GymBuddy- A Fitness Application

UNIVERSITY OF
LINCOLN

Iyinoluwa Ifedapo Zoe Sobowale
SOB19703584

19703584@students.lincoln.ac.uk

School of Computer Science

College of Science

University of Lincoln

Submitted in partial fulfilment of the requirements for the
Degree of BSc (Hons) Computer Science

Supervisor: Mr Francesco Del Duchetto

May 2023

Abstract

The speed with which technology has been incorporated into the fitness sector has completely changed how people approach their training regimens. In this project, we introduce GymBuddy, a comprehensive fitness software that makes use of the user's equipment to improve training experiences. By offering individualised training programmes, exercise demonstrations, and progress monitoring, GymBuddy enables consumers to tailor their fitness routines to their unique equipment inventory.

The GymBuddy app is made to suit a variety of people, including novices and experienced athletes, who have access to varied degrees of equipment. The app helps users minimise any disappointments that may result from inaccessible workouts or equipment constraints by letting them input their available equipment. This guarantees that each workout plan is in line with the users' resources.

The development of GymBuddy involved extensive research to ensure its effectiveness and usability. In the initial stages, a thorough analysis of existing fitness apps and market trends was conducted to identify gaps and opportunities. This research provided valuable insights into user preferences, popular features, and the challenges faced by individuals with different equipment resources.

GymBuddy also provides tools for tracking progress, allowing users to keep track of their past workouts, create objectives, and measure their successes over time.

Table of Contents

Chapter 1

1.1 Introduction

One of the essential elements of maintaining good health is exercise. When first joining a gym, the majority of individuals struggle to know which exercises to perform. Some people hire a personal trainer who will direct them through particular exercises to help them reach their fitness and physical appearance objectives. Many gym goers, however, may not be able to afford this due to the hefty expense of a personal trainer on top of the gym membership fee.[1]With the introduction of mobile fitness apps, it has made making and maintain good health practices such as exercising and a proper diet more accessible[2].

There are an array of fitness and health apps that are available on Android and IOS systems with specialised features that appeal to people at different stages of their fitness journey. They can range from paid applications with memberships to free apps that give a basic level of aid. An issue of note is that even though having the app can make exercising more comfortable it does not give the exact result as a personal trainer as the app is unable to guide on technique as that is a visual aspect as well as the app cannot tell if the workout is too hard for the user's current skill level[3]. Some of these applications have a multitude of features that cater to the

[1] Moller et al. (2012)
[2] Lee et al. (2018)
[3] Metcalfe (2022)

different needs of the user. Having experienced some of these apps, here are some features that would increase the usability functionality for all users, some especially beginners at the gym.

Some of these features are the ability to input the equipment available to the user, as gyms are not standardised in the equipment they provide, meaning that the exercises recommended by the currently available apps either underutilise what is available or suggest what is not. Another feature that would aid in the familiarity with routines and gyms is a visual demonstration of the exercises set. Many beginners tend to drop out due to the lack of knowledge on how some equipment works and how to perform specific activities.

These are the features I plan to include in my mobile fitness application. As an occasional gym goer having an application like this would aid in my consistency and independence.

1.2 Referencing

This Project Report will be referenced using the Harvard Referencing Style.

Chapter 2

2.1 Literature Review

The rising popularity of smartphones and wearable devices has resulted in a considerable growth in demand for fitness applications in recent years. These help to promote healthier lifestyles compared to other apps on the market. (West et al.,

2012) These applications have shown to be great tools for gym-goers to measure their progress, establish objectives, and obtain personalised training regimens. The purpose of this literature study is to look at the existing research and literature on designing a fitness app particularly for gym goers.

Effectiveness of fitness apps

Fitness applications have grown in popularity in recent years as a way to promote physical exercise and healthy living. These applications can give users a variety of functions such as fitness monitoring, dietary counselling, and social support.

Convenience

The convenience of exercise apps is one of the main benefits of using them. Exercise apps enable users to work out at any time they want without needing to travel to the gym or pay a personal trainer. This makes it simpler for users to include exercise in their daily habits, which may lead to healthier lifestyle choices. “Exercise app users are more likely to exercise during their leisure time, compared to those who do not use exercise apps, essentially fulfilling the role that many of these apps were designed to accomplish.” (Litman et al., 2015) This quote confirms that exercise apps help those who want to exercise fill that time effectively and make it more of a purposeful habit compared to those who don't use exercise apps.

Behaviour change

Fitness applications have the ability to help behaviour change and enhance exercise programme adherence. Several studies have found that app elements such as goal setting, reminders, social support, and progress monitoring are important in supporting behaviour change. For example, Higgins (2016) states “Apps that incorporate evidence-based behavior change techniques are more likely to be

effective". Higgins has deciphered that having a goal setting element added to the fitness app that can keep the user accountable can be more effective in helping them to continue using the app and subsequently exercising. Also, Schoeppe et al. (2016) found that fitness apps with self-monitoring and goal-setting tools had a beneficial influence on behaviour modification and long-term adherence.

Conclusion

The evidence shows that fitness applications can be beneficial in increasing physical activity, enhancing fitness results, and facilitating behaviour change. Goal setting, self-monitoring, social support, and gamification may all improve user engagement and motivation. However, resolving issues with accuracy, personalisation, and long-term efficacy is critical for maximising the potential influence of fitness applications on individuals' health and well-being. Future study should concentrate on long-term adherence, sustainability, and the effectiveness of app-based therapies in varied groups.

User Experience (UX)

The whole experience that a person gets when interacting with a product or service is referred to as user experience (UX). In the context of fitness applications, user experience (UX) is critical to app success.

Usability

The necessity of usability is amplified in the case of fitness applications. Users frequently utilise these applications to keep them motivated and on track with their fitness objectives. Users may rapidly lose interest and quit an app if it is difficult to use or complicated, defeating the point of using it in the first place. "'Most participants indicated several times during the interview that ease of use was the

most important app characteristic. They reported that if an app was not easy to use, then it would simply be replaced with one that was from the other existing apps readily available." (Gowin et al.,2015, p.228) This quote shows the significance of usability in the participants' views. It indicates that individuals prefer applications that are easy to use and navigate.

If an app is challenging, participants said they would switch to another one. This underscores the importance of app developers prioritising the user experience and making their products simple to use. This increases the app's chances of being accepted and utilised by its intended audience. This links to the third objective listed below, which mentions organising the workout to make it easier for the user to find them in their specific categories. This is also why it is important to test the application before deploying it. The user testing will ensure that not only is the usability good, but the features are helpful.

Personalisation

UX is improved by tailoring the app experience to the specific user demands and preferences. Adaptive goal setting, customised suggestions, and individualised feedback have been demonstrated to boost user engagement, adherence, and long-term app usage (Silva et al., 2020). Fitness applications with personalised UX frequently give users with real-time feedback on their workout performance. This feedback may include parameters such as heart rate, calories burnt, or modifications to workout technique. According to research, real-time feedback improves user engagement, self-awareness, and motivation, resulting in greater performance. (Voth, Oelke and Jung, 2016)

Conclusion

Finally, customization has a big influence on the UX of fitness applications by personalising exercise routines, goal setting, content, suggestions, feedback, and social interactions to individual users. This customisation boosts motivation, engagement, and overall happiness, resulting in increased adherence and better outcomes.

Lack of Equipment

Limited access to gym equipment for a specific type of workout can lead to a gym dropout. Many gyms don't have the space and /or the money to be able to provide a large range of equipment. This is highlighted in this quote. "Working out usually requires both time and money. People with high income have more spare time to work out and can also afford high gym prices." (Chen et al.,2018, p.50). Therefore, to ensure that everyone can achieve their fitness goals regardless of their budget, the application will have different exercises that coincide with the available equipment.

They will be able to input what they have available and exercise plans with that equipment will be shown to them. "The number of people who take up strength training activities is much less than the number of people who take up aerobic training since aerobic training has lower requirements on venue, equipment, cost, time, and so on." (Chen et al.,2018, p.51). As stated in the fourth objective, different workout plans will be available to the user so that, hopefully, they can still participate in strength training with their available equipment.

2.2 Aims & Objectives

Aims

To create a fitness mobile application that allows users to input available equipment. To configure workout plans with the stated equipment whilst giving access to a visual demonstration of how to use the equipment and perform the workouts.

Objectives

There has been a slight revision of the objectives compared to the ones stated in the project proposal and the interim report. One of the objectives that stated, “Create a database of exercise equipment and workouts that utilise said equipment” was removed as during development a more effective solution was found and used. Also, the workout plans will not be organised by difficulty as I am not a professional trainer and cannot appropriately categories the difficulty of the exercises.

- Evaluate three different fitness applications on the market and consider what features are necessary for a successful fitness application and can be adapted into our application.
- Organise the gathered workouts into specific categories such as equipment necessary, body parts and targeted muscles.
- Make ten workout plans of varied targeted muscle groups based on the users' available equipment.
- Collect video and or animated tutorials for most equipment and workout option available in the application.
- Research the most appropriate platform for mobile application development to create the application initially.
- Recruit users to test the functionality and usability of the application.

Chapter 3

3.1 Requirements Analysis

These requirements will be helpful in the effective development and deployment of the fitness mobile application, allowing users to enter available equipment, configure training regimens, and provide visual examples, among other things sated in the above aims and objectives.

1. Profile Management
    - The application should allow users to manage their profiles, including personal information, fitness goals and preferences.
    - The application shouldn’t have an account creation feature in accordance with the preferences specified by the possible users.
2. Equipment Input and Management
    - Users should have the ability to input and manage their available fitness equipment.
    - The equipment management feature should allow users to add, edit, and delete equipment from their inventory.
    - The application should have a range of fitness equipment including cardio machines, weights etc.
3. Workout Plan Configuration
    - The application should provide personalised workouts based on their available equipment.
    - The application should provide various workout plans that range in targeted muscle groups.
4. Visual Demonstrations

- The mobile application should provide visual demonstrations for each exercise or workout included in the workout plan.
- The visual demonstrations should be easy to understand and accessible for users of all fitness levels.

5. Exercise Tracking and Progress Monitoring
    - The application should allow users to track their exercises, sets, repetitions during each workout session.
6. Cross-Platform Compatibility:
    - The mobile application should be compatible with major mobile platforms, such as iOS and Android, to ensure a wider user base and reach.
7. Performance and Scalability:
    - The application should be responsive and provide a smooth user experience, even during peak usage times.
    - The system should be scalable to accommodate an increasing number of users and handle concurrent requests without significant performance degradation.

Chapter 4

4.1 Design & Methodology

Project plan

When making a fitness application it is important to make a plan that ensure the development goes smoothly. At the start of the project the plan was made and organised in the form of a Gantt Chart.

