Initial Plan

Designing an Interactive Application to Promote Healthy Cognitive Ageing among Older Adults at Home

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Description

With an aging population within the UK, more adults are now entering a stage in their life where cognitive decline begins. However, this project aims to help older adults to maintain a healthy mental state for people as they progress into “old age”. By having a proactive approach to aging, this project intends to work on healthy aging before it’s too late. Aiming to help reduce the speed of cognitive decline and Mild Cognitive Impairment (MCI) which is a precursor to Dementia. Creating an application that users can interact with daily “brain teasers” to work the mental aspect, along with physical activity and dietary reminders aspires to achieve this. Brain games such as sudokus or crossword puzzles can slow down cognitive decline according to a paper written by Eshkoor et al. (2015). In addition, in having prompts and interactive features the application looks at promoting a routine for the user that they can work into their daily lives to keep them mentally and physically active. In numerous studies, including one by Geda et al. (2010), it is shown that “any frequency of moderate exercise performed in midlife or late life was associated with a reduced odds of having MCI”. Furthermore, the risk of MCI can be reduced by a Mediterranean diet (Singh et al. 2014), therefore, including these as reminders will give the user more ways to aid their cognitive health.

Project Aims and Objectives

Aims

I want to research into which games can promote healthy cognitive ageing for older adults. From this, developing an application that can provide a user with the specific activities to complete daily. The aim of the project is that the application can display times for the activities and display this to the user so they can see improvement overtime. Also, alongside the main cognitive aspect of the app the user should be reminded to complete physical activities and incorporate beneficial foods into their diet. These will not be tracked by the application but are extras that the user can complete for better results.

My initial idea is an interactive application designed with a native development IDE as they will have the ability for fast app development and will allow for deployment into either Android or Apple markets. By working on this project, I am hoping to improve my mobile application design skills along with project management skill as these are important for moving into the workplace.

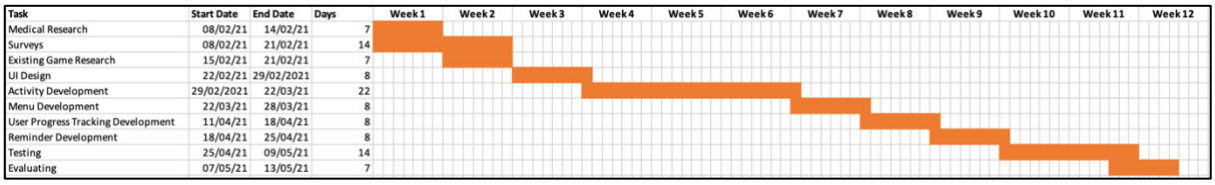
Objectives

1. Identify existing cognitive health orientated game solutions
    - Research into the Cognitive/Brain Training games and understand what works and potentially adapt these features for my application
2. Research into health improvement activities
    - Study research papers to identify the most important/beneficial activities for health improvement in older adults
    - Identify an age group to direct the application and further research towards
3. Release Survey
    - Provide a survey across social media aimed at the identified age group
    - From the findings, outline the key features of the application

4. Design User Interface (UI) and in-app Activities:
    - Using existing solutions identify effective UI
    - Create mock-ups of all screen
    - Produce games based on research and my own researched ideas
5. Develop Application:
    - Produce backend database for user data
    - Produce front end using Android Studios built in features
6. Test and Evaluate Application:
    - Run user testing to highlight design problems
    - Run different evaluations on the application post-testing

Work Plan

Gantt Chart



Task	Start Date	End Date	Days
Medical Research	08/02/21	14/02/21	7
Surveys	08/02/21	21/02/21	14
Existing Game Research	15/02/21	21/02/21	7
UI Design	22/02/21	29/02/2021	8
Activity Development	29/02/2021	22/03/21	22
Menu Development	22/03/21	28/03/21	8
User Progress Tracking Development	11/04/21	18/04/21	8
Reminder Development	18/04/21	25/04/21	8
Testing	25/04/21	09/05/21	14
Evaluating	07/05/21	13/05/21	7

Milestones:

Week 3:
By the start of week 3 I expect to have the research for the project completed. This entails having all medical paper research completed, results from the survey collected and findings from existing games. This will enable me to have completed the designs for the UI of the application by the end of this week too.

