Creative Technologies Project: Gamifying a Health and Fitness Apps for Young Adults – Final Report

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*Screenshot/ image of the work (600 pixels high x 800 pixels wide .jpg)  
This image is to be used for the degree show booklet. For white backgrounds please use 1/2pt black border.  
Also submit a copy of image file separately (600 pixels high x 800 pixels wide .jpg @ 240 dpi).*

**Abstract**

This project set out to test the viability of creating a health and fitness app for young adults using game design methods versus traditional design methods and explore possible uses for such an app, such as use within healthcare.

**Keywords**: gamification, apps, wellbeing, serious game**Brief biography**

I wanted to find a way to improve health and wellbeing in young adults as lack of mental health support for young people is seen as a huge problem across the country. This project attempts to give support for people who need though the use of game design mechanics, such as a customizable avatar. This project has helped improve my project management and knowledge of software development cycles as well as my C# programming abilities.

**How to access the project** (not included in word count)

Verdana, 9pt. Please put down the project URL and/or details of how to access your project, and the ***URL of your final video***. If we need to see any back end / administration interface please provide us with necessary passwords and URLs to access this. Basically, what we cannot access will not be considered for marking. You can change the passwords after you receive your mark.

We also want to be able to see source code, and the best way is to download it from your site or Github. Please clearly comment code to show us what is your own and what has been used from frameworks, libraries, OSS or borrowed from elsewhere.

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1. **Introduction** 400 words

Healthcare/wellbeing/apps intro

The original aim of this project was to produce an mobile application (app) that teaches and promotes healthy lifestyles for students and young adults. Earlier research found 5 key lifestyle choices were identified as helping to contribute towards good mental health and general fitness:

* BMI (body mass index)
* Physical Exercise
* Mental activities (e.g. playing an instrument, reading)
* Sleep
* Regular social patterns ( e.g. meeting people regularly)

Through supervisor feedback and aniterative design process, the purpose of the project changed slightly.

It was realised that an app encouraging healthy lifestyle choices could be prescribed by healthcare professionals to people suffering from common mental illnesses, such as anxiety and depression. Such an app could also monitor symptoms of these common mental illnesses using non-intrustive data collection methods, such as a game. This project aims to show what this app could look like.

What sets this project apart from other health and wellbeing apps is the use of game design (gamification) methods. Fitness apps are the 9th largest group of apps (Statista stat); however studies have shown that young people often experience negative feelings as a result of using these apps (Honary et al 19) such as lack of motivation and lack of control. Young people use apps lots – benefit of aiming at young people. By using gamification methods, this project attempts to alleviate some of the negative feelings by ‘deriving the fun and engaging elements found in games’ (Chou, Y. 2015) and applying them for the purposes of promoting healthy lifestyles and monitoring mood.

Based on this research, the objectives of the project are:

* Design and produce a small game to collect user data regarding mood in order to identify symptoms of common mental illnesses
* Design and produce a application which allows users to customise and interact with a virtual avatar
* Design and produce a application which encourages healthy lifestyle choices
* Combine these into one coherent and polished application experience
* Create a functioning android build with considerations around user interface

The final project will contain:

* The Android Package Kit (APK) of app which can be ran on android devices
* Unity project with final build

**2. Practice** 1500 words

The main outcome of this project is an application that encourages healthy lifestyles, contains a customisable avatar that a user can identify with and collects data regarding the user’s mood in a non-intrusive way.

