INTERACTIVE AUDIO DEVELOPMENT FOR GENERAL WELLBEING

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# Statement of Ethics

Many ethical considerations have taken place throughout this project’s lifetime. One ethical concern was the intersection between poorer states of mental health and genuine mental health conditions that inhibit every aspect of day-to-day life. This project is not a solution for curing or fixing any kind of serious mental ailment – rather it is focused on finding a way for technology users to become more aware of their own mental health, their battles, and how they operate.

# Abstract

This report introduces the topic of interactive audio development for general wellbeing. It describes a modern crisis of mental health across the globe and provides evidence to suggest that the increased use of technology aligns with these recent trends. It outlines the problem that the way in which technology is used is having a significant impact on the mental health of the end user. It describes existing technologies which have been designed to improve this relationship, highlighting their areas of success. The breakdown of development into creation of a new application is outlined, using the statistics and information about existing technologies to develop an application providing new and unique features not currently available. This product is then tested, reviewed, and compared to existing technologies, assessing its ability to achieve the outcomes it was designed for. The project’s management and progress tracking system and tools are then considered, providing a full breakdown and analysis of the processes and systems designed for project progress. A conclusion is then stated, claiming \_\_\_\_.

# Introduction

Over the last century, particularly through recent decades, the advancement and development of technology has taken place at a significant rate [1]. The rapid pace of progression has produced increasingly intelligent and useful technological solutions in every area of day-to-day life. As a result, there exists a need for conducting research into the resulting impact of these innovations, considering how they may have affected factors such as interpersonal relationships, productivity, and general mental health/well-being.

When considering the scope of this project, it can be best represented as the intersection point between three primary areas of research and development (figure 1):

Mental health & general well-being

Project significance

Existing software/apps for relaxation & mindfulness

iOS multimedia development

Figure 1 – A Venn diagram showing the three primary fields of interest as inspiration for the project.

This report introduces existing work from the fields of interest shown above, demonstrating the inspiration for the project and its significance by providing context of what current solutions are available, any success they have had, and where there lies room for improvement and further development. The exact intention of this project is then explained, alongside a list of measurable objectives to track project progress. Additionally, a plan is introduced which shows the methods and systems used to monitor development, before finally summarising the work described in this report.

# Project Context

To better understand the context for this project, it is first necessary to recognise the existing work in the relevant fields of research and development mentioned above as the inspiration and motivation for the project’s development. This section outlines some of the leading research into mental health over recent years, particularly looking at the consequences of the COVID-19 pandemic on mental well-being and investigating the relationship between general mental health and technology use. A closer look into the development of iOS technology is then explored, investigating the impact Apple as a company has had on mobile technology and the resultant impact this has had on the mental health of technology users. It then describes some of the leading technological solutions for improving mental health and relaxation, highlighting potential key features which account for the success and value of currently available technology.

## Mental Health Over Recent Years

Studies show that, despite life expectancy being at its highest to date, mental illness has skyrocketed in recent years, with 5 of the 10 leading causes of disability worldwide now being mental-related issues [2]. While physiological illnesses are more common in less affluent countries, the contribution of mental disorders is larger in wealthier countries (23% compared to the 11% found in low- and middle-income countries). Other research has outlined more specific struggles such as anxiety – notably, one 2015 study which examined the prevalence rates from three large community surveys (two conducted in the U.S. and the other across European countries) found that 33.7% of people are affected by anxiety disorder during their lifetime [3], with the most common disorders being specific phobias and social anxiety disorder.

### Mental Health in Younger People

When considering how mental health impacts the well-being of an individual, one group that has arguably seen the most rapid increase of mental health struggles over recent years is younger people, with an NHS survey discovering that the proportion of under-16s experiencing any mental disorder in the U.K. has risen from 11.4% to 13.6% between 1999 and 2017 [4]. The study went on to cover the transition into adulthood, with a rate of 16.9% in 17–19-year-olds experiencing some type of mental health disorder [5]. Emotional issues were outlined as the only category which showed significant change over time, with behavioural disorders, hyperactivity, and other less common disorders remaining similar in prevalence for the 5–15-year-old age group since 1999.