Week 6:
By the end of week 6 I expect to have completed the activities I will need to implement into the app. These will be created based on research findings and survey responses in order to create the most user-friendly and inclusive games.

Week 7:
Have a basic prototype completed which takes a user from a main menu to the games on the application. There will be no progress tracking or daily reminders incorporated yet, but the user should be able to navigate around the application.

Week 8:
Expect to have the user progress tracking completed. This will allow the user to complete activities and overtime they will be able to see their progression with their completion times being presented in an easily readable format.

Week 9:
Expect to have a fully functioning application at the end of this week which my supervisor and I will be able to work through and finalise any last-minute changes.

Week 12:
I will have all testing and evaluation completed on the application showing if the app is suitable and meets the criteria to fulfill the aims I set out to achieve at the start of the project.

Timeline:

Week 1:
Initial research into healthy cognitive aging methods. This will be collected through medical research papers and other credible sources. Through this research I should be able to find trends in studies which outline which activities promote healthy cognitive aging for older adults. Coming back to my supervisor at the end of the week with my findings and the ability to show him how this could be featured in an application.

Week 2:
Collect my findings and publish an online survey for adults of a particular age range (e.g. 55+), based on research, where they can outline areas of their health they feel are deteriorating fastest or they feel perhaps need working on in order to feel healthier along with preferences for games and game features. Pairing my findings from research and the survey, I will produce a collection of activities that can be incorporated into the application. Research into existing solutions and form ideas based around effective functions in these solutions. As a result, understand what prevents these solutions from being optimal. Returning to my supervisor at the end of the week, I will display the findings I have made with achievable ideas for the application.

Week 3:
Begin to design UI with findings to create ergonomic design. At the end of week, I will display UI designs with reasoning behind choices to my supervisor for scrutiny.

Week 4:
Make changes to UI designs, if needed, after my meeting with my supervisor. Using research from weeks 1 and 2, begin working on the in-app activities. Via looking through similar solutions online and my own knowledge, I will produce algorithms for the activities.

Week 5:
Start coding the activities using the algorithms I have created and existing solutions. At the end of the week, I will show my supervisor my progress and ask any queries I have.

Week 6:
Aim to have completed all the activities for the application by the end of the week in time for the meeting with my supervisor. Allow the supervisor to test the applications for ease of use and take his feedback into consideration.

Week 7:
Begin working on the Menu and other aspects of the applications. Aim to have the Menu completed with games linked by the end of the week so that I can show my supervisor a basic prototype of the application without daily reminders and progress tracking.

Week 8:
Taking onboard any comments from my supervisor, begin working on the tracking of the application. This will mean taking results from the users' games and presenting them in an easily readable format (e.g. graph) which the user can check whenever they want. I expect to have this close to completion or completed by the end of the week with test data in it that my supervisor can view.

Week 9:
This week will be aimed at completing the final section of the application, the reminder aspect. This will combine research from weeks 1 and 2 and provide users with small notification prompting them to complete some exercise or incorperate something into their day/diet.

Week 10 and 11:
In these 2 weeks I will be undertaking the testing of the application. This will include testing such as: Unit Testing, Smoke testing and User Acceptance Testing. Towards the latter end of week 11, I will also being working on the overall evaluation of the application. By the end of the week I should be able to provide my supervisor with a document of thourough testing of the application.

Week 12:
This is the last week and will involve me completing my evaluation of my application, linking back to aims to see if they are met and whether the solution I have provided fulfils the roles I set out to achieve.

References

Singh, B., Parsaik, A.K., Mielke, M.M., Erwin, P.J., Knopman, D.S., Petersen, R.C. and Roberts, R.O. 2014. Association of mediterranean diet with mild cognitive impairment and Alzheimer's disease: a systematic review and meta-analysis. *Journal of Alzheimer's disease* 39(2), pp.271-282.

Eshkoor, S.A., Hamid, T.A., Mun, C.Y. and Ng, C.K. 2015. Mild cognitive impairment and its management in older people. *Clinical interventions in aging* 10, p.687.

Geda, Y.E., Roberts, R.O., Knopman, D.S., Christianson, T.J., Pankratz, V.S., Ivnik, R.J., Boeve, B.F., Tangalos, E.G., Petersen, R.C. and Rocca, W.A. 2010. Physical exercise, aging, and mild cognitive impairment: a population-based study. *Archives of neurology* 67(1), pp.80-86.