**Lifestyle Habits**

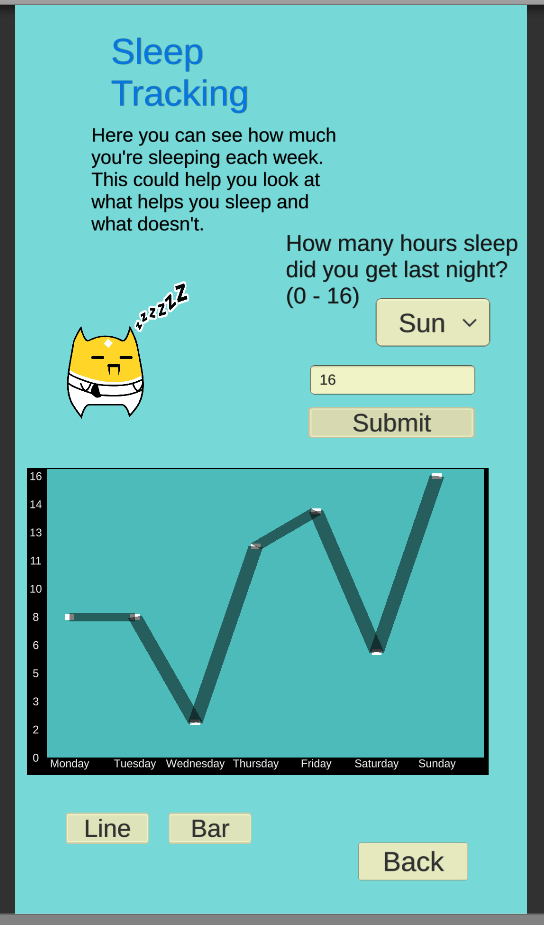
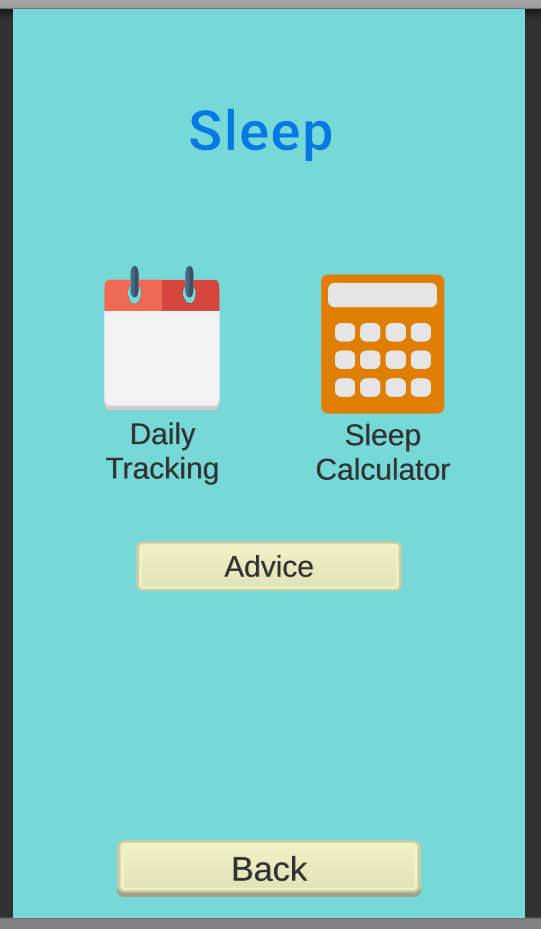
As mentioned, one of the aims was to produce a system to encourage healthy lifestyle choices.

This was one of the first features implemented. One lifestyle choice that was focused on was sleep. Through analysis of other apps (Ong and Gillespie, 2016), key features of apps were identified by looking at the features which were most popular.

These include:

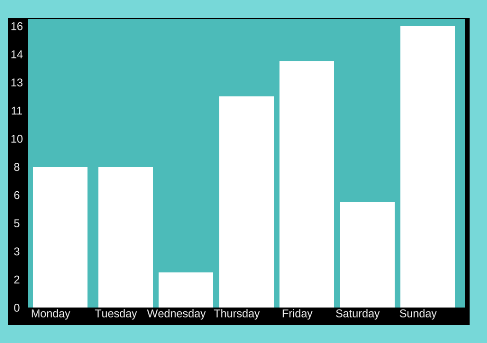
* Duration of sleep
* Sleep structure (how long the user spent in deep sleep and REM phases of sleep)
* Sleep efficiency calculator
* Sleep debt calculator (cumulative effect of lack of sleep)
* Smart alarms (designed to wake the user up at the optimal moment in their sleep cycle based on when they started sleeping)

Some of these are included in this project. One feature is that users will be able to input how many hours they slept each night and view it on either a line graph or a bar chart (fig 2/3).



