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| School of Electronic Engineering and Computer Science | **Final Project Report**  **Programme of study:**  Computer Science BSc  **Project Title:**  **Digital Counsellor**  **Supervisor:**  Dr Sukhpal Singh Gill  **Student Name:**  Abdullah Waheed  Date: 25/04/2023 |
| Final Year  Undergraduate Project 2022/23 |
| QMLogo |

Abstract

Anxiety and depression are one of the major issues in todays society. Every week in the UK, 6 in 100 people be diagnosed with generalised anxiety disorder and over 8 million are experiencing anxiety at any one time. And less than 50% of people with anxiety have access to treatment. In the uk, 1 in 6 adults experience depression. Woman are twice as likely than men to have depression and only 9% and 15% of men and women respectively, receive treatment for depression.(Source: <https://championhealth.co.uk/insights/mental-health-statistics/>).

Digital Counsellor is an online website which helps the user improve his mental health. It does so by providing a meditation service with a range of audio choices. It also provides the user with a goal system where, for example, the user has a daily task to drink a certain amount of water or sleep a certain number of hours, the reason this is important is because these lifestyle choices are linked to mental health. The user also will input his physical measurements such as height, weight and also age and gender, because this will tailor the system to give accurate goals for the user to follow. Every day, the user will also input his mood in the system so he can see progress overtime. There will be a tracking system which will create a graph of all the users days and their features. There will be a graph for water intake every day for example. And another graph for the users daily mood, so the user can compare how water intake affected his mood. There will be multiple graphs for different daily goals so the user can compare his mood levels with those goals.

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**ontents**

[Chapter 1: Introduction 5](#_Toc133856101)

[1.1 Background: 5](#_Toc133856102)

[1.2 Problem statement: 5](#_Toc133856103)

[1.3 AIM: 5](#_Toc133856104)

[1.4 Objectives: 6](#_Toc133856105)

[1.5 Research Questions: 6](#_Toc133856106)

[1.6 Report Structure: 7](#_Toc133856107)

[Chapter 2: Literature Review 8](#_Toc133856108)

[2.1 Literature review: 8](#_Toc133856109)

[2.2 Similar apps/services: 10](#_Toc133856110)

[2.3 Proposed solution: 13](#_Toc133856111)

[Chapter 3: Analysis And Design 14](#_Toc133856112)

[3.1 Functional Requirements 14](#_Toc133856113)

[3.2 Non-Functional Requirements 15](#_Toc133856114)

[3.3 Use Case: 16](#_Toc133856115)

[3.4 Software Development Life Cycle Model: 17](#_Toc133856116)

[3.5 Software Requirements: 17](#_Toc133856117)

[Chapter 4: Application And Implementation 18](#_Toc133856118)

[4.1 Implementation Setup: 18](#_Toc133856119)

[4.2 Application Details: 19](#_Toc133856120)

[Chapter 5: Validation 26](#_Toc133856121)

[5.1 Unit Testing: 26](#_Toc133856122)

[5.2 User Testing: 28](#_Toc133856123)

[5.3 Summary 30](#_Toc133856124)

[Chapter 6: Evaluation 31](#_Toc133856125)

[6.1 Reflecting On Digital Counsellor: 31](#_Toc133856126)

[6.2 Comparison With Similar Services: 32](#_Toc133856127)

[6.3 Limitations Of Digital Counsellor 34](#_Toc133856128)

[6.4 Summary 34](#_Toc133856129)

[Chapter 7: Legal, Social, Ethical and Commercial Issues: 35](#_Toc133856130)

[7.1 Legal/Ethical Issues: 35](#_Toc133856131)

[7.2 Social Issues: 35](#_Toc133856132)

[Chapter 8: Conclusion: 36](#_Toc133856133)

[8.1 Challenges: 36](#_Toc133856134)

[8.2 Achievements And Reflection: 36](#_Toc133856135)

[8.3 Overall Conclusion: 36](#_Toc133856136)

[Appendix A: Risks Register 37](#_Toc133856137)

[Appendix B: Revised work plan for semester 2 39](#_Toc133856138)

[Revised work plan Table: 39](#_Toc133856139)

[Appendix C: References 40](#_Toc133856140)

# Introduction

## Background:

In this day and age, anxiety and depression has become a major problem for us. It can have many causes such as trauma or an illness or stress from excessive workload. As of 2017, an estimated 264 million adults around the globe had anxiety. The spread of all mental health disorders increased by 50% worldwide (source: <https://www.nejm.org/doi/full/10.1056/nejmsa043266>) (from 416 million to 615 million) between 1990 and 2013.

## Problem statement:

Many people with anxiety don’t tell others about it and choose to deal with it themselves. Therefore we need to present forward a good option for doing it by themselves i.e. in the form of an effective web app. A lot of people also don’t want to spend money on counselling support. Or they may not want to spend time having to explain their anxiety to a counsellor, due to confidential information. And sometimes people with anxiety may not have close friends or people they can reach out to for public support. A wellbeing charity CABA has found that in the UK 32% of people with anxiety don’t tell anyone about it.

(Source:<https://www.caba.org.uk/resource/burned-out-accountants-mental-health-study.html>)

## AIM:

The project aim is to create an effective web app where people with anxiety can get effective strategies to reduce anxiety with set goals to achieve in the day and also a meditation service in a digital format. The interface would have a soothing design to help restore the users positive mood and will also be an easy to use system for the user. There would be a table journal to track the users mood every day which can show them a track of their progression. As well as mood, the system will also let the user input their sleep, water and food quality intake and also exercise hours as these things are known to reduce anxiety. A track of the amount of time (in minutes) that the users spends on the meditation service each day will also be recorded automatically in the journal so the user can compare that as well to his mood score to see if any improvements are happening.

