City, University of London

BSc (Hons)

Computer Science

Final Year Project PDD

 

*Metabolic – Fitness Mobile Application*

Academic Year: 2022 – 2023

Proposed By Kacper Zoltowski

Project Supervised By:

Ross Paterson

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# Introduction

“Physical activity can also boost self-esteem, mood, sleep quality and energy” [1] – the importance and benefits of improving one’s fitness has been extensively studied. The cost of obesity to the economy has risen to £10 billion with the rate rising to 25.9%.

This project’s will try to is help users track their exercises and provide information on work routine while encouraging consistency by ‘gamifying’ the process through a downloadable mobile application. An exercise with similar features like other applications on the market will be developed allowing users to input exercises or chose from one provided within the application. However, in order to differentiate itself from the market competition, the application will have a game-oriented UI/UX rewarding users for meeting targets through achievements and levels. Furthermore, the project will explore the psychology of ‘gamification’ and try to push the frontiers of technology to utilise these findings.

# Problem to be solved

Although, applications that track exercise, calories burnt, duration, etc. there are currently none which makes the process personal and in cooperate game like mechanics. The following products are examples of applications that have similar features of what is being proposed.

## Market Research:

|  |  |
| --- | --- |
| **Home Workout – No Equipment**  **Leap Fitness Group** | Android and IOS application which gives user information based on desired outcomes. Primarily focused on providing a workout plan and tracking exercises. Seems catered towards a wide range of audience, beginners to pros, however, based on the colour palette and images seems more catered towards the male market. |
| **Garmin Connect**  **Garmin** | Android and IOS application which allows users to track exercises, food intake, sleep, and other health metrics. Very expansive in terms of features, however, the application is very smartwatch dependent and will be limited without having a Garmin appliance. Application is very well designed, catering towards everyone – but the dark colour palette and sharp edges suggests more focus on advanced/pros. |
| **Peloton**  **Peloton** | Android and IOS application focused on providing gym classes online. Users can pay a membership fee to sign up for online classes lead by coaches. There are a range of paid sessions along with a very limited free section for non-paying users. Seems to appeal to beginners as ‘starters’ workouts are highlighted more. |
| **Kayla Fitness**  **kaylaitsines** | Website and mobile application which provides pre-recorded workout programmes and exercise tracking. Multiplatform application makes it more accessible and appeals to a greater market. Seems more catered towards beginners and to the female market. |
| **Fitbit**  **Alphabet Inc.** | Android and IOS application which allows users to track exercises, food intake, sleep, and other health metrics. Very expansive in terms of features, however, the application is very smartwatch dependent and will be limited without paying a membership fee and having a Fitbit watch. Application is very well designed, catering towards everyone – but the light colour palette and soft edges suggests more focus on beginners. |

## Conclusions From Market Research:

Based on all the market research completed the following are the takeaways from it:

|  |  |
| --- | --- |
| Try to be inclusive of all platforms. | Most applications are supported on both IOS and Android, this makes it very accessible and appealing to a wide range of audience. It may be good to try to make it compatible on computer/laptops if time permits.  Further research on coding languages and cross platform compatibility will be conducted. |
| Be as flexible as possible with UI/UX  &  Avoid home screen clutter | Many applications seemed more catering towards beginners or professionals based on the colour palette used, graphical interface and features offered. The application should allow users to customise how it feels not to alienate parts of the market.  A lot of the applications had a lot of features displayed on the home screen. This will raise the skill floor required to use the application as intended putting users from using it. Make it as clear and initiative as possible.  Further research on best practices and philosophies on UI/UX design will be conducted. |
| No membership or gated features | The application should not have any paywalls or gated features limited to a few people. Most applications researched had premium options allow users to access most advanced features or volumetrics. This project wants to support the betterment the users and society – there needs to be a stronger understanding of why this is good and useful.  Further research on importance health and fitness will be conducted. |
| Use research/studies done on health and fitness | Most applications boost extensive studies done on health and fitness, with advance algorithms created based off that research. To be able to competitive with the market and provide the optimum results a proprietary algorithm may be built to support the features of the app to give it a unique selling point – on features like workout plan, scheduling, goals, etc.  Further research on the maths behind health and fitness will be conducted. |

# Project Objectives

## Main objective:

The main objective of this project will be to create a IOS and Android application which allows users to log their exercise sessions, get recommended workout routine based on goals set and track their progress. There will be a game like aspect to incentivise users to stick to their goals and make the experience more rewarding.

## Requirements for the project:

The following are the list of requirements and testable outputs for the project.

## Functional requirements:

1. The system will allow users to upload their workout sessions - Users can choose the date, time and list of exercise completed which will be saved onto their account. The system will store this on its local memory or potential on an online database.
2. The system will allow users to create a profile – users can create a personal profile and set custom goals to make it more personalised and protect data.
3. The system will allow users to view their logged workouts – there will be a list of completed workouts, users can filter by date, workout, and other factors.
4. The system will allow users to edit and delete their workouts – users may edit or delete their workouts, with the options to change time, date, list of exercises completed or just completely delete the workout altogether.
5. The system will allow users to log in and log out – this will ensure personal data is more protected as some data will be stored on the cloud.
6. The system will generate workout plans for the user based on further research done – an algorithm will be created that will try to create a program that offer a programme to follow based on goals set and progress.
7. The system will track and visualise the progress made by the user – a system of points and awards will be used to encourage users to meet their goals
8. The system will use local and online data storage – using google firebase and local mobile storage to store data from the user and being able to retrieve the data when required.

