WeightLess: A Fitness App to Tackle Global Obesity

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Abstract:

Obesity's global impact demands effective weight management solutions. WeightLess is a mobile fitness app that attempts to challenge these issues by trying to induce user engagement by including features to educate users, set goals and enable calorie and workout tracking. The project explores the implementation, testing and user feedback, to see whether this draft app shows promising signs in tackling global obesity. Results show the potential of the app having a 74% engagement approval from the user feedback.

Introduction:

It has been reported by EASO that obesity and being overweight is the 5th global cause of death (EASO, 2020). Obesity can be seen as an overlooked catalyst for many serious health issues. It is estimated that being overweight or obese causes at least 2.8 million adults to die yearly (EASO, 2020). However, this medical condition is not only affecting adults but also the younger generation. It was found that by the age of 5, at least 10% of children are diagnosed with obesity and this only gets worse with age as it rises by 23% by the age of 11 (Baker, 2023).

Obesity can be deemed a silent killer as it results in detrimental symptoms and effects that can result in death. Obesity occurs when excessive amounts of body fat are being held by a person. The risk of obesity and being overweight are diabetes, cardiovascular diseases, and cancer, which all can exponentially increase the risk of death (Dixon, 2009). Not only does it affect a person's physical health but also their mental health which was proven by a study done by Markus Jokela and Micheal Laakasuo which mentioned that being obese was correlated to a higher risk of depression (Jokela & Laakasuo, 2023).

Therefore, the need to tackle such an issue is vital. However, due to an abundance of information online, spoken word and social media a lot of fitness advice has been circulating making it very intimidating and confusing to begin a fitness journey that specifically combats weight loss (Nakul, 2022). Social media is a big factor as any person can influence and inform viewers about weight loss or weight gain without any scientifically backed methods (Nakul, 2022).

"More information doesn't always equal greater motivation" (Chen, 2021). Additionally, even with the correct information, people would still not implement or consistently implement the weight loss knowledge in their lifestyle as solutions are not engaging. Therefore, many people turn to reliable aids such as fitness apps for help. However even with such resources the global weight crisis is still at large. This is due to fitness apps having low user retention and not being engaging. (Consagoustech, 2023).

This is why the aim and objectives of this project is to:
-   Produce some form of software that promotes weight loss and combats global obesity.
-   Implement software that maximises user engagement to promote consistent usage of the software.
-   Produce software that provides correct weight loss information.
-   Test a draft version of the software with users and determine whether the software was successful in engaging users.

Literature Review:

The Effects Of Obesity:

Obesity causes a lot of visceral fat to build up in the body which is harmful as this increases the risk of cardiovascular diseases (Iacobellis, 2023) and increases the risk of cancer due to more inflammation in the body. Fat build-up occurs as energy expenditure is much lower than energy intake resulting in the body holding onto the excess energy in the form of fat. The cause of excess energy can be linked to poor eating habits and an inactive lifestyle (Otsuka et al., 2023).

Exercise has been proven to reduce body fat percentage as it increases energy expenditure used by the body which would help with obesity as fat is the build-up of excess energy being stored in the body. (Zhang et al., 2021). Even if the exercise being done has no reduction in body fat, it still has a positive effect as it would improve cardiovascular

health (Shaw et al., 2006) which counter acts some of the harmful side effects of being overweight. To effectively reduce body fat percentage and improve cardiovascular health the effect of exercise along with a tracked healthy diet results in better weight reduction (Shaw et al., 2006). Therefore, the need for physical activity especially cardiovascular activity and or a reduction in overall calories consumed are both key to reducing the health risks presented by obesity.

To calculate a caloric goal to lose weight, a person's basal metabolic rate (BMR) is needed. BMR is the minimum number of calories/energy needed to survive and carry out essential bodily functions such as breathing and digestion (Shereen Lehman & Eliza Savage, 2023). BMR varies depending on many biological factors:

- Gender
- Age
- Height
- Weight

After knowing BMR it will be used to find the active metabolic rate (AMR), which is a person's metabolic rate with consideration of their daily activity (Shereen Lehman & Eliza Savage, 2023). To ensure an individual loses weight they must consume 300-500 calories less than their AMR (Shereen Lehman & Eliza Savage, 2023). BMR is calculated using the Harris-Benedict formula (Shereen Lehman & Eliza Savage, 2023).

Women:
$$BMR = 655.1 + (9.563 \times Weight\ (kg)) + (1.850 \times height(cm)) - (4.676 \times age\ (years))$$

Men:
$$BMR = 66.47 + (13.75 \times Weight\ (kg)) + (5.003 \times height(cm)) - (6.755 \times age\ (years))$$

Then using the BMR, AMR can be calculated using the following formula:
- Sedentary activity level (little to no exercise) = $BMR \times 1.2$
- Moderate activity level (exercise 3-5 a week) = $BMR \times 1.55$
- Very Active activity level (exercise 6-7 a week) = $BMR \times 1.9$

Formulas from (Shereen Lehman & Eliza Savage, 2023)

How to use software to combat obesity:

Tracking calories, nutrition and exercise is crucial for effective weight loss. Modern technology/software is the optimal approach due to the effort paradox as biologically it is ingrained in humans to be unmotivated by more high-effort tasks as it can deplete intrinsic resources (Yi et al., 2019). Software can reduce effort as it can track calories and workouts while providing current fitness information.

To implement software, the medium of hardware that it would be delivered by has to be considered. Smartphones are especially fitting with 86.29% of the global population having one (Turner, 2023). Given their constant presence in daily activities, integrating software through this medium into a daily routine is effortless. This lack of effort is more likely to encourage consistent engagement in weight loss efforts. Given the preference for smartphones, a mobile fitness app stands to be the most appealing solution to use software to combat obesity.

The study "Effectiveness of Mobile Apps in Promoting Healthy Behaviour Changes and Preventing Obesity in Children: Systematic Review". (Yau et al., 2022) explored fitness mobile apps targeting childhood obesity. The results indicated these apps effectively help children adopt healthier behaviours, such as improved diet and increased physical activity (Yau et al., 2022). While the apps' direct impact on obesity was uncertain, two features that the apps had shared, goal-setting and gamification features were accredited for promoting healthy behavioural changes in the children.

Goal setting was a feature that consisted of giving the children certain physical activity or eating goals/targets which prompted healthy changes. These healthy changes were successful as they had been adopted by the children that had used the apps. While gamification is when game-like features are incorporated into non-game contexts (Hamari et al., 2014). In fitness apps, this could be earning rewards or the progression of an in-app avatar. To ensure the mobile app would be successful in implementing healthy behavioral changes it must include at least goal-setting or gamification features.

Features to make an effective and engaging mobile fitness app:
A study carried out by Yunwen Wang and William B. Collins (Wang & Collins, 2020) analysed and evaluated 351 participants against 98 fitness apps examining the characteristics and features that are desired by participants. The data and results of the

study can be found in Table 1 and in Appendix 1.0 Figure 5.

Feature	User features want (%)	Top 2 most desired features (%)
Education	92.6	- Goal setting (72.4) - Custom training (55.3)
Tracking	96.6	- Biometrics: Calories (76.4) - App logs workout progress (69.8)
Social	37.6	- Community among app users (22.2) - Add Friends (20.5)
Gamification	63.0	- Challenges and Quests (42.7) - Badges and trophies (35.6)
Motivation	77.5	- Music (52.7) - Reminder/notification (44.2)

Table 1 – Data obtained from Yunwen Wang and William B.Collins study (Wang & Collins, 2020)

Considering both Table 1 and Figure 5, the importance of including education and tracking features, especially goal-setting information and calorie tracking features is essential to increase user engagement. Table 1 shows that more than 90% of people wanted these features.

