Deliverable C – Conceptual Design and Project Plan

Group Z8
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May 23, 2021

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Table of Contents

List of Figures

Introduction

The goal of deliverable C is to create a conceptual design using the functional decomposition, information obtained from the client and concepts generated by each group member. Each member of the group had to create multiple designs of an application that would help the client with exercises meant for their joint pain. The concepts are then compared by first summarizing their features and then comparing them to the chosen criteria. Each concept designed by the team members will be evaluated based on the target specifications of Project Deliverable B and the newly updated criteria. From there the best concept as well as a combination of other ideas were used to create the group concept. A visual representation of the group concept was also generated. Lastly, the group concept was compared to the criteria and assessed based on its advantages and disadvantages. The conceptual design will help in the creation of prototypes and further steps in the design process.

Functional Decomposition

Firstly, the application will consider the user's daily habits. It will be able to know what the user needs by using a system of specific questions. Since the exercises are based on pain, pain locations and pain intensity, it is important to pay attention to the questions.

Secondly based on the answers, the questionnaire will send the user a detailed list of exercises to do the time of application depends on the intensity of the pain. Each exercise is a result of the answers to the questions.

Next, the application will be able to track the number of exercises and their effectiveness to improve it if necessary.

At the end of each week, the application will make a report, which will help the user to know which activities are potentially the indirect cause of acute pain and which exercises work better than others. The application has a database that will store enough information for a potential comparison.
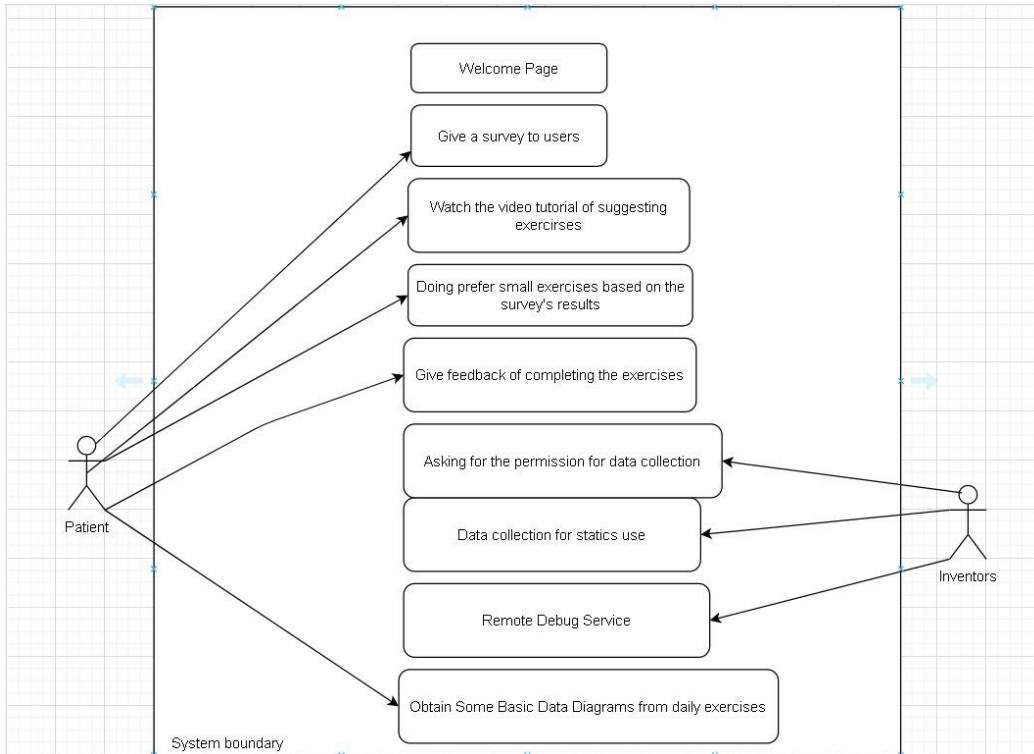
Figure 1: Functional decomposition of app functions.

Product Concepts

Ze's Concepts

Time based -Based An application that tracks environmental factors as well as pain and exercise. The app is to be used as a journal/diary for the user/client who emphasized data tracking and collection. The app will use a simple slider system so that when the user opens the application they are presented with the various factors and can rate how they feel/ or what events occurred that day. Another page will be present so that the user can decide for themselves which workout is most appropriate for how they are feeling that day. The workouts will be organized into various sections based on pain and location. The data that the user inputs will then be extrapolated into graphs and can be tracked by the time of input.

Friend-Monitoring The application will be designed to lock for a minute if the user chooses to not complete the exercise daily. It will be counted into the statistics. If the user does the exercise daily, the app will automatically send a message to the users' social media app like Facebook. The purpose of this function is to show their friends what users have achieved in our app and let their friends monitor their works.

Prefer-submitting – The application will track the habit of using the app and collect the data from the other apps. It will track the searching recordings from the users' phones. Once a user searches for some content related to the physical pain, the app will automatically send notifications for some relative exercises.