Chart, line chart

Description automatically generatedThese trends have not only been found in the U.K., with evidence stating that in the U.S. rates of experiencing significant depression among teenagers has risen steadily since 2012 (figure 2). The U.S. study also shows a larger overall average for females than males, though both trends show similar behaviour over time.

Figure 2 – Rates of depression among teenagers in the U.S. between

2004-2018. Produced by [6].

### The Effects of COVID-19

Furthermore, the COVID-19 pandemic has only served to further intensify the struggle in the battle against mental health related issues. Restrictions in accessing public facilities used in day-to-day life has resulted in a more sedentary and isolated lifestyle for most, living from the confines of their own homes. This has resulted in an increased concern for both individual and public safety, with the uncertainty of the virus adding additional pressure and frustration to everyday life.

With the average lifestyle forced into a more sedentary format, the convenience and consequently the use of technology has drastically increased, both for work and for leisure purposes. Preventative measures such as social distancing and wearing face coverings are necessary for slowing the spread of the virus, but as a result these measures increase isolation and a subsequent feeling of loneliness, causing a rise in levels of stress and anxiety [7]. This resulting stress can be a dangerous instigator for a myriad of different mental struggles ranging from decision making and impacts on mood to overall general well-being and happiness, particularly for those who are considered more susceptible to the virus due to a pre-existing health condition. Severe factors such as bereavement, separation, loss of income and fear are triggering mental health conditions or exacerbating existing ones [8]. Simultaneously, critical mental health services have been significantly disrupted due to the pandemic, with over 60% of patients reporting disruptions to mental health services for vulnerable people. The current state of the public’s general well-being and the current absence of available support are critical factors for the desperate and urgent need for relief in any way possible, otherwise this struggle will inevitably worsen over time.

### Technology and Mental Health

The specific causes of mental health and anxiety can sometimes be difficult to identify due to the wide range of potential reasons for a worsening mental illness or increased dissatisfaction with life quality. However, one specific pattern that mirrors the recent trends in general and overall well-being is the rapid uptake of technology and social media use. It therefore suggests that identifying correlations between use of technology and the state of general well-being could be a crucial component in explaining and defining user’s current relationship with technology, as well as outlining concerns and consequently proposing ways to improve this multifaceted relationship.

Chart, line chart

Description automatically generatedExisting research already begins to uncover and reveal some of these trends, examining the correlation between overall well-being and technology use. It can be claimed that use of technology and social media is at an all-time high, with more than twice the number of teenagers in the U.K. using a smartphone for over 7 hours daily compared to those whose usage is 30 minutes or less. Correspondingly, heavy technology users were twice as likely to have low states of well-being (figure 3).

Figure 3 – Percent of adolescents low in psychological well-being by hours a day of computer, gaming, or smartphone use. Produced by [9].

Similar trends are also present in U.S. datasets, with a 70% difference in the number with at least one suicide risk factor among those using electronic devices more than 5 hours a day compared to those whose use is less than an hour, and more than twice as many unhappy adolescents in the heavier usage group [9].

However, despite these indications, evidence is not entirely conclusive in claiming technology use as the sole perpetrator for this increase in lower well-being and mental health difficulties [10][11]. Especially over recent years, it has become progressively more challenging to be able to pinpoint causes of stress, anxiety, and poor well-being, through the plethora of limitations and difficulties introduced by the COVID-19 pandemic [12].

iOS and Mobile Technology:

* Intro
* Mobile Device Usage
  + Device usage in the 21st century
  + Landline to mobile
* Apple’s Impact on Technology
  + Apple intro
  + iPhones
  + Device usage before and after iPhone
  + Social media & Apple’s impact on social media use
  + Other iOS devices
  + Apps & notifications
* Impact on Mental Health:
  + Phones and notifications and their addictive nature
  + The war for attention and personal data (personalised advertising)
  + Statistics on mental health as technology became more addictive and tailored to personal use
  + Overall conclusion of the impact technology has had (due to Apple’s impact) on mental health