For Education, there is a 21.2% difference between the demand wanted at 92.6% and the supply at 71.4%, showing how wanted this feature is and clearly showing the scarcity of such features in the fitness app market. Within the Education features, goal setting was the most desired education feature having 72.4% of participants wanting such a feature. "Goal setting" was also credited in the investigation "Effectiveness of Mobile Apps in Promoting Healthy Behaviour Changes and Preventing Obesity in Children: Systematic Review" for being effective at being one of many causing factors for positive behavioural health changes (Yau et al., 2022). Proving that Education, especially "goal setting" is vital for both engaging users and to prompt successful fitness behavioural changes. This was also a case for tracking features but with only an 11.9% difference between supply and demand where demand was 96.9%, with 76.4% of those 96.9% people wanting a calorie tracking option. Thus, both Tracking and Education features must

be included in the app to maximise user interaction and engagement.

According to the study by Yunwen Wang and William B, only 37.6% of participants found social features desirable in fitness apps. Moreover, Figure 5 reveals a -21.6% difference between the demand and the provided supply of social features (Wang & Collins, 2020), suggesting that these features are oversaturated within the market and may not be essential for engaging users or could potentially do the opposite and demotivate people with their fitness journey.

When considering Gamification features, the investigation done by Yau (Yau et al., 2022) on fitness apps and their effects on children believed that many fitness-focused behavioural changes were encouraged by gamification elements. Nevertheless, it may not be the most coveted feature as only 63% of participants wanted these elements and Table 1 shows the specific gamification features that are desired are only wanted by less than 50% of participants.

The Data from Table 1 indicated that more than 75% of participants had sought out motivational features. Table 1 also shows the most desired motivational attributes were "Music" and "Reminder/Notification" features. However, integrating personalized music could be challenging, as music is subjective and different users would have different diverse preferences. Moreover, numerous standalone music streaming apps stream music while multitasking on different apps, therefore it would be unnecessary to include music features in a fitness app.

Things to consider when designing the app:
A few key principles need to be considered when designing the interface of the app so that it is more ergonomic and appealing to users (Babich, 2020). The principles Babich had stated were that there is only one primary function per page. Also, to ensure the navigation is intuitive, buttons must be at least 7-10mm and text should be legible with contrast ratios of 3:1 for large fonts and 4:5:1 for smaller fonts.

Existing solutions:
There are many existing fitness apps that aim to help improve health. To ensure the new app is successful and effective in alleviating weight-related issues, the shortcomings and benefits of some existing apps must be analysed. When investigating, three main apps stood out which were MyFitnessPal, MyDietCoach and

WeightDrop. The analysis was based on the user interface, app features (Tracking, Education, Motivation etc.), ease of use and navigation.

MyFitnessPal offers some valuable features such as calorie and exercise tracking, goal setting, diet plans and workout guides. The calorie tracker is user-friendly spilt by meal-specific panels with a barcode scanning option to upload food. However, it lacks a weight loss-specific focus as there are options to gain and maintain weight which may overwhelm or intimidate users due to excessive information. It also goes against the key principle of app design where the less information the better (Babich, 2020). Too much information with the combination of the app supporting multiple fitness goals can seem confusing and intimidating to users as they would struggle to differentiate between the information. When looking at user feedback one uploaded response on the Apple app store was *"Ugly / plain / not attractive. I used for 2 days and lost motivation as I couldn't find anything easy… Why is it hard to find what you've added"*. Showing how the app's design and navigation can be uninspiring, leading to demotivation while it also being difficult to find added items resulting in potentially reducing user engagement. Additionally, pushy prompts and premium features which are blocked by paywalls can seem to hinder the free experience, especially as there are restrictions for nutritional input when logging in calories.

MyDietCoach stands out with its minimalist design, user-friendly calorie tracker, and customizable goal setting. The app's simplicity and intuitive two-page layout enhance navigation. Goals can be uniquely tailored, to an individual. The calorie tracker simplifies food logging, including barcode scanning and visual progress bars. However, the app falls short due to:
- Lack of educational content
- Payment required for Premium features

MyDietCoach lacks information or guidance on calories, weight loss strategies, and exercise routines, placing the burden on users for research and planning. Leaving a lot of the work of educating and finding specific custom training and exercise routines down to the user multiplying the effort required. Considering the effort paradox, this may deter the user from starting their weight loss journey. Moreover, essential features like meal saving and barcode scanning are locked behind a premium paywall, limiting the app's functionality. Additionally, the lack of gamification elements and

motivational notifications further diminishes user engagement and consistency.

WeightDrop app's key features include BMI calculation, goal setting, and progress tracking. While it focuses on weight loss and BMI tracking, it lacks crucial elements for a comprehensive fitness experience such as:
- Limited education, motivation, and gamification
- Absence of workout and calories trackers
- Very dull user interface (UI) with limited features

It was also mentioned in the Apple app store that the app is *"Not very motivational".* WeightDrop fails to include crucial and desired features such as workout and calorie trackers. Additionally, the lack of less crucial features such as gamification features are not included, further reducing the urge or motivation to use the app. The User interface of the app (UI) can also be seen as unexciting as it lacks colour and is very invariant, this combined with the lack of features will lead the app to fail to captivate and encourage users to consistently use the app.

Analysing the existing solutions showed common trends in fitness apps, such as the importance of tracking features and user-friendly interfaces. However, it also highlighted a critical gap in the market which was despite having a few key features there is limited information provided for new beginners about weight loss, who may not know where to start. By focusing on providing user-friendly educational content, personalised goals and simplified tracking features the project also intends to address this gap and consider it during the designing and implementation of the app.

System Requirements:
User Profiling:
Three types of demographics that must be targeted to help reduce the cases of obesity globally:
- Those who lack knowledge of fitness and weight loss.
- Those who have the necessary knowledge, but do not start their fitness journey.
- Those who have started their fitness journey but cannot maintain it.

It would be essential that users use the app regularly so that they can be educated while successfully transitioning into their weight loss

journey and consistently implementing it into their daily lifestyle. To achieve this, users must be engaged and consistently using the app daily to achieve the desired. After considering the studies from the literature review and the analysis of existing fitness the vital features of this app to target this audience were clear and the following requirements were derived.

Design Functional requirements:

1) Allow users to log food exercise and calories on the app	2) Have a page where users are educated on Weight Loss
3) Include a form of personal goal setting within the app	4) Allow users to view to find different exercises and workout routines
5) Allow users to save workout routines on the app	6) Allow users to save meals on the app
7) The app must send notifications to remind users to log on and track their progress	8) Large text must have a contrast ratio of 3:1 while smaller text should follow a 4.5:1

Design Non-Functional requirements:

a) The app should be easy and intuitive to navigate and read	b) Buttons used on the app should be at least "7-10mm"
c) The interface of the app must be understandable	d) The database and architecture used to implement the app must be suitable for the app

The fitness app to be produced is called WeightLess. The Weightless fitness app must include calorie and workout tracking features and weight loss-specific educational features. Gamification elements can be included however it is not crucial to have. While taking into consideration Table 1 Social and motivational features can be left out as they are not as desired

as the other features and including them would only make the app drain and use more of a smartphone's resources.

Use Case Diagram:
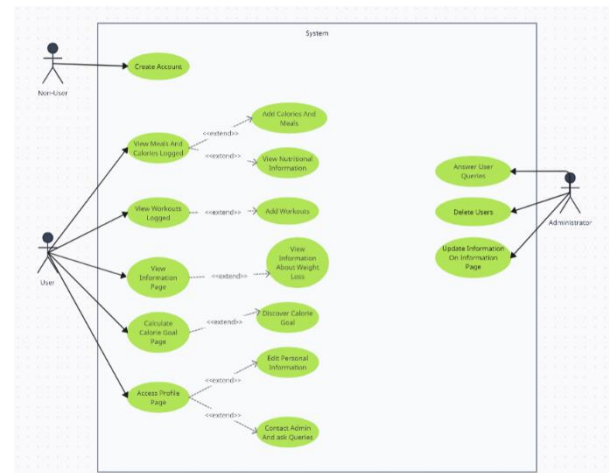
Figure 3 - Use case diagram of the app

After deriving the system requirements, a use case diagram (Figure 3) and user/screen flow diagram were made (Appendix 8.0 Figure 4). The diagrams were focused on having Babich's principles in mind, especially having one primary function per page, while incorporating the necessary features mentioned in the design requirements.