Sebastian's Concepts

Timer-Based - An exercise and pain tracking application. The app opens to a home page greeting the user and asking them if they would like to proceed with a workout/the exercises. The app leads the user to a pain questionnaire as well as a questionnaire regarding the type and location of the pain. This data will be collected into a report. Based on the decisions made, a list of exercises will be generated and compiled into one workout for the user. The user will be able to choose the length of the workout with the possibility of an enforced minimum. Beforehand, the user can customize and add various exercises that will be compiled into the list. Once the workout has started the user will be given a timer to complete the exercise, the user must be present on the app for the timer to complete. Once the timer is completed the user will move onto the next exercise until each timer has been marked as completed. If the workout is not completed the app will send notifications to the user to motivate them to finish the workout. This way the user can not cheat their way out of the workout.
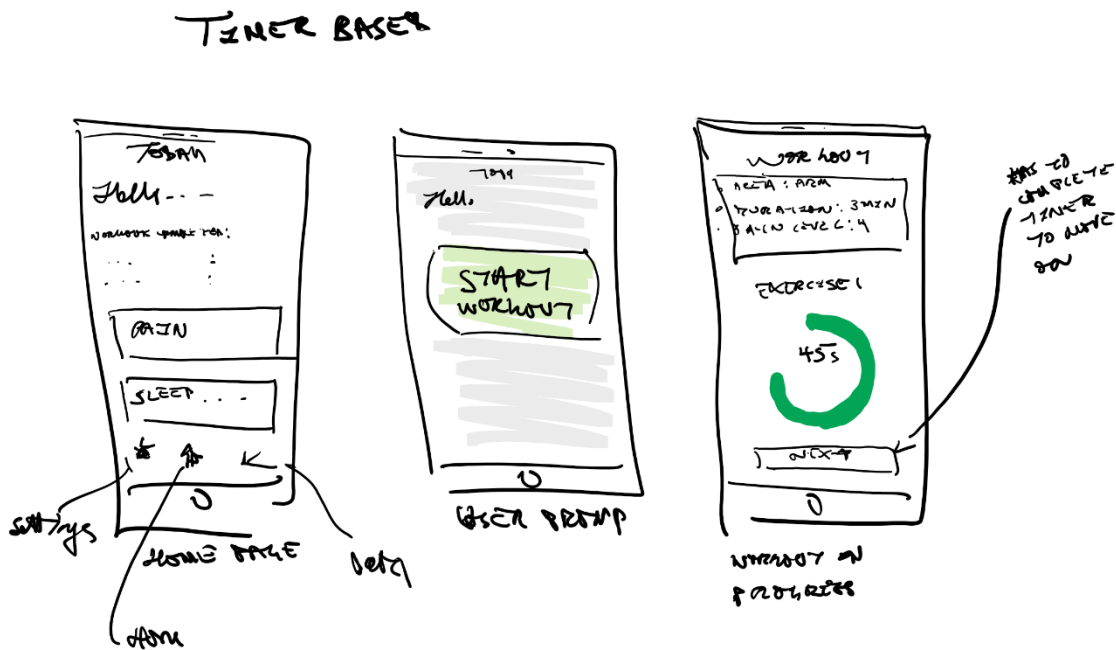
Figure 2: Sebastian's timer-based app sketch.

Calendar-based - A calendar-based app where the app the user opens the app and is greeted with a calendar system. The user can scroll back based on months, weeks, or years. The opening page will be set for the day. The user can then answer the questions that the app presents. It will be a survey-based app where one question proceeds the next. Questions will revolve around pain, which workouts were completed etc. The data will be extrapolated into graphs for each day. A check system will be employed for the user to check off whether they did their workout. A checkmark/ a green glow will appear on the days that they had completed workouts.
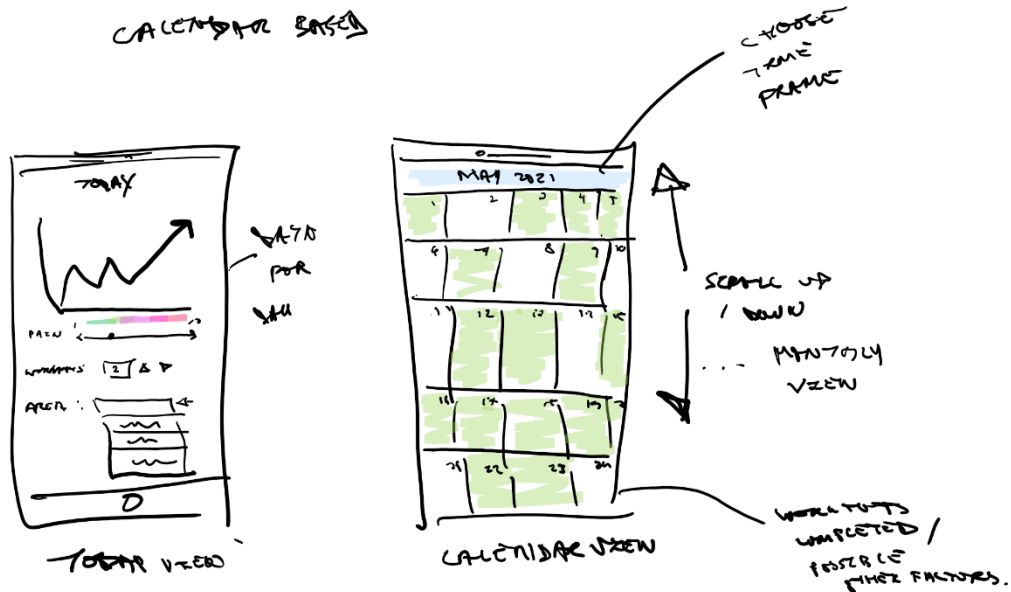
Figure 3: Sebastian's calendar-based app sketch.