A Gantt Chart is the best way to manage the project as it gives a visual representation of the project schedule, making it easy to understand and track the timeline of tasks and their dependencies.[4] It allows me to see the project at a glance and identify potential bottlenecks or delays. It also allows me to track my time management over the course of the project. As shown in Figure 1, where the progress of the project is documented as of February compared to the end of the project shown in Figure 2

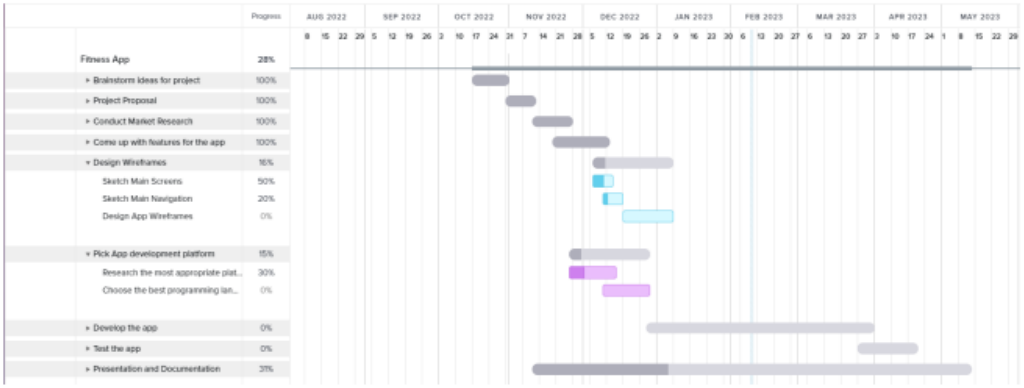

Fig 1 - Gantt Chart as of Early February

[4] Wilson (2003)

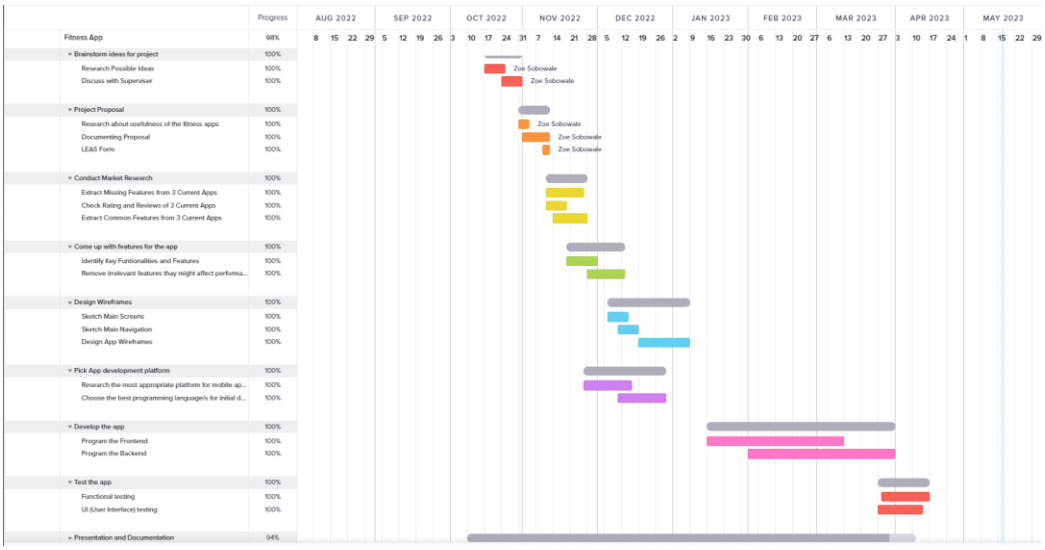

Fig 2 – Gantt Chart as of Early May

The Gantt Chart shows the individual tasks I would need to complete for the project. Here are the tasks laid out and why they are necessary as well as any additional tasks that I performed that went listed on the Gantt chart.

Brainstorm ideas for projects: This section has been split into two subsections saying research possible ideas and discuss with supervisor. This is one of the first things that is required of any project, making sure that the ideas that I had for the project were suitable enough to be able to get high marks.

Project proposal: this section is split up into three sub sections saying research about usefulness of fitness apps, documenting proposal, and the LEAS form. Often a siding on making a fitness app it's important to be able to understand the target market for a product like this and this was documented in my project proposal as well as the essential paperwork needed to continue with the project.

Conduct market research: this section has been split up into three subsections saying extract missing features, check ratings and reviews, and extract common features

from three current apps. When making a product is important to know about the existing products currently available on the market by doing this research, I am ensuring That my app has the key features needed to make it successful.

That's part of the market research I realised that it was important to get the feedback from past and current users popular apps and what features they may like to see which required me to fill out another form and make a questionnaire, but the information gathered from this was quite valuable.

Come Up with features for the app: this section has been split up into two sections saying identify key functionality and features and remove features that might affect performance. After doing the prior research here is where the decision on what features will be included in the app and what features aren't needed.

Pick app development platform: This section has two subsections sing research the most appropriate platform for mobile applications and choose the best programming language/s for initial development. As I will be making the fitness app it's important to know the best platform to use both for my own current skill level as well as what is currently being used in the industry.

Test the app: this section has two subsections same functionality testing and UI (User Interface) Testing. After making an app it's important to see how it functions as stated and the literature review the usability of the app is very important to maintain the main functionality.

Presenting and talking and reworking and Finalising: These sections are about documenting the process of making the app and all the things listed above.

Risk Analysis

Risk	Likelihood	Impact	Solution
Lack of participants	High	Unable to evaluate the application efficiently	As the target market is not minimal, being able to find participants will be easier as well as starting testing earlier will be able to make
Lack of video and or animated tutorials for the equipment	Low	Not being able to represent the equipment and having the user must go elsewhere to understand the workouts minimising the utility of the application	There are plenty of online resources to help understand the gym and workouts. If a specific exercise is not covered online that we can import, we can create one.
The workouts are not being categorised properly	Medium	As I am not a personal trainer or specialised in gym workouts and their difficulty, the exercises may be categorised wrong and cause users to either overexert or underachieve during their workout	as stated previously, as I am not a professional, I will be relying on online resources already labelled for my categories and understanding that levels are subjective to the user.
Workout not suitable for the user	High	As workouts are subjective, something stated as a beginner may be too hard for some and vice versa and may cause frustration for the user	ensuring that a safety warning is agreed upon when the user signs up for the App stating that they exercise within their strength to ensure they do not sustain any injuries and the exercises can be adapted for comfortability
Poor UX/UI Integration	Medium	Users not being able to use the App	by doing proper research and planning out my UI with sketches and

		efficiently due to the messy UI	wireframes, and ensuring that they can be implemented in the programming language/s
Issues with Privacy Concerns	Low	Users may not trust the App and not want to use it or input any information into the application	It is not a vital feature of the application to have the user input a large amount of personal information. The security of the information given will be prioritised
App format not available to the tester	Medium	This will make the testing process more complicated and minimise the test group	During my research on the app development platform and the programming language I will use the ability to share it easily will be one of the keep aspects of my decision.
The App does not have all the features due to time management issues	Low	not being able to offer all the main features that I have stated will minimises his ability and cause frustration amongst the users	when planning ensuring that there is enough time to do this set up on aims and objectives whiskey as well as ensuring that my aims were achievable the there are other things, I want to include in the application focusing on these main two will ensure the app is completed

Table 1 - Risk Assessment of the Project

4.2 Software development projects

Software development methodology

“The waterfall methodology uses a sequential or linear approach to software development. The project is broken down into a sequence of tasks, with the highest-level grouping referred to as phases.” (Sherman, 2015).

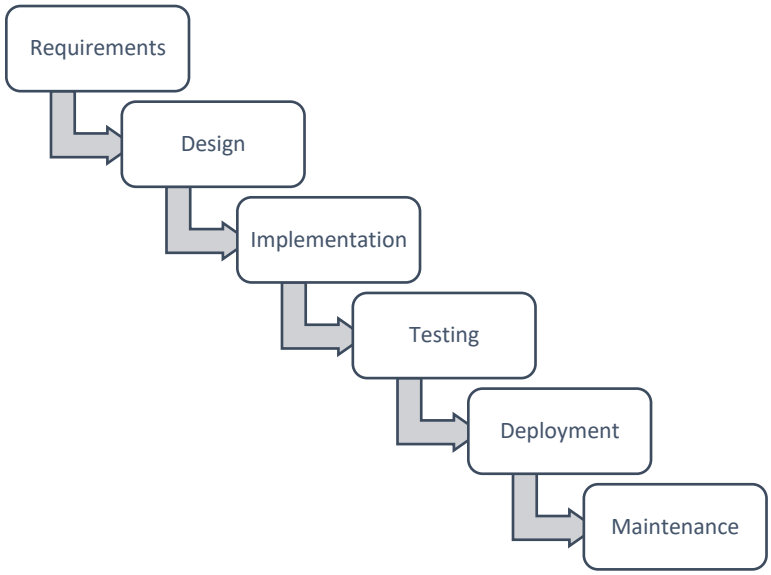

Fig 3 – Waterfall Model

Waterfall methodology was the chosen methodology for GymBuddy because the initial requirements collecting step helps in defining and documenting the project's needs in detail. Additionally, the chronological structure makes it very simple to manage and track development. Each phase has a distinct beginning and ending point, making it easier to assign resources, predict deadlines, and track project milestones which goes in line with the project plan set out in the gantt chart above (Fig 2)

However, outside of the project a more suitable methodology for creating a fitness app would be Agile methodology. This is because Agile methodologies emphasise

iterative development, which allows you to deliver viable versions of the programme in frequent increments. This allows you to receive user input early on and make improvements based on real-world usage, ensuring that the app corresponds with user needs and expectations.

Toolsets and machine environments

When making an application the software and programming language is very important as this will affect the style of the application as well as how simple it is to amend any features as mobile application are always being updated to improve the user experience.

Mobile applications can be developed using different approaches, each with various advantages and disadvantages. Here are three common ways to create mobile applications:

Native Mobile Apps: “Native applications run on a device's operating system and are required to be adapted for different devices.” (Joorabchi, Mesbah and Kruchten, 2013). Native apps function directly on hardware. They can therefore provide high performance, high levels of security, and cutting-edge features that are "native" to the particular operating system. This implies improved performance and maybe fewer issues to solve. For different types of mobile apps, the following are some of the codebases that are most frequently used across the main two operating systems:

- iOS: Programming languages include Swift, Python, and Objective-C
- Android: Programming languages include Kotlin and Java

Cross-Platform Apps: Cross-platform applications use a single codebase to function across many mobile operating systems, such as iOS and Android. This strategy saves time and effort by allowing developers to create code once and publish it

across several platforms. The development of cross-platform apps is possible because to frameworks like React Native, Flutter, and Xamarin. These frameworks provide as a link between the code and native components, enabling programmes to use device features. While cross-platform apps allow for code reuse, they do not always provide the same level of performance and user experience as native apps. React Native, being the more favourable choice, uses a JavaScript library.

Web mobile apps: Web apps are programmes that may be used on a mobile device's web browser. Typically, they are created using web technologies like HTML, CSS, and JavaScript. Web apps may be made to be responsive and adjust to various screen sizes, giving users a consistent experience on all platforms. Web applications may be accessed directly through a URL, unlike native or cross-platform apps, which must be downloaded from an app store. Web apps could not offer the same degree of performance as native apps and may only have restricted access to device functionalities.

Hybrid apps: Native and web app components are combined in hybrid applications. They are created using web-based tools like HTML, CSS, and JavaScript and are then encased in a native shell to enable installation and use much like a native app. Similar to cross-platform programmes, this method has the benefit of reusability of code across several platforms. The creation of hybrid apps is made possible by frameworks like Ionic and Apache Cordova (formerly PhoneGap). In contrast to completely native apps, hybrid apps could be constrained in terms of performance and access to device functionalities.