## Objectives:

* Researching existing models and see their gaps: They’re already apps related to coping with anxiety but they have distinct features. The app in this project will contains all these features so they are available for the user in one place. For this to happen, different features need to be researched beforehand.
* To create an effective user interface: The interface would be easy to use and with a soothing design in terms of colouring, background and music to create a positive environment for the users mood. For this I will test out different CSS combinations background images as well as different music to see which ones work best for relaxation.
* There will be a range of meditation audio tracks with different lengths and different meditation music types to choose from.
* Make a useful tracking system for the users progress: To make a journal which tracks the users mood on a scale of 1 to 10. It Would also include a system for tracking sleep hours and water intake of the user because they are linked to anxiety.
* Make a system which gives the user strategies to improve from anxiety: Have pages in the app which have information to do with what causes anxiety and how to reduce it such as eating specific foods that reduce anxiety, exercises which relieve stress and basic things like drinking water and taking deep breaths.
* To test the application with random users, receive feedback and see if it can be improved in any way.
* To keep researching constantly about general ways of reducing stress so new ideas may come to mind whilst creating the app.

## Research Questions:

* How will a person from anxiety benefit from this app?
* In what ways can real life anxiety coping techniques be implemented in a digital platform?
* How can a person get similar benefits from this app to as if they are going to a real counsellor?
* In what way can I design a simple easy to use interface with also a soothing flow for positive vibes?

## Report Structure:

Chapter 2 includes research about anxiety in todays world and the ways it’s overcome in terms of lifestyle choices such as food, water, exercise and sleep. And it talks about the use of journalising to reduce anxiety. It looks at late apps and services that are already available to help users overcome anxiety and what there pros and cons are.

Chapter 3 contains the functional and non-functional requirements required for the app, as well as a use case diagram. It will also have an explanation of the software development life cycle model followed, and the different software used to create the app.

Chapter 4 looks at each page of the application ,talks about its functionality, why it is beneficial for a user with anxiety and the strategy used to implement it.

Chapter 5 goes through the unit testing and user testing applied on the application, with their results, and a conclusion to summarise my view on the test results.

Chapter 6 evaluates the final outcome of Digital Counsellor and compares it to different apps in the market today, and compares their similarities and differences with Digital Counsellor.

Chapter 7 talks about legal, social ethical and commercial issues which surround the app, and how they are dealt with.

Chapter 8 contains the conclusion of the project, talks about the challenges and achievements faced and gives an overall reflection.

# Literature Review

There has been a vast amount of research into ways of coping with anxiety and implementing it into a digital format.

## Literature review:

### Research into ways of countering anxiety:

An experimented method to reduce anxiety is having a good food quality intake. Research from mayo clinic suggests that limiting caffeine can make you feel less nervous and also give better sleep. Also foods high in complex carbs increases the level of serotonin in the brain which has a calming effect. Alcohol is also researched to make you feel unstable and interfere with sleep. A good anxiety curing app could help the user make handy food choices to improve. That’s where the journal tracking system come in handy.

Deep breathing in the form of meditation is also another researched way to reduce anxiety. The automatic nervous system is split into two parts. One is the sympathetic nervous system, which controls your flight or fight response. The other is the parasympathetic nervous system which controls rest and relax response. While both are active, deep breathing is shown to help quiet your sympathetic nervous system hence reduce feelings of anxiety. Meditation is also researched to reduce anxiety levels 60% of the time. (source: <https://disturbmenot.co/meditation-statistics/>)

Meditation has also ben researched to be able to increase dopamine production by up to 65%. Dopamine is a neurotransmitter, associated to positive moods regulations. (Source: <https://www.healthline.com/nutrition/how-to-increase-dopamine#8.-Meditate>). (Source: <https://www.webmd.com/mental-health/what-is-dopamine>)

Another proven method of reducing anxiety is writing down your thoughts. This can give you more control over your emotions and make you understand them better. Hence the idea of an in-app journal comes in handy so the user can see patterns in their minds behaviour.

### Meditation in a digital format

In a good digital meditation service, it’s important to have a variety of meditation options such as different genres like a category for ambient music, a separate category for nature sounds, one for zen music, binaural tones, isochronic tones etc.. This gives the user a more broad, flexible and interesting experience of the service. The user should also be able to choose the length of the meditation. Maybe not all users want to spend too long initially on meditation, especially if they’re just getting used to it.

Another thing is the interface of the meditation service. Such as colour, background, patterns and music. An example of a background vision is fractals, which is a mathematical term for never ending patterns. Research suggests that looking at fractals reduces anxiety by increasing alpha brain waves and by increasing blood flow to the areas of the brain that regulate emotions such as parahippocampus.

(Source: <https://www.cnbc.com/2020/03/31/mental-vacations-and-travel-photos-relieve-stress.html>). Pictures of nature and greenery are also strongly researched to boost the mental health.

(Source: <https://www.sciencealert.com/just-looking-at-photos-of-nature-could-be-enough-to-lower-your-work-stress-levels>)

The way these techniques can be applied to this project is by having a range of meditation audios which vary in length according to the users preference and by having background with properties linked with nature and calm moving patterns, which can be a background of falling leaves, raindrops or bubbles moving under water.

### Digital lifestyle quality tracking technology:

A key feature for a useful tracking service is to have the users details personalised. This includes collecting user information such as age, gender, height and weight. It doesn’t only give a more accurate calculation of how the user could change their lifestyle, but also it makes the user feel that the app addresses their personal needs, instead of someone else’s and this elevates the users comfort and experience in the app. For example when the app recommends the user the amount of water to drink (in litres), it could improve it’s accuracy immensely by giving the recommended intake relative to the users physical measurements like height/weight. Also the users sleep requirements would vary based on the age input.