Journal-based- The app is built with an integrated calendar system. It is built with the user's feelings in mind thus the app is focused on helping the user journal/write how they are feeling and where they feel the pain. Additionally, sliders will be to quantify the pain on a scale from 1-10, how they were feeling etc. The main screen is the current day. The app is also centred around social interaction; thus, the user can join groups discussing to help motivate themselves. Additionally, since this is journal-themed app pictures and videos can be added to the app which can later serve as data for how they were feeling or to take pictures if any injuries arise.
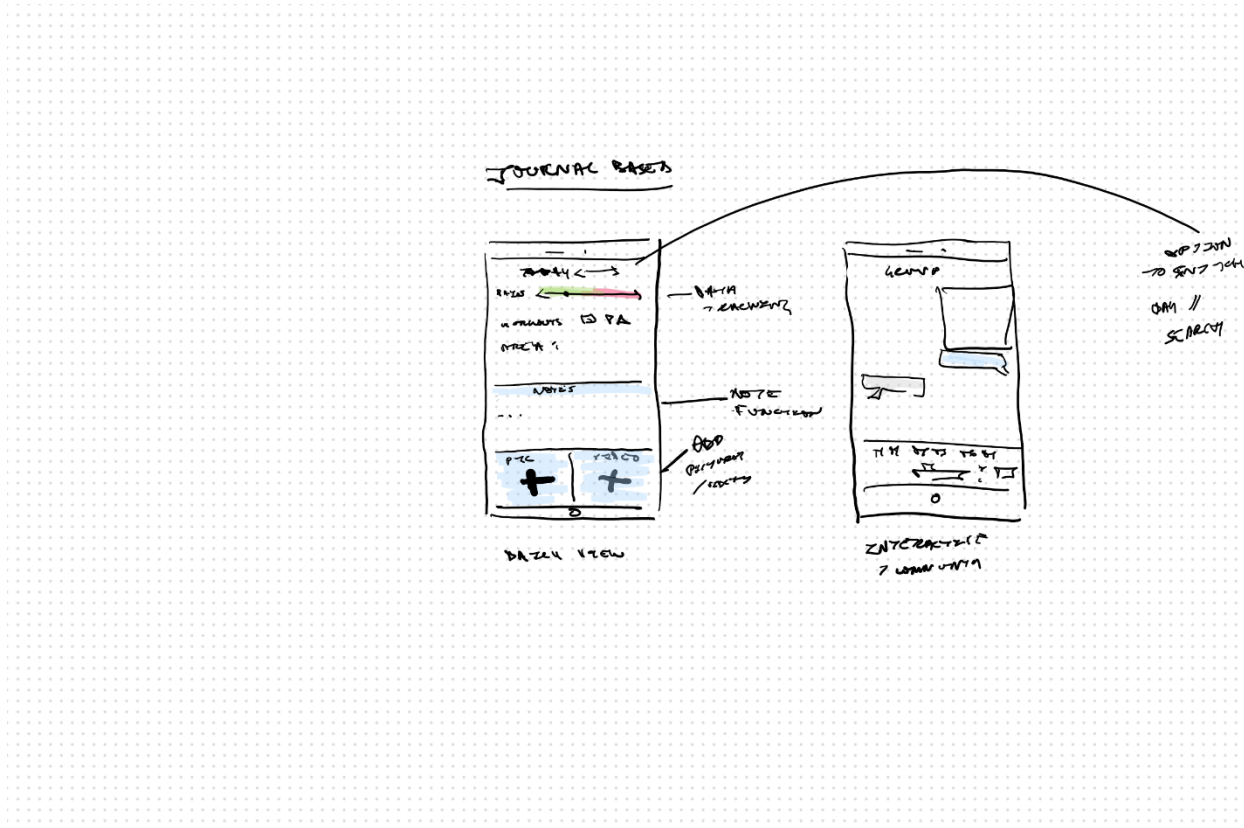
Figure 4: Sebastian's journal-based app sketch.

Abdelrahman's Concepts

Graph Representation - The client expressed that she is heavily interested in being able to collect and view data relating to her joint pain and exercises. The app opens displaying data from previous days in the form of graphs that the client can swipe through. On the home page, different buttons will take the client into different pages. One button will take the client to the pain questionnaire to allow the client to input her current pain in the app. This will allow the app to generate a list of different recommended exercises to help relieve the pain. After the client is done with the exercises, she will be led to a feedback page where she can input whether the exercises were useful or not.

Figure 5: Abdelrahman's graphical representation sketch.