In the use case diagram, there are three actors Admin, Member and Non-Member. "View Meals and Calories Logged" and "View Workout Logged" were important as they would be used to help track calories and exercise. Both pages can be used to add their logs to each specific tracker. The "View Information Page" was important to educate users on weight loss and some routines they could follow for their workout routines or diet. "Calculate Calories Goal" is essential to help users create custom calorie goals based on their physical attributes. A few use case scenarios were created to outline the functionality/ features and layout of the app. Use case scenarios can be viewed in Appendix 10.0

Looking at the user/screen flow diagram in Figure 4 in Appendix 8.0. Upon launching the app, users are greeted with a launch page. Members would be required to log in while non-members would need to register to create an account. Upon logging in or registering users would be taken to the home page, a page which branches to 5 other pages. Among these is the Workout Tracker Page, where exercises can be that have been added can be viewed. The Workout Tracker Page also extends to the add workout page, where users can

add workouts to the Workout Tracker, and another page to edit and delete entries. The Calorie Tracker Page mirrors the same structure as the Workout Tracker Page applies but an additional page can be accessed where the nutritional information of the meals logged can be viewed. From the Home Page, the Calorie Goal Calculator, Information, and Profile page can all be accessed. The Calorie Goal Calculator allows users to discover their specific caloric target needed to be met to lose weight. The information Page takes users onto a new page where they can learn information about weight loss and learn about weight loss-specific advice/routines. The Profile page allows members to contact support or change their profile details.

System Implementation:

System Architecture
Android Studio is the official integrated development environment for creating Android applications. Android studio was also useful as it has built-in constraints that warn users if their button sizes are too small or if text has poor contrast which helps with design requirement 8, a, and b. To make the app three parts were needed:
- Front End
- Back End
- Database

For the Front End, Android studios utilises XML, while using Java for the Backend.

Database
For optimal functioning of the app, it requires both a local and remote database. A database would be required to store the entries made by users for their Calorie and Workout Trackers. For this purpose, a local database is necessary as unlike remote databases it does not require any internet connection to access. This is advantageous as offline access to the log entries allows fast and efficient retrieval of data as it is stored locally. Moreover, local storage enhances data protection, as remote databases remain isolated from the internet minimizing the risk of cyber-attacks. Login Credentials for the app would be best suited to a remote database is used, especially since remote databases have backup and data recovery allowing login details to be recovered if lost. While Android Studio can support many external databases, it does, however, have built-in support for SQLite, which was used to store entries for both trackers where each tracker had its own separate SQLite database. For login details, a Firebase database can be used.

For the Workout Tracker, the database was implemented in the following way. Looking at Figure 5 in Appendix 9.0, The Constructor (Figure 5, line 10) initialises DBHelper which is a subclass of SQLiteOpenHelper, to create a database called "**w**orkoutdata". Then the onCreate method is overridden in (Figure 5 line 14) and now changes the onCreate method to be able to help define the new database. It does this by using sqliteDatabase.execSQL to execute a raw SQL statement and in this case, it creates a table called "**W**orkoutdata" in the "**w**orkoutdata" database.

App Functioning:
The app was named Weightless and after considering how the app would be implemented a draft app of Weightless was created on Android studios.

The Home page:
The Home Page, seen in Appendix 2.0 Figure 6, consisted of 5 buttons, where four of the buttons would take the user to another page to use one of the features of the app. The app has 4 features:
- Calorie Tracker
- Workout Tracker
- Information Station
- Calorie Goal Calculator

Each of the primary features were implemented on their own separate page to align with Babich's principles (Babich, 2020).

Calorie Goal Calculator
The Calorie Goal Calculator was implemented to help users identify their personal caloric goal which helps achieve design requirement 3. The feature asks the user for their age, weight, height, gender and activity level as seen in Appendix 2.0 Figure 7 and using the Harris-Benedict formula (Shereen Lehman & Eliza Savage, 2023) the calorie target is determined and displayed at the bottom as seen in Appendix 2.0 Figure 7. Data privacy and user consent does not need to be consider as this features only uses the data to calculate the target calories and does not store the data.

Information station
The information station is a page, seen in Appendix 2.0 Figure 8, where users can learn specific elements of Weight Loss and discover routines for their Workouts. When clicking on the specific tabs as this is a draft app it currently just opens a link to Google however, with time it would have access to important weight loss information that would be useful to the user. The information

station was a feature implemented to satisfy design requirements 2 and 4 to educate users.

Calorie and Workout Tracker

The Calorie Tracker (seen in Appendix 2.0 Figure 9) and Workout Tracker (seen in Appendix 2.0 Figure 10) are tracking features that help users track the calories they consumed and their exercise done by allowing them to type and save them in the app satisfying design requirements 1, 5 and 6. After pressing the "Workout Tracker button", the user will be taken to the "Workout Tracker" page where they can see the list of entries they have entered. Then When they want to add an exercise to the log, they press the green button and get taken to a new page called "add exercise", seen in Appendix 2.0 Figure 11. On this page, the user will be prompted to enter and submit the values they want to log in to the "Workout Tracker". When submitted the "add_exercise" java class captures the data and saves it using the "DBhelper" class as there is a method in the "DBhelper" called "saveuserdata" that the "add_exercise" class calls to save data onto the "workoutdata" database seen in Appendix 3.0 Figure 14.

The "Workout_Diary" class then has a "displaydata" method, seen in Appendix 3.0 Figure 3.0 (line 55), which uses the "getdata" method from the "DBHelper" to get data entered by the user in the "workoutdata" database. Then in the "Workout_Diary", data is obtained and stored in array lists. After that, an instance of the "MyAdapter" class is created and the array lists with data in them are passed along as arguments to the "MyAdapter" constructor, as seen in Appendix 3.0 Figure 16 (line 24). The arrays are then received as parameters in the "MyAdapter" class and are used to populate an XML file to display data in a presentable format and to be displayed in the recycler view on the "Workout_Diary" activity. From the user's point of view after having added an entry, When the user returns to the Workout Tracker page the new entry would be shown with any prior entries they may have entered as seen in Appendix 2.0 Figure 9.

Then if entries want to be edited or deleted users are instructed in the workout tracker to click on the entry panels to do so and would be taken to an edit Workout Tracker page seen in Appendix 2.0 Figure 12. On this page, the user can change the values of the entry by entering new values. When the new values are submitted it is updated in the "workoutdata" database, due to the "updateuserdata" method which is called from the "DBHelper", seen in Appendix 3.0 Figure 17. The

same applies to the deletion of an entry but a "deleteuserdata" method, seen in Appendix 3.0 Figure 18, is called from the "DBHelper" class instead of the "updateuserdata" where it removes the entry from the database.

The Calorie Tracker mirrors the same coding infrastructure but with the addition of an extra nutritional information button that takes the user to the Total Nutrition page which calculates the total Calories, Protein, Carbs, and fats that have been entered in the Calorie Tracker As seen in Appendix 2.0 Figure 13.

Trouble Shooting

The Draft app was tested on an Android emulator in different scenarios to see whether the implemented features worked as intended. After testing user input and actions that can be done on the app the results can be seen in Appendix 4.0.