## The Introduction of Mobile Technology and iOS

Mobile technology is one of the most popular aspects of modern society. In the U.K., phone ownership has risen from 16% to 80% between 1996 and 2006 [i3], with more and more phones making the transition from landline to mobile. A U.S. study shows a similar trend over more recent years, with an increase in cell phone ownership of 35% (97% in 2021 compared to 62% in 2002), with almost the entire population owning a mobile device in 2021 [i7]. Today, it is clear to see that mobile devices have visibly been integrated into almost every aspect of day-to-day life. From digital menu selection and payment applications to tracking health and fitness statistics, portable devices have seemingly endless applications, all aiming to make life simpler and more efficient at the tap of a screen. One company in particular has acted as a catalyst in instigating this rise in popularity - the technology company Apple, who have become internationally renowned for their unique and elegant approach to designing technological solutions. As a company, Apple has created a significant impact in the change of the end user’s relationship with mobile technology in modern civilisation, and consequently may be one of the potential reasons behind prolonged technology use and mental health difficulties sharing a connection.

### Apple’s Impact on Technology

As a company, Apple has had one of the most significant impacts on technology across the world. Since its creation in 1976, its original founders (Steve Jobs, Steve Wozniak, and Ronald Wayne) had a vision to “*Change the way people viewed computers*” [i1]. To achieve this, their focus prioritised making computers smaller, more portable machines that could be integrated more easily into the offices and homes of people across the world, aiming to make technology “*User-friendly*”. Almost 40 years after its inception, Apple has become the world’s most profitable company, with over $274 billion in revenue as of 2021 [i2].

In June 2007, Apple released the first iPhone - a piece of technology that would create a change in the way mobile technology could be used, therefore significantly impacting the relationship between people and their mobile devices. The introduction of the iPhone was a significant one. Despite this not being the first smartphone on the market, the iPhone made

This development gave rise to a series of other devices which implemented the same iOS operating system, such as the iPod Touch, a portable device released later in the same year as the original iPhone release.

Years later, Apple release the iPad – another mobile platform which featured the same operating system.

\_\_Other iOS Devices\_\_

\_\_Apps\_\_

### Mobile Device Usage Over Recent Years

Over the 21st century, the development of mobile technology has been a prominent part of modern society.

\_\_Device Usage Since iPhone Was Released\_\_

\_\_Social Media -> How Apple Made Social Media Easier to Use\_\_

### Impact on Mental Health

\_\_The Subtle Addiction Method of Phones and Notifications\_\_

\_\_The War for Your Attention (& sharing your data)\_\_

\_\_Statistics on Mental Health since technology has been like this\_\_

## Technology for Relaxation

It is clear to see that the use of technology and social media is becoming increasingly popular, particularly on mobile platforms and devices. This creates the problem of managing mental health and general well-being appropriately in order to counteract the consequences of the increasing amount of time spent using technology, so that a sustainable and healthy relationship with technology use can be maintained. As described above, whilst these two trends are becoming progressively noticeable, there is some uncertainty in being able to decisively connect the patterns and behaviours between the two trends due to the wide number of potential causes for fluctuations in mental health and well-being. Nevertheless, it remains clear that there is a growing issue in terms of both use of social media and technology, and the overall state of mental health and well-being.

Various gadgets and devices have been created to bring different ways to relax and de-stress. Some notable mentions in this category of stress-relief gadgets include physical guided meditation devices such as the *Core* meditation trainer, which when held uses ECG sensors to send small periodic vibrations to guide breathing and focus, or the *Muse* meditation headband, which tracks brain activity in real time and plays a corresponding background sound reflecting the current level of activity in the brain [13]. More simple devices aim to provide a sense of calm and relaxation, such as Bluetooth speaker pillows and passive sound devices like the *Zwitscherbox* – a small motion-sensitive sound player that outputs soothing nature sounds when a user is walking past. Whilst these devices provide some potential for rest and relaxation, they do not offer much of a sense of accountability or motivation over prolonged use and are not always conducive to a busy lifestyle. Furthermore, gadgets like these are often very specific and sometimes expensive, making them more unlikely to appeal to a wider target audience as a useful application for providing a sense of calm and relaxation. As a result, despite the benefits offered, they have not seen tremendous success as a method of improving mental health and overall well-being.