Data Exportation - On the home page, different buttons will take the client into different pages. One button will take the client to the pain questionnaire to allow the client to input her current pain in the app. This will allow the app to generate a list of different recommended exercises to help relieve the pain. After the client is done with the exercises, she will be led to a feedback page where she can input whether the exercises were useful or not. The previous app showcased data in the form of graphs, this app will allow the export of the data collected so that the client can do whatever she would like.
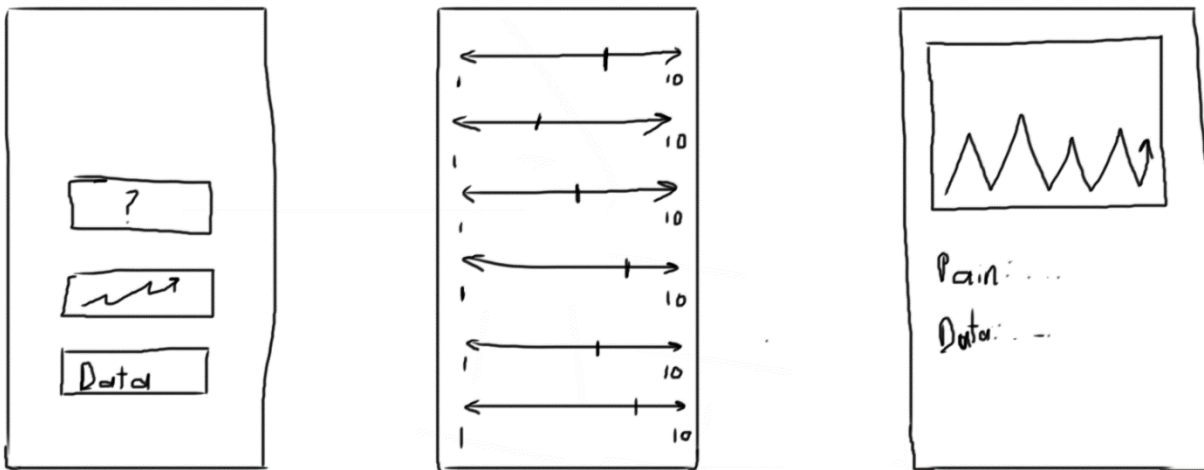

Figure 6: Abdelrahman's data exportation sketch.

Data represented as a game - The client expressed that she is heavily interested in being able to collect and view data relating to her joint pain and exercises. The design for this app is like the previous 2

concepts with the expedition of how the data is represented. On the home page, different buttons will take the client into different pages. One button will take the client to the pain questionnaire to allow the client to input her current pain in the app. This will allow the app to generate a list of different recommended exercises to help relieve the pain. After the client is done with the exercises, she will be led to a feedback page where she can input whether the exercises were useful or not. The other app showcased the data in graphs or simply raw data that the client would be able to export. This app showcases the data in the shape of a game. The joint pain is represented by a digital representation of a teddy bear with a health bar. The health bar fluctuates depending on the data imputed in the pain questionnaire or the feedback.
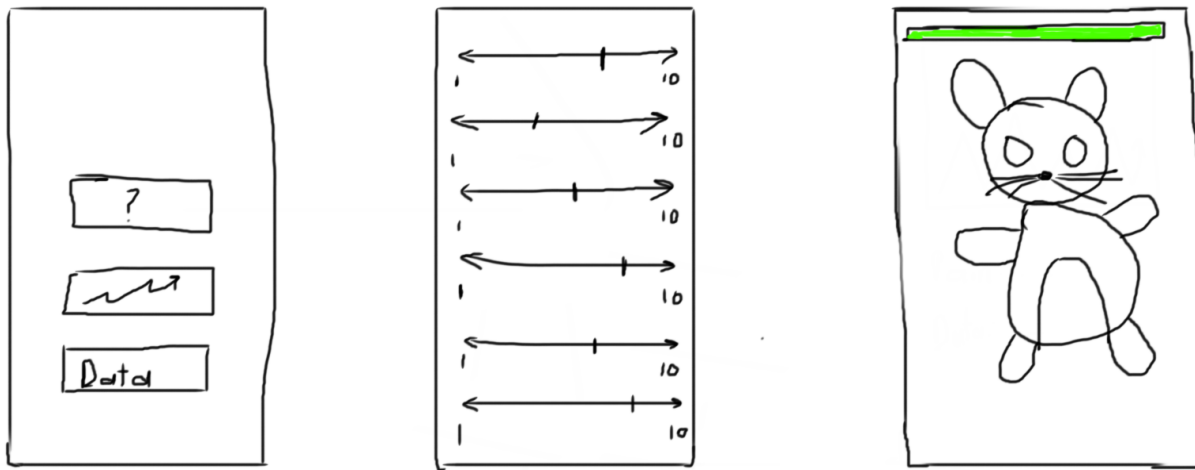
Figure 7: Abdelrahman's app game sketch.

Naomi's Concepts

Sport- Based - The application starts by asking the intensity of the pain. First, the user fills in a questionnaire about the painful parts, from there it is chosen if the pain is muscular or in the joints. The reasons for the pain also count, the absence of physical activities for a long time, a morning or a day too busy, the amount of water drunk, then with the graph we check the motivation, the mood, the effectiveness of the application depends on the specification of the user, during the day the person will record his mood, make sure that all the activities have been performed, the application can contain challenges where you choose what you want to achieve in the week and for each exercise well done, you earn points.

Figure 8: Naomi's general app layout sketch.