Another crucial feature for tracking services is to give details of the users progress for instance in the use of a graph to see what their key intakes where everyday such as water intake, sleep hours, exercise time and meditation time was each day. This lets the user set realistic goals in improving their life quality and makes them more determined and focused to do so. The way these features can be implemented to this project is by taking the users physical details in the beginning of the app and allowing them to edit this throughout. And using proven, researched calculations to give them accurate recommendations for lifestyle choices such as water intake in litres, sleep hours and also food intake quality. The food quality section will consist of subsets for each macros such as carb recommendation and protein, fats and nutrients recommendation as well as an overall calorie count for day because these things also have an impact on mental health and anxiety. The calorie count will also vary depending on weather the users weight is affecting his confidence and mental health and if he is trying to lose/gain weight in order to overcome it. Here the aspect of digital fitness therapy comes into place. Research suggests that 43% of adults with depression have obesity and adults who have been diagnosed with depression are more likely to be overweight than those who have not, according to the centers for disease control and prevention.

(Source:<https://www.healthline.com/health/depression/obesity-and-depression#if-you're-obese>).

## Similar apps/services:

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*CALM*:

This is a meditation app with a variety of different audios containing meditational music with follow voices in the background. This is good because it lets the user choose which type of audio he’s in the mood to follow. And it can be done anywhere with a laptop.

But this is only a meditation app and could be improved if it had strategies to reduce anxiety with a mood tracking service for the users mood on a scale of 1 to 10, and also a tracking system for their sleep and food quality so the user can also see patterns in his mood every day and how its affected by his sleep and food.

Icon

Description automatically generated*WHATS UP?*:

This is a mood and habit tracking app which has 3 journals. One for mood, one for positive habits and one for negative habits. This is useful because it lets the user observe their minds behaviour and change some habits.

However it could be improved if there was a table like input format for sleep hours, food quality intake and exercise which lets the user compare these mood feelings to his diet, sleep and activity to see if they can bring a more positivity in the mind. Though this is still possible to record on the notepad, the notepad cannot track the day to day progress of the user in terms of these goals and their mood. It could also benefit from giving the user specific goals to reach every day such as drink a set amount of water and sleep a certain amount of hours. “Whats up” could also improve from using relaxation services such deep breathing cycles and meditation audios.

*Icon

Description automatically generatedDaylio:*

This is a lifestyle tracking app which tracks the following about the user:

* Mood
* Social activities
* Hobbies
* Sleep
* Food intake quality
* Exercise
* Water intake

The mood of the user each day is recorded in a calendar. And the user can click on a specific date of the calendar to see what he did during that day in terms of activities, exercise, sleep and food/water intake. This lets the user see patterns in his routine and how it affects his mood. There is also a mood graph of all the days in which the user can see his mood progress throughout time. The app is also a gamified system as it gives the user achievement trophies for doing certain things in the app, for example the “millennium” trophy is achieved when the user does 1300 day entries in the app. This motivates the user to use these features to help their mindset improve.

A suggested improvement for this app could be to also get an input of the users measurements of things like height, weight, age and gender and set them goals such as getting a certain amount of each vitamins in the diet, drinking a set amount of water, getting enough sleep and consuming a set combination of carbs, protein and fat. The food intake aspect is useful because the food quality can both improve the users mood directly in the short term such as releasing positive hormones like serotonin in the brain(linked to good mood), and also in the long term as these quality foods lead to better fitness hence more confidence in the user. Similar to health and fitness apps.

*TALKING THERAPIES*:

There are lots of one to one counselling services already available in online sessions and face to face. However they require lots of time, extra planning and could cost money. Also the person with anxiety may not want to initially talk to anyone about it and they may try work on it themselves first, and for that, a digital counselling app comes in useful as 32% of people with anxiety don’t tell anyone. (Source:<https://www.caba.org.uk/resource/burned-out-accountants-mental-health-study.html>) However a digital counsellor would be available for a person to use 24/7 with no need to wait.

Table 1 Pros and Cons of Existing Services

|  |  |  |
| --- | --- | --- |
| Service | Pros | Cons |
| CALM | * Online meditation a range of audios * Can Be done anywhere on a laptop | * Doesn’t have a tracking system for mood, or a goals system for the user to follow * The meditation playlist cannot be further categorised based on types of meditation music such as zen music, binaural beats, nature sounds etc. |
| WHATS UP | * Allows user to track and improve behaviour and mood * Acts as a portable notepad so can be done anywhere * Gives user strategies to improve mood | * Doesn’t have a meditation service * Doesn’t have a goal system for the user to follow * The tracking system can be made stronger if there was a table-like input system for the users specific tasks like how many litres of water where drank that day. And if there was a daily progress graph where the user can see how his mood and lifestyle choices changed each day |
| Daylio | * Allows user to track and improve behaviour and mood * Acts as a portable notepad so can be done anywhere * Allows user to see progress of mood throughout the days, in a chart. * Allows user to input a range of lifestyle activities for each day and see these activities in a calendar along with the mood score. | * Doesn’t have a meditation service * Doesn’t have a goal system for user to improve mood |
| THERAPY | * More accurate way of dealing with anxiety as a human counsellor can grasp exactly what causes the persons anxiety, as opposed to a digital one. | * Costly * Requires time * It’s not always a 24/7 service * User may not want to talk about confidential information |

## Proposed solution:

The aim of this project is to create a digital counselling app which has a meditation audio service with a range of audio tracks in terms of length(similar to the “CALM” app). The tracks will also be categorised into genre of meditation such as binaural, zen music etc.. Coping strategies for anxiety will be given and there will be a tracking system for the users mood on a scale of 1-10 and a tracking system for their daily life habits such as sleep, exercise and food intake(similar to Daylio). So it will have a range of features that other anxiety apps have, but all in 1 place so the user doesn’t have to install multiple apps. The interface will have a soothing colour scheme with relaxing music in the background along with background imagery elements like fractals and nature to improve the users mood. The app will also use the users body measurement input (such as age, height, weight and gender) to set them daily goals, such as drinking a set amount of water (litres), sleeping a specific number of hours, eating a set amount of carbohydrates, protein, fats and eating a certain amount of each vitamins in their diet. These macros can be found by the user typically on food labels or from internet. Vitamins however typically won’t be present on food labels so the user is advised by the app to use the internet to find the vitamins in certain foods. The user will then input these macros and vitamins in the app to see progress over the days. And the app will give feedback to the user based on these inputs.

