

One Semester Individual Project (40 Credits)

CM3203

Initial Plan – Designing an Interactive Web Application to Enhance Weight Loss

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Project Description:

Obesity is a serious health issue facing the UK. In 2019, 28.7% of adults in England and 23% of adults in Wales were identified as obese [1]. Furthermore, 35.6% of adults in England were identified as overweight [1]. Obesity carries a number of associated health risks such as heart disease, diabetes, high blood pressure, depression, stroke and even cancer. Many people are turning to fitness and nutrition apps to help them lose weight. For example, MyFitnessPal is consistently one of the highest rated free fitness apps available and has over 233,000 daily iPhone users in the UK [2] and 19.1 million monthly users in the US [3]. However, there have been a number of studies that show that the majority of these apps are not very effective in helping users lose weight. One study of MyFitnessPal found that, after 6 months of use, the app made no difference to the rate of weight loss [4]. The most commonly cited reasons as to why these apps are ineffective are: they do not incorporate a wide breadth of behaviour change techniques into their functionality [5], and they are difficult or tedious to use [4].

The aim of this project is to design and develop an interactive web application that will support users in losing weight and will contribute to reducing the overall rate of obesity in the UK. The app will do this by providing a number of top rated tools and features selected among existing fitness and nutrition apps which could include a Calorie Counter, an Exercise Tracker, a Food Diary, a Recipe Finder and a Weekly Meal Planner. The features to be implemented will be chosen after a review of the existing applications and research into their effectiveness.

The app will also include a number of original features. For instance, studies have shown that labelling foods with the amount of exercise needed to burn off the calories leads to healthier decisions [6]. Therefore, the project will look to include a feature that, when given the nutritional information of a food product, returns the physical activity calorie equivalent to highlight to the user how much exercise would be needed to burn off the calories from the product.

Moreover, in order to address the shortcomings of existing market products, the project will explore ways in which a wider range of techniques that encourage behaviour change can be incorporated into the app. This could include a game that promotes portion control. HCI design principles will also be implemented to increase the usability of the application.

Project Aims and Objectives:

Objective 1 – Research the current fitness and nutrition apps available and studies into their effectiveness in order to identify areas for improvement.

- Research into current market products will be used to identify the top features to include in the app whilst also looking for original features that could improve on existing products.

Objective 2 – Research behaviour change techniques and explore ways in which these techniques could be implemented into the application.

- Studies have shown that most weight loss apps are ineffective as they don't include a wide range of behaviour change techniques.
- This project will research such techniques and will look for ways in which they could be implemented as features.

Objective 3 – Use HCI design and evaluation principles to ensure the app is highly usable.

- Poor usability is often cited as a reason for weight loss apps not being effective. HCI will therefore be an important consideration for the project.
- Techniques will include UI prototyping, Heuristic and User-Evaluations, as well as design principles such as CARP. (Research into these methods will be required)

Objective 4 – Research web technologies to select the best tools suited for the development of the application.

- This includes research into APIs, programming languages, frameworks and database technologies.

Objective 5 – Develop the application by implementing the features identified in the research whilst following the user feedback from the design stage.

- Implement the features identified from the research to ensure the app is effective.
- Utilise user feedback from the design stage to ensure the app is usable.
- Constructing the app will include developing the frontend, backend and database and will use the technologies identified from Objective 4.

Objective 6 – Test the application to ensure it functions correctly and it meets the usability objectives.

- Use test cases to test the functionality of the system.
- Use Heuristic and user-based evaluations to assess the system for usability.

Objective 7 – Produce a complete report on the entire project.

- The report will document each stage of the project including research, design, development and testing.
- The report will also include a reflection of the success of the project, problems encountered, areas for improvement, as well as a personal reflection on my own performance and lessons learnt.

Work Plan

Week 1: 27th January 2020 – 31st January 2020

Tasks:

- Start writing Initial Plan.
- Preliminary research into fitness and nutrition apps. (High level for purposes of Initial Plan).

Milestones:

- Started Initial Plan.

Week 2: 3rd February 2020 – 9th February 2020

Tasks:

- Complete Initial Plan.
- Project organisation. This includes the selection of the development methodology to be used and the setup of any organisation resources such as a Trello page and Git repository.
- Define project requirements.
- Conduct in depth research into existing fitness and nutrition apps. This includes studies of their effectiveness and areas for improvement, as well as the most common features.
- Start documenting progress in a draft of the Final Report.

Milestones:

- Completed and submitted the Initial Plan.
- Defined the project requirements.
- Started the Final Report draft.

Deliverables:

- Initial Plan (03/02/2020)

Week 3: 10th February 2020 – 16th February 2020

Tasks:

- Complete research into existing fitness and nutrition apps.
- Conduct research into behaviour change techniques for weight loss and exploration into how these techniques could be implemented into the app.
- Use research to identify the main features of the application.
- Update Final Report draft.

Milestones:

- Identified the main features to be implemented in the app.

Week 4: 17th February 2020 – 23rd February 2020

Tasks:

- Create Personas and Use Cases.
- Conduct research into HCI design and evaluation principles.
- Conduct research into web technologies such as APIs, programming languages, frameworks and databases.
- Update Final Report draft.