Needs-based- An application should be produced that first contains questions in the form of a survey to determine which part of the body is affected by the pain. The questions will include phrases such as: is the pain in the cartilage or is it muscle pain? Each answer will be assigned a specific exercise and a time limit. The questions will be generated according to the client's need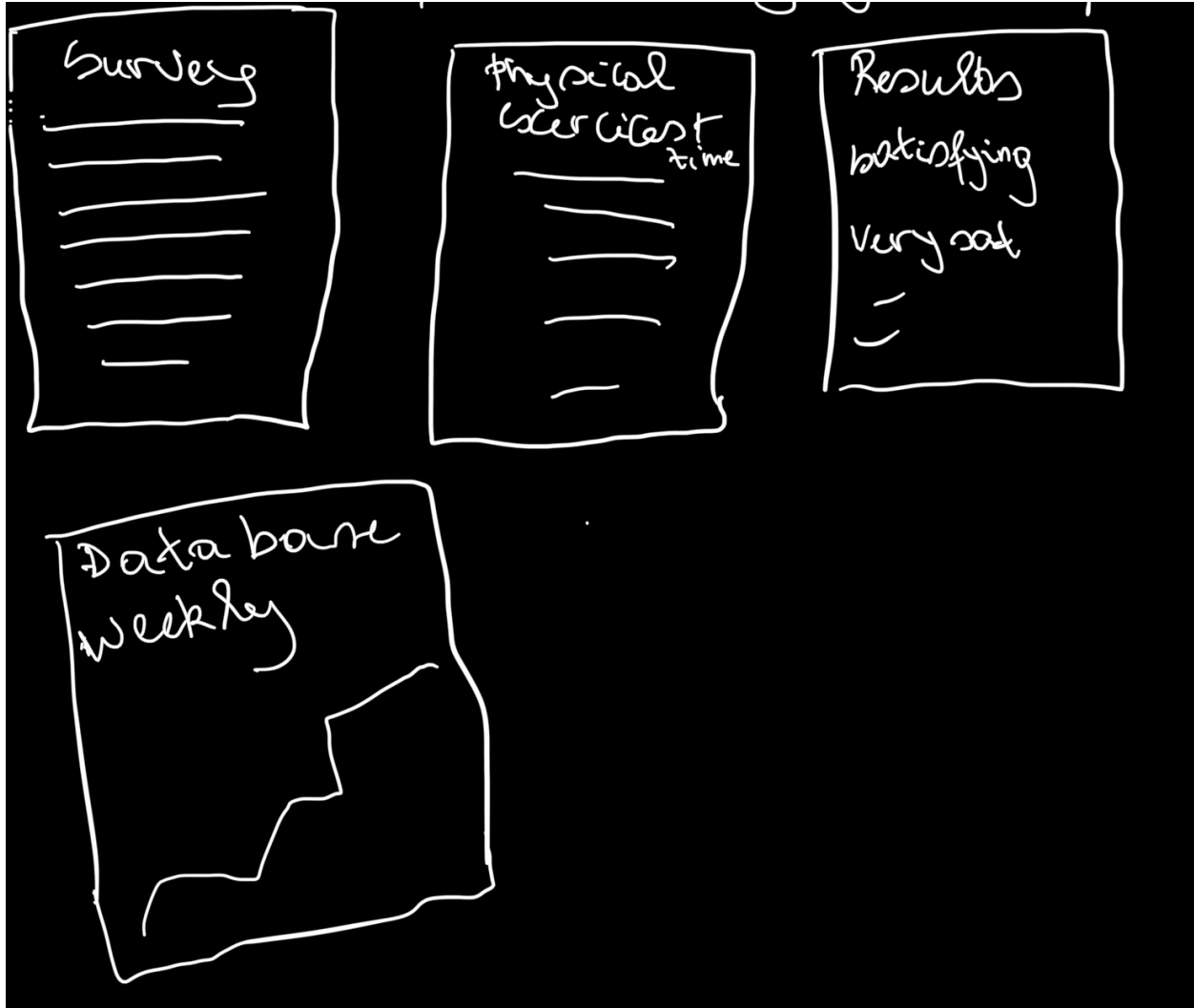s. The suggestion of exercises and time will come after answering the survey because everything depends on the parts that are painful. Afterwards, the application will be able to track through surveys, the exercises that have been performed and the results in relation to the pain, if the exercises have helped to relieve the pain or not. This will help the client by classifying by week the updates that the application needs. A graph will show the satisfaction of the client, on the number of minutes, the kind of exercises proposed the expected results vs. the obtained results.

Game-based- To enter the user will fill in the survey and then the workings of the exercises, the user does his exercises having the phone on him so that it is tracked. Each time the user completes an exercise well, he/she gets more points, and each time he/she gets 50-100 more points, he/she gets a badge that increases more and more. At the end of each week, we have the results of the points

received. A pain and efficiency tracker with exercise suggestions, with the results of the application, detects a need for an update or not.

Concept Evaluation

To analyze and evaluate the concepts, tables were made for each group member's ideas. One for the analysis portion and one for the evaluation portion. The tables help first to sort if the concept has the features, we are looking for and how they measure to the client's needs.