## Non-functional requirements:

1. The application will be available 99% of the time – with allowance of slow down or crashing when if a bug is discovered.
2. The application will run on the IOS and android platform.

# Project Beneficiaries

The application can be used by everyone, lots of research on UI/UX will be done to make the app will versatile and accessible to everyone – through customisation. However, to set a clearer goal for the developer when designing and implementing the features the users with these characteristics will be primarily focused on:

1. Ages 16 to 35 - Usually the largest demographic users of these type of applications [2]
2. Beginners when using health and fitness applications – focus on beginners and have additional features to allow more advanced users to participate as well.
3. More adept at using technology – will be more receptive to the less intuitive features allowing more features to be added, mostly like those of the younger demographic [3]
4. All genders – need to be accommodating to all members of society regardless of self-identifications.
5. Beginners to working out and exercising – more advanced people may not use apps as they will most likely already will comfortable/familiar with exercising and tracking metrics on their own. [4]

# Work Plan

## Grant Chart Diagram:[5]

Chart, waterfall chart

Description automatically generated

# Risk Assessment

The project will most likely not go completely according to plan. Below is the risk assessment which highlights potential risks, their likelihood, severity and potential mitigation to reduce/negate the impacts.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Task | Risk | Likelihood (1 = Low 5  = High) | Impact  (1 = Low 5  = High) | Total Severity = Likelihood \* Risk | Mitigation |
| Loss/Corruption of Data | All the progress made will be lost and the project may need to be restarted on. | 2 | 5 | 10 | Back up all files and work on Google drive, GitHub and Firebase. Practice good version control. |
| Very complex application bugs | Will lower the quality of the final product impacting user experience and goals set. | 3 | 5 | 15 | Perform constant testing and version control. Create frequent tests to have a better sense of what is working and what isn’t – predicting is a very good form of prevention. Backing up will allow to revert to a more stable version. |
| Personal issues – physical and mental health. | Can slow or even stop progress depending on the severity of the issues. | 1 | 4 | 4 | Take lots of breaks and plan well. Talk to support staff if further assistant needed. |
| Poor planning and failure of time management. | The project can be unfinished or rushed leading to poor user experience and not being able to achieve all targets. | 4 | 5 | 20 | Create a concise but flexible plan to allow a clear goal to be set but is flexible enough to account for potential roadblocks. Keep track of all progress and report to supervisor if more assistance required. |
| Inexperience of frameworks and languages used | Unable to implement all features and meet set goals leading to poor user experience and improper testing of features | 3 | 5 | 15 | Use online resources such as documentations and tutorials to further enhance knowledge. Allocate enough time to relearn concepts and to allow further learning to be conducted. |