For both the Workout and Calorie Trackers it mentions "Fail". This is because in the "Add Exercise" page users would be able to type in letters in the sets, reps and weight boxes and this would be added to the "Workout Tracker" when submitted. The app, however, should not allow this as it does not logically make sense. The same happened on the Add Meal page where letters could be submitted for the Calories, Protein, Carbs and Fats boxes. To overcome these issues, in the XML file for these pages each box was assigned an input type and it was set to "number" as seen in Appendix 4.0 Figure 19. After implementing this when entering a value for the Sets, Reps and Weight only a number keypad was shown. Preventing users from being able to type numbers. The same was also done to the Add Meal page solving this troubleshooting issue.

User Testing and Results

A Survey was done to get user feedback from 10 anonymous users that had used the draft app and experienced what it had to offer. The survey used, which can be found in Appendix 5.0, was used the get responses which can be found in Appendix 6.0 Table 2. After collecting the responses, the following graphs were produced graph 1, graph 2, and Graph 3 seen in Appendix 7.0.

Based on the User feedback graph 1 in Appendix 7.0 shows the most liked feature was the Workout tracker with an average rating of 7.2 out of 10 closely followed by the Calorie tracker with an average rating of 7.1 out of 10. This is promising as the tracking features were also mentioned in the study done by Yunwen Wang and William B to be desired fitness app features (Wang & Collins, 2020). Both features were also in the top 2 most

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liked features in the app seen in Appendix 7.0 graph 2. Considering both the results from graphs 1 and 2 from Appendix 7.0 along with the research done by Yunwen Wang and William B the tracking features are mostly the driving force behind user engagement. Therefore, including both these tracking features and improving them would be pivotal in boosting the engagement potential with the app further. Furthermore, in Appendix 6.0 the results from the user feedback, user 4 mentioned they found the app more engaging as they could enter the nutrients themselves, motivating them to use the feature more. This further proves the promising potential the tracking features have in engaging users.

However, it is worth considering that from Appendix 7.0 Graph 2, the Calculate Calorie Goal feature had the least votes for "most liked feature" and in Appendix 7.0 Graph 3 it had the most votes for being the "least liked feature" on the app. Additionally, the Calculate Calorie Goal feature received the lowest average rating of 6.2 out of 10 from Appendix 7.0 Graph 1. This feature could potentially be the reason the user engagement is not higher. Nonetheless, the Calculate Calorie Goal feature should not be removed as in Table 1 from the Literature Review section, Yunwen Wang's study indicates the goal-setting feature was wanted by 72.4% of participants (Wang & Collins, 2020). Therefore, such a feature should still be incorporated in the final version of the app but it should be improved to appeal to more users. In Appendix 6 Table 2, user 8 mentioned "If there was an option to change the amount of weight you want to lose it would be helpful." The user was not happy that the Calorie Goal Calculator only had a weight loss goal only for losing 0.25kg per week and not other options such as 0.5kg. Implementing a variety of goals for weight loss could possibly increase the app's overall engagement.

To maximise user engagement further user feedback is needed for the information station as even if it did not get rated as low as the Calculate calorie feature it did not compare well against the tracking features as it only got an average rating of 6.9 out of 10 rating.The Interface/Design/Layout of WeightLess was given an average rating of 6.4 which can also indicate the engagement with the app could be held back by the interface/design and layout of the app.

Conclusion
After Receiving user Feedback, the draft app was somewhat successful in meeting the set objectives of creating an app with relevant features and is engaging. When analysing the feedback in Appendix 6.0 Table 2 it is evident that the app has a good level of engagement of 74%. It is important to consider that user preferences vary widely, making it challenging to create an app that is universally engaging to everyone. Hence, an engagement level of nearly 75% suggests that the app is effective at holding user retention. The engagement metric is particularly encouraging as higher engagement can correlate to more consistent usage of the app, which shows the app has good promise when tackling global obesity. Motivation is also a crucial factor in driving users to consistently engage with the app. Therefore, when considering the average 6.8 out of 10 motivational rating, it further shows the app's success in engaging users to use the app and pursue their weight loss journey. Considering both the engagement and motivational results when the app is fully complete it can be seen as a promising practical solution in combating the global problem of obesity and being overweight.

Future Work
For future work other than securing more detailed user feedback on the app's interface/design/layout and app features to improve the user engagement of the app Motivational features such as notification reminders mentioned in design requirement 7 were not met and should be implemented. The creation of user accounts and logging features were not included in the draft version of the app and would be implemented for a better user experience. Additionally, as mentioned before gamification features were not as desired as the other features, as in the Literature Review section table 1 shows only 63% of people wanted this feature in the study. Even with a low score, gamification was still wanted by more than half of the participants so, including such features could increment the engagement score of the app further. For example, if a user had consistently logged in their calories for 30 days, they would get an in-app achievement. The tracking features could be further improved as further analysing the user feedback it was mentioned: "If the calorie tracker was able to show the calorie goal and the remaining calories that can be had after logging in entries it would be more helpful". This shows how combining the result from the Calculate Goal Calorie feature with the Calorie tracker would make the tracking feature more effective in terms of ease of use which in turn would improve user engagement.

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All image used in the app are copyright free:

Freepik (2019). *Freepik - Free Graphic resources for everyone*. [online] Freepik. Available at: https://www.freepik.com/.

Figure 5 - *"Table 2. Comparing Mobile Fitness App Features between the Market (98 apps) and Users (n = 351)."* **From** *Yunwen Wang and William B.Collins study (Wang & Collins, 2020)*
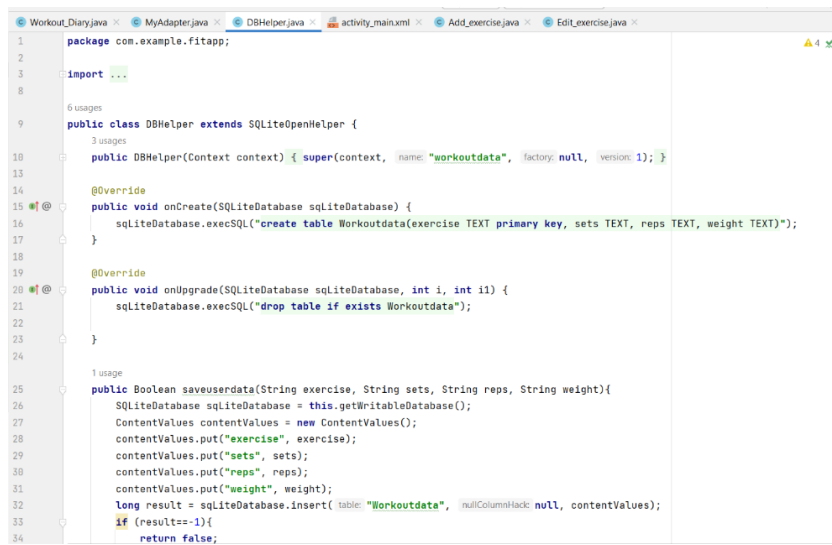
Features	Market % (n)	User % (n)	% Delta
Education	**71.4 % (70)**	**92.6 % (325)**	**21.2**
text tutorial	28.6 % (28)	22.2 % (78)	-6.4
photo tutorial	17.3 % (17)	31.9 % (112)	14.6
audio tutorial	21.4 % (21)	22.8 % (80)	1.4
video tutorial	52.0 % (51)	40.2 % (141)	-11.8
timing/interval guidance	25.5 % (25)	47.0 % (165)	21.5
real-time audio feedback	6.1 % (6)	27.9 % (98)	21.8
custom training	43.9 % (43)	55.3 % (194)	11.4
goal-setting	19.4 % (19)	72.4 % (254)	53
Tracking	**84.7 % (83)**	**96.6 % (339)**	**11.9**
users log data	27.6 % (27)	61.5 % (216)	33.9
app logs workout progress	69.4 % (68)	69.8 % (245)	0.4
sensor log data	55.1 % (54)	49.3 % (173)	-5.8
GPS based	17.3 % (17)	51.0 % (179)	33.7
Biometrics: Heart Rate	10.2 % (10)	64.7 % (227)	54.5
Biometrics: Weight	22.4 % (22)	69.5 % (244)	47.1
Biometrics: Calories	32.7 % (32)	76.4 % (268)	43.7
Social	**59.2 % (58)**	**37.6 % (132)**	**-21.6**
add friends	25.5 % (25)	20.5 % (72)	-5
community among app users	35.7 % (35)	22.2 % (78)	-13.5
social media sharing	36.7 % (36)	19.4 % (68)	-17.3
Gamification	**35.7 % (35)**	**63.0 % (221)**	**27.3**
badges and trophies	13.3 % (13)	35.6 % (125)	22.3
leaderboards	12.2 % (12)	21.1 % (74)	8.9
points and values	6.1 % (6)	35.0 % (123)	28.9
challenges and quests	25.5 % (25)	42.7 % (150)	17.2
role playing video game	4.1 % (4)	14.8 % (52)	10.7
Motivation	**38.8 % (38)**	**77.5 % (272)**	**38.7**
music	28.6 % (28)	52.7 % (185)	24.1
reminder/notification	8.2 % (8)	44.2 % (155)	36
motivational quotes	3.1 % (3)	23.4 % (82)	20.3
tips, advice	8.2 % (8)	32.8 % (115)	24.6
voice cheer, audio alert	6.1 % (6)	14.8 % (52)	8.7

