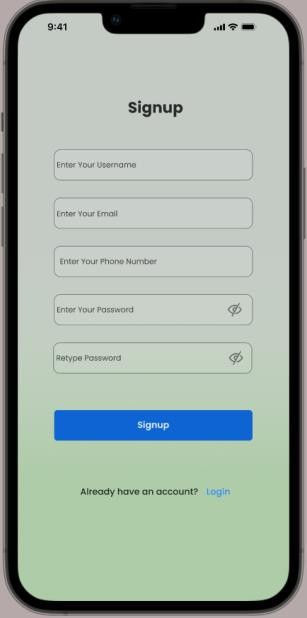
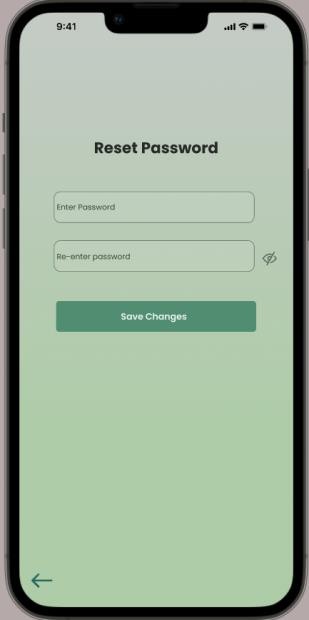
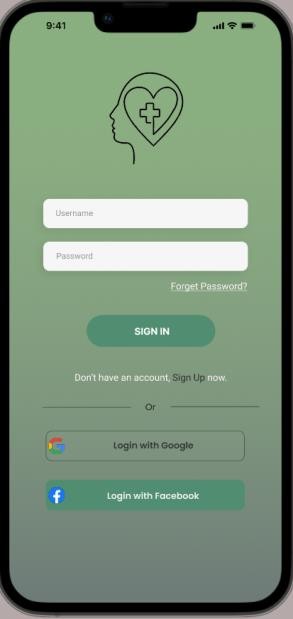
## Appendix A

Profile settings page from low fidelity prototype:



## Appendix B

*Sign up and Quote of the day screenshots from high-fidelity prototype:*





## Appendix C

**Participant Information Sheet**

Title of the study : Maintaining Mental Wellbeing

**What is the purpose of this product?**

*It is common for people to experience mental health problems from time to time. The symptoms of a mental health concern become a mental illness when they cause frequent stress and interfere with people’s daily routine. So, this product aims to* examine people's mental well-being through simple tests to determine whether they are experiencing symptoms of a specific mental health condition. Based on the outcome, the underlying features help people to feel calm by suggesting several self-care activities - such as positive affirmations and anxiety relief meditation audios. It also allows people to locate nearby psychiatric therapists.

**Do you have to take part?**

Your participation in this survey is totally optional. The survey will be carried out online and remotely. Any questions that make you feel uncomfortable can be skipped, and you always have the option to exit the survey. If you change your mind and choose not to participate in this survey, you may do so at any time and without providing a reason.

**What is expected from you as a participant?**

If you accept to participate in this study, you will be required to spend between 5 and 10 minutes online completing a survey on the "Maintaining Mental Wellbeing" prototype. Therefore, in order to complete the survey, you are requested to watch the feature prototype demo video or directly utilise the sample excel prototype. The survey will be a questionnaire of 10 questions that may be accessed by clicking on the Microsoft form links.

**What information is being collected in the survey?**

The survey's whole data set is completely anonymous. There is no way to link any of the participant information to a single individual. No information gathered from this survey would fall under the GDPR category for "sensitive personal information" (Data Protection Act 2018). The anonyms responses will then be used to evaluate the prototype. Based on the evaluation, the prototype will be redesigned, or any missing functionalities will be added.

**Who will have access to the information?**

Please understand that, in accordance with GDPR, all data will be kept private, anonymous, and used just for this study. Additionally, the information will never be disclosed to anybody outside the Strathclyde University. No data will also be handled outside of the UK or used for any other purpose.

**Where will the information be stored and how long will it be kept for?**

The Microsoft form will keep all survey replies as responses. When the prototype designing is over, the survey data will be erased after being downloaded and saved as excel files on University OneDrive. The URLs to the survey were also made with an expiration date. Even with the URL, the survey forms won't be accessible to the public beyond the end date.

**Consent Form**

Department of Computer and Information Sciences University of Strathclyde

### Statement:

Thank you for participating in this survey.

The data collected here will be used to evaluate the prototype for ‘Maintaining Mental Wellbeing’. This should take about 10-15 minutes to complete. Please be assured that all the information provided is completely anonymous.

***This survey consent form should be reviewed before taking the survey.***

By completing this survey, you agree with the following statements:

* I confirm that I have read and understood the Participant Information Sheet for the above survey.
* I confirm that I have read and understood the Privacy Notice for Participants and understand how my personal information will be used and what will happen to it.
* I understand that my participation is voluntary and that I am free to withdraw from the survey at any time, up to the point of completion, without having to give a reason and without any consequences.
* I understand all data gathered during this survey will be destroyed at the end of the prototype design process, which is expected to be December 2022.
* I understand that I can request the withdrawal from the survey of some personal information and that whenever possible researchers will comply with my request.
* I understand that anonymized data (i.e., data that does not identify me personally) cannot be withdrawn once they have been included in the survey.
* I understand that any information recorded in the research will remain confidential and no information that identifies me will be made publicly available.
* I understand how to raise a concern or make a complaint.
* I consent to be a participant in this survey.

For any questions regarding this survey, please contact Sabarishbabu via email [sabarishbabu.murugesan.2021@uni.strath.ac.uk](mailto:sabarishbabu.murugesan.2021@uni.strath.ac.uk)

**Interview Questions of Low-Fidelity prototype**

1. Are you experiencing or ever experienced any mental health problems?
   1. Yes 2) May be 3) No
   2. Do you agree that mental health issues affect mental wellbeing?
      1. Yes 2) May be 3) No
   3. Do you feel the assessment section can be helpful?
      1. Yes 2) May be 3) No
   4. Do you feel a notification to friends/family about your mental health can be useful to get help?
      1. Yes 2) May be 3) No
   5. Please provide your suggestions and feedbacks on the Low-Fidelity prototype to improve it to a High- Fidelity prototype.

**Interview Questions of High-Fidelity prototype**

1. The prototype is aesthetic and well designed.
   1. Yes 2) May be 3) No
   2. Navigation in prototype is smooth and interactive
      1. Yes 2) May be 3) No
   3. Features of the prototype are easy to understand.
      1. Yes 2) May be 3) No
   4. Prototype’s concept can be helpful.
      1. Yes 2) May be 3) No
   5. Please provide your suggestion and feedbacks on the usability of this prototype design.