One option to help restore some balance to the relationship between technology consumption and mental health could be to reduce screen time and prioritise time spent away from technology, but with social media and marketing strategies focused on attracting more user attention, combined with the additional difficulties introduced by the COVID-19 pandemic such as remote working, this is becoming significantly more challenging to do. Therefore, an alternative (and perhaps, given the circumstances, a more successful) method is to develop technologies and solutions that can be incorporated within the devices used in day-to-day life, providing a sense of stability to an otherwise addictive and potentially dangerous relationship.

Over recent years, phone usage has increased dramatically, with 6,378 billion smartphone users worldwide in 2021 compared to 3,668 billion in 2014 [14], and the average daily phone use rising from 2.5 hours in 2016 up to almost 4 hours daily in 2021 [15]. One instigator of this increased phone usage is the substantial uprise in the development of mobile apps. Apps have become more popular due to their convenience of use, regular updates, and sense of achievement provided through use. These benefits resulted in a rise of app use compared to mobile websites, with mobile users now spending 88% of their phone time on mobile apps [16]. Recently, there has been a substantial uprise in the development of apps which aim to offer a work-life balance, focussing on ways to improve general well-being through mindfulness and meditation practices in a format that is easily accessible and portable, so that it can be utilised at the user’s convenience. Today, a wide variety of available apps have been created with the sole purpose of providing a sense of relaxation, calmness, and sometimes even entertainment for the user, all with the intention of improving their mental state through distraction and mindfulness techniques [17].

Some notable releases in this category over the last decade include apps such as *Calm*, *Headspace: Meditation & Sleep*, and *Simple Habit*. These apps have been identified as successful and effective through user feedback and ratings [18].

### Calm

The winner of Apple’s “App of the Year” in 2017, *Calm* has been dubbed the “*World’s Happiest App*”, having collected over 100 million downloads with more than 1.5 million 5-star reviews across its distributed platforms since its original release date in 2012 [19]. The app holds the current number 1 slot for sleep, meditation, and relaxation. *Calm* offers flexibility through its use, with less structure and more freedom to select from a range of programs and exercises that help manage anxiety. Different modes such as *Sleep*, *Meditate*, *Music* and *More* provide a selection of different functions within the app for the user to choose freely between (figure 4):

Graphical user interface, application

Description automatically generated

Figure 4 – Screenshots of the main interface of the app *Calm*. Produced by [20].

The main interface of *Calm* is simple and easy to use, with soothing and calming nature sounds to accompany a slowly moving nature-themed background. The user is not overwhelmed with different options, alerts, or subscription notifications, and can move between the different modalities of the app with ease. Deeper colours and rounded edges of panels containing different natural environments increase the sense of peace and relaxation felt through the app’s use.

From personal experience, *Calm* is a beautiful and relaxing app to use. Even the opening screen itself inspires a sense of peace, with the simple words “take a deep breath” being the first interaction with the app. The animated nature environments with accompanying nature soundscapes create an instant sense of relief from the beginning of the app, and the main interface panel shifts between matching colour themes which blend between the soundscape and the app content. Soft and appropriate colour selection for different text and sections complement the meditation and mindfulness options, which show aesthetic images of either the individual leading the practice or a pleasant nature environment. There is a consistent theme of nature integrated into the app’s functionality, which enhances its effectiveness in escaping and relaxing from the stresses of the outside world. Daily reminders are also included which allow the option to take a quick mental inventory, helping the user to become more aware of their current mental state and providing opportunity to track changes over time. Inside the user’s profile, statistics such as the number of mindful days and the total number of minutes and sessions are featured, along with the history of consecutive use to help inspire consistency and motivation to continue to use the app. Most options require access to the *Calm* subscription, which is moderately priced at £28.99 a year, but for the range of exercises and practices to choose from this seems trivial compared to the benefits the app offers. There is also a 7-day free trial for users to experience the entirety of the app before purchasing. It is clear to see from personal use why this app has achieved such success.