The analysis portion works by summarizing the information pertinent to each criterion. This helps to quickly identify the concepts that fulfill the client's needs. The concepts that do not explicitly say anything about a specific criterion will be assumed to have a basic feature that incorporates the criterion. This is based on group discussions where everyone expressed that this is the standard but may not have written it down into their concept descriptions.

The evaluation portion works by using the information provided in the analysis section and then scoring each idea based on the information given. The score is also dependant on the criteria/specifications and how well each concept fulfills that specification. The scale is from 1-3. The value associated with each concept is then multiplied by the weight and a total is then tallied. The higher the total the better ergo a score of 3 (before being multiplied by the weight) is better than a score of 1.

Ze's Idea Analysis

Criteria	Concept 1	Concept 2	Concept 3
Performance Time	Sliders are quick	Locks phone for a minute if workout is not completed	Based on users searches
Data Tracking	Journal/diary Emphasis on data tracking Graphs and tracked by date	Workouts counted for statistical analysis Sends alerts to social media for friends to monitor work	Sends message No permanent data storage
Complexity	Slider system Customizability options	Have to link social media Locks phone	Tracks users phone searches Scan internet
Customizability	Slider system for surveys/ratings	N/A	Many options for workouts - from internet not user

Figure 9: Ze's concept analysis.

Criteria	Weight	Concept 1	Concept 2	Concept 3
Performance Time (>30s)	0.1	3	1	1
App size (>50 mb)	0.1	3	3	3
Data Tracking (< 2 factors)	0.4	3	1	1
Complexity (>10 actions // user friendliness)	0.2	3	2	1
Customizability (< 2 options)	0.2	3	1	2
Total Score	1	3	1.4	1.4

3 - Best & 1 - Worst

Figure 10: Ze's concepts evaluations.

Sebastian's Idea Analysis

Criteria	Concept 1	Concept 2	Concept 3
Performance Time	Survey questions Customizable length/time frame	Quick check if user did workout Can choose to input more information	Based on how long they journal Survey questions
Data Tracking	Reports and graphs	Graphs for each data Calendar check mark system	Social media posting Calendar journal system Add pictures and videos
Complexity	Survey questions Multiple workouts generated	Organized using a calendar	Text boxes Social media links// integrated support groups with chats

		Checking the questions off	
Customizability	Customize workouts Survey questions	Survey questions No workouts offered	Survey questions Journal//notes section

Figure 11: Sebastian's concept analysis.

Criteria	Weight	Concept 1	Concept 2	Concept 3
Performance Time (>30s)	0.1	3	3	2
App size (>50 mb)	0.1	3	3	3
Data Tracking (< 2 factors)	0.4	3	3	2
Complexity (>10 actions)	0.2	3	3	2
Customizability (< 2 options)	0.2	3	1	2
Total Score	1	3	2.6	2.1

3 - Best & 1 - Worst

Figure 12: Sebastian's concepts evaluations.

Abdelrahman's Idea Analysis

Criteria	Concept 1	Concept 2	Concept 3
Performance Time	One button exclusively for the questionnaire Survey	One button exclusively for the questionnaire Survey	One button exclusively for the questionnaire Survey
Data Tracking	Pain questionnaire Feedback page Graphs	Pain questionnaire Feedback page Export data	Pain questionnaire Feedback page Data shown in game

Complexity	Different buttons for different pages One button exclusively for the questionnaire	Different buttons for different pages One button exclusively for the questionnaire	Different buttons for different pages One button exclusively for the questionnaire Game adds complexity Not as obvious
Customizability	Generated list of exercises from app	Generated list of exercises from app	Generated list of exercises from app

Figure 13: Abdelrahman's concept analysis.

Criteria	Weight	Concept 1	Concept 2	Concept 3
Performance Time (>30s)	0.1	3	3	3
App size (>50 mb)	0.1	3	3	2
Data Tracking (< 2 factors)	0.4	3	3	3
Complexity (>10 actions)	0.2	2	2	1
Customizability (< 2 options)	0.2	2	2	2
Total Score	1	2.6	2.6	2.3

3 - Best & 1 - Worst

Figure 14: Abdelrahman's concepts evaluations.

Naomi's Idea Analysis

Criteria	Concept 1	Concept 2	Concept 3
Performance Time	Questionnaire	Questionnaire Answer assigned specific exercise and time limit	Questionnaire
Data Tracking	Questionnaires/surveys Graphs Physical fitness, water, mood etc	Questionnaires/surveys Completion Graph	Point tracking system

Complexity	Internal challenges with points Surveys	Surveys	Surveys Game system with points
Customizability	Questionnaires for various factors	Satisfaction of user	App suggestions

Figure 15: Naomi's concept analysis.

Criteria	Weight	Concept 1	Concept 2	Concept 3
Performance Time (>30s)	0.1	3	2	3
App size (>50 mb)	0.1	3	3	3
Data Tracking (< 2 factors)	0.4	3	3	2
Complexity (>10 actions)	0.2	2	3	3
Customizability (< 2 options)	0.2	1	1	1
Total Score	1	2.4	2.5	2.2

3 - Best & 1 - Worst

Figure 16: Naomi's concepts evaluations.

