

IBEHS 1P10

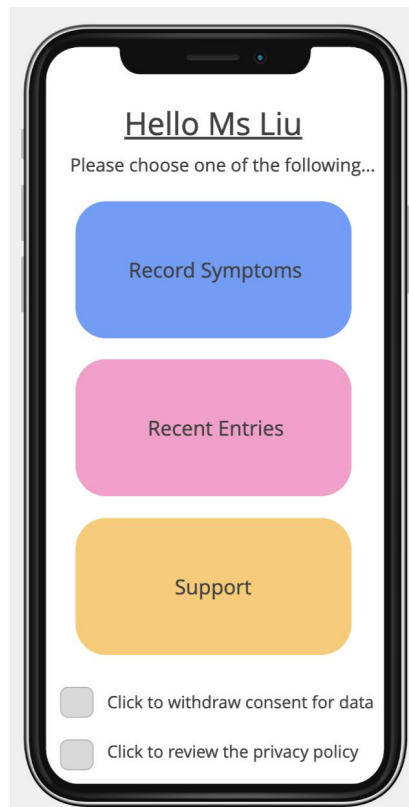
DP4 - Team 17

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April 9, 2020

LogMe

A Symptom-Tracking App



Academic Integrity Statement

The student is responsible for performing the required work in an honest manner, without plagiarism and cheating. Submitting this work with my name and student number is a statement and understanding that this work is my own and adheres to the Academic Integrity Policy of McMaster University.

Submitted by: Ansh Kuckreja, 400235166

A Kuckreja

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Submitted by: Meera Moorthy, 400244635

m moorthy

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Submitted by: Rachel Don-Wauchope, 400261793

R Don-Wauchope

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I. Need Statement:

To design a product for Ms. Liu that allows her to effectively convey information regarding her condition with others to help improve her quality of life with her autoimmune disorder.

II. Background and Research Summary:

i. Diagnosis:

Ms. Liu is an undergraduate student with an unidentified autoimmune disorder that causes her extreme joint pain and limits her daily functioning. The severity of her pain varies day-to-day and can affect her fingers, wrists, hips, and/or shoulders. This unpredictability makes it difficult for medical professionals to diagnose her condition. Ms. Liu visits the hospital once a month to undergo blood testing, but otherwise communicates with her doctors through symptom-logging worksheets given to her. These worksheets ask her to indicate levels of swelling, burning, and itching, with an additional column for additional comments and feelings. This method, however, introduces a variety of factors keeping her from accurately recording data, thus hindering her doctors' abilities to diagnose her condition.

Specifically, on days where her joint pain is severe, she finds it extremely difficult to use a pen to log her symptoms. Furthermore, having to remember specific feelings in order to accurately convey them to her doctors is difficult. At one point she was using an app, but found it ineffective and it ended up being discontinued. This lack of data is a major problem inhibiting doctors from being able to decipher a pattern in her symptoms and diagnose her specific condition, reducing the chances of ameliorating Ms. Liu's condition.

ii. Wireframing and Prototyping:

A potential solution to Ms. Liu's symptom-logging problems is an app that would efficiently collect information from Ms. Liu and convey it to her doctors. To plan and conceptualize the various pages of the app and how they would collect and display data, along with interact with each other (the general user experience), a wireframe can be created. A wireframe is a tool used to transform low-fidelity ideas into high-fidelity prototypes by delineating how the user interface and experience of a design can be connected [1], without any real functioning. Adobe XD is a software that offers a wireframing tool for app design, in which users can easily create user interfaces and share them with collaborators for external input. Multiple sample screens can be connected to create a flowchart of an app's functionality [2]. This was the software used to create the designs of the screens and determine how each page would be linked.