# Analysis And Design

As this is an app for managing anxiety, understanding the requirements play a vital role in ensuring that the user receives optimum service to deal with their condition. Listed below are the functional and non-functional requirements:

## Functional Requirements

Table 2 Functional Requirements

|  |  |
| --- | --- |
| REQUIREMENT: | SERVICE: |
| The system should accurately calculate the users recommended dietary intakes such as calories, protein carbs. And this is based on the details which the user inputs i.e. age, height, weight, gender | Goals page – dietary recommendation service |
| The system should be able to track the daily dietary input values of the user in particular the amount of different macros consumed. | Goals page – dietary tracking |
| The system should track the daily times the user spent doing exercise as well as the type of exercise it was such as cardio or strength, and low intensity or high intensity. | Goals page – exercise tracking |
| The system should display the users daily dietary and exercise input details on a graph so they can see their progress. | Progress page – progress checking |
| The system should have a variety of music genre categories with multiple songs in each one. | Meditation page- music |

## Non-Functional Requirements

Table 3 Non-functional Requirements

|  |  |
| --- | --- |
| REQUIREMENTS | SERVICE |
| User should have an easy to use interface with clear link navigation and minimal explanation required on how the pages should be used. | Header section links/ other in-page links |
| System should not allow the user to submit an incorrect input type for a field. (Such as writing a String for an int field) | Goals and Profile page – Input section |
| System should have a soothing design, in terms of interface CSS styling and colours to give the user a more relaxing feel to help cure their anxiety. | Overall software interface |
| The dietary/exercise progress graph should be designed in a clear readable format so the user has no complications In understanding their progress. It will be a simple, straightforward bar chart sorted by date, alongside their values for the given feature. (There will be multiple bar charts on the page, one for each feature.) | Progress page |
| System should give general advice to the user on how to deal with their anxiety, including techniques which they can use and where they can go for help. | Home page- information section |
| System should educate the user on how dietary/lifestyle choices can help recover from anxiety/any mental disorder | Profile page – advice service |
| System should accurately recommend the user their daily recommended dietary intakes(water intake and macros intake) and exercise times, based on their personal input details(i.e age, height, weight, gender) and if they have a specific fitness goal they would like to reach (e.g. losing weight/building muscle). The goals section will be different based on what the users fitness goal is. | Goals page – recommended dietary/lifestyle choices |
| System should give the user a variety of music categories in the meditation service, with quality music to help the user optimise their anxiety recovery. The system will educate the user on the most efficient techniques to utilise the meditation service, in order to maximise the benefits from the service. | Meditation – music service |

**Diagram

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## Use Case:

Figure 1 Use Case Diagram

## Software Development Life Cycle Model:

The SDLC model I used is the iterative model which involves initially implementing the basic components of the website, testing and evaluating these parts, then constructing a new specification of requirements from where the system is left, and this process is done continuously in iterations. This method was my preferred as it is an accessible method where each movement and decision in the implementation is easy to track, with minimal misunderstandings and a clear development perception.

## Software Requirements:

The coding languages and software used are:

* PHP
* HTML
* CSS
* JAVASCRIPT
* MYSQL
* Local host server (XAMMP)

# Application And Implementation

## Implementation Setup:

The frontend implementation for this web app is done using HTML,CSS and JavaScript, while the backend is done on PHP, linked with an SQL database through an XAMMP local host.

### PHP:

A PHP application was chosen over other languages due to it’s simplicity in organisation of code and it’s transparent understanding of command functions, which played an important factor for debugging the code in errors. Also PHP is easily and securely connected with databases as compared with other coding languages such as python. This is because other languages require special drivers, required from 3rd party services, whereas PHP has a built in module, which is used to connect to databases effortlessly. (Source: <https://kinsta.com/blog/php-vs-python/>)

### XAMMP:

XAMMP was chosen as the local development server as it was reliable and easy to use, configure and manage. Also it’s phpMyAdmin interface is designed in an accessible way where altering and managing the database is straightforward.

### Website Compatibility:

A website application was chosen over a mobile app, as the interface design quality has a greater potential for user experience, if done on a website. A website gives a broader field of vision for the user, which allows detailed focus to the less noticeable and micro design features of the page such as the small-scale, moving shape components of the background animations, and patterns such as ripples, as this is a key feature for the users anxiety management. Moreover a web app is compatible across a range of devices and platforms, requiring just a URL, whereas a native app would require separate device versions to be installed such as android or IOS.

### Workspace Setup:

Before working on the implementation, it’s essential to run the XAMMP MySQL database and the Apache web server, through the manager-osx section. This allows the user to make a request to the server and receive the pages for the web app, and it links the user with the MySQL database to retrieve stored information.

## Application Details:

Upon launching the application, the user has the options of going to three pages. These are the Home page, Login page and the Signup page. The other pages are accessible only after the user logs in/signs up. This is because those pages contain information from a database, and the system has to use the users login information to be able to retrieve the correct information for that specific user, based on the users previous inputs on the application.

### HOME PAGE:

A screenshot of a website

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Figure 2 Home Page

It’s functionality is to educate the user on the topic of anxiety, give some advice on how to deal with it and give them an idea of how this app is structured to help them improve. It’s background has a sliding layers design. This plays a part in visually exposing the user to patterns which help to reduce anxiety by improving blood flow to the Para hippocampus area of the brain, which regulates emotions.