Group Concept

Designing a movement reminder application(app) based on the Thunkable platform, which is mainly focusing on pain tracking and exercising. The app opens to a welcome page and leads users to a survey page. It requires users 2-3 minutes for completing the survey to get a better knowledge of users' physical condition. All the data will be collected into a report. The report will show up after completing the survey to let users known their current physical condition. A list of exercises will be offered based on the survey. There are different time-length exercises, and users can choose the exercises depends on their own time. The app will offer some advice base on the survey. After users click on a certain exercise, a tutorial video will show up for teaching the users how to do the exercises properly. A button will show up after the video to let the user begin the exercises. A timer will be set after the exercise began. The timer will not continue if the user does not present the app. Also, if the exercise was not completed, the next one will not begin. After the first time doing the exercises, the tutorial video can be skipped. There

will be an achievement system to record the achievements of users in this app. The weekly statistics will send to users, which includes daily diagrams that analyze the users' daily exercise tendency. If the users did use the app for a long time, it will send a notification. Also, if they did not complete the exercise, the app will send an unachieved notification. The app will let the user give feedback on each exercise that they do.

Other concepts including an app with a game and integrated social media platform/reminder were not incorporated into the final group concept. The social media app had a function that would send alerts to the user's social media regarding their progress. Considering the users' feelings, they may not be willing to be monitored by their friends. For the gaming app, the user may only focus on the game elements. Repeating the same game every day would also get boring. For these reasons, we modified our concepts and selected the common attributes to create the group concept.
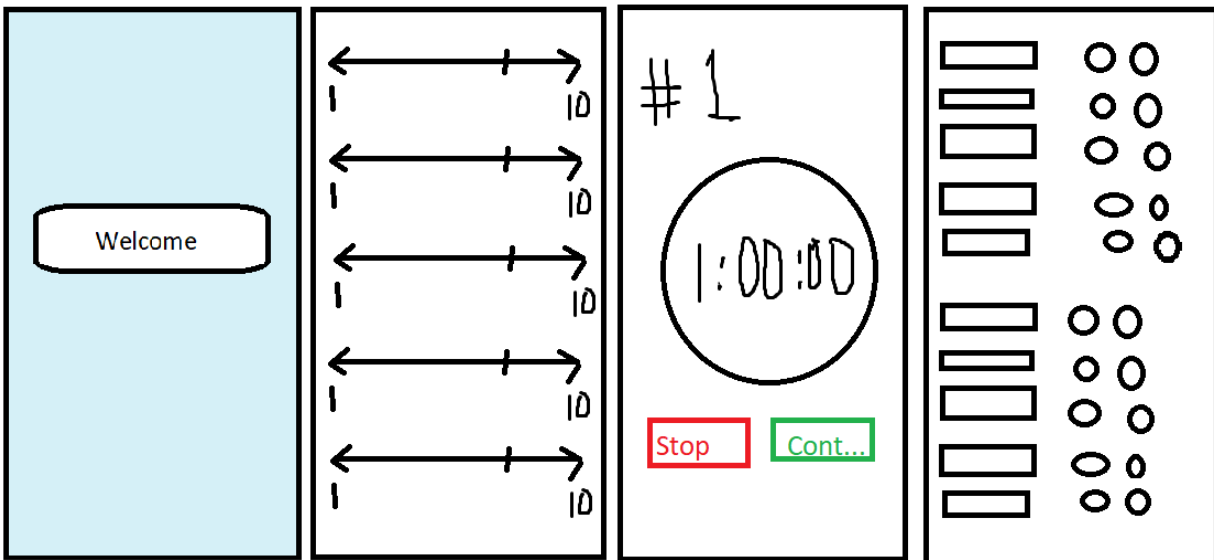
Group Concept Visual Representation

Figure 17: App user interface sketch.

Concept Benefits, Drawbacks and Target Specifications

Target Specifications

The target specifications have been modified since the last deliverable to better represent what the group will be measuring. Performance time, app size, complexity, customizability and data tracking will be measured among the other specifications that were valid but did not directly apply to the app and the user. The app relates to the performance time both in how responsive the app is to user commands and the time it takes for the user to complete a task. The surveys that are a critical part of the user experience take time. This is explained in the drawbacks. Additionally, the complexity metric which measures how simple it is for the user to achieve the intended goal is hindered by these surveys. Meanwhile, the customizability and user experience are both benefitted from the surveys are their

abilities. From the survey, the workouts will be tailored to the user's needs for that particular day making the experience more pleasant. Data is an important factor for the user however the more data that must be collected the greater the app size.

Benefits

The group concept has many advantages that will serve the client and her needs. First, the app has a timer system. The timer system helps the user complete the workout and not cheat themselves out of doing it. When the workout begins the app will cycle through the exercises. The timer will start, and the user can not proceed to the next exercise/ to the end before the timer for all of the exercises have been completed. The customizable options are an advantage since they allow the user to have the best workout based on her survey answers. The area of focus can be changed allowing the workouts to be more specific and helpful, the time can be changed allowing the user to tailor the workouts to her routine and the exercises can also be customized helping the user choose the best exercises to manage her pain. These features will help the user experience in general.