Once a wireframe is created and the various aspects of an app have been conceptualized, a prototyping tool can be used to illustrate beta versions of an app. Prototyping is essential to the design process as it allows for external, constructive feedback and helps identify any flaws in the user interface and experience. Justinmind is an app-prototyping tool in which users can import the screens from their wireframes and use drag-and-drop features to add functionality to each feature [3]. For example, it can make a button clickable and assign various tasks upon the click. It can then run a simulation of how the app would look and work for a user, making the design verification process much easier. Once completed, it can be turned into a native app ready for publishing on the market [4]. Hence, due to its swift interface and prototyping capabilities, Justinmind was the tool used to create a simulation of an app for Ms. Liu.

III. Design Specifications:

i. Product Identification:

- **What It Is:** LogMe, an interactive mobile app residing on the App Store.
- **Purpose:** Provide Ms. Liu with an efficient and user-friendly way to record her symptoms soon after she has experienced them, so they are fresh in her memory.
- **What It Does:** Helps her easily track her symptoms and feelings and condenses each log into summaries that are displayed to her physicians. It also sends push notifications to remind her to log, and includes a mental health / support page for her.
- **Key Features:** It is a piece of software, so Ms. Liu is only bearing the weight of her iPhone, which she is accustomed to.

ii. Usage:

- **Visual Design:** The general design incorporates bright colours and interactive buttons to encourage Ms. Liu to continue using it.
- **Functional Design:** Dragging and sliding motions were avoided, instead, entries can be inputted by simply tapping. Furthermore, more complicated entries (involving details that cannot be summarized by a predesigned button) use speech to text technology, allowing Ms. Liu to fully describe her condition when she needs to (without causing further irritation). There are also large hitboxes around each element to accommodate for struggles she may have, as her condition impacts her fine motor skills.
- **Key Features:** The app can be used with one hand, especially if she rests her phone on a surface while using it.
- **User Interface:** The following series of diagrams illustrates the user interface and function of each page.

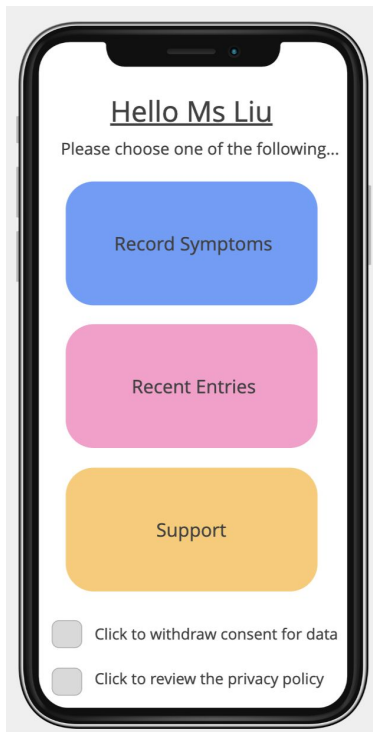


Figure 1: “Home” page

Home Page

- The “Home” page is the page that Ms. Liu opens *LogMe* to. It offers her the options to record a new entry, view her recent entries, or seek emotional support as pictured in *Fig. 1*.
- The “Home” page also provides the option to withdraw consent to the collection of her data, should she feel uncomfortable sharing it.
- Ms. Liu can also review the privacy policy from this page.

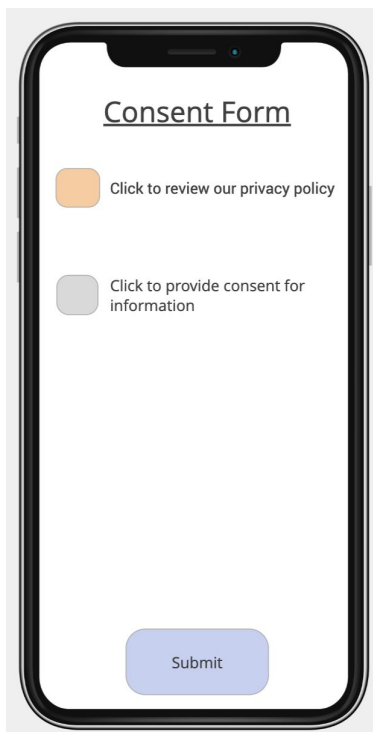


Figure 2: “Consent Form” page

Consent Form

- The “Consent Form” page is issued in accordance with the standard privacy policy. Before Ms. Liu is able to input any of her data into the server, she must provide her informed consent on this page.
- This page appears after the home page on her first use and, once accepted, will not appear again unless she chooses to revisit the privacy policy or withdraw consent.