### Headspace: Meditation & Sleep

Graphical user interface, application

Description automatically generated*Headspace* (figure 5) is one of the most popular and well-known apps for meditation and mindfulness. Released in 2010, its sole mission is “*To improve the health and happiness of the world*”.

Figure 5 – Screenshots of the main interface of the app *Headspace: Meditation & Sleep*. Produced by [20].

The company uses science-backed meditation and mindfulness tools to create habits for supporting mental health and general well-being. As a pioneer in guided mindfulness and meditation practices, it has been proven through use to reduce stress by as much as 14% over 10 days, alongside providing other benefits such as relaxing the mind, improving focus, and even enhancing quality of sleep [21]. The app has accumulated over 70 million followers in 190 countries worldwide, exceeding 600,000 reviews. The primary focus of *Headspace* in its functionality is using guided meditations, offering breathing exercises, sleep meditations, movement demonstrations, and wind-down practices. The app also dims the screen to encourage the mind to be present and focussed on the audio of the guided meditation.

*Headspace* appears to be an ideal candidate for those whose minds get lost in worry or overwhelm. Even from opening the app the user is welcomed with a slow visual animation encouraging the user to take a single mindful breath. Based on experience, the app is well organised and categorised into separate sections, each providing a range of different exercises and practices to select according to the amount of time they wish to spend. The whimsical, innocent characters with peaceful expressions are a nice added touch to personalise the theme and interface of *Headspace* and are featured throughout its content, being the avatars of the consistent animated theme that populates the display images of the various guided meditations an. A recent update has also added the *Today* panel, which outlines a small series of guided meditations recommended for different stages throughout the day. This is a smart way of inspiring consistency and providing a daily reset button in effect to return to the present moment. On the user’s profile page, there is an outline of progress, showing interesting metrics such as total time meditated and number of sessions completed. One notable mention when exploring the app is that in its current version all exercises and practices require access to the paid subscription, which at the annual cost of £49.99 is quite a big commitment. There is, however, an option for a 7-day free trial for those considering subscribing who wish to experience the app first. Overall, the app is easy to use and neatly arranged, offering a variety of available and effective guided meditations based on the user’s desire at any moment throughout the day.

### Simple Habit

*Simple Habit* has taken a slightly different approach to achieving success in alleviating symptoms of stress and anxiety, focussing its design and functionality for more hectic and busier lifestyles, and subsequently earning the title of “*The best meditation app for busy people*” [22]. Winning the 2018 Google Play award for “Standout Well-being App” and an “App of the Day” award in 2019, the app is becoming increasingly popular across multiple platforms, making its mark in the category of health and general well-being. This app is designed to meet the needs of users who feel they have limited free time, prioritising short and simple 5-minute meditations for recentring, and gaining back a sense of control. *Simple Habit* has an extensive library of meditations, ranging from guided exercises for sleep and mindfulness to more active tutorial videos for movement (figure 6). Each meditation is specifically titled and well catalogued, making them easy to find and use.

Graphical user interface, application

Description automatically generated

Figure 6 – Screenshots of the main interface of the app *Simple Habit*. Produced by [23].

The use of *Simple Habit* is enjoyable and intuitive. Even from the sign in process, the app features slow moving and informal messages to help calm the user. The app uses information based on sex, age, and desired goal (such as increasing happiness or reducing anxiety) to create a personalised plan which matches the user’s personal situation. Each guided meditation has the option to add a pre-set nature sound in the background if desired. A *For You* page is regularly updated with the user’s current practice and recently explored content. The guided meditations featured on the app also include a comment section, where other users can describe and share their own experiences with a particular meditation or practice. The price tag attached to *Simple Habit* is more expensive than its competitors, demanding an £87.99 annual fee after an optional 7-day free trial. Some content is still available without subscribing to this premium service. A deep blue colour theme remains throughout the entire app’s content, creating a smart and aesthetic design. There is also a tracking feature inside the user’s profile which shows statistics like the current streak and total sessions explored, accompanied by any achievements unlocked by the user to provide a sense of achievement and accomplishment. One advantage of *Simple Habit* is that it can also be used offline, providing even more opportunity and convenience to be able to use the app and therefore gaining an advantage over its competitors who require an internet connection to operate. The app is well produced and offers a range of different features, all tailored to fit the user’s particular situation or stare of mind.