Each strategy has advantages and disadvantages, and the best option will rely on a variety of elements, including the app's needs, target audience, development resources, and performance concerns. The first thing to be considered is which mobile operating system the app would be developed for first.

In terms of making GymBuddy, the chosen method is cross-platform development, and the framework is React Native. This is because JavaScript is one of my preferred languages and reactive native mainly uses JavaScript as well as some CSS aspects. Also react native also allow the app to function on multiple devices.

A code editor will also be used, such as Visual Studio Code to write and edit your React Native code. Node.js and npm (Node Package Manager) are essential for me to manage dependencies and install necessary libraries and packages. Npm is a package manager that comes with Node.js, a JavaScript runtime that enables you to execute JavaScript on the server-side.

During the deployment process, it was discovered that using an API (Application Programming Interfaces) for the exercise database would be beneficial compared to the initial plan of making the database from scratch using SQL. The use of APIs is very common in the mobile and web development industry as they enable integration, reusability, flexibility, collaboration, scalability, innovation, and platform independence.

Design

Making a prototype for your app is crucial since it aids in conceptualization, feedback gathering, defect identification, cost reduction, streamlined communication, and stakeholder attraction. It vastly increases the likelihood of creating an effective and user-friendly software while minimising risks and making the most of available resources. In case of GymBuddy, it is helping to know how the app will be layout and coded as well as the best framework to use and how best to achieve the desired look.

There are several different forms of prototyping, each suited to different stages of development and varying project requirements. Paper prototyping and Mock-ups are the forms that were used whilst developing GymBuddy.

Paper prototyping: This low-fidelity approach entails producing manually doodled sketches or printed copies of displays, user interfaces, or product parts. Paper prototypes may be quickly and affordably made, enabling quick iterations and user testing early in the design process. Figures 4 – 7 are the paper prototypes make for GymBuddy. They were made on a tablet to make them easier to reference digitally.

Based on the research done of the apps that are currently on the market, these sketches reflect the clean layouts that is common amongst fitness apps. This is because the app is meant to be used whilst performing exercises so don't need consistent attention. This also why the navigations system used is Tab navigation which is the buttons that are consistently on the bottom of the screen in the Login page in Figure 4 and all the screens in Figure 5. This feature is preferred as the main pages are always available and not hidden behind a menu and is a preferred method compared to having a long scrolling screen which is advised against.[5]

[5] Harms et al. (2015)

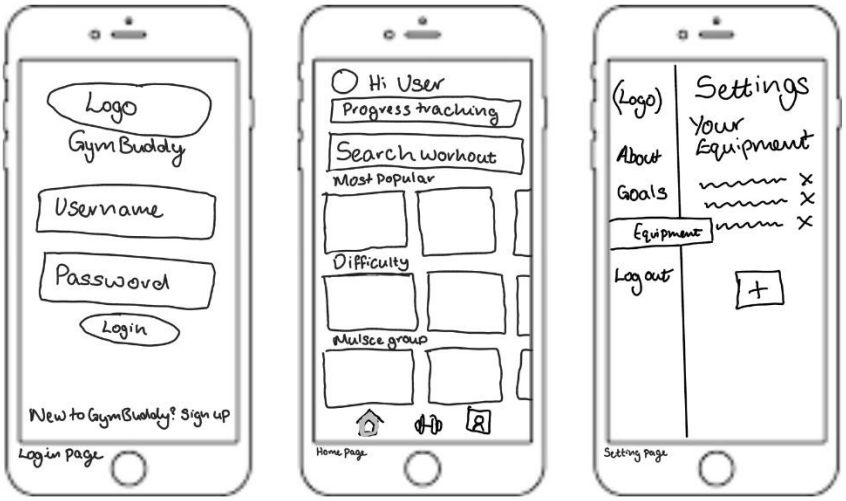

Figure 4 – Sketches of Login Page, Home Page, Setting Page

The login page and sign-up pages as seen in figures 4 and 6 are key features of having app that has any form as personal feature as it allows users to access their data on several devices. The Home page in fig 4 greets the user giving a personal aspect to the app which helps with keeping them on track with their fitness goals. Having the equipment page in the setting made sense as though this feature is key to the project the user isn't likely to use it often as if they have a gym membership the equipment that they have access to will not have to be update frequently.

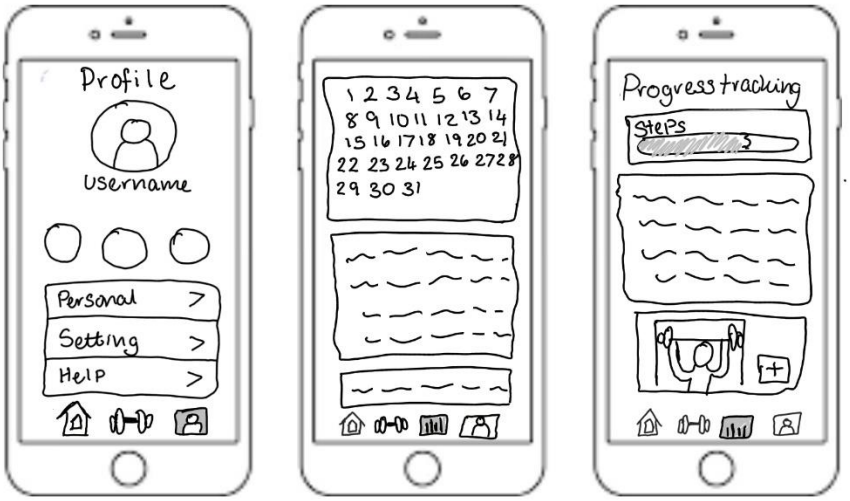

Figure 5 – Sketches of Profile Screen, Calendar Screen, Progress tracking Screen

Progress tracking is something that can really help with the adherence of users[6], therefore having progressing tracking was important to include in the app shown in the Calendar and Progress Tracking screens. This is why in some of the sketches the progress tracking tab is there. The style of progress tracking is a replica of the progress tracking shown the app FitOn that I reviewed (Fig 12). The profile page is the best way to access all the information that affects the app work but isn't need often.

[6] Schoeppe et al. (2016)

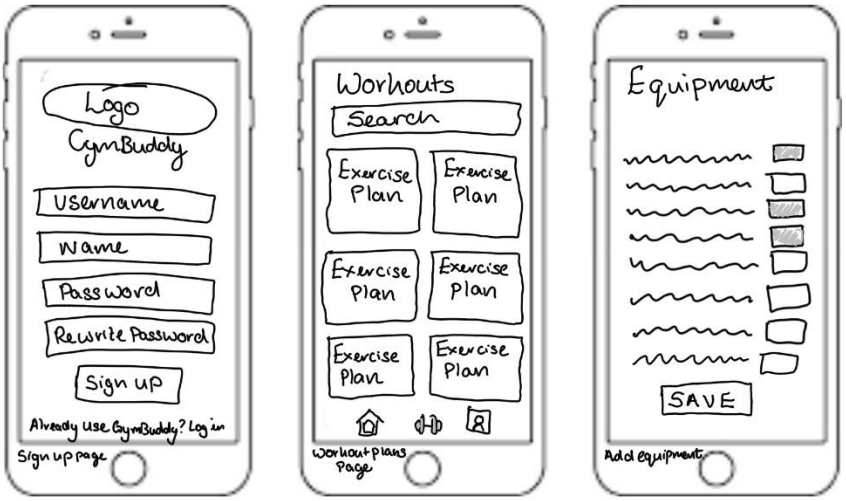

Figure 6 – Sketches of Sign-up Page, Workout Plans Page, Equipment Page

During the sketches, the style of the equipment page made more sense being an independent page as it would have would be interacted with. This way reduces the number of pages need as this page would display the equipment selected and allow the user to change their choice. The Workout Plans Page show the Workouts with a visual representation of the workout as well as the name listed to make finding what is need easier. This common among all the fitness apps that were reviewed hence this is an affective form of displaying them.

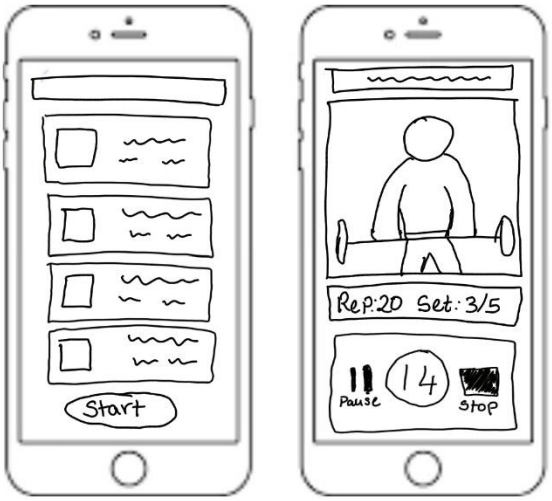

Figure 7 – Start Exercise Page, Exercise Page

The Pick Exercise Page will show four exercises based on the muscle group workout selected and the equipment available. The start will lead to the Exercise page that will show a gif of video of the current exercise that is named as well as timer to help with setting the reps and set for each workout.

Mock-ups: Mock-ups are static, accurate representations of the product that closely match the final design. They give a more accurate and comprehensive representation of the product's look and can be produced utilising prototype equipment or graphic design software. In order to improve the design, mock-ups are helpful for getting user input on aesthetics.

After doing the Paper protypes, there was now a baseline of how GymBuddy would be created. Not all the pages were made into Mock-ups due to time and lack of need. Theses mock-ups are very close to how the final product will look as they now have stock images as representatives of the profile pic for example seen in figures 8 and

9 in the profile page and the home page. The Created Logo and the set colours for the application re also used here. The Logo is Simple and is a good portrayal of the GymBuddy. The Colours aren't very bright but are used to make key parts stand out against the grey and white screens.

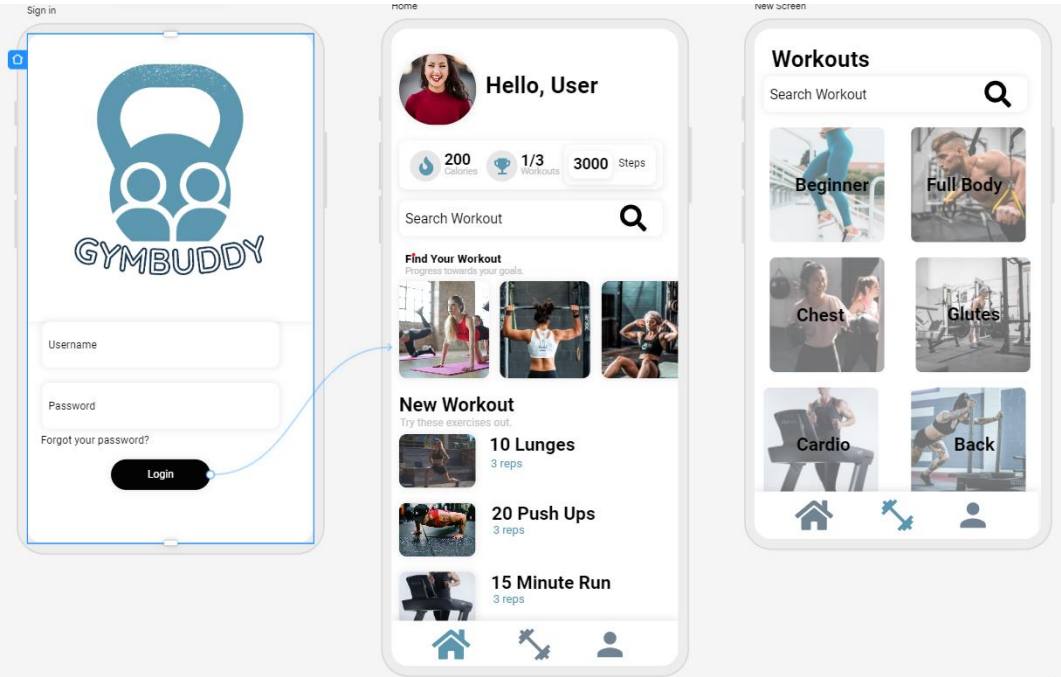

Figure 8 – Mock-ups of Login Page, Home Page, Workout Plans Page

The equipment page has now been moved to the profile page opposed to having it in a separate settings page as done in the paper prototypes. This way it is easier for the user to find and implement for more reasons such as when some equipment is available but being used. The Progress Tracking pages were removed as they are not something that users need in such large details and would add extra complications.