Appendix 2.0 – imagines of WeightLess app from Android Studio

Figure 6 - WeightLess Home Page	**Figure 7** - Calorie Goal Calculator Page	**Figure 8** - Information Station Page
Figure 9 – Workout Tracker Page	**Figure 10** – Calorie Tracker Page	**Figure 11** – Add Exercise Page
Figure 12 – Edit Exercise Log Page	**Figure 13** – Total Nutrition	
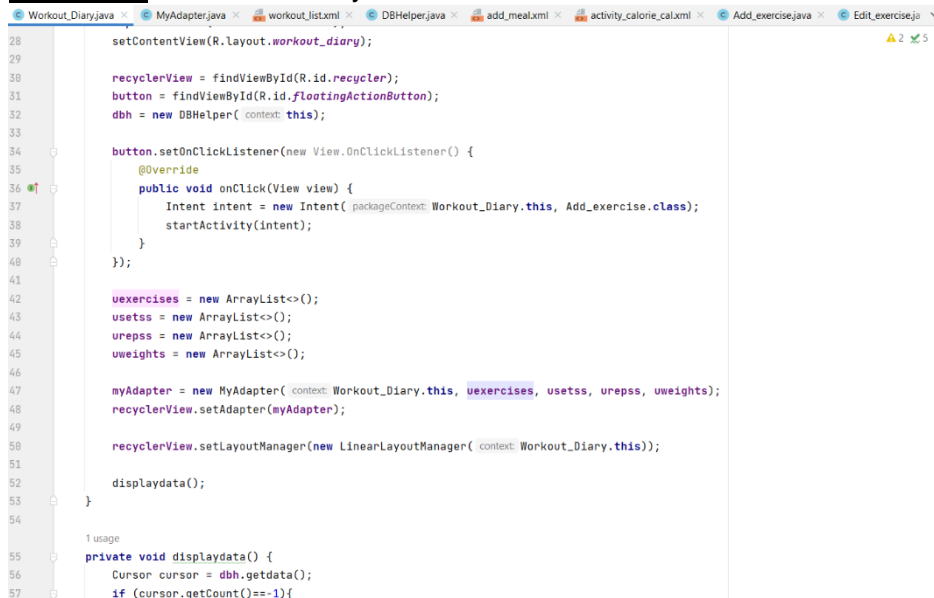
Appendix 3.0 – Images of code for WeightLess app from Android Studio

Figure 14 – DBHelper Class code
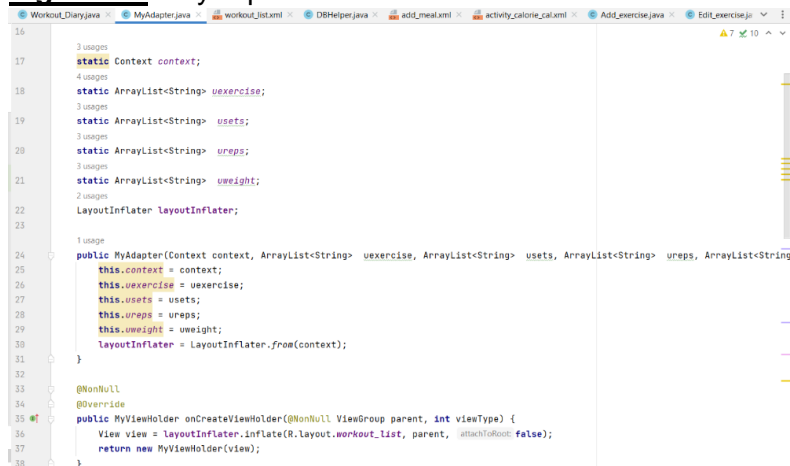
Figure 15 – Workout_Diary Class code

Figure 16 – MyAdpter Class code

Figure 17 – DBHelper updateuserdata method


```java
        contentValues.put("reps", reps);
        contentValues.put("weight", weight);
        long result = sqLiteDatabase.insert( table: "Workoutdata", nullColumnHack: null, contentValues);
        if (result==-1){
            return false;
        }
        else{
            return true;
        }
    }


    1 usage
    public Boolean updateuserdata(String exercise, String sets, String reps, String weight){
        SQLiteDatabase sqLiteDatabase = this.getWritableDatabase();
        ContentValues contentValues = new ContentValues();
        contentValues.put("sets", sets);
        contentValues.put("reps", reps);
        contentValues.put("weight", weight);
        Cursor cursor = sqLiteDatabase.rawQuery( sql: "select * from Workoutdata where exercise = ?", new String[] {exercise});
        if(cursor.getCount()>0) {
            long result = sqLiteDatabase.update( table: "Workoutdata", contentValues, whereClause: "exercise=?", new String[] {exercise});
            return result != -1;
        }
        else {
            return false;
        }
    }
```

Figure 18 – DBHelper deleteuserdata method


```java
        contentValues.put("weight", weight);
        Cursor cursor = sqLiteDatabase.rawQuery( sql: "select * from Workoutdata where exercise = ?", new String[] {exercise});
        if(cursor.getCount()>0) {
            long result = sqLiteDatabase.update( table: "Workoutdata", contentValues, whereClause: "exercise=?", new String[] {exercise});
            return result != -1;
        }
        else {
            return false;
        }
    }


    1 usage
    public Boolean deleteuserdata(String exercise){
        SQLiteDatabase sqLiteDatabase = this.getWritableDatabase();
        Cursor cursor = sqLiteDatabase.rawQuery( sql: "select * from Workoutdata where exercise = ?", new String[] {exercise});
        if(cursor.getCount()>0) {
            long result = sqLiteDatabase.delete( table: "Workoutdata", whereClause: "exercise=?", new String[] {exercise});
            return result != -1;
        }
        else {
            return false;
        }
    }


    1 usage
    public Cursor getdata(){
        SQLiteDatabase sqLiteDatabase = this.getWritableDatabase();
        Cursor cursor = sqLiteDatabase.rawQuery( sql: "select * from Workoutdata", selectionArgs: null);
        return cursor;
    }
}
```

Appendix 4.0 - App Testing and troubleshooting

Home Page

Action	Pass/Fail	Outcome
Tap the "Workout Tracker" Button	Pass	The "Workout Log" Page was opened when the button was pressed
Tap the "Calorie Tracker" Button	Pass	The "Meal Log" Page was opened when the button was pressed
Tap the "Information Station" Button	Pass	The "Information Station" Page was opened when the button was pressed
Tap the "Calculate Calories Goal" Button	Pass	The "Calorie Goal Calculator" Page was opened

Workout Tracker Page

Action	Pass/Fail	Outcome
Tap the green plus button to add Workout to log	Pass	"Add Exercise" Page was opened

Add Exercise Page

Action	Pass/Fail	Outcome
Try adding letters and numbers into the Exercise Name bar	Pass	The Exact typed exercise name is added and shown in the "Workout Log"
Leaving One of the bars empty	Pass	The notification "All Boxes must be filled to add Workout" pops up.
Trying typing letters in "sets, reps and weight"	**Fail**	The entry was added successfully to the "Workout Log" with the numbers, and no warning was given.