# Ethics Approval

|  |  |  |
| --- | --- | --- |
| **A.1 If you answer YES to any of the questions in this block, you must apply to an appropriate external ethics committee for approval and log this approval as an External Application through Research Ethics Online - https://ethics.city.ac.uk/** | | *Delete as appropriate* |
| 1.1 | Does your research require approval from the National Research Ethics Service (NRES)?  e.g. because you are recruiting current NHS patients or staff?  If you are unsure try - https://www.hra.nhs.uk/approvals-amendments/what-approvals-do-i-need/ | **NO** |
| 1.2 | Will you recruit participants who fall under the auspices of the Mental Capacity Act?  Such research needs to be approved by an external ethics committee such as NRES or the Social Care Research Ethics Committee - http://www.scie.org.uk/research/ethics-committee/ | **NO** |
| 1.3 | Will you recruit any participants who are currently under the auspices of the Criminal Justice System, for example, but not limited to, people on remand, prisoners and those on probation?  Such research needs to be authorised by the ethics approval system of the National Offender Management Service. | **NO** |
| **A.2 If you answer YES to any of the questions in this block, then unless you are applying to an external ethics committee, you must apply for approval from the Senate Research Ethics Committee (SREC) through Research Ethics Online -**  **https://ethics.city.ac.uk/** | | *Delete as appropriate* |
| 2.1 | Does your research involve participants who are unable to give informed consent?  For example, but not limited to, people who may have a degree of learning disability or mental health problem, that means they are unable to make an informed decision on their own behalf. | **NO** |
| 2.2 | Is there a risk that your research might lead to disclosures from participants concerning their involvement in illegal activities? | **NO** |
| 2.3 | Is there a risk that obscene and or illegal material may need to be accessed for your research study (including online content and other material)? | **NO** |
| 2.4 | Does your project involve participants disclosing information about special category or sensitive subjects?  *For example, but not limited to: racial or ethnic origin; political opinions; religious beliefs; trade union membership; physical or mental health; sexual life; criminal offences and proceedings* | **NO** |
| 2.5 | Does your research involve you travelling to another country outside of the UK, where the Foreign & Commonwealth Office has issued a travel warning that affects the area in which you will study?  *Please check the latest guidance from the FCO -* [*http://www.fco.gov.uk/en/*](http://www.fco.gov.uk/en/) | **NO** |
| 2.6 | Does your research involve invasive or intrusive procedures?  These may include, but are not limited to, electrical stimulation, heat, cold or bruising. | **NO** |
| 2.7 | Does your research involve animals? | **NO** |
| 2.8 | Does your research involve the administration of drugs, placebos or other substances to study participants? | **NO** |
| **A.3 If you answer YES to any of the questions in this block, then unless you are applying to an external ethics committee or the SREC, you must apply for approval from the Computer Science Research Ethics Committee (CSREC) through Research Ethics Online - https://ethics.city.ac.uk/**  **Depending on the level of risk associated with your application, it may be referred to the Senate Research Ethics Committee.** | | *Delete as appropriate* |
| 3.1 | Does your research involve participants who are under the age of 18? | **NO** |
| 3.2 | Does your research involve adults who are vulnerable because of their social, psychological or medical circumstances (vulnerable adults)?  This includes adults with cognitive and / or learning disabilities, adults with physical disabilities and older people. | **NO** |
| 3.3 | Are participants recruited because they are staff or students of City, University of London?  For example, students studying on a particular course or module.  If yes, then approval is also required from the Head of Department or Programme Director. | **NO** |
| 3.4 | Does your research involve intentional deception of participants? | **NO** |
| 3.5 | Does your research involve participants taking part without their informed consent? | **NO** |
| 3.5 | Is the risk posed to participants greater than that in normal working life? | **NO** |
| 3.7 | Is the risk posed to you, the researcher(s), greater than that in normal working life? | **NO** |
| **A.4 If you answer YES to the following question and your answers to all other questions in sections A1, A2 and A3 are NO, then your project is deemed to be of MINIMAL RISK.**  **If this is the case, then you can apply for approval through your supervisor under PROPORTIONATE REVIEW. You do so by completing PART B of this form.**  **If you have answered NO to all questions on this form, then your project does not require ethical approval. You should submit and retain this form as evidence of this.** | | *Delete as appropriate* |
| 4 | Does your project involve human participants or their identifiable personal data?  *For example, as interviewees, respondents to a survey or participants in testing.* | **YES** |

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| --- | --- | --- |
| **B.1 The following questions must be answered fully.**  **All grey instructions must be removed.** | | *Delete as appropriate* |
| 1.1. | Will you ensure that participants taking part in your project are fully informed about the purpose of the research? | **YES** |
| 1.2 | Will you ensure that participants taking part in your project are fully informed about the procedures affecting them or affecting any information collected about them, including information about how the data will be used, to whom it will be disclosed, and how long it will be kept? | **YES** |
| 1.3 | When people agree to participate in your project, will it be made clear to them that they may withdraw (i.e. not participate) at any time without any penalty? | **YES** |
| 1.4 | Will consent be obtained from the participants in your project?  Consent from participants will be necessary if you plan to involve them in your project or if you plan to use identifiable personal data from existing records. “Identifiable personal data” means data relating to a living person who might be identifiable if the record includes their name, username, student id, DNA, fingerprint, address, etc.  *If YES, you must attach drafts of the participant information sheet(s) and consent form(s) that you will use in section B.3 or, in the case of an existing dataset, provide details of how consent has been obtained.*  *You must also retain the completed forms for subsequent inspection. Failure to provide the completed consent request forms will result in withdrawal of any earlier ethical approval of your project.* | **YES** |
| 1.5 | Have you made arrangements to ensure that material and/or private information obtained from or about the participating individuals will remain confidential? | **YES** |

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| --- | --- | --- |
| **B.2 If the answer to the following question (B2) is YES, you must provide details** | | *Delete as appropriate* |
| 2 | Will the research be conducted in the participant’s home or other non-University location?  *If* ***YES****, you must provide details of how your safety will be ensured.* | **NO** |

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| **B.3 Attachments**  **ALL of the following documents MUST be provided to supervisors if applicable.**  **All must be considered prior to final approval by supervisors.**  **A written record of final approval must be provided and retained.** | ***YES*** | ***NO*** | ***Not Applicable*** |
| Details on how safety will be assured in any non-University location, including risk assessment if required (see B2) |  |  | **V** |
| Details of arrangements to ensure that material and/or private information obtained from or about the participating individuals will remain confidential (see B1.5)  *Any personal data must be acquired, stored and made accessible*  *in ways that are GDPR compliant.* |  |  | **V** |
| Full protocol for any workshops or interviews\*\* |  |  | **V** |
| Participant information sheet(s)\*\* | **V** |  |  |
| Consent form(s)\*\* | **V** |  |  |
| Questionnaire(s)\*\*  *sharing a Qualtrics survey with your supervisor is recommended.* | **V** |  |  |
| Topic guide(s) for interviews and focus groups\*\* |  |  | **V** |
| Permission from external organisations or Head of Department\*\*  *e.g. for recruitment of participants* |  |  | **V** |

# Appendix

## Bibliography

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