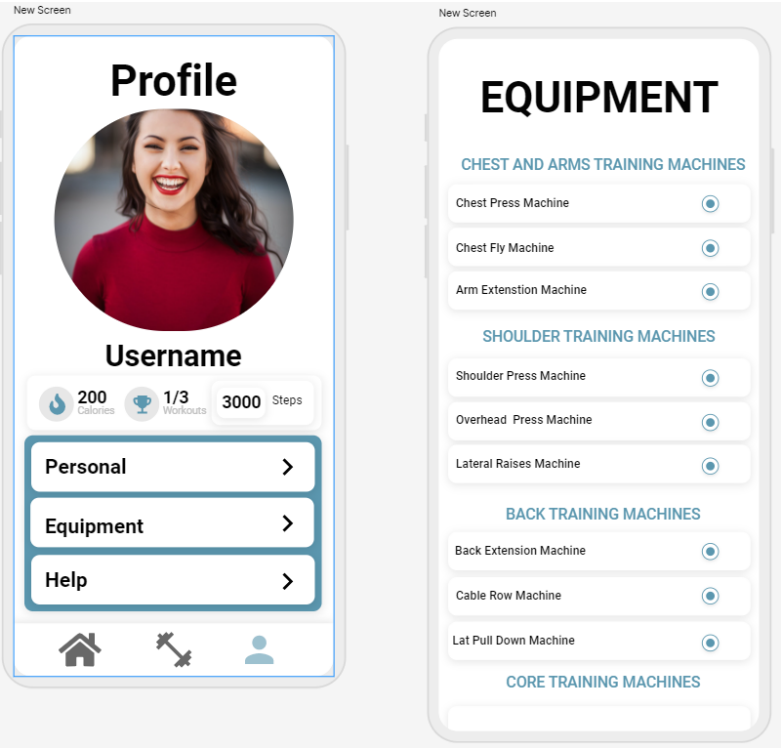

Figure 9 – Mock-ups of Profile Page, Equipment Page

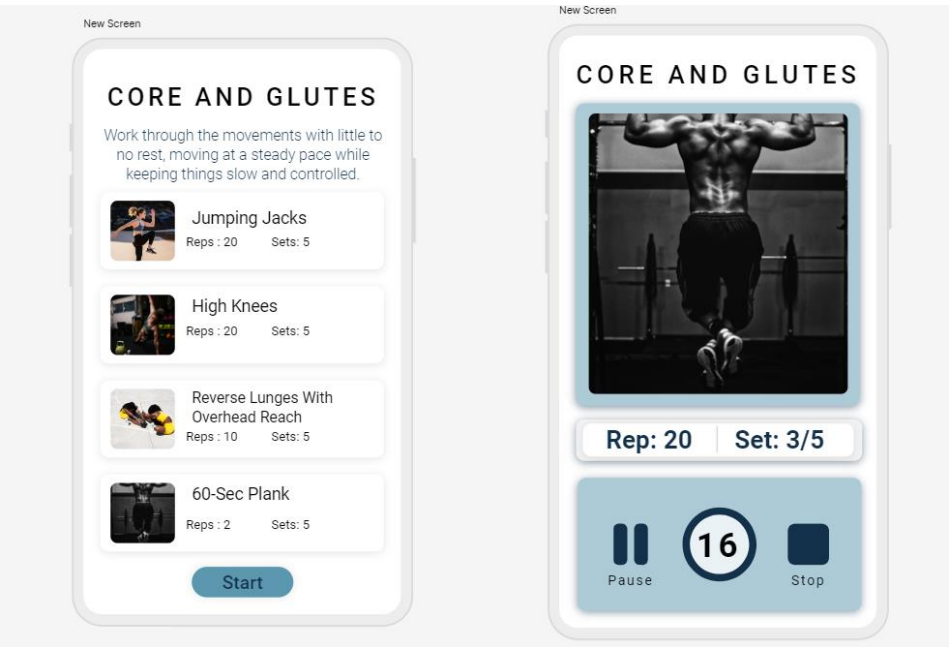

Figure 10 – Mock-Ups of Start Exercise Page, Exercise Page

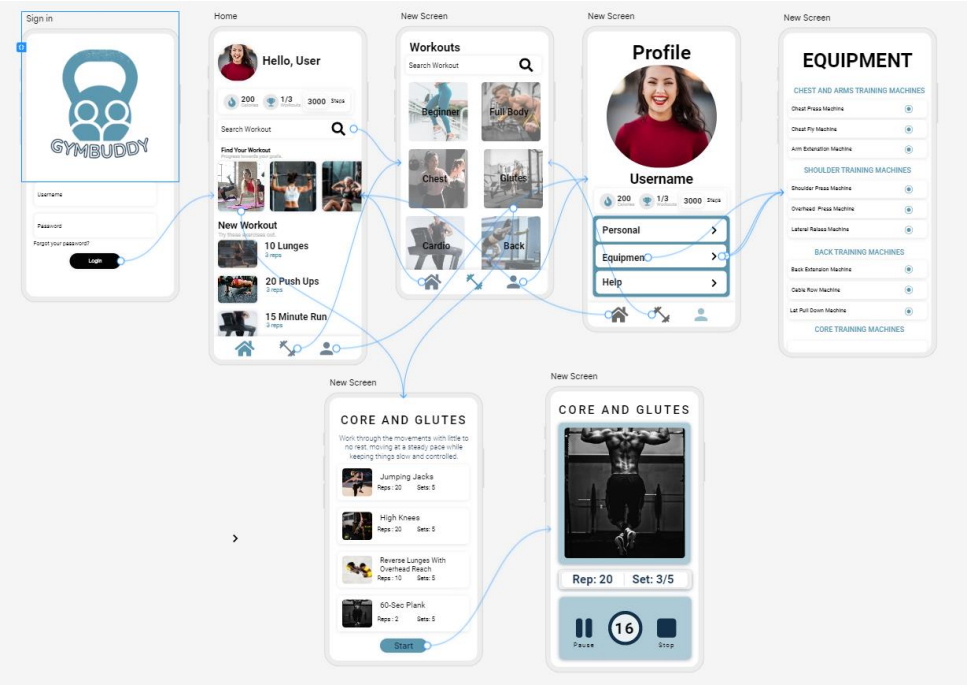

Figure 11 – All of the Mock-ups and the methods of Navigation between them.

Testing

For testing there was a questionnaire that should have been sent out with the completion of the application over due to a lack of agreement there wasn't time to send out the questionnaires for users to be able to fill them out often the app. Therefore, the testing is very minimal which is a major downfall on my part and in the future, I would focus on it, especially as this was part of my objectives.

4.3 Research *not* involving human participants.

When making a fitness application it is important to investigate what is currently available and assess their functionality and their features on their effectiveness. The average user would first check their app store to see what is recommended. The most popular app stores amongst current phone companies are Google play store and IOS App store. This is where I will be getting the data from as well as some well credited websites such as Forbes to pick the best 3 applications that are universally recommended.

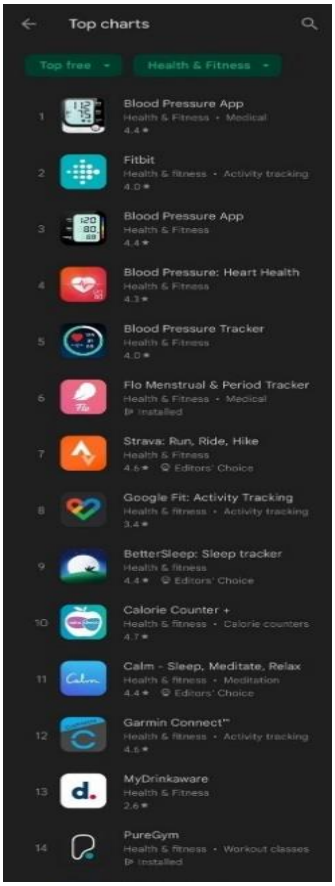

Figure 12 – Fitness Section of the Google Play Store

As I currently own an android device (Samsung Galaxy A51) shown in Figure 1 is the top 15 Health and Fitness Applications on the google play store as of Nov/Dec

2022. Most of the apps logged are not directly relevant to the specific style of application I am planning to create. Only #14(Pure Gym) is related. Therefore, looking at a more specific category would garner better results.

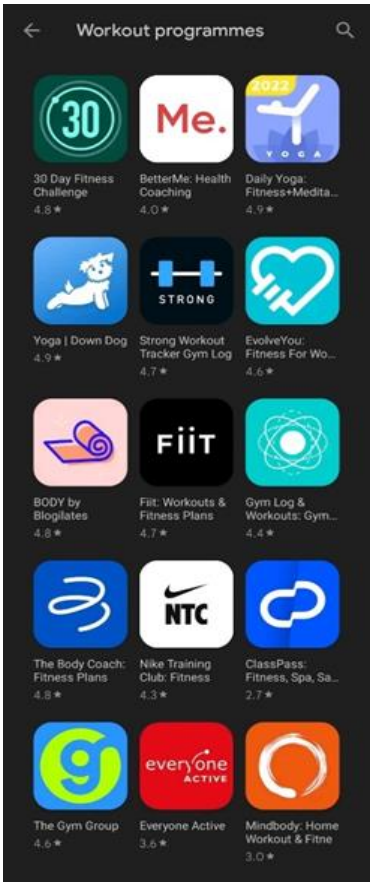

Figure 13- Workout Programmes section of the Google Play Store.

In Figure 2, I have the top workout programmes as this is more in line with the contents of the application I am developing. Hoever after checking with websites most of the apps listed are frequently used. This may be because a large population of user are Iphone users so most of the data is gathered from the IOS App store.

Based of the Forbes Health Blog The apps I will be reviewing are

FitOn

FitOn is a video fitness app including workouts in a variety of forms, such as weight training, yoga, stretching, kickboxing, high-intensity interval training (HIIT), dance, barre, meditation, and more. Every day, new follow-along videos for its routines are released. You may browse through a vast library of past exercises by duration, intensity, style, equipment, and instructors after logging in and viewing the future programmes.