(Source: <https://www.cnbc.com/2020/03/31/mental-vacations-and-travel-photos-relieve-stress.html>). In the middle container, there is information on how the user could receive mental health support, outside of the application, if they struggle to talk to a close person about it. On the right containers, the user is educated on how sleep affects anxiety and tips to utilise sleep efficiently to help them.

### GOALS PAGE:A screenshot of a computer Description automatically generated with medium confidence

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A screenshot of a blue screen

Description automatically generated with low confidence

Figure 3 Goals Page

It’s function is to obtain dietary, exercise and sleep input data from the user. This data is then stored on the MySQL database. The system displays this information through multiple bar graphs in the *Your Progress* section of the app (*figure 4* below). More information on the purpose for storing these details can also be found on figure 4.

The macros mentioned in the inputs are more specific for mental health management, rather than general physical fitness (for example, complex carbs are tracked, rather than total carbs, because benefits for mental health lie in complex carbs but the other types of carbs i.e. simple carbs should be reduced or avoided for optimum mental health). Also only unsaturated fats are tracked, but not saturated fats, as unsaturated fats are important for a healthy mind and body, however saturated fats can have a detrimental impact on this. (Source: <https://www.nhs.uk/live-well/eat-well/food-types/different-fats-nutrition/#:~:text=Eating%20too%20much%20saturated%20fats,of%20heart%20disease%20and%20stroke>.) Protein, fibre are also tracked, as well as sleep, water intake and exercise times, as they have a link to improvements for anxiety. (Source: <https://www.mhconn.org/nutrition/protein-and-mental-health/#:~:text=Foods%20rich%20in%20protein%20contain,can%20trigger%20anxiety%20and%20depression>.) (Source:<https://www.matherhospital.org/weight-loss-matters/fiber-up-for-mental-health/>)

Calories are not tracked in the system because the aim was to have this app inclined more towards the quality of macros rather than the quantity, as this is what accurately determines how the body benefits from the food, such as the production of specific hormones in the body like serotonin, endorphins and dopamine, released from the food for aiding anxiety and also other health benefits like maintaining healthy gut bacteria which has a strong link to anxiety as well. Scientific information about the hormones, and benefits from certain macros can be seen by the user on the profile page (Figure 5 below).

On the right containers, the user is educated on the purpose of this tracking feature and why improved lifestyle is a good way to enhance mental health. The four main lifestyle concepts in this app are sleep, dietary intake, exercise and motivation. The information on this page covers mainly the aspect of motivation. Dietary intakes and exercise are covered on the profile section(Figure 5 below). And sleep is covered on the home page (Figure 2 above).

The user also learns about increasing motivation through writing down their daily thoughts and experiences in diary. They also learn how this stimulates their mind to recognise patterns in their thoughts such as stress triggers and how they can use these to manage their mind more strongly and have more control over it. (Source: <https://www.verywellmind.com/journaling-a-great-tool-for-coping-with-anxiety-3144672>) (Source:<https://psychcentral.com/stress/how-to-begin-journaling-for-stress-relief#benefits-of-journaling>)

Note, this app contains a journal feature for the users diet and exercise in the form of statistics graphs (figure 4 below), however there is no notepad for tracking thoughts and experiences, because the user wouldn’t be able to view a graph for analysing their progress on their thoughts and experiences, hence it would be more convenient for them to keep a physical journal for this purpose, which they are highly advised to do from the app. However dietary and exercise information could easily be plotted on a graph for the user to analyse how patterns in their lifestyle affect their mood on the long run.

### PROGRESS PAGE:

### A screenshot of a graph Description automatically generated with medium confidence

A picture containing text, line, number, screenshot

Description automatically generatedA picture containing screenshot, text, line, number

Description automatically generated

Figure 4 Progress Page

This is to give the user, insight on which aspects of their lifestyle they can build on, to help accomplish a healthier state of mind. It links with the idea of journalising, talked about in the goals section (figure 3 above) to give the user a deeper understanding on how specific patterns affect their mental wellbeing, but only for lifestyle choices, as opposed to thoughts and experiences, where the user is recommended to do that in a journal. For lifestyle, the use of bar charts allow the user to easily see how changes in their quality macros consumptions, as well as sleep and exercise boost their mental wellbeing, and they can compare these stats to their their daily mood chart which is the top-most chart on the page. Note, the inputs for the mood chart come from the profile page section (Figure 5 below), and the rest of the lifestyle inputs come from the goals page section (figure 3 above).

### PROFILE PAGE

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A screenshot of a website

Description automatically generated with low confidence

Figure 5 Profile Page

The functionality of this page is to take the users details and tailor the system to give more accurate lifestyle recommendation values for the macros, water and sleep intake of the user, which are in the goals section (figure 3 above). This, as well as giving the user a more effective improvement in mental health, would also makes the user feel that the app addresses their personal needs more specifically instead of someone else’s, this elevates the users comfort and experience using the tracking system. It also enables the user to see more precise patterns in their lifestyle when they view their statistics in the progress section (figure 4 above) and compare these results to their changes in mood across the days. In order to get the recommendation values (displayed in the goals page), the age, gender, height and weight sections need to be filled in. However it is not compulsory to fill them to just use the tracking system. The only difference is that it will say N/A (figure 7 below) instead of a value for the recommendation, in the goals section, but the user can still view the statistics graph of their progress. Note In order to submit this form, all of the inputs i.e. age, height, gender and weight would need to be filled, or the system will display a window with an error (figure 6 below).