Calorie Tracker Page

Action	Pass/Fail	Outcome
Tap the green plus button to add Workout to log	Pass	"Add Meal" Page was opened
Tap the "Total Nutrition"	Pass	Opens "Total Nutrition" Page

Add Meal Page

Action	Pass/Fail	Outcome
Try adding numbers into the Meal Name bar	Pass	The Exact typed exercise name is added and shown in the "Meal Log"
Leaving One of the bars empty	Pass	The notification "All Boxes must be filled to add meal" pops up.
Trying typing letters in "Calories, Protein, Carbs and Fats"	**Fail**	The entry was added successfully to the "Meal Log" with the numbers, and no warning was given.

Information Station

Action	Pass/Fail	Outcome
Tap the "Workout Routine Button"	Pass	Google was opened
Tap the "How Weight is Lost" Button	Pass	Google was opened
Tap the "How to Incorporate Healthy Food Into Your Lifestyle" Button	Pass	Google was opened

Figure 19 – Code for the solution of the input error

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WeightLess App Questionnaire:

This Questionnaire is purely to get Feeback on the Draft Fitness App WeightLess; no personal information is necessary or required.

1) Out of 10 how would you rate the Interface/design/Layout of the app?

2) Out of 10 how would you rate the Features present on the app?

3) Which of these features did you like the most? (You can choose multiple)

Calorie Tracker	Workout Tracker	Information Station	Calculate Calorie Goal

4) Which of these features did you like the least?

Calorie Tracker	Workout Tracker	Information Station	Calculate Calorie Goal

5) Out of 10 how would you rate the Calorie Tracker on the app?

6) Out of 10 how would you rate the Workout Tracker on the app?

7) Out of 10 how would you rate the Information Station on the app?

8) Out of 10 how would you rate the Calculate Calorie Goal on the app?

9) Out of 10 how motivational do you find this app?

10) Out of 10 how engaging is the app to you?

Appendix 6.0 - User Feeback Results

Table 2 – User Feedback results

| User	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Feedback
#1	6	7	Workout Tracker	Calorie Tracker	5	8	7	6	7	7	-liked the design, it is welcoming. -might not work with older demographic. -Found manually putting in nutrition hard. -Would be better if target calories present with calories eaten showing remaining calories.
#2	6	8	Information Station	Calculate Calorie Goal	7	8	8	6	6	8	-The navigation was simple as each page can only be accessed via one path. -The layout was nice, but the astronaut pictures were not necessary.
#3	3	5	Calories tracker	Workout Tracker	6	4	5	5	5	5	-I find a workout tracker unnecessary as I feel like there is no need to use it. -The Calories tracker was useful as it can be tailored specifically for me making it more engaging. -The Design of the app would be better if the astronauts were not there.
#4	8	8	Calorie Tracker	Information Station	9	9	7	8	8	9	-I found the app more engaging as I had to enter the nutrients myself, motivating me to track my meals more.
#5	7	7	Calculate Calorie Goal	Information Station	8	7	7	8	8	8	
#6	8	6	Information Station	Calorie Tracker	5	6	8	7	7	7	-If the calorie tracker was able to show the

											calorie goal and the remaining calories that can be had after logging in entries, it would be more helpful.
#7	7	6	Workout Tracker	Information Station	8	8	7	7	6	8	
#8	8	8	Workout Tracker	Calculate Calorie Goal	7	8	7	6	9	9	-If there was an option to change the amount of weight you want to lose it would be helpful. (for Calculate Calorie Goal Feature)
#9	5	6	Calorie Tracker	Calculate Calorie Goal	7	6	6	4	6	6	-The Features are nice but the layout could be made a little cleaner and no need for the astronaut pictures
#10	6	6	Calorie Tracker	Calculate Calorie Goal	9	8	7	5	6	7	
Average:	6.4	6.7	Average:		7.1	7.2	6.9	6.2	6.8	7.4	

Graph 1 – Average Rating out of 10 for each feature

Average Rating Out Of 10 For Each Feature

Graph 2 – Mosted Liked Feature
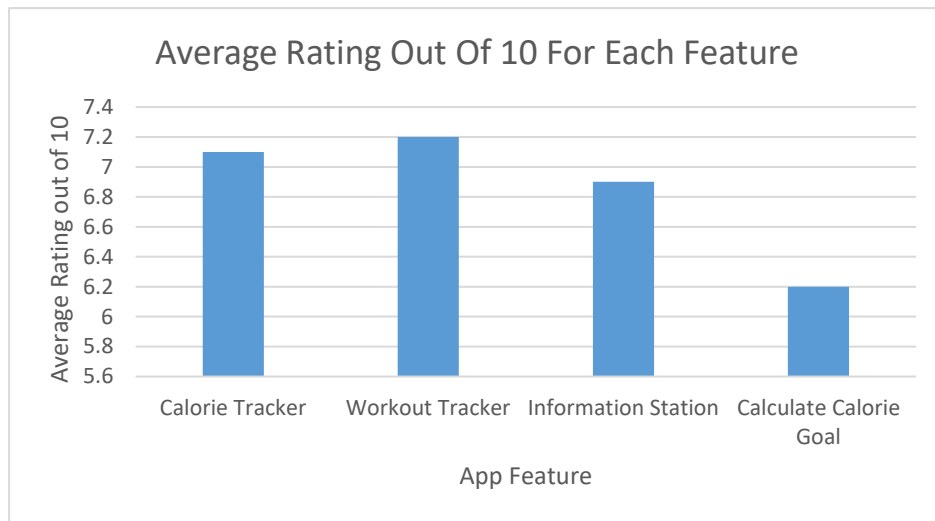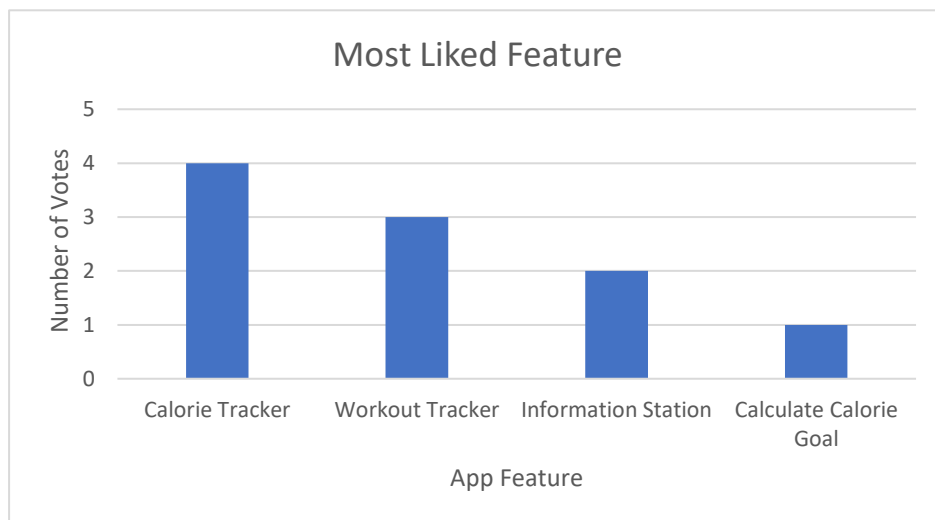
Most Liked Feature