According to the Forbes Blog, Fit On has been ranked the best fitness app of 2023. It is also listed as the best for celebrity fitness, this is due to the inclusion of workout plans and video that include celebrities like Gabrielle Union and Halle Berry as seen below in Figure 14. They also say “With a live leaderboard and real-time heart rate tracking via Apple Watch, users can track their progress and fitness goals” (10 Best Fitness Apps Of 2023, 2023) is one of reasons that they picked it for the top spot.

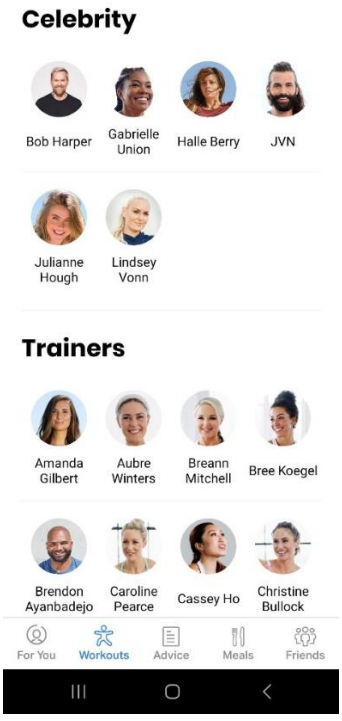

Figure 14 – FitOn Screenshot of the Celebrities and trainers shown on the workout page.

My Analysis

After have a quick glance at the feature that they offer and using the app for one workout here are my finding

User Interface

The user interface of the application is very clean. The colour scheme mostly consists of greys and whites with accent colours of pinks, purples and Blues which are evident from the logo. Tab navigation with the icons being placed at bottom of the screen making it easy to navigate between different pages. For you page is quite busy with a large scroll menu of different features. The same can be said for the workout page. Size is rather big and easy to read especially as someone with dyslexia. Between the several pages works quite smooth and it's quite responsive to touch.

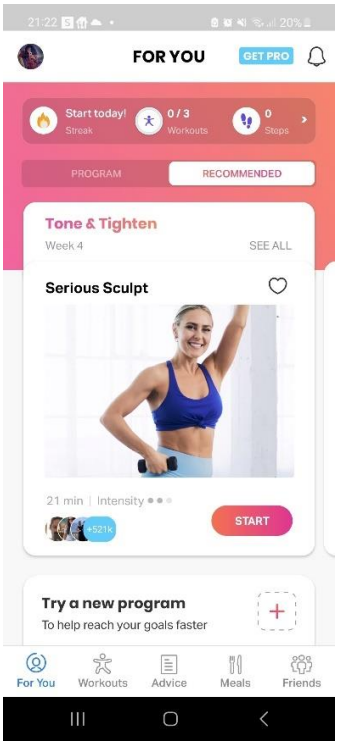

Figure 15 - FitOn Screenshot of the For you Page

Overall, I would give it 8/10 for its user interface.

Usability

the usability of FitOn is quite high opinion due to everything being categorised quite well and the key features being listed quality for usage. There are quite a few features that I cannot see myself using on a day-to-day basis such the mail tracker or the social aspects. To understand as there is a video that is played out for you follow along with could you the exercise is being listed (Fig 16). Currently you are unable to use the app offline as that is a premium feature that you will have to pay for there are quite a lot of things that are premium features that can be quite frustrating to not have access to but that incentivise you to pay for those features. There is consistent scheduling and reminders helping you to keep on track with your

goals but they can be quite annoying so there is an option to remove those in the settings.

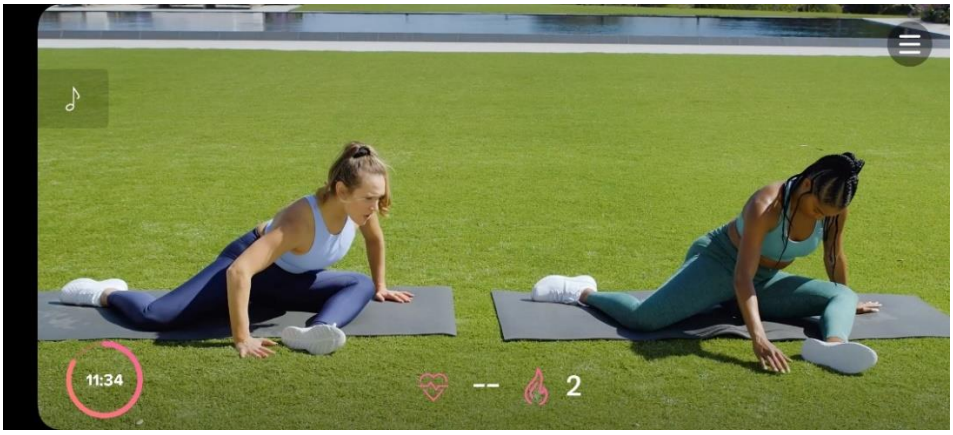

Figure 16- FitOn Screenshot of the Workout Video

Overall, I would rank the usability 6/10

Functionality

In terms of the functionality there are a range of exercises ranging from yoga to strength exercises and it also shows new exercises being added every day. There are also features to customise the amount of workouts you want to in a day and this is displayed as a target of for you page as a motivation. Progress tracking is a big thing with FitOn allowing users to input everything from the amount of workouts they've done in a day, how many steps they've done and their current weight to track progress. they can also take a photo after the exercise is done and it gets added to a calendar so that they can go back on their achievements (Fig 17). There is a section for low calorie meals for those who are dieting and looking for more inspiration (Fig 18). However, this is locked behind The FitOn Pro paywall as shown in Figure 19.

Overall, I would rank the functionality 7/10

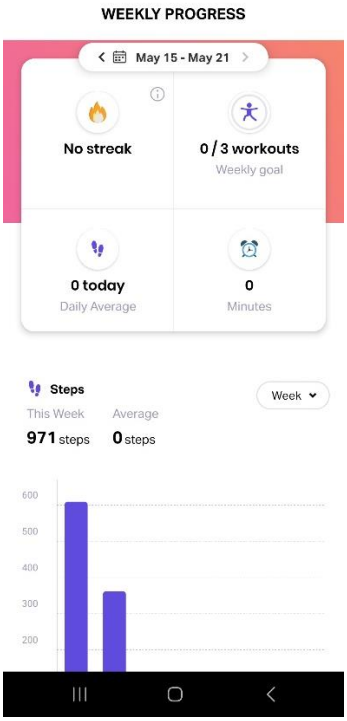

Figure 17 - FitOn Screenshot of the Progress page

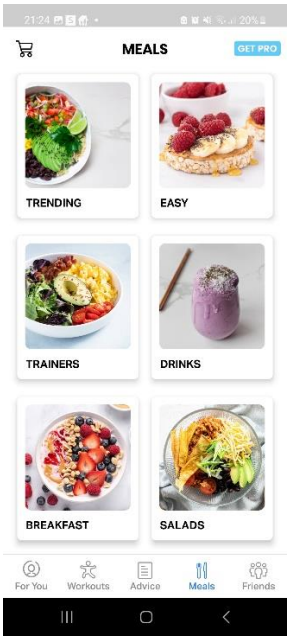

Figure 18 - FitOn Screenshot of the Meals page

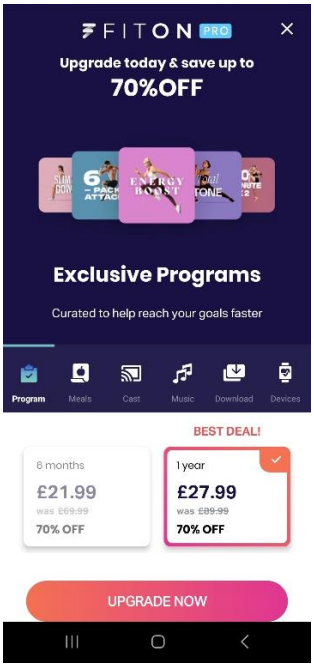

Figure 19 - FitOn Screenshot of the FitOn Pro Advert screen.

Nike Training Club

Nike Training Club is a free fitness app featuring a wide selection of workouts and programmes that last from one week to twelve weeks. There are more than ten different types of exercises, such as yoga, cardio, and strength.

According to the Forbes blog, Nike training club 4.5 stars ranked the best free fitness app. They gave it this ranking because “The Nike Training Club app gives you the perks of personal training without the hefty price tag. In 2020, Nike made the app’s premium content permanently free. You can access multi-week training programs catered to your specific fitness goals, as well as more than 100 standalone workout videos.” (10 Best Fitness Apps Of 2023, 2023). Which I would agree with.

My analysis

User Interface

User interface is very clear and simple with no distinct colours just the standard black and white with images and GIFs displaying the workouts, expert tips and the trainers. Club uses tab navigate well is menu navigation to be able to move around the app. The top navigation is just simple words at the top of the screen underneath the title that switches between the pages. This can quite hard to eyes as buttons for navigation. The page runs quite smoothly between the menu pages and the tab pages

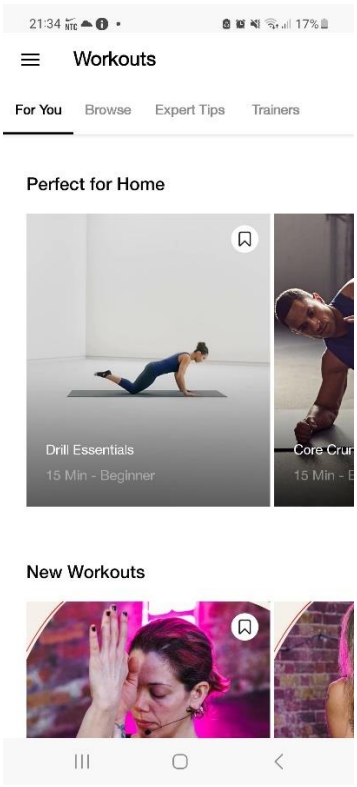

Figure 20 – Nike Training Screenshot of the For you Screen

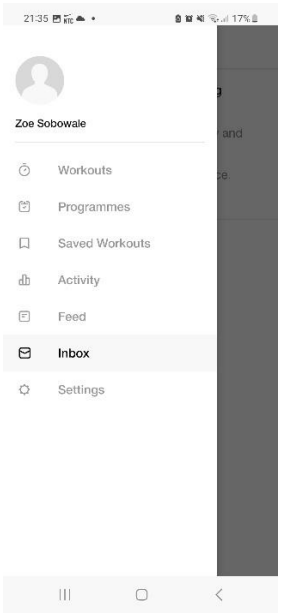

Figure 21 – Nike Training Screenshot of the Menu pull out

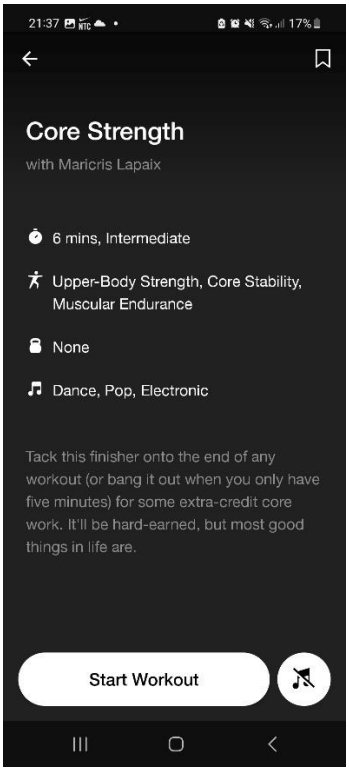

Figure 23 – Nike Training Screenshot of the Exercise Screen

Overal the user interface is a 6/10

Usability

The usability of Nike training club is very good especially with the two forms of navigation. The menu navigates all of the features that aren't frequently being hidden away so that they don't clutter the main pages making it more streamlined to use the app what is needed for. The app gives notifications currently running a what so that if you were to leave the work out to checking notification it reminds you to come back and finish your workout. The instructions are very clear as they are in

video form as well so you just follow along with the instructor. A feature that I especially like is the ability to add your own music alongside the video sometimes these can overlap so you can't really hear your music very well as well as it's not integrated with popular streaming services such as Spotify so it requires you to have music saved onto your device.