This page also aims to educate the user on the mental benefits of eating specific foods and macros, and avoiding others. Such as how healthy gut bacteria are linked to mental mood disorders, and how complex carbohydrates ensure that they are being produced effectively. (Source: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5987167>). It also talks about how Complex carbohydrates and protein are essential for serotonin production, a neurotransmitter which regulates your mood. (Source: <https://healthyeating.sfgate.com/food-affects-neurotransmitters-11501.html>). Benefits of exercise is also detailed, and how specific hormones such as endorphins released from exercise help combat anxiety. (Source:<https://www.mayoclinic.org/diseases-conditions/depression/in-depth/depression-and-exercise/art-20046495#:~:text=Regular%20exercise%20may%20help%20ease,your%20sense%20of%20well%2Dbeing>)

*A screen shot of a computer

Description automatically generated with medium confidence*

Figure 6 Screenshot for alert

A blue and green rectangle with white text

Description automatically generated with low confidenceA blue and green rectangle with white text

Description automatically generated with low confidence

As opposed to

Figure 7 Example of recommendation values

These inputs are then used in formulas from trusted sites on the internet which will calculate the recommended values of the users lifestyle intakes. Below the detail input section, there is an option for the user to select if they have any fitness goal they are currently following. This will further tailor the system to give more accurate lifestyle recommended values for increased precision to the user, as people who are doing some form of fitness, will require a diet with more macros in general. However if this not selected, the system will assume, that the user is following the “maintain weight” choice.

The last section is a slider where the user selects their mood for that day, on a scale of 1-10. The user is recommended to do this daily, and the value of this is added to the “mood” bar chart on the progress page. This is vital for allowing the user to observe what affect their lifestyle changes has, on their mood.

### MEDITATION PAGE:

A screenshot of a computer

Description automatically generated with medium confidence

Figure 8 Meditation page

The meditation service consists of multiple categories, with different genres of meditation music. The background links to the aspect of creating a soothing user interface to optimise anxiety recovery. There’s also information on why anxiety is useful for mental health. On the far right container, there’s detail on how the user can maximise the benefits of meditation, such as using the 3-3-3 rule, so they receive a more efficient recovery, during meditation. (Source: <https://www.healthline.com/health/333-rule-anxiety>)

# Validation

Testing is a crucial step for an app of this kind, as interface and functionality experience is a major component for the people with anxiety using it.

## Unit Testing:

After implementing each feature in the app, it was tested thoroughly to ensure that it works, but also that it doesn’t affect any other service of the app which was linked to it.

Table 4 Unit Tests

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Screen** | **Test Case** | **Procedure** | **Expected Output** | **Success** |
| Sign Up | User fills all details. | The signup.php file checks if all the input fields are filled using the if(empty($variable)) statement. If not, it alerts the user through the window to re-fill. | User receives an alert message to fill all fields. | Yes |
| Sign Up | Only allow signup if the username is not taken. | Signup.php file checks the database to see if the username is used anywhere. If it is, it alerts the user to use a different one. | User receives an alert message to choose a different username. | Yes |
| Login | User should fill all the correct details. | The login.php file checks if all the fields are correct by first checking if the username entered by the user exists on the database, then checking if the password assigned to it is the same one that the user entered. If not, it alerts the user to try again. | User receives an alert message to fill the correct fields. | Yes |
| Goals | User should fill the fields with the correct input type, i.e. integer. | In the html form, input type is set to a ‘number’. So if a user types a string value on the keyboard, it won’t be input and only numbers can be input. | String value, is not written in the input section upon typing on the keyboard. | Yes |
| Goals | System updates the users input details on the database. | When the user fills a form, The system needs to update this to the database. To do this, the code searches for the a row in the user lifestyle database table, using the users username and the date that the value is input. This lets the system know if the user has already previously inserted a row on the database for his details, for that date. And if he has, then the code calls the “updateDetails” function rather than the “addDetails” function to enter the data onto the database. The difference is that the “updateDetails” uses the SQL UPDATE method rather than the INSERT method which would have created an extra unnecessary row in the database. However if the user has previously input the values on the database, but for a different date, then the system will create a new row, using the INSERT method. This is essential, for the progress statistics section of the app to work. | The users row on the database is updated instead of having to add a new row, which take up space. | Yes |
| Profile | Ensuring that all the input details are filled before submitting. | The addDetails.php file checks if all details are filled, by using the is(empty($variable)) statement. If not, then, it alerts the user to fill all the details. | User receives an alert message to fill all the details. | Yes |
| Profile | User should fill the details with the correct input type, i.e. integer. | In the html form, input type is set to ‘number’. So if a user types a string value on the keyboard, it won’t be input and only numbers can be input. | String value, is not written in the input section upon typing on the keyboard | Yes |
| Profile | User updates their details. | In the addDetails.php file, the code searches for the a row in the user details database table with the users username. This lets the system know if the user has already previously inserted a row on the database for his details. And if he has, then the code calls the “updateDetails” function rather than the “addDetails” function to enter the data onto the database. The difference is that the “updateDetails” uses the SQL UPDATE method rather than the INSERT method to update the data. | The users row on the database is updated instead of having to add a new row, which take up space. | Yes |

## User Testing:

A sample of 12 users, where asked to browse through the app, and use all the features including the meditation and the tracking service. Then they were surveyed about their experience.