### Apple and Mental Health

Apple products have a series of built-in solutions and tools dedicated to help cultivate a healthier relationship with their technology. Features such as setting app limits, which warns users when they have used an allotted amount of time on an app, or allowing a user to set specific times during the day or night to silence all incoming notifications, all help to provide opportunity to create balance for how a user interacts with their software. Notably, Apple has incorporated several health-oriented options on the Apple Watch, all designed to help with general well-being and overall health. These solutions include features such as the *Mindfulness* app (figure 7), which periodically notifies the user to spend 1-2 minutes taking short number of guided breaths [24]. Health notifications also regularly remind users of their progress in achieving pre-set daily goals for movement and activity, either congratulating or motivating the user based on their current progress throughout the day. Small reminders such as these help to keep the user engaged and active in achieving physical and mental goals – an equally important factor considering physiological state has a direct influence on mental well-being [25].

A picture containing black

Description automatically generated

Figure 7 – A series of screenshots showing the operation of the *Mindfulness* app on the Apple Watch. Taken from [24].

From the research described previously, it can be said that the research and development into technological solutions that improve and enhance overall well-being is an increasingly significant area. The recent impact of the COVID-19 pandemic has increased the time spent using technology, creating the necessity to cultivate and maintain a healthy, balanced, and sustainable relationship with the software and hardware used daily. It is observable from the number of reviews and users of different apps that mobile apps for improving mindfulness, relaxation and overall well-being are considerably popular. As a result, these apps have been able to deliver on their promises, showing a measurable reduce in stress levels from brief and consistent use of the app over a two-week period [26].

## Overview

Whilst there is already some success in existing apps for assisting with stress and anxiety, there is still more that can be explored through future work in this area. For instance, one noticeable limitation is that current apps such as those outlined above, whilst effective, all use a passive approach to achieve a sense of calm and relaxation, requiring no action from the user other than to select and play an audio or video of a guided meditation or practice. This may make it easy to zone out or get distracted while listening due to lack of engagement, preventing the user from getting the most from the practice and potentially still leaving them feeling restless and unsettled. Gadgets and toys such as fidget spinners and stress balls exist to physically provide an outlet for restless activity through physical interaction. This project aims to combine these two concepts to develop a more immersive and engaging form of stress relief whilst still providing a sense of calm and relaxation, and therefore potentially a more effective tool for improving mental health and overall well-being.

# Project Aims

This project sets out to create an interactive software solution with advanced audio functionality which helps to alleviate signs of stress and anxiety, providing a relaxing and calming experience for the user. The final deliverable will be an iOS application using leading research and identifying key features of successful applications for mindfulness and mental health as inspiration behind its design and functionality.

## Project Objectives

The final deliverable of the project can be broken down into the following objectives:

1. Produce a research document outlining the key features of leading successful applications for mental health and relaxation, analysing the user experience and existing reviews to highlight the specific features that appeal to users.
2. Research into iOS interface design and relevant audio frameworks, investigating how to achieve an interface that uses the successful features above whilst having an audio-driven focus.
3. Draft a visual prototype of the application with provisional descriptions and explanations of its key functionality and potential additional features.
4. Design a skeleton version of the application in XCode.
5. Design a complete version of the application with full functionality in XCode, using any necessary audio frameworks where appropriate.
6. Obtain user feedback for application, comparing it to existing apps it used as inspiration to get an initial response as to how successfully the app has been designed.
7. Further expand on first model using feedback from VI to create an improved version of the application.