Overall I give usability a 7/10

Functionality

in terms of the functionality of Nike training club, is available extensive especially they have made all of the exercises available for free. Some of the workouts are video led and some are not. As I was using the app for actual amount of time I was not able to discover front forms of workout formats have. Here is one of the workout types that I experienced. Whiteboard workout which is instead of being a instructor the listed with the number of reps and sets needed which is very common list other fitness apps. That is a form of progress tracking in a gamified way with medals that you can collect. This helps to track any goals you can also track your history based on the workouts that you have performed. Like many other fitness apps Nike fitness club has a form of meal planning with recipes that they can add to a separate tracking app to track their calories called LifeSum.

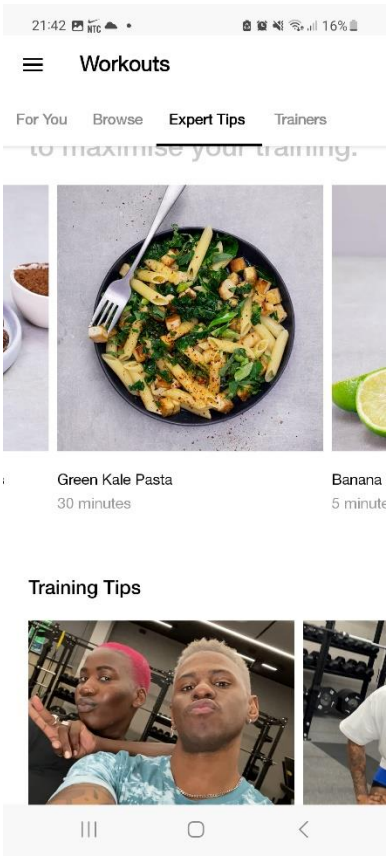

Figure 24 – Nike Training Screenshot of the expert tips Screen

Overall I give Nike fitness app a 6/10 for functionality.

MyFitnessPal

MyFitnessPal is a website and app (available on both iOS and Android) that helps users track their diet and exercise. It is free to sign up and use but some features are reserved for their premium subscription.

According to Forbes my fitness pal is ranked 4.3 and it was given this ranking because “The app’s Meal Planner tool even allows you to customize your menus based on your goals and target calorie intake. You can also track your workouts and

steps with the app’s fitness tracker and customize goals for weight loss, weight maintenance, nutrition, and fitness.” (10 Best Fitness Apps Of 2023, 2023)

My analysis

User Interface

All the apps that I have reviewed MyFitnessPal has the least appealing with its dark background and blue accent colours doesn't look very inviting. This app also uses tab navigation with a search bar at the bottom as well. it is clear from using the app that tracking calories and dieting is its main function. Which isn't very helpful to me trying to make a workout app. The pages are quite responsive, but they do take some time to load as there are ads built into the app as seen in figure 25.

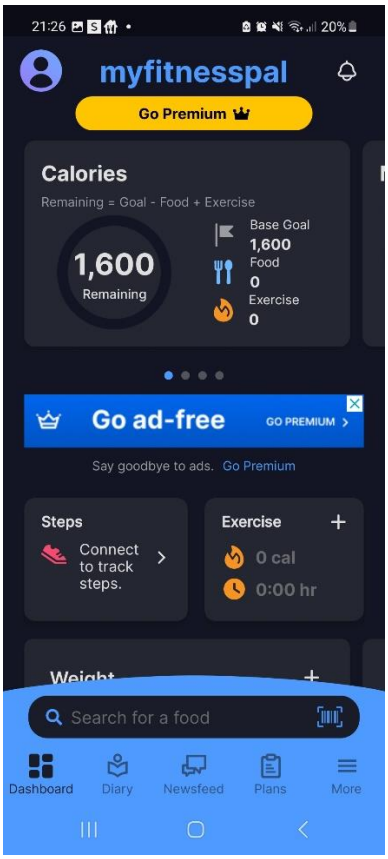

Figure 25 – Screenshot of Myfitnesspal dashboard

Overall, I would give the UI 4/10

Usability

The usability of my fitness pal is good it is easy to navigate between the different pages due to the top navigation. As stated, before the main functionality of my fitness pal is calorie tracking so that it is shown in majority. However, because I am looking for the workouts to find the workout page go to the more sections shown in figure 26, where the workouts are blocked by a paywall which negates it from being useful to me as a person looking for workouts.

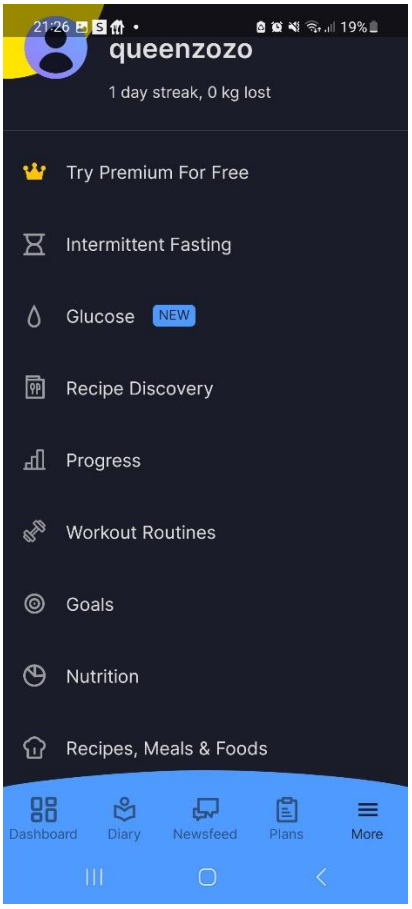

Figure 26 – Screenshot of Myfitnesspal More Menu page

Overall, I would give MyFitnessPal a 5/10 for usability.

Functionality

As my fitness pal is not a workout app mainly functionality of the app is no for me as that is what I was looking, and the main part is research and not being able to look at any form of other days locked behind a paywall lowers its score even more. From the basic you said the calorie counting I can see that it is a very effective system as it tracks your calorie throughout the day as well as your water intake. There aren't many things in the app that are free, and the app isn't very affordable if it was to be paid for costing about the same as a gym membership.

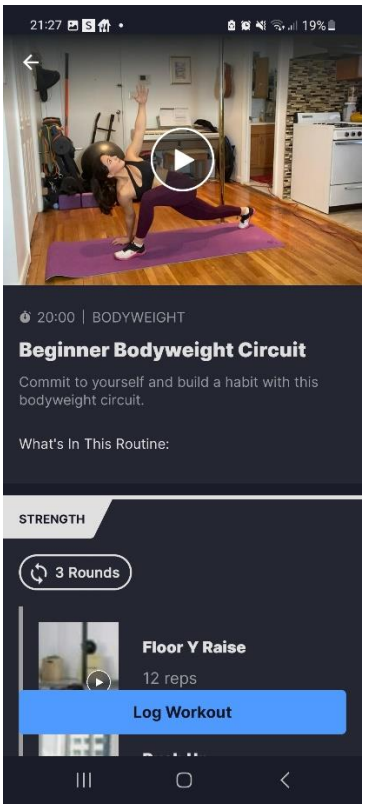

Figure 27 – Screenshot of Myfitnesspal workout page

Overall, the functionality is a 2/10

In conclusion the key features that I will be taking from this research and implementing into GymBuddy are:

- Clean and simple layout
- Tab navigation
- Image based buttons.
- Progress tracking
- All free content

4.4 Research involving human participants.

In addition to the secondary research conducted, there was also a questionnaire that was to get the options of the those who have used fitness aps before and their opinions of them. There were 37 responses ranging from 18 – 54yrs old. This questionnaire asked people that workout in different environments as that is main use for GymBuddy. This information was key in making sure that GymBuddy would include all the features users would frequently use.

Heer is some of the questions asked and the responses given and how this affected the development of GymBuddy.

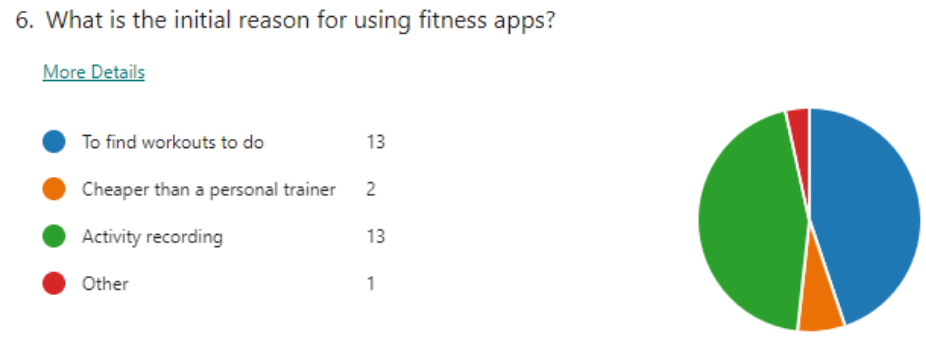

Figure 28 – Questionnaire Question 6 and response

based off this answer it's clear to see that most people use to find what with almost half the people stating that they wanted to find workouts This is why it's important to be able to have different workout categories in GymBuddy.

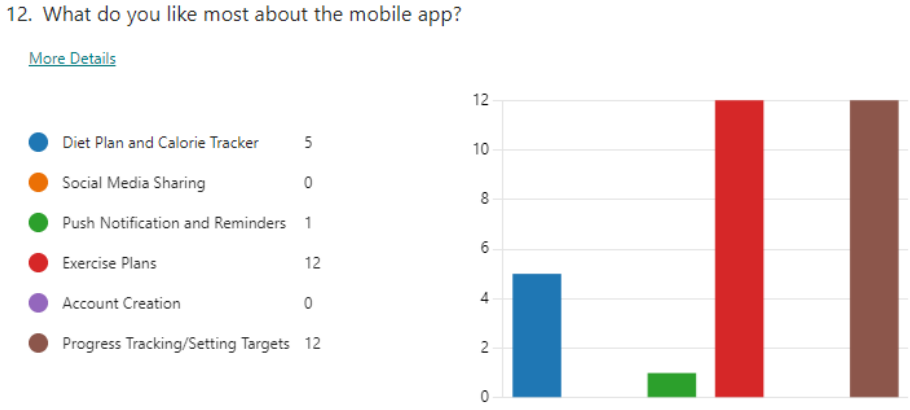

Figure 29 – Questionnaire Question 12 and response

This response gives occasion on what features users gravitate towards here you can see that who are exercise plans progress tracking with no one thing they preferred social media sharing. This is why I will bring these in my application.