**1** Page showing user options for sleep

**2** Example of a user sleep graph (line) inside the app

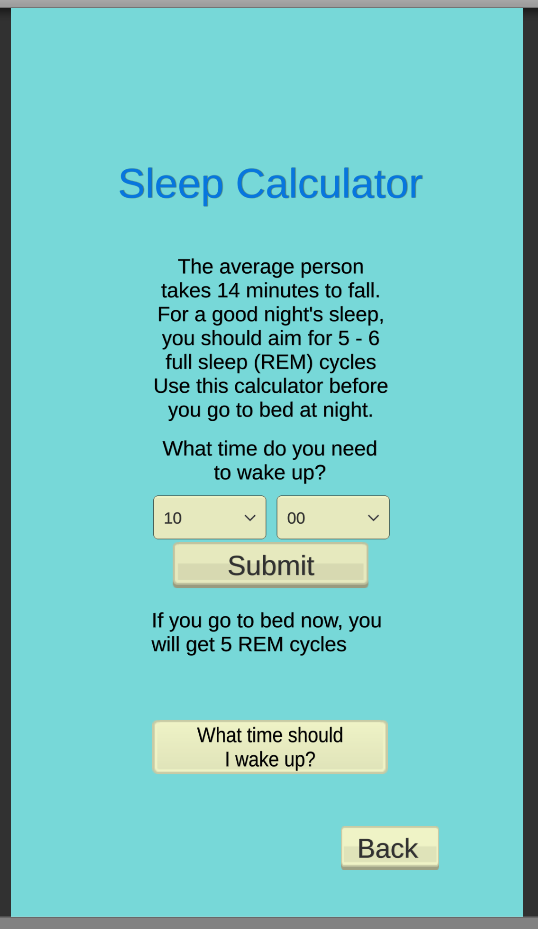
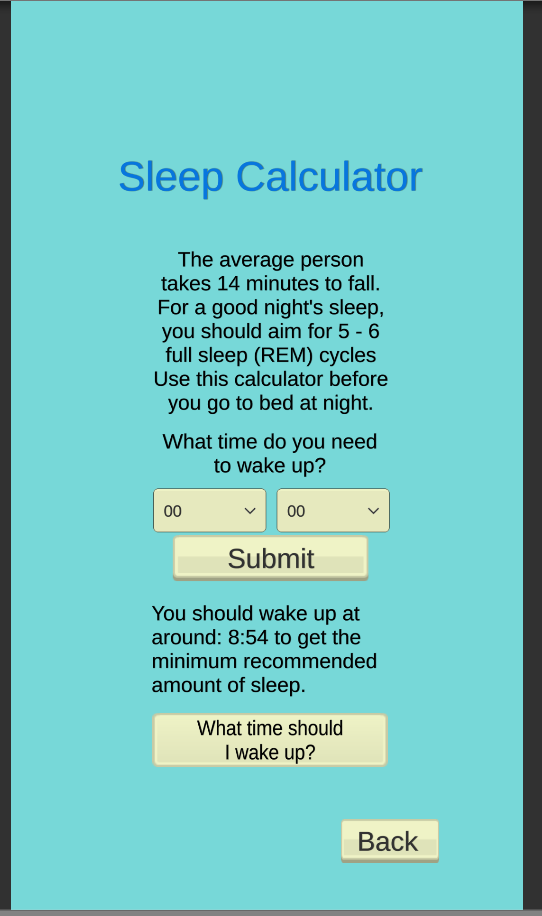


3 Sleep data bar chart (y axis shows hours slept, x axis show days of week)

This worked well as users can choose how to visualise their own data. Through general feedback (evidence?) at a public demonstration at Colston Hall, changes were made to make it clearer where and how to input data.

Through the use of a graph, users will be able see how they slept each night, and potentially identify what habits help them sleep and which do not. Sleeping at regular times has shown to improve quality of sleep and wellbeing in children and adults. (Zisberg, Gur-Yaish and Shochat, 2010) (Mindell and Williamson, 2018). By helping users to keep a sleep routine, the app could contribute to better sleep (and therefore better health (Jagannath, Peirson and Foster, 2013)) and better wellbeing.

Another feature that could help contribute to a regular sleep pattern is the sleep calculator (fig 4/5).