## Intended Approach

The intended approach for the project is to expand on the current research and analyse the user experience to identify specifically what traits and features from existing applications in the field of health and wellness make successful apps so effective and appealing. These features will then be used as inspiration for researching into iOS interface design and audio frameworks, at which point potential features and components for the app’s interface and functionality will be considered. After this research period, an initial draft of the app’s design will be created, and then a skeleton version of the application will be implemented using this design. Once a basic model has been created, additional and more advanced features will be incorporated to improve the overall experience with the software. Then, the app will be evaluated through user feedback, comparing the experience with this model against other successful applications in the field to identify similarities and differences. This feedback will inspire future development to further enhance the capabilities and overall appeal of the app as a useful and viable product.

During this process, regular reviews will be undertaken to review progress and identify if there is a particular stage that has taken an unexpected amount of time, adjusting the plan as necessary.

## Proposed Timetable

Two main tools were designed to organise and manage the project’s progress in order to achieve its aims – the Project Objectives table (see Appendix A) and the Project Timetable (Appendix B).

# Initial Research

# Designing the Product

# Developing the Product

# Reviewing the Product

# Planning and Time Management

Over the course of the project, several different systems, methods, and approaches have been adopted and maintained throughout the project’s lifetime. These tools serve to monitor progress into the project, tracking the current stage of the project against clearly defined objectives.

## Initial Plan

At the beginning of the project, initial tools were designed to help track project progress, and outline a comprehensive breakdown of the project in different phases, each with actionable objectives and tasks required to make progress.

Two main tools were created to achieve this – the Project Objectives table (see Appendix A) and the Project Timetable (Appendix B).

## Project Adaptations/Evolution

## Reflection

## Risk Assessment

# Conclusion

This report introduces the significance of the project as the intersection between three areas of research and development – mental health & general well-being, iOS multimedia development, and existing apps for relaxation & mindfulness. It highlights significant research into mental health over recent years, showing the average increase of lower states of well-being both through excessive use of technology and due to the resulting impact of the COVID-19 pandemic. Leading apps in the field of relaxation & mindfulness are explored, commenting on the key features from reviews and personal experience. Other solutions for technological solutions for improving mental health and general well-being are mentioned, before stating the aims and objectives for this project – to design, develop, and test an interactive iOS application with advanced audio functionality created for relief of stress and anxiety as an example of how technology can be used to address and alleviate a modern crisis in mental health. The intended approach is described, accompanied by a visual representation of the plan for work over the coming months.

# Further Work

# References

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I2 - <https://www.thetealmango.com/featured/biggest-tech-companies-in-the-world/>

I3 - <https://www.uswitch.com/mobiles/guides/history-of-mobile-phones/>

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Links to use:

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# Appendix A – Project Objectives

This document contains the main objectives for the final project. It is a useful tool to track project progress in context of the main deliverables outlined for the project, and should be used to identify corresponding tasks as outlined in the weekly project updates. The table below shows the list of main project objectives, along with a brief description of each task and a check box to indicate its current status. This will be actively updated during the project’s lifetime.