### Survey Results:

*On a scale of 1-10, how would you rate the interface design of the app, in terms of being visually appealing for a person with anxiety using it?*

* 9 respondents gave a score of 10
* 3 respondents gave a score of 9

*On a scale of 1-10, how would you rate explanation of knowledge, for educating the user on anxiety and the benefits of using certain techniques to help reduce it?*

* 3 respondents gave a score of 10
* 4 respondents gave a score of 9
* 3 respondents gave a score of 8
* 2 respondent gave a score of 7

*On a scale of 1-10, how relevant would you say that the overall information given in the app is, in terms of educating the user on anxiety and how to use features in the app?*

* 7 respondents gave a score of 10
* 3 respondents gave a score of 9
* 1 respondents gave a score of 8
* 1 respondents gave a score of 7

*On a scale of 1-10, how easy to use is the meditation service of the app?*

* 8 respondents gave a score of 10
* 3 respondents gave a score of 9
* 1 respondent gave a score of 7

*On a scale of 1-10, how easy to use is the user lifestyle tracking service of the app?*

* 6 respondents gave a score of 10
* 2 respondents gave a score of 9
* 3 respondents gave a score of 8
* 1 respondents gave a score of 7

At the end of the survey, the users where asked to give overall feedback on improvements for the app. The most popular areas of improvements included:

* “*The meditation service could have been improved if it allowed the user to play music in the background whilst viewing through the other pages in the app, not just the meditation page.”*
* *“The scientific terminology for some of the information might take slightly longer for some users to understand, especially for the younger generation who are less educated.”*
* “The meditation service could’ve been better if it allowed users to add their own songs/playlists to the meditation page”

I agreed with the comments, however due to the limited time factor, it would’ve been difficult to add all of those features to the app near the end. However it is a great learning point for me, for when I intend to create a similar app to help people with anxiety in the future.

## Summary

Overall the unit testing validation has shown that all the functionalities of the app work correctly. The survey scale-based results proved that the visual interface design was appealing for a user with anxiety, the quality and usefulness of the information and knowledge was strong, though could have been simplified for the younger generation. And the lifestyle tracking and meditation services where easy to follow.

# Evaluation

Here we will assess the projects functionality and requirements and compared them to other services in the market.

## Reflecting On Digital Counsellor:

Overall, I think that the project was a success, based on the functionalities which were aimed for at the beginning. The functionalities are operating well and error-free, so the user will not encounter any unwanted gaps or errors in the system when using the app.

Some requirement plans had changed throughout the progress of the app. For instance I decided to not proceed with the idea of calorie tracking and only track specific macros instead, as I found these where more important for a person’s focus when improving the quality of their diet, primarily for mental health. Also I decided to not add detail for each vitamin recommendation, as the key benefits for mental health rely mainly on the macros as opposed to the vitamins. Also the level of knowledge for vitamins may have potentially been excessive for the user to understand, especially for the younger generation of anxiety, who are less educated on the topic. However, the types of foods recommended in the system are those which contain all the vital vitamins and minerals required for the user, which ensures in that sense that the user will still achieves their vitamin requirements.

## Comparison With Similar Services:

I will compare the features of digital counsellor to some popular apps/services that are already available for users today.

A cartoon character wearing headphones

Description automatically generated with medium confidenceHeadspace:

Headspace is a meditation app which contains a range of audios, with speech and advice for improving from anxiety which is a similarity to digital counsellor in the sense it gives a range of categories for the user to choose, as well as information regarding optimising meditation techniques.

A key difference is that Digital Counsellor has multiple features and services apart from meditation such as lifestyle tracking, giving mindful advice to users and including technical functionality in the app, e.g. graphs and a tailored lifestyle recommendation system, to make it easier for the user to follow the techniques and recognise patterns in their minds thinking approach to help them overcome mental weakness. It also provides a more scientifically reasoned education to the user on why these specific lifestyle choices improve a persons mental state rather than more the more general advice from Headspace, which is still a good feature due to its simplicity, however it can be improved, as scientific knowledge gives the user a deeper understanding of these lifestyle patterns, which can make their improvements in lifestyle and mental health more effective . The interface of Digital counsellor is designed to help people cope with anxiety visually through aspects such as soothing patterns (e.g. ripples and bubbles), whereas Headspace chooses a more professional interface style, which is still appealing, however less tailored towards a user with anxiety.

A picture containing text, font, logo, graphics

Description automatically generatedMoodkit CBT:

This is an app for users to track their mood over time, as well receive advice on healthy activities which lead to an improved mood, as well as a calendar to plan activities which will contribute to mood improvements. This is similar to Digital Counsellor in the aspect that the user is able to see how their mood changes over multiple days, however Digital Counsellor is different in the sense that it compares it with diet and lifestyle routine rather than the users activities. The exercise element of the lifestyle tracking in Digital Counsellor could still be classified as a category of activity tracking. However Mood Kit doesn’t contain dietary and lifestyle tracking. Mood Kit doesn’t have a user education service for anxiety management or technical services such as meditation for anxiety treatment. The interface for Mood Kit is also inclined more towards the professional aspect as well, although still appealing, however Digital Counsellor mainly pin points design features based on anxiety and mental health improvements.

A picture containing text, font, white, logo

Description automatically generatedBreathwrk:

This is a breathing exercise app with a range of inhaling and exhaling exercises and classes. It consists of categories for exercises such as sleep, recharge, morning boost. And it allows the user to select the length of time. Digital Counsellor is similar, in the sense that it contains a range of audio tracks in the meditation service with the user being able to select a category and pick an audio with desired length. However, Breathwrk doesn’t target anxiety in the form of monitoring and improving lifestyle and activity choices, which is a major component for anxiety management.

## Limitations Of Digital Counsellor

Digital Counsellor was successful for the functionalities and requirements planned at the beginning of the project, although there were some amendments made during the progress such as removing the user caloric intake recommendation and only giving the specific macro recommendations for the user. This was done to ensure that the user utilises a quality based approach as opposed to quantity based approach to the diet, which is more ideal to make sure that the body gains benefits and releases positive hormones to reduce anxiety. It’s also because I wanted to incline my app more towards helping people with anxiety and achieving strong mental mindset development, rather than being a fitness app. However this app would still help people with fitness goals.

Vitamins tracking was also removed from the plan as it may have been overwhelming for the user, especially younger generations to keep track of all the micro details of their diet and insert it into the system daily. It’s more flexible for them to focus on a small set of macros, so tracking becomes simple and they maintain the habit of inserting these details daily. To requite as a replacement for vitamin tracking, the system gave the user education on a healthy range of food choices, which would ensure they still reach their full vitamin requirement.