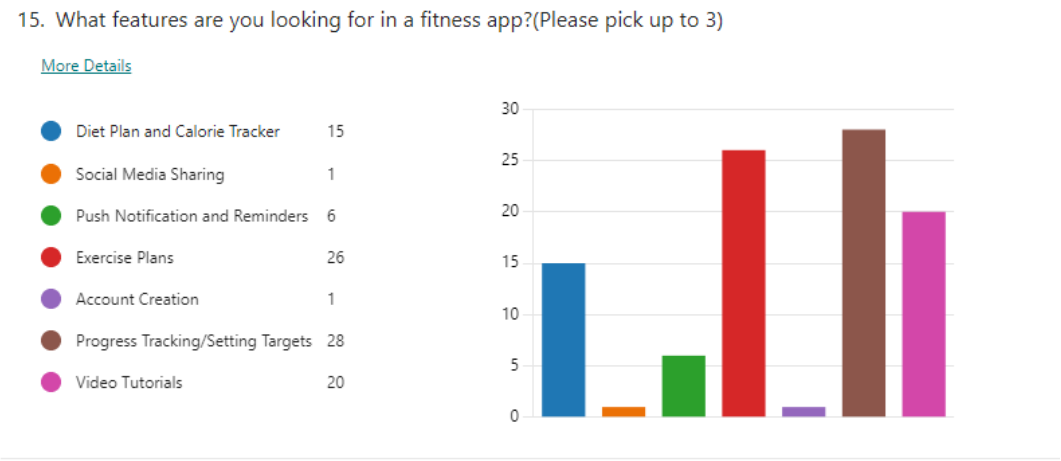

Figure 30 – Questionnaire Question 15 and Response

And was very important as the top three features asked for were going to be the ones that would be included in GymBuddy as specified by the users is the features that they would require. In Figure 30, You can see that the top three choices are progress tracking video tutorials and exercise plans. These features were already specified in my objectives, and it is good to see that uses would enjoy these features.

Chapter 5

5.1 Implementation

When making a react native app it's important to categorise your screens into separate folders. This because it makes it easier when calling to the navigations. In The GymBuddy program there are three main screen folder that lead to the main 3 screens of the app. The User Interface of the application is different to what was drafted in the Mock-ups as It was more important to have the key features of GymBuddy functionally smoothly and efficiently. The Basic Outline of the format is the same and with time and experience the visual aspect will match.

As stated previously for the exercise database an API was used. This API was found on RapidAPI plenty of public and private APIs that are available to be used for different styles of projects. This API already has the exercise is categorised into body parts targeted muscles equipment it was just like of calling to the database. IT required a key to be able to access and had a limited amount of time that it can be called for free. Therefore, to ensure that GymBuddy can be efficiently tested the upgraded package was purchased.

The Home Screens

In the Home screens folder, there is the file called styles.js. In this file all the aesthetics features of the home page are defined (Fig 31). This page is similar to themes in the assets page. These JavaScript files describing the presentation of Web pages, including colours, layout, and fonts. This is how CSS function in a HTML Project. This allows the main screen files to have the function of the page and just call to the colours need instead of redefining them.

```
import { StyleSheet } from 'react-native';

const COLORS = {
    primary: "#5b97af",
    secondary: "#14314b",
    tertiary: "#f3f6f4",

    gray: "#83829A",
    gray2: "#C1C0C8",

    white: "#F3F4F8",
    lightWhite: "#FAFAFC",
    black: '#000105',
  };

  const SIZES = {
    xSmall: 10,
    small: 12,
    medium: 16,
    large: 20,
    xLarge: 24,
    xxLarge: 32,
  };

  const STYLES = StyleSheet.create({
    container: {
      flex: 1,
      alignItems: 'center',
      justifyContent: 'center',
    },
```

Figure 31 – Code from Themes.js

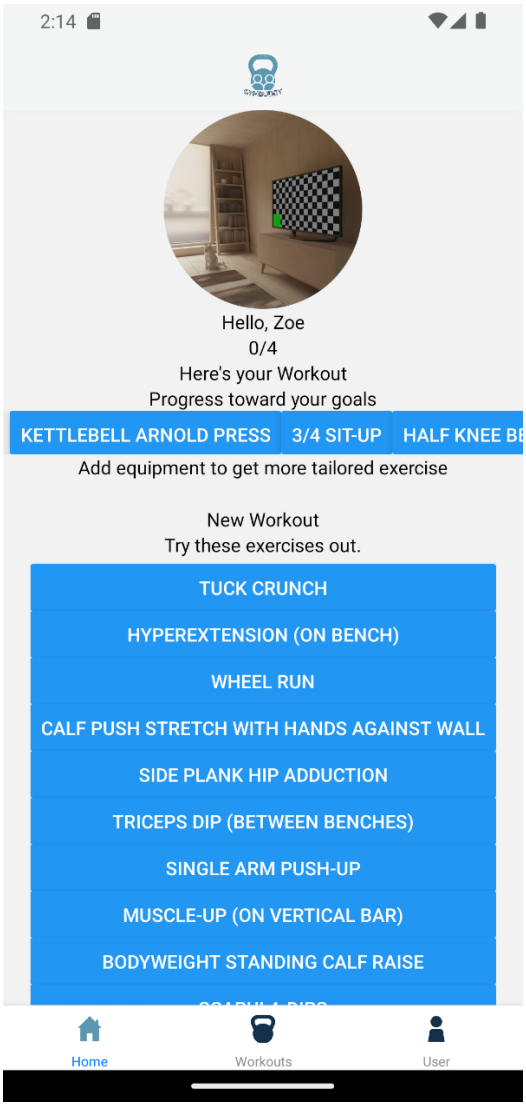

Figure 32 – GymBuddy Home Page

The Home Page Shows the same workout progress as on the user page. There are also some links to workouts they can do that aren't muscle specific however they will only show what they have the equipment.

The User Screens

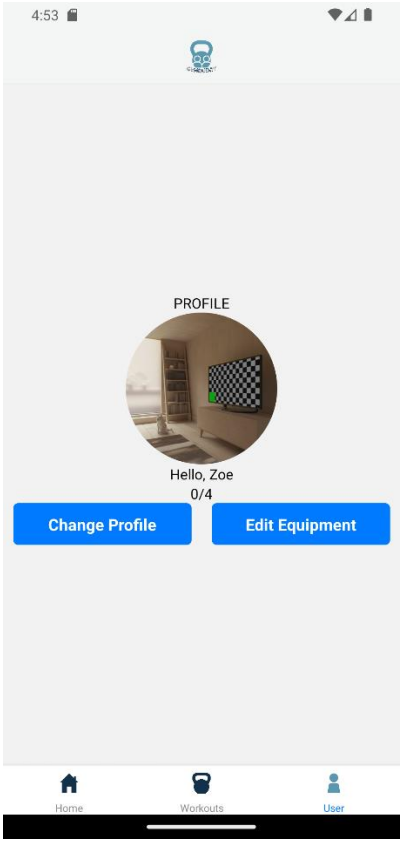

Figure 33 – GymBuddy User Page

As the users have stated that they're not fond of login and sign in features. The best way to ensure that the app has all of need inputs is to include it as part of the user screen. When the app first loads, it will request this information.

Due to time, I was unable to include to implement the step counter and the Calorie counter that was shown in the mock up (Fig 9). There is still the progress tracking system of counting the amount of workouts the user has done that day as well as the amount they would like to achieve which also asked at launch and can be edited at any time.

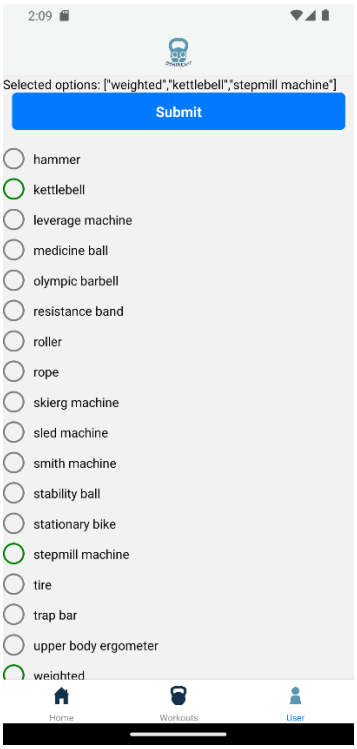

Figure 34 – Equipment Input Page

The Workout screens.

In the Utils folder, here is where the data is being fetched from the API to be Implemented. When developing the app, the best way to be able to display exercises for the users input is to randomise the exercises that are available to them based on the equipment that they have selected. As the database has a large amount of exercise and I wanted to keep the workout plans to four exercises per muscle group. In figure 32 you can see all the back focused double workout have been listed, this was good during development as it showed that the link between what the user selected, and the exercises is displayed was working.

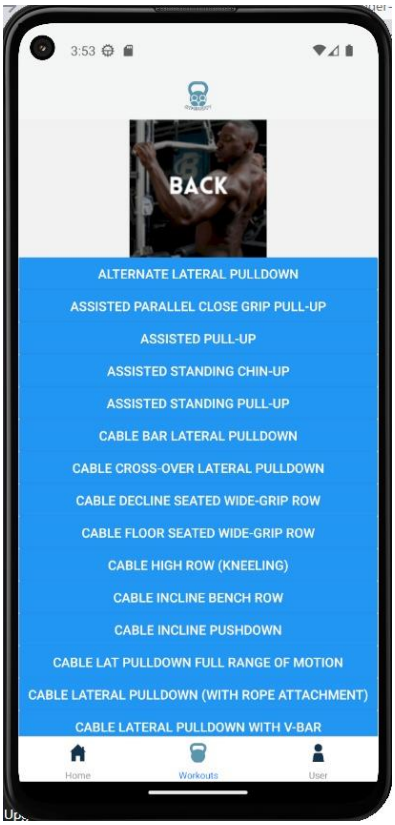

Figure 35 –GymBuddy Back Workout Plan in Workout Page

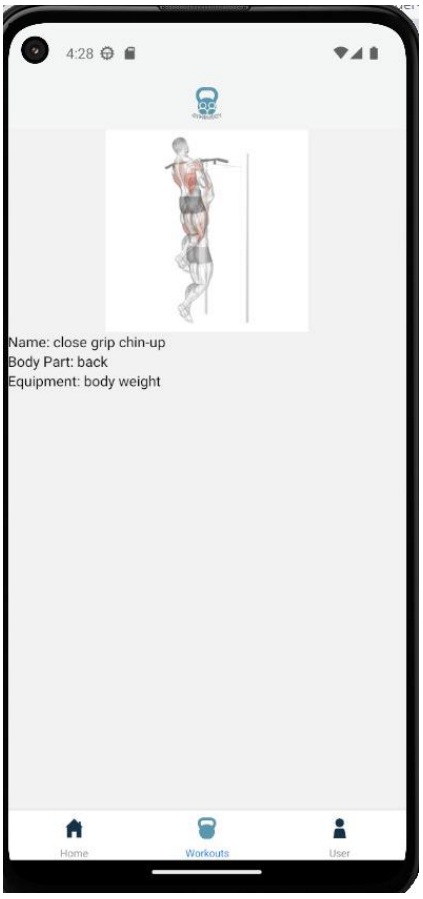

Figure 36 – Early development of GymBuddy exercise details page

Here is the early development of what the exercise detail page will look like it displays the work how as well as the GIF of this specific workout selected. What was then added was the set counter as well as the Rep counter as shown in Figure 37.