*Graph 3 – Least Liked Feature*

Least Liked Feature
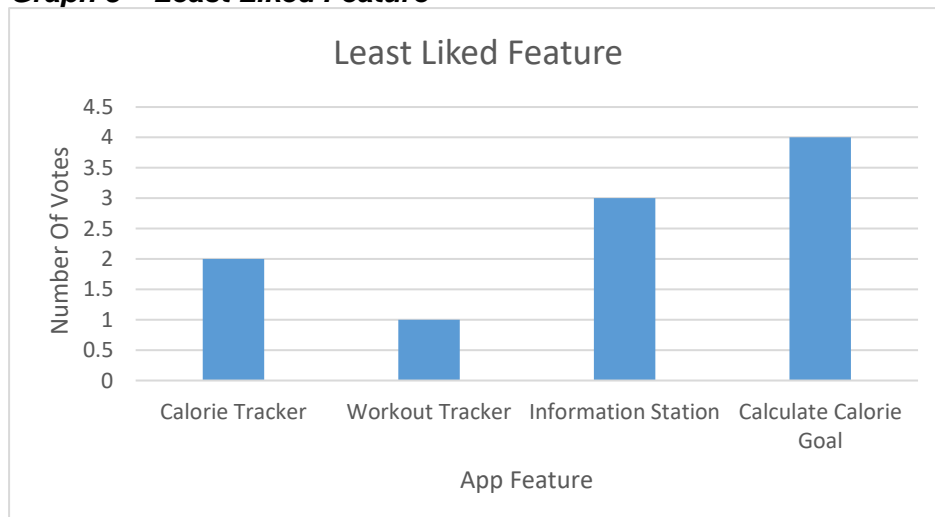
Appendix 8.0 – Screen flow diagram:
Figure 4 - Screen flow diagram of app
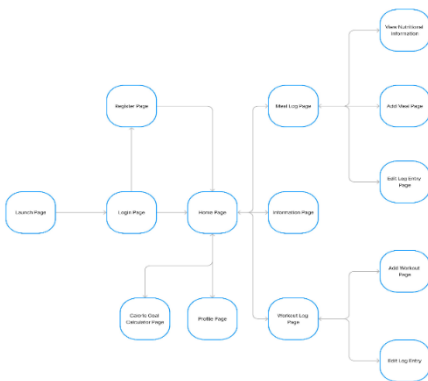
Appendix 9.0 – Screen shot of the SQLite Database being implemented on android studios for WeightLess

Figure 5 – screen shot of DBHelper class from android studios for the Weightless app.

Appendix 10.0 – Use case Scenarios

Use Case Scenario	Registering
Actor	Non-Member
Pre-Condition	Have a stable connection to the internet
Path	1. Non-Member opens app. 2. App shows login page with option to register. 3. Non-member clicks to register. 4. Register page opens. 5. Non-member enters details. 6. Non-Member fills in details. 7. Non-Member becomes Member and is taken to Home Page
Post Condition	Non-Member becomes Member and is on Home Page
Alternate Path	

Use Case Scenario	Logging Calories
Actor	Member
Pre-Condition	Member is at Home Page
Path	1. Member clicks on Calorie Tracker Button. 2. Calorie Tracker page opens. 3. Member clicks on add Calorie button. 4. Add Calorie Page opens. 5. Member adds Meal/entry information. 6. Member clicks submit and Entry Accepted.
Post Condition	Entry is Displayed on Calorie Tracker Page
Alternate Path	5a member add letters to numerical input boxes

Use Case Scenario	Editing Calorie Tracker Log
Actor	Member
Pre-Condition	Existing entries in Calorie Tracker
Path	1. Member clicks on entry in Calorie Tracker. 2. Member is taken to Edit/Delete Entry Page. 3. Member edits values in entry and Member clicks submit. 4. New values of entry are updated in Calorie Tracker.
Post Condition	Updated Information is now displayed on Calorie Tracker Page
Alternate Path	3a member add letters to numerical input boxes

Use Case Scenario	Deleting Calories Tracker Log
Actor	Member
Pre-Condition	Existing entries in Calorie Tracker
Path	1. Member clicks on entry in Calorie Tracker. 2. Member is taken to Edit/Delete Entry Page. 3. Member clicks delete entry button. 4. Entry is removed from the Calorie Tracker.
Post Condition	The Entry does not appear on the Calorie Tracker Page
Alternate Path	

Use Case Scenario	Logging Workout
Actor	Member
Pre-Condition	Member is at Home Page
Path	1. Member clicks on Workout Tracker Button. 2. Workout Tracker page opens. 3. Member clicks on add Workout button. 4. Add Workout Page opens. 5. Member adds Exercise/entry information. 6. Member clicks submit and Entry Accepted.
Post Condition	Entry is Displayed on Workout Tracker Page
Alternate Path	5a member add letters to numerical input boxes

Use Case Scenario	Editing Workout Entry
Actor	Member
Pre-Condition	Existing entries in Workout Tracker
Path	1. Member clicks on entry in Workout Tracker. 2. Member is taken to Edit/Delete Entry Page. 3. Member edits values in entry and Member clicks submit. 4. New values of entry are updated in Workout Tracker.
Post Condition	Updated Information is now displayed on Workout Tracker Page
Alternate Path	3a member add letters to numerical input boxes

Use Case Scenario	Deleting Workout Entry
Actor	Member
Pre-Condition	Existing entries in Workout Tracker
Path	1. Member clicks on entry in Workout Tracker. 2. Member is taken to Edit/Delete Entry Page. 3. Member clicks delete entry button. 4. Entry is removed from the Workout Tracker.
Post Condition	The Entry does not appear on the Workout Tracker Page
Alternate Path	

Use Case Scenario	View Target Calorie Goal
Actor	Member
Pre-Condition	Member is at Home Page
Path	1. Member clicks on Target Calorie Goal. 2. Target Calorie Goal page opens. 3. Member enters details and submits information. 4. Target Calories are calculated and displayed to Member.
Post Condition	Member is shown the Target Calories
Alternate Path	3a member add letters to numerical input boxes

Use Case Scenario	Find Weight Loss Information
Actor	Member
Pre-Condition	Member is at Home Page
Path	1. Member clicks on Information page. 2. Information page opens. 3. Member can view Weight Loss Information
Post Condition	Weight Loss information is displayed to User
Alternate Path	

MSc Project - Reflective Essay

Project Title:	WeightLess: A Fitness App to Tackle Global Obesity
Student Name:	Gajan Kanagenthiran
Student Number:	190282527
Supervisor Name:	Marcus Pearce
Programme of Study:	Computing And Information Systems MSc

Analysis of strengths/weaknesses and Work that I would have conducted if you had more time.

Having completed the research paper, The WeightLess Draft app was completed successfully. The app offers many of the features mentioned in the literature review that many participants desired being the Calorie Tracker, Workout Tracker Calorie Goal Calculator that is tailored specifically to the user and their physical attributes. Furthermore, the draft app addresses the scarcity or over-complication of weight loss-specific educational content within existing fitness apps on the market through the Information Station feature. When the app is fully developed, this feature will deliver precise and up-to-date information specifically tailored for weight loss, enhancing the app's educational aspects. Overall, the app was implemented successfully and achieved the main objective of the project which was to maximize engagement with the app as from feedback it got an average engagement score of 7.4 out of 10. Demonstrating that when the app is fully complete it will have very good potential in tackling the global crisis of obesity and the amount of overweight people worldwide.

The project did have its downsides, one of which was that both tracking features implemented were basic as they only allowed the tracking of one day. This means that the next day if a user wants to track their calories or workouts, they will have to delete their old entries from the previous day. If there was more time, more large-scale trackers would have been implemented, where users can enter calories/workouts for each day of the year and be able to see entries they have made on a different day.

The Calorie Goal Calculator is a good feature, however, there was no option to save the value obtained from the calculator. Additionally, user feedback mentioned that being able to see the calorie goal in the calorie tracker and seeing how many calories are remaining after entering a new entry would be more useful which could have been implemented if more time was available.

The Layout and navigation of the app were average but, can be more efficient as currently, users would have to always return to the home page after using one feature to access another. To make this more effective a navigation bar can be on the bottom or side of the screen allowing users to jump straight from one feature to another in the app. This reduces the effort required by users to track their workouts and meals improving the usability of the app thus resulting in better engagement.

Another drawback of the project was the user feedback was not enough as only 10 people were asked to do the survey and much more participants were needed to get a more reliable scope of how effective and engaging the app would be on a global scale. To get more streamlined feedback, focus groups could have also been used to get more detailed and descriptive feedback on the app.

The draft app was planned to have a user account option, where users had to register and make an account for the app. As mentioned in the research paper this feature would

be implemented using a remote database. Having individual user accounts ensures user authentication to a higher degree. This is gone in more detail into the Legal, Social Ethical Issues and Sustainability Issues and Implementation section. Furthermore, the draft should have included a consent page where users agree for their data to be stored as the data, they enter the trackers is stored and displayed back to them. Both elements, however, could not be implemented within the given time.

Presentation of possibilities for further work

Currently, the app can only run on Android devices therefore in the future it would be crucial that it can also be used on IOS to improve the availability of the app. Meaning the app would have to use Xcode which is Apple's integrated development environment (Ekren, 2022). If the app is only on Android devices, users without such a device would be discouraged from using the app.

To maximise the potential that the Calorie Tracker has, there could be a nutritional database with popular meals that have their nutritional information preloaded on the database. This database could then be accessed by users allowing them to automatically add those meals to their diaries reducing the effort required to track calories.

Furthermore, if an algorithm was used in the app, it could suggest meals or workouts to the users based on the previous entries they have made. The algorithm would work by taking in the user's input and learning about the user's preferences analysing and recommending types of meals based on that. For example, if the user keeps entering vegetarian meals, the algorithm can suggest vegetarian meals that the user can try. However, Data protection would need to be considered to ensure that user data is secure.

As mentioned in the user testing and results section of the research paper the inclusion of gamification elements could improve engagement (Dakić, 2019). For example, having achievements for users meeting their calorie goal or consistently logging in their meals and workouts may increase engagement with the app as it helps users feel a sense of achievement (Dakić, 2019).

Critical analysis of the relationship between theory and practical work produced.

The practical work produced uses a lot of the theory mentioned in the literature review. The layout of the app strictly followed Babich's principles where each page should only have one primary function on it. (Babich, 2020).

The draft app included all the vital features mentioned in the **study "Effectiveness of Mobile Apps in Promoting Healthy Behaviour Changes and Preventing Obesity in Children: Systematic Review"** (Yau et al., 2022) and **"Systematic evaluation of Mobile Fitness Apps: Apps as the tutor, recorder, game companion, and cheerleader, Telematics and Informatics."** (Wang & Collins, 2020). These features are a Calorie Tracker, Workout Tracker, and Calorie Goal Calculator. However, in the study done by Yau, K.W. *et al.* (Yau et al., 2022) gamification features were mentioned. Even so, such a feature was left out as the study done by Yunwen Wang and William B. Collins (Wang & Collins, 2020) had shown it to be a less desired feature by the participants that took part in the study.

As mentioned in the introduction of the research paper, too much information about weight loss and fitness is being circulated, intimidating people from starting their fitness journey. The research and analysis done with the existing solutions showed how many fitness apps either failed to showcase specific information about weight loss or had too

much fitness information. Both these findings resulted in the information station feature being included in the practical work.

The theory was mainly used to boost user engagement within the fitness app. After conducting user testing the results showed a promising sign as the engagement of the app had an average 7.4 out of 10 rating displaying how the theory was mostly accurate when trying to engage as many users as possible.

<u>Legal, Social Ethical Issues and Sustainability issues and implementation</u>

The General Data Protection Regulation (GDPR) has an impact on the current features of the draft app, particularly the Workout, Calorie Tracker, and Calculate Calorie Goal as they involve collecting and processing user-generated data related to meals, exercise routines and personal biometric information. To ensure compliance with the GDPR data protection and user privacy must be prioritised. This involves obtaining clear consent from users before collecting their personal data while ensuring robust data security measures are in place to safeguard this sensitive information. Such a measure could be a data loss prevention tool (DLP Tool), which adds an extra layer of security as it restricts personal data from being taken outside the network (Gruenberg, 2018). Furthermore, encrypting the database on the databases would also need to be done for GDPR compliance. This is because even if the database is breached and data is taken, it would be in an unreadable format and would require a decryption key to decipher it.

When considering the future work to be done such as account creation, to enhance user authentication, the process of account creation and the data protection of usernames and passwords must be secure. For a user to establish a secure connection it would be done by HyperText Transfer Protocol Secure (HTTPS) to create an account. To ensure the usernames and passwords are stored safely, before storing them they should be ran through a strong cryptographic hashing algorithm. This ensures if the passwords are stolen, they cannot be obtained as they would also require the algorithm to decipher them.

The inclusion of an algorithm that recommends meals or exercises to users would be developed further, however, data protection must be considered. Firstly, users must consent to their data being taken and a privacy policy should be displayed showing how the users' data will be used. Then the protection of the data must be considered. For this, robust security measures such as data encryption in both transit and at rest should be implemented.

The consideration of social and ethical issues must be kept in mind before publishing the app. Users' well-being and mental health must be prioritised. This means making sure the app does not show or support unhealthy body images or extreme weight loss methods that could hurt users. The app does succeed somewhat in this as it does not show any images of bodies whatsoever and only uses cartoon images that do not resemble any realistic unhealthy body images.

Furthermore, the app also only has a calorie goal target does not promote as it only includes a calorie deficit of 300 calories for the calorie goal which is safe.

The information station is a useful tool but to ensure it does not display any unhealthy weight loss methods it should be checked and regulated often to see if any information present only shows relevant and up-to-date information about healthy and sustainable weight loss. This also applies if an algorithm or nutritional database is used for future work as these features must only recommend safe, healthy, and sustainable options.

The app does focus on beginners who are new to fitness however, the same methods can essentially be applied to any fitness level. This is because Weight Less needs to be inclusive meaning the app should work well for people with backgrounds, body types and

fitness levels. The design requirements also helped people with difficulty seeing using the app due to the contrast ratio and button sizes being eligible. One issue the app does not highlight is the information provided does not hold more precedence than medical advice given by a professional. This would also need to be clear when users consent to use the app.

Closing Remarks

The Computing and Information Systems MSc focused heavily on teaching Python and SQL. However, for this project to be completed it also required the use of Android Studios, Java, and XML which I had had zero experience with before starting this project it was intimidating. Nonetheless, I was determined to produce a draft app d as I know how useful these programming languages are and how they apply to different fields. Having no experience, I tried different coding camps and beginner guides to improve my knowledge.

Overall, I am pleased with how the practical part of the project has turned out, as it functions to how I wanted it to be. However, there is still a lot of work that still needs to be done to improve the app features. This can only be achieved through further knowledge of the programming language.

Researching further into the problem area has not only educated me about how severe and widespread obesity is but even if such a problem and its effects are known how tough it can be to counteract such negative health effects.

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