Milestones:

- Created Personas and Use Cases.

Week 5: 24th February 2020 – 1st March 2020

Tasks:

- Complete research into Web technologies and decide on the technologies to be used to develop the app.
- Design UI.
- Create UI prototype.
- Plan prototype user testing (including recruitment of users).
- Update Final Report draft.

Milestones:

- Selected the web technologies to be used for development.

- Completed the design of the UI.
- Created UI prototype for user testing.
- [Project review with supervisor.](#)

Week 6: 2nd March 2020 – 8th March 2020

Tasks:

- Conduct prototype testing and document results.
- Refine UI design based on prototype testing results.
- Update Final Report draft.

Milestones:

- Completed user testing of UI prototype and refined UI design.

Week 7: 9th March 2020 – 15th March 2020

Tasks:

- Design backend and database. Document using UML and state diagrams.
- Start implementing frontend.
- Update Final Report draft.

Milestones:

- Designed the backend and database.
- Started the implementation of the frontend.

Week 8: 16th March 2020 – 22nd March 2020

Tasks:

- Continue implementing frontend.
- Start implementing backend
- Start developing database.
- Update Final Report draft.

Milestones:

- Started the implementation of the backend.
- Started the development of the database.

Week 9: 23rd March 2020 – 29th March 2020

Tasks:

- Complete frontend implementation.
- Continue implementing backend.
- Continue developing database.
- Update Final Report draft.

Milestones:

- Completed the implementation of the frontend.
- Started the development of the database.

Easter Recess Week 1: 30th March 2020 – 5th April 2020

Tasks:

- Complete backend implementation.
- Complete database implementation.
- Update Final Report draft.

Milestones:

- Completed the implementation of the backend.
- Completed the development of the database.

Easter Recess Week 2: 6th April 2020 – 12th April 2020

Tasks:

- Create test cases.
- Plan Heuristic and User-based evaluation.
- Update Final Report draft.

Milestones:

- Created the test cases for testing the application functionality.
- Planned the Heuristic and User-based evaluations.

Easter Recess Week 3: 13th April 2020 – 19th April 2020

Tasks:

- Conduct system testing.
- Begin Heuristic and User-based evaluation.
- Update Final Report draft.

Milestones:

- Tested the functionality of the system.

Week 10: 20th April 2020 – 26th April 2020

Tasks:

- Complete Heuristic and User-based evaluations.
- Document the application.
- Update Final Report draft.
- [Project review with supervisor.](#)

Milestones:

- Completed the Heuristic and User-based evaluations.
- Documented the application

Week 11: 27th April 2020 – 3rd May 2020

Tasks:

- Start writing the Final Report using the draft.

Milestones:

- Started the Final Report.

Week 12: 4th May 2020 – 10th May 2020

Tasks:

- Complete and submit Final Report.

Milestones:

- Completed and submitted the Final Report.

Deliverables:

- [Final Report \(07/05/2020\).](#)

Ethical Considerations:

This project will need to seek ethical approval as it includes user based research, namely the UI prototype testing and User-based evaluation.

Project Challenges and Considerations:

- There will be a personal learning curve in this project as there are a number of skills that I will be learning as I go. The area where this is most pertinent is in the use of web technologies to construct the application. For instance, it is highly likely that this project will require the use of an API. However, I have no experience in using an API. I have therefore scheduled two weeks for conducting research into web technologies so that the necessary skills can be learnt.
- Similarly, I have never conducted any prototype testing before and this is another skill that I will be learning on this project. I have therefore allocated time to research HCI design techniques such as this.
- Security is also an important consideration for this project as the application will store personal data of users. I must therefore ensure that all data is stored securely in the database and user accounts are password protected. This will include the need for password hashing.

References:

- [1] Baker C 2019, *Obesity Statistics*, House of Commons Library, viewed 02 February 2020, <<https://researchbriefings.parliament.uk/ResearchBriefing/Summary/SN03336#fullreport>>.
- [2] O'Dea S 2019, *Daily active users (DAU) of leading iPhone health and fitness apps in the Great Britain (GB) in 2019*, O'Dea S, viewed 02 February 2019, <<https://www.statista.com/statistics/878485/leading-iphone-health-and-fitness-apps-dau-united-kingdom/>>.
- [3] Clement J 2019, *Most popular health and fitness apps in the United States as of May 2018, by monthly active users*, Clement J, viewed 02 February 2020, <<https://www.statista.com/statistics/650748/health-fitness-app-usage-usa/>>.
- [4] Laing BY, Mangione CM, Tseng C, et al. Effectiveness of a Smartphone Application for Weight Loss Compared With Usual Care in Overweight Primary Care Patients: A Randomized, Controlled Trial. *Ann Intern Med.* 2014;161:S5–S12.
- [5] Conroy et al. Behavior Change Techniques in Top-Ranked Mobile Apps for Physical Activity. *Am J Prev Med.* 2014;46(6):649–652.
- [6] Daley, Amanda & McGee, Eleanor & Bayliss, Sue & Coombe, April & Parretti, Helen. (2019). Effects of physical activity calorie equivalent food labelling to reduce food selection and consumption: systematic review and meta-analysis of randomised controlled studies. *Journal of Epidemiology and Community Health.* jech-2019.