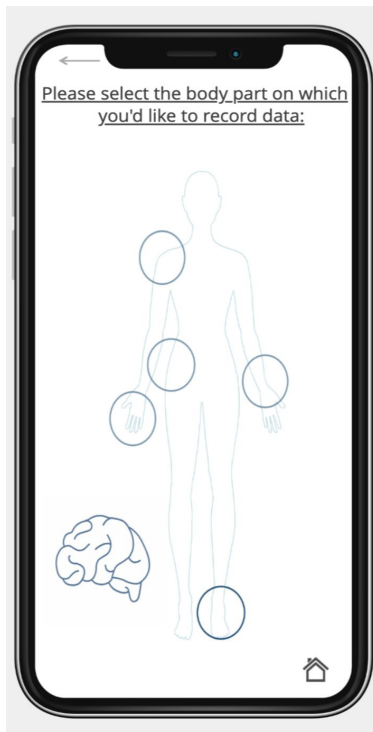


Figure 3: “Symptom Localization” page

Symptom Localization

- Ms. Liu is directed to the “Symptom Localization” page when she chooses to log a new entry.
- The five locations pictured in *Fig. 3* (fingers, wrist, hip, shoulders, and feet) are where Ms. Liu experiences the most pain due to her condition.
- She can select multiple body parts to log entries about each of them.
- She can also click on the image of the brain to make a mental health entry.

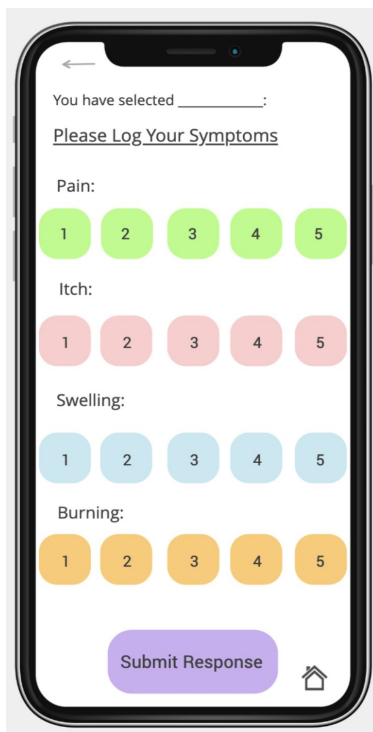


Figure 4: “Symptom Entry” page

Symptom Entry

- Ms. Liu is further directed to the “Symptom Entry” page from the “Symptom Localization” page.
- Based on a selected body part, she can indicate her levels of: pain, itching, swelling, and burning.
- This page requires Ms. Liu to select a value for all sensations before she can submit the entry.
- Data collected from the “Symptom Entry” page will be stored and consolidated for her and her physicians.

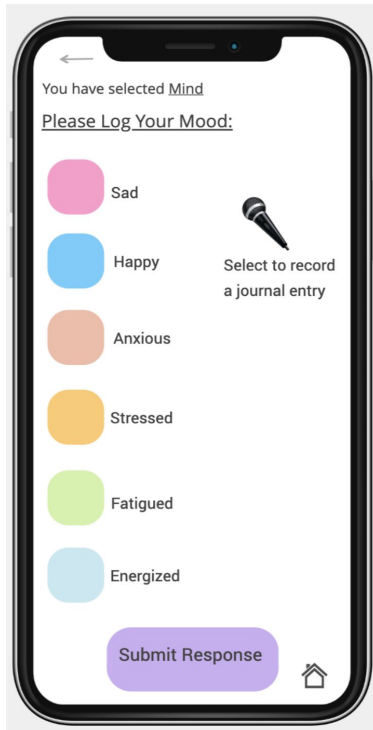


Figure 5: “Mood Entry” page

Mood Entry:

- Ms. Liu is directed to the “Mood Entry” page from the “Symptom Localization” page if she selects the brain, as pictured to the left of *Fig. 3*.
- She can log one or more of the listed moods in *Fig. 5* (sad, happy, anxious, stressed, fatigued, and energized) and then submit her response.
- Information collected from the “Mood Entry” page is stored as mental health data and will not appear in summaries for her physicians.
- For more complicated entries, Ms. Liu can click on the microphone in *Fig. 5* and use the speech-to-text feature to orally record her state of mind. With this function, *LogMe* can be treated as an online journal as well as a more intensive log of her condition.



Figure 6: “Mental Entries” page

Mental Entries:

- Ms. Liu is directed to the “Mental Entries” page from the “Home” page by clicking the *Recent Entries* button as pictured in *Fig. 1*.
- She is able to visit her recent mental health entries from this page. Each entry is dated and timed to precisely when she recorded them in order to evaluate trends.
- Ms. Liu can be further directed to the “Physical Entries” page by clicking the arrow at the bottom of the screen, as pictured in *Fig. 6*.

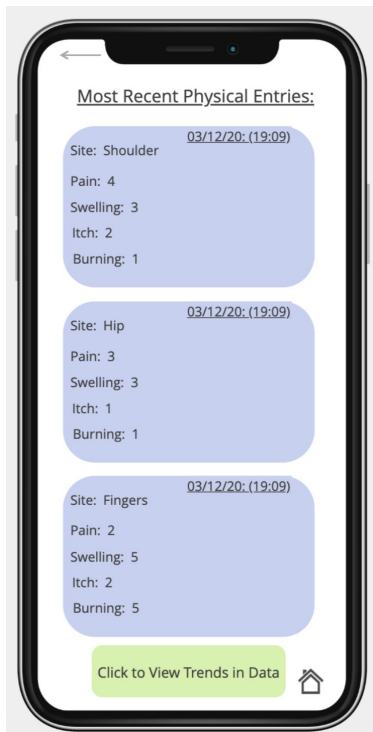


Figure 7: “Physical Entries” page

Physical Entries:

- Ms. Liu is directed to the “Physical Entries” page from the “Mental Entries” page.
- The “Physical Entries” page is similarly structured to the “Mental Entries” page.
- Each entry displays the localization and scale of a physical symptom with the appropriate date and time of recording.
- Ms. Liu can be further directed to the “Data Trends” page by selecting the *Click to View Trends in Data* button at the bottom of the page, as pictured in Fig. 7.

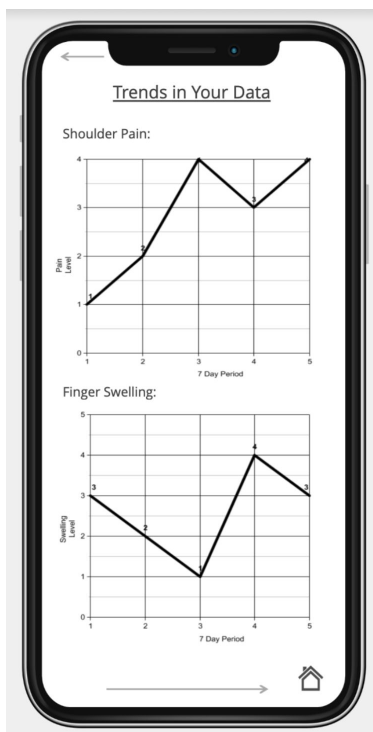


Figure 8: “Data Trends” page

Data Trends:

- Ms. Liu can be directed to the “Data Trends” page from the “Physical Entries” page.
- This page graphically models her physical entries for a specific location and symptom over a 7 day period.
- To prevent scrolling, 2 graphs are presented on the screen at a time. Additional graphs can be viewed by clicking on the arrow at the bottom of the screen, as pictured in Fig. 8.