Also there were improvement suggestions from the survey which where to allow meditation music to keep playing in the background whilst browsing other pages, and to allow the user to add in their own music to the meditation page. This was useful advice which I would reflect on, for when I intend to create a similar app for mental health development in the future. Also there was a suggestion that the scientific calibre of the knowledge , provided for educating the user, could be changed to be less complicated to understand. This has both benefits and downsides. The downside is that it could be initially hard for the user to understand the concept, however it is beneficial in the long term as it stimulates the users brain to want to learn more information about the topic of anxiety. This would increase their knowledge of anxiety and also they’re motivation in general, which is a major component in mindful health.

## Summary

Overall the aim to provide effective help to people with anxiety, in a way that is easy to follow and maintain in the long term, has been achieved. The results from the scale-related question on the survey also support that a user would overall feel comfortable using it, for all its services. And that the design interface is visually compatible for a user with anxiety.

# Legal, Social, Ethical and Commercial Issues:

## Legal/Ethical Issues:

One legal/ethical issue to consider is the handling of sensitive data from the user. When the user enters sensitive details (for instance in the profile details section), the user is guaranteed safe because in the database, there is no method to trace this information to a specific person. The only information which could be seen is a username with some numerical values associated to it, which were input as part of measurements (i.e age, height, gender etc.), and they don’t have any links to a persons personal details. This is because no personal information such as email, phone or address is required for sign up. The app also doesn’t require any permission such as location, camera, or microphone to be able to use any of the features.

Hence in case of any database breach, the only information visible about an account is a username and some input values, and that wouldn’t have any link to a specific person as many people would have similar names in general.

## Social Issues:

In todays world, apps are not guaranteed to motivate people to change their lifestyle. It’s down to the individual to be motivated to make the change. The way that apps these days attempt to counteract this issue of motivation is by setting reminders and alerts to their users via notifications. However this method tends to be ineffectual. In todays world we cannot create an app with perfect dexterity of keeping users motivated, because there is no technology which could read the mind of a user.

However we can increase the likelihood of instilling motivation to a users mind successfully, by giving education of what benefits they would obtain from following a specific routine. This app attempts to inculcate motivation into users by exposing them to knowledge throughout the app. Though it’s not guaranteed to motivate everyone, it will increases the liklihood that a new user will increase his motivation through the app.

# Conclusion:

## Challenges:

There were many challenged faced and overcome during this project. My knowledge of the coding languages used, especially php, javascript was initially good in terms of the basic fundamentals needed to start the project, however, in the later stages, it was a challenge to implement more of the complex features in the system. I overcame this by looking through a range of tutorial videos and learning sites on the internet when I was free, to understand the more complicated concepts of these languages. I applied this to my code.

## Achievements And Reflection:

In this project, I managed to fill in all the vital checkboxes I had planned for the requirements, ranging from the tracking system, progress viewing service, an accurate lifestyle recommendation calculating service, providing education and techniques to the user, and the meditation service.

However I still have areas which could be improved, as could be seen from the survey suggestions. This comes with the benefit that I have the opportunity to reflect on these improvements, to further build and refine my technical skills, especially for when I aspire to make an app in the future, to support people with mental health and anxiety.

## Overall Conclusion:

This project has been a major academic accomplishment in my education. Although I was nervous for this project at the start, I have really enjoyed doing this project overall and appreciate the opportunity to be able work on it. It has enabled me to boost my confidence, and taught me a lot of things about web programming and also about the field of technology in general.

# Appendix A: Risks Register

Table 5 Risks

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Risk | Impact | Liklihood Rating | Impact Rating | Prevention |
| Loss of work files: | May have to restart the some parts of work could cause delay in completion. | LOW | HIGH | Always have a duplicate copy of the file in separate location. |
| lllness | Could delay some work that needs to be done. | MEDIUM | MEDIUM | Ensure that everything is up to date all the time. Let the supervisor know beforehand and catch up afterwards if needed. |
| Time constraint | Might run out of time for the deadline | LOW | MEDIUM | Plan what you have to do each day until the deadline to ensure nothing is left late. |
| Coding without knowing how it works. | If you copy code from the internet but don’t understand how it works, it may lead to problems such as when you get an error and don’t know what’s causing it because you don’t understand the code. | LOW | HIGH | Don’t plainly copy code from internet. Understand how it works then rewrite it in a format that you will understand. |
| Not thinking ahead enough | You may underestimate the time it will take for a task, and when you later get on to doing it, you may have less time to complete it. | LOW | MEDIUM | Even if you are planning to start a task later, be sure to still think about what you will need to do for it so you can prepare for starting it. For instance if you are planning to start the backened first and then the frontend later. Make sure to know how long each will take so you don’t spend too long doing the blackened and not have enough time left for the frontend. |

# Appendix B: Revised work plan for semester 2

## Revised work plan Table:

Table 6 Semester 2 Plan

|  |  |  |  |
| --- | --- | --- | --- |
| TASK | START DATE | DUE DATE | DESCRIPTION |
| Report | 16/12/2022 | 24/04/2023 | The overall final documents of the project |
| Develop backend | 15/12/2022 | 15/01/2023 | Develop the database and tables behind the app |
| Develop frontend prototype | 15/01/2023 | 15/02/2023 | Develop the interface the user will browse through |
| Develop final front end and backened. | 15/02/2023 | 15/04/2023 | Polish the whole backend and frontend so there are no flaws. |
| Test app with random users. | 15/03/2023 | 15/04/2023 | Let random users test the app and receive feedback |
| Project video | 15/02/2023 | 25/04/2023 | Start the main video of the project. |
| Project presentation slides | 15/02/2023 | 25/04/2023 | Start the slides that will be presented. |

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