Drawbacks

The timer-based group concept has some drawbacks regarding the methods it employs to achieve the task. While discussing with the client during our meeting, she mentioned how motivation was a large factor in her ability to do the workout. This was noted and discussed in deliverable B. No app will ever be entirely responsible for the user's motivation however there are methods that can help motivate the individual. While the timer app presents a sophisticated solution for the motivational aspect there are still flaws. The user could choose to wait for the timer to end and proceed to the next exercise until the workout is completed thus completing the task. Additionally, the user could ignore the reminders sent by the app and disable app notifications however these issues are not unique to our concept. Next, the surveys that are conducted before each workout and the customization options for the type of workout and duration may take longer than another app concept or system. It is here where one must weigh the value of the user experience against the time required before starting the workout. Seeing as the client discussed the fact that she does many workouts on the go and that they are quick, time is an important factor. On the other hand, helping her alleviate the pain is still the number one focus. The time requirement is simply a drawback. One final drawback is the complexity of the user data collection and analysis. To provide the best comparison, the app may need to be complex which could impact the user-friendliness of the application.

Conclusion

In conclusion, we considered the client's needs to choose a concept that will best meet the client's needs. We compared all our twelve concepts, which all detail their functionality, comparing the strengths and weaknesses of each concept. The concepts were assessed based on the group metrics which helped the group decide on the group concept. When creating the concept, the group built on previous knowledge obtained from the client. For the best user experience, it is important for the app to make sure that the survey questions are perfectly matched to the exercises as this could cause the user more pain if executed incorrectly. A customizable application adapts to the client who defines their needs. The application will accomplish tasks step by step. Finally, the user will be able to track the data automatically and save it. These are the results of the analysis of the customer needs that define the

tasks of the product. The group was able to create a conceptual design that will help in the design of the first prototype and further steps.

Appendix

WRIKE - Snapshot

https://www.wrike.com/frontend/ganttchart/index.html?snapshotId=xdXLqoMUtcCT7QxdpzsDhv6uMZ
OIpcIe%7CIE2DGMZZGQZTILSTGE3A

Screenshots from Wrike to illustrate that descriptions have been added for the tasks/subtasks and important documents have been added.
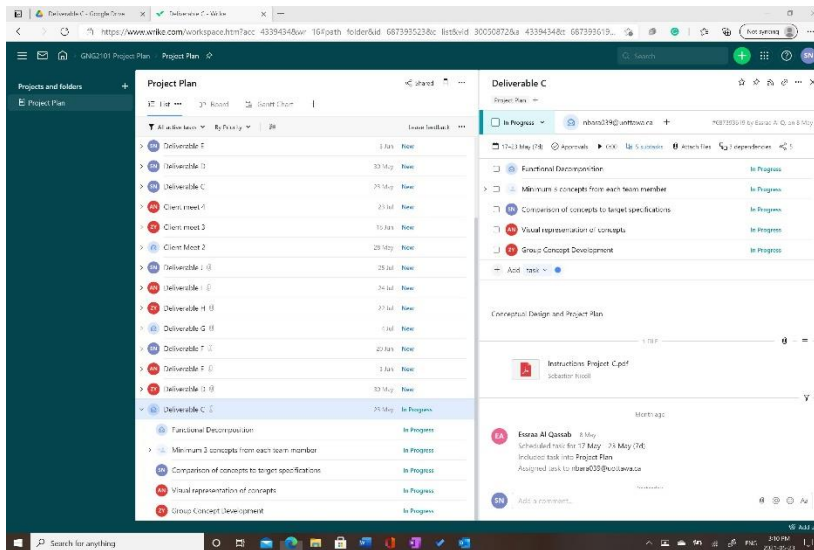

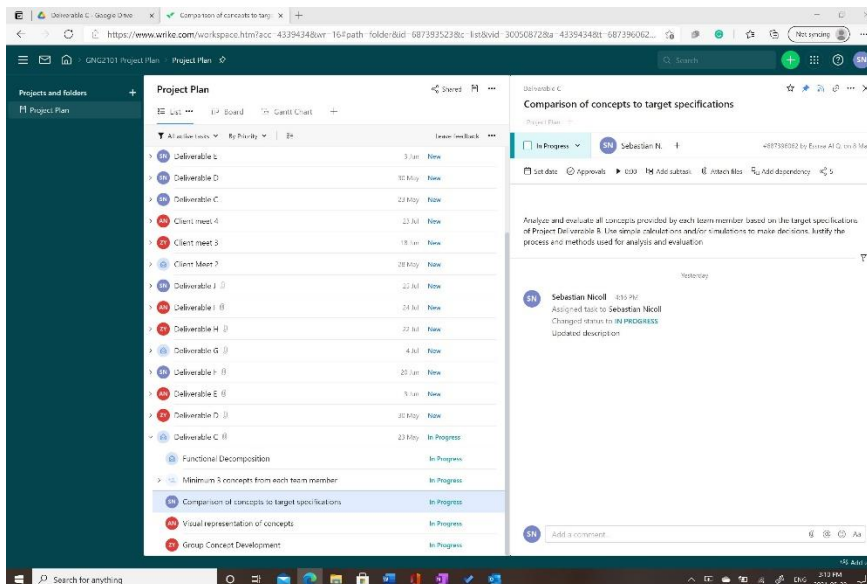Figure 18: Wrike screenshot of main task with files and description.

Figure 19: Wrike screenshot of subtask.