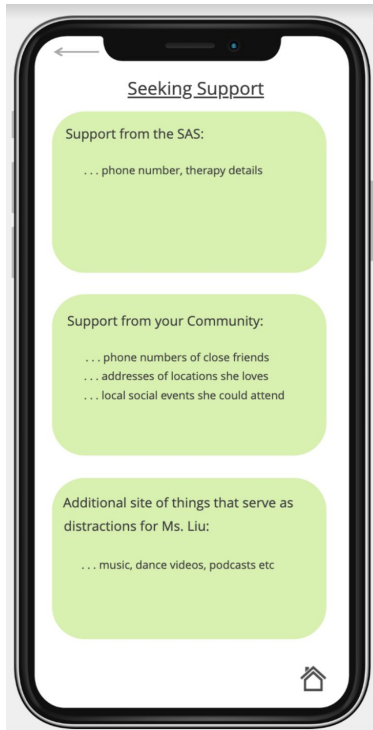


Figure 9: “Support” page

Support:

- Ms. Liu can be directed to the “Support” page from the “Home” page by clicking on the *Support* button, pictured in *Fig. 1*.
- Ms. Liu can seek various mental health support services through *LogMe* from the “Support” page.
- The “Support” page will feature:
 - a. Links to McMaster’s Student Accessibility services.
 - b. Links to community and non-academic services.
 - c. Links to “Moral Boosters” and distractions that are randomly and newly generated each time she visits the “Support” page.

iii. Standards and Safety:

- **Guidelines:** Publishing an app to the App Store requires the app to follow the guidelines and policies for app developers, specifically those for Health and Health Research apps.
- **Privacy Policy:** A privacy policy will be made to include (a) nature, purpose, and duration of the research; (b) procedures, risks, and benefits to the participant; (c) information about confidentiality and handling of data (including any sharing with third parties); (d) a point of contact for participant questions; and (e) the withdrawal process [11].
- **User Consent:** Once a user downloads the app they will be required to read the privacy policy and acknowledge this as well as consent to the collection of their personal data. There will also be an option to withdraw their consent at any time, furthermore, there will be an option to delete their data. In order for the patient’s (or Ms. Liu’s) data to be shared with her physicians, there will be a section in the privacy policy that highlights how the data will be shared and exactly what it will look like. Also, there will be an area for her to enter the contact information of the people she wants to have access to her data. Finally, the app will provide a way to contact us (the developers) in case the user has any questions or concerns.

iv. Life Cycle:

- **Environmental Implications:** Seeing as this design is software-based, there are no direct environmental implications of its creation or use, and thus concerns about replacement and disposal are not pertinent.
- **Maintenance:** Software updates can be issued upon request or feedback to enhance the user experience, whether it be regarding the design, the data being collected, or the data collecting process. One thing to be cognizant of would be ensuring the software is compatible with the latest android or OS updates, especially given how frequent they can be.

v. Production Cost:

- **Cost of Publishing:** The cost of publishing an iOS app so that it is available for download and installation is \$99 annually [10], whether or not you sign up as an organization or an individual.
- **Cost of App:** If the app were to cost the user any money (in-app purchases or a subscription) the App Store charges a 15% Transaction Fee [10], though the intention is to keep the app free.

Appendix A - References:

- [1] Uxplanet.org, “A Step by Step Guide to Creating Mobile App Wireframes,” *Medium*, 09-Jul-2019. [Online]. Available: <https://uxplanet.org/a-step