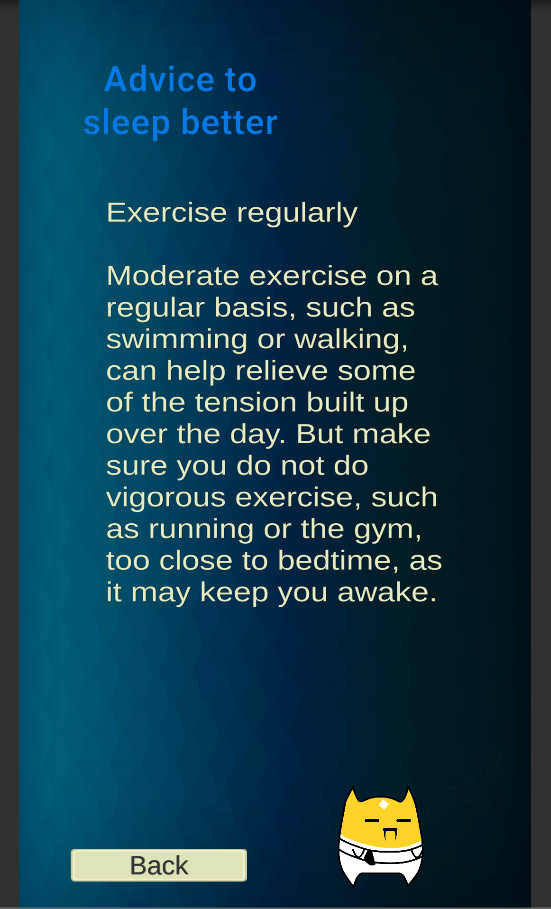


**3** Sleep calculator showing the minimum recommended amount of sleep

**4** Calculator showing REM cycle calculation

Research (Watson et al, 2015) shows that adults should sleep at least seven hours a night. To encourage this, the calculator takes the current hour according to the system clock and outputs either when the user should set their alarm for to get the minimum recommended amount of sleep or how many cycles of sleep they will experience if they wake up at a specific hour (one sleep cycle is roughly 1.5 hours).

As well as the graph and the calculator, the app features some generic advice for sleeping taken from the NHS (NHS 2019). One UI consideration that was made here was a carousel style presentation of the text, which allows the user to swipe across the screen to view each piece of advice. This was implemented to prevent the user being overwhelmed with too much text, while utilising feature of a mobile device (touch input).



**5** Sample sleep advice

The system takes an array of images (in this case with text elements attached) and displays one on the screen at a time. This system was reused to allow users to customise their virtual avatar.

**Virtual Avatar**

One of the problems this app needs to overcome in order to be viable is that users must be motivated to use it. This is overcome through the use of game design methods, one of which is a customisable virtual avatar.

Previous research (Zhong, Z. Yao, M. 2013) showed that when users identify with a avatar, they are more likely to engage with it; and in this case it could mean that users are more likely to engage with the app.



**6** Game window showing the virtual avatar and it’s statistics

The avatar has three ‘needs’ that the user is encouraged to satisfy. These are sleep, hunger and boredom (fig 6). These were selected as according to Maslow’s hierarchy of needs (Maslow 1943) these are three of a human’s basic needs. By assigning them to a virtual avatar, users may identify more with the avatar

The user is able satisfy these ‘needs’ with the avatar using the buttons provided. When the user leaves the app, the statistics about each need are saved to a binary file. Upon relaunching the app, for every hour that has passed since the user closed the app, each statistic is reduced (fig7).

**A screenshot of a cell phone

Description automatically generated**

**7** Avatar needs gameplay loop

Another statistic which is saved to and read from file is an index number which refers to which avatar should be displayed on screen. This was implemented for consistency, so that upon reopening the app, a user will see the same avatar they selected. This could help the user identify with the avatar more and consequently engage with it more.

**3. Discussion of outcomes** 900

**5. References** (=not included in word count – these are the sources you are actually quoting in this report; in alphabetical order)

Jagannath, A., Peirson, S. N. and Foster, R. G. (2013) Sleep and circadian rhythm disruption in neuropsychiatric illness. *Current Opinion in Neurobiology* [online]. 23(5), pp. 888-894.

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[last access: 23 September 2009]

**Appendix A: Project Log** (not included in word count)

**Appendix B: Project Timeline** (not included in word count)

**Appendix C: Title title title** (not included in word count)  
If necessary, insert further mateirals such as: a list of interview questions, any larger tables, evidence of design development, longer code snippets or other relevant materials in here or in further Appendixes. This does not come under the wordcount. Nevertheless, only insert useful materials here, please don’t just bulk this report up. Your main text should be able to stand on its own, without relying on information contained in appendixes!