|  |  |  |  |
| --- | --- | --- | --- |
| Reference | Objective | Description | Completed |
| Phase 1 | Research |  |  |
| 1.1.a | Research SwiftUI | Investigate the capabilities of using SwiftUI as a tool for iOS development. |  |
| 1.1.b | Create Simple SwiftUI Demo | Make a very basic program using SwiftUI to verify it is a viable method for development. |  |
| 1.2 | Audio Framework Research | Look into existing audio frameworks for iOS development - JUCE and AudioKit are good starting points. |  |
| 1.3.a | Existing App Research | Continue research from the initial project report to look into more apps for relaxation and mental health. |  |
| 1.3.b | Create App Comparison Document | Make a small document that outlines the key features from existing apps and why they are so appealing/successful. A simple compare and contrast approach will suffice. |  |
| Phase 2 | Design |  |  |
| 2.1 | Create Marketing Report | Create a short document to outline the project in context to the problem it is trying to address. |  |
| 2.2 | Create User Stories | Create user stories to provide an informal and general explanation of the product from the end user’s perspective. |  |
| 2.3 | Write Software Specification | Design a Software Requirements Specification (SRS) document describing the product and its features/requirements. |  |
| 2.4 | Design Paper Prototype | Create a paper prototype of the product to get an idea of how it might come to live when developing. Areas to focus on - audio content, main interactive features, transitions, and general interface/overall experience. |  |
| Phase 3 | Development |  |  |
| 3.1 | Create Skeleton Version of App | Create the basic structure of the app in terms of its overall functionality. |  |
| 3.2.1 | Add Main Features to App | Add the main features of the app’s functionality to the skeleton version of the app designed previously. To be expanded on at a later date. |  |
| 3.2.2 | Finalise Transitions and General Interface | Improve the overall user experience with the app. |  |
| Phase 4 | Review |  |  |
| 4.1 | Conduct User Feedback Experiment | Create a series of questions and ratings for the user to answer after a short experience with the app. |  |
| 4.2 | Consolidate User Feedback | Using the feedback from above, produce figures and statistics from the experiment conducted in order to provide insight on the app and its effectiveness. |  |
| 4.3.1 | Evaluate App Effectiveness | Using results from the feedback experiment, create a conclusive summary outlining how successful the app has been, highlighting both its strengths and areas for improvement. Additional work can be made to the app if there are any significant recommendations. |  |
| 4.3.2 | Research New Technologies | Perform brief research into any new releases for technological solutions for mental health and well-being during the course of the project. |  |
| 4.4 | Evaluate Project Usefulness | Looking at the app in context of what it has attempted to achieve, create a document to discuss the project in its entirety, re-addressing the answers to the problem defined at the beginning of the project with this new evidence to make a more informed response in how successful modern technology is able to address the current crisis in mental health. |  |
| Phase R | Report & Project Management |  |  |
| R.1.1 | Create Document for Final Project Report | Make the main document for the final project report using the initial report as a template. |  |
| R.1.2 | Create Project Management System | Design a project management system (containing a detailed Gantt chart, list of project objectives, progress tracker, and document tracking system) to maintain control of project progress. Adapt as necessary. |  |
| R.2 | Make Adjustments from Feedback | Improve the current template using the feedback provided from the initial project report. |  |
| R.3.1 | Write Background Reading & Project Context | A full account of relevant research which helps to set the project context and significance, inspired by the Venn diagram produced in the introduction. |  |
| R.3.2 | Write Design Stage | Explain in detail the approach taken for designing the product, using the research and significance for the product as outlined in the project context section. |  |
| R.3.3 | Write Development Stage | Methodically outline the entire development for the app, explaining how it used the design choices for creating the product. Reflect on the process of development and highlight what went well and what could have been improved. |  |
| R.3.4 | Write Review Stage | Write about the methods used for obtaining user feedback, and also what that data suggests about the app and its ability to successfully confirm that technology can be a solution to the current mental health crisis. |  |
| R.4.1 | Write Project Management Section | Outline the key protocols and systems used to track project progress and how it changed over time. |  |
| R.4.2 | Write Risk Assessment | State the potential risks involved with the project and also what action was taken to prevent or otherwise minimise these risks. |  |
| R.5.1 | Write Conclusion | Provide a succinct overview of the entirety of the project, describing what the project aimed to do, the approach taken, and any conclusions derived from the project in answering the initial problem it was designed to address. |  |
| R.5.2 | Write Further Work Section | Outline what further action should be taken to continue the progress made by the project, and why it might be useful to develop in the future. |  |
| R.6 | Write References | Produce appropriate and consistent IEEE referencing, checking that all links work and are appropriately sourced. |  |
| R.7 | Write Statement of Ethics | Create a brief statement commenting on any ethical considerations made for the project. |  |
| R.8 | Write Abstract | Create a short overview of the entire report contents on a separate page. |  |
| R.9.1 | Add Final Touches | Write acknowledgements, double check reference and figure numbers, and verify sources are appropriate and correct. |  |
| R.9.2 | Proofread | Review and read the entire paper, checking that it has been designed as intended. |  |
| R.10 | Presentation Preparation | Prepare and rehearse the presentation for the project. |  |

# Chart, timeline Description automatically generatedAppendix B – Initial Project Timetable

# Appendix C – Final Project Timetable