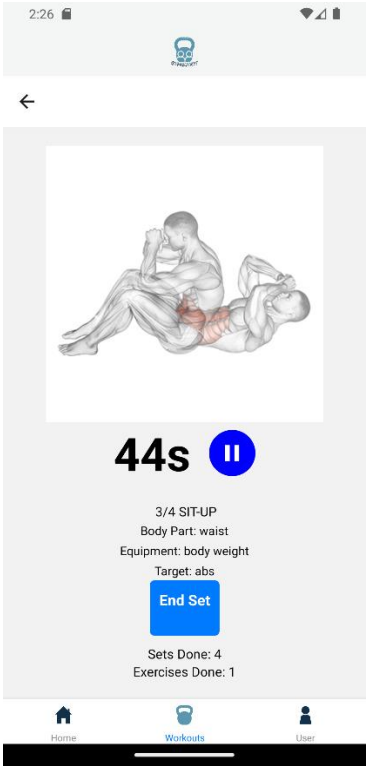

Figure 38 - GymBuddy exercise details page

The code shown below is adding the timer are you configuration what counts as a workout for the progress section. This code does the calculation on how many sets equal an exercise performed. Seen in figure 37 is the 4 Sit up reps making an exercise done tally go up.

```
// setting the timer icon
const toggleTimer = () => {
  setIsRunning((prevIsRunning) => !prevIsRunning);
};

//increase sets done in UserContext 4 sets = 1 exercise, 2 exercises = 1 workout
const incrementSetsDone = () => {
  const newSetsDone = setsDone + 1;

  if (newSetsDone % 4 === 0) {
    setUserData((prevUserData) => ({
      ...prevUserData,
      exercisesDone: prevUserData.exercisesDone + 1,
    }));
```

Figure 39 – Code form exercise details screen.

Chapter 6

Results & Discussion

After the creation of GymBuddy it is important to test the functionality and make sure that it fits within the aims and objectives set for it. As I was unable to get others to test the app, the testing of the app will be internal using the same questionnaire that would have been given to users to give feedback.

1. What is your age?
    a. 23
2. Where do you mainly exercise?
    a. At the Gym
3. What type of device will you use GymBuddy on?
    a. Android
4. What are your thoughts on the design and layout?
    a. The Design is Simple and Lack any attracting features such as pictures and Illustrations.
5. How easy is app navigation?
    a. Somewhat Easy
6. How good is the functionality of the app?
    a. Good
7. What's your experience with inputting the equipment you have available?
    a. Very Good
8. What do you like most about the mobile app?
    a. Exercise Plans
9. What do you least most about the mobile app?
    a. Progress tracking/setting targets

10. How would you describe your overall experience with GymBuddy?
    a. The app is easy to sue and after some more development it is something I would use frequently.
11. What improvements would you like to see in GymBuddy?
    a. The Design elements
12. How likely are you to recommend this product to a friend?
    a. Somewhat likely
13. Would you continue to use GymBuddy?
    a. Yes

GymBuddy is a Fitness mobile application that allows users to input available equipment to analyse workouts. the app categorises workouts based on their targeted muscle group. Each workout will have a video gift into help to explain and correct form.

This table is the requirement analysis that was set out for GymBuddy and whether they have been achieved.

Requirements	Achieved	Explanation/Evidence
The application should allow users to manage their profiles, including personal information, fitness goals and preferences.	Yes	as explained in the implementation is part of the user profile and is asked upon launch, shown in figure 3.
The application shouldn't have an account creation feature in accordance with the preferences specified by the possible users.	Yes	there is no account creation however ask for the user's name and the amount of exercise they want to perform. this is all stored locally onto the device.

Users should have the ability to input and manage their available fitness equipment.	Yes	this is done in a page that is accessing user profile page and is shown in figure 34
The equipment management feature should allow users to add, edit, and delete equipment from their inventory.	Yes	the users will be able to select and select the equipment they have available, and they will be able what they've selected at the top on equipment page shown in figure 34
The application should have a range of fitness equipment including cardio machines, weights etc.	Yes	though this isn't categorised as shown in the mock up there is a range of fitness equipment from cardio machines to body weight that is available be selected. Shown in figure 34
The application should provide personalised workouts based on their available equipment.	Yes	the exercises are randomised based off the users equipment selection
The application should provide various workout plans that range in targeted muscle groups.	Yes	the workouts have been placed in two groups on the workout page that is categorised by muscle group
The mobile application should provide visual demonstrations for each exercise or workout included in the workout plan.	Yes	Each workout has a Gif that coincide the specific workout shown in figure 36 and 38
The visual demonstrations should be easy to understand and	Yes	the gifts are uncomplicated and show the specific muscles that are being targeted with each movement. Shown in figure 38

accessible for users of all fitness levels.		
The application should allow users to track their exercises, sets, repetitions during each workout session.	Yes	the exercises are tracked using the button and four set is equal exercise and four exercises is equal to it shown in figure 38.
The mobile application should be compatible with major mobile platforms, such as iOS and Android, to ensure a wider user base and reach.	Yes	This is possible because the app is made using react native which is a framework that allows the code to be used for multiple devices and platforms
The application should be responsive and provide a smooth user experience, even during peak usage times.	Yes	this is something that I was unable to test as I could not have multiple users using the application at the same time however this shouldn't be an issue the only linked aspect is the database, and it can be called to over that I subscribe to 5000 times a month to the payment
The system should be scalable to accommodate an increasing number of users and handle concurrent requests without significant performance degradation.	N/A	though I have paid for multiple users to be cool to the database for the equipment and it is I would have for a larger amount depending on how many users GymBuddy has.

Table 2 – Requirement Checklist

Chapter 7

Conclusion

In conclusion during the development of GymBuddy, many things have been learnt. One of my biggest limitations is my lack of time management, this became an issue I was unable to test it using the questionnaire I had prepared. As well as the visual aspect of GymBuddy was not up to a match for the mock ups that were made for it and was not very visually appealing. The progress tracking element was also quite ambitious and though an element was able to be implement in the future the remaining features will be added.

The research that was done was very helpful to know exactly what is needed to make a successful app. GymBuddy has most of these features and characteristics, and this is due to knowing exactly what to focus on and what uses request from the applications.

One of the major takeaways of this project is my development in not only JavaScript but react native as a framework this is something I plan to develop more on and eventually return and develop GymBuddy to the standard of current apps available on the App Store.

References

1. Moller, A., Roalter, L., Diewald, S., Scherr, J., Kranz, M., Hammerla, N., Olivier, P. and Plotz, T. (2012). GymSkill: A personal trainer for physical exercises. 2012 IEEE International Conference on Pervasive Computing and Communications. [online] doi:https://doi.org/10.1109/percom.2012.6199869.

2. Lee, M., Lee, H., Kim, Y., Kim, J., Cho, M., Jang, J. and Jang, H. (2018). Mobile App-Based Health Promotion Programs: A Systematic Review of the Literature. *International Journal of Environmental Research and Public Health*, [online] 15(12), p.2838. doi:https://doi.org/10.3390/ijerph15122838.

3. Metcalfe, C. (2022). Can fitness apps be as effective as a personal trainer? [online] BBC News. Available at: https://www.bbc.co.uk/news/business-59651335.

4. West, J.H., P. Cougar Hall, Hanson, C.L., Barnes, M.R., Christophe Giraud-Carrier and Barrett, J.H. (2012). There's an App for That: Content Analysis of Paid Health and Fitness Apps. [online] 14(3), pp.e72–e72. doi:https://doi.org/10.2196/jmir.1977.

5. Carolina, A. and Gasparini, I. (2015). A Usability Evaluation of Fitness-Tracking Apps for Initial Users. [online] doi:https://doi.org/10.1007/978-3-319-21383-5_76.

6. Higgins, J.P. (2016). Smartphone Applications for Patients' Health and Fitness. *The American Journal of Medicine*, 129(1), pp.11–19. doi:https://doi.org/10.1016/j.amjmed.2015.05.038.

7. Litman, L., Rosen, Z., Spierer, D., Weinberger-Litman, S., Goldschein, A. and Robinson, J. (2015). Mobile Exercise Apps and Increased Leisure Time Exercise Activity: A Moderated Mediation Analysis of the Role of Self-Efficacy and Barriers. *Journal of Medical Internet Research*, [online] 17(8), p.e195. doi:https://doi.org/10.2196/jmir.4142.

8. Schoeppe, S., Alley, S., Wendy Van Lippevelde, Bray, N., Williams, S.G., Duncan, M.J. and Corneel Vandelanotte (2016). Efficacy of interventions that use apps to improve diet, physical activity and sedentary behaviour: a systematic review. [online] 13(1). doi:https://doi.org/10.1186/s12966-016-0454-y.

9. Gowin, M., Cheney, M., Gwin, S. and Franklin Wann, T. (2015). Health and Fitness App Use in College Students: A Qualitative Study. *American Journal of Health Education*, [online] 46(4), pp.223–230. doi:https://doi.org/10.1080/19325037.2015.1044140.

10. Silva, B.M., Joel, Isabel, López-Coronado, M. and Saleem, K. (2015). Mobile-health: A review of current state in 2015. [online] 56, pp.265–272. doi:https://doi.org/10.1016/j.jbi.2015.06.003.

11. Voth, E.C., Oelke, N.D. and Jung, M.E. (2016). A Theory-Based Exercise App to Enhance Exercise Adherence: A Pilot Study. [online] 4(2), pp.e62–e62. doi:https://doi.org/10.2196/mhealth.4997.

12. Chen, X., Zhu, Z., Chen, M. and Li, Y. (2018). *IEEE Xplore Full-Text PDF:* [online] Ieee.org. Available at: https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=8337895.

13. 10 Best Fitness Apps Of 2023. (2023). *Forbes*. [online] 12 May. Available at: https://www.forbes.com/health/body/best-fitness-apps/ [Accessed 18 May 2023].

14. Harms, J., Kratky, M., Wimmer, C., Kappel, K. and Grechenig, T. (2015). Navigation in Long Forms on Smartphones: Scrolling Worse than Tabs, Menus, and Collapsible Fieldsets. [online] pp.333–340. doi:https://doi.org/10.1007/978-3-319-22698-9_21.

15. Mona Erfani Joorabchi, Mesbah, A. and Kruchten, P. (2013). Real Challenges in Mobile App Development. [online] doi:https://doi.org/10.1109/esem.2013.9.

16. Sherman, R. (2015). *Business Intelligence Guidebook from Data Integration to Analytics*. [online] Morgan Kaufmann. doi:https://doi.org/10.1016/b978-0-12-411461-6.00018-6.

17. Wilson, J.F. (2003). Gantt charts: A centenary appreciation. [online] 149(2), pp.430–437. doi:https://doi.org/10.1016/s0377-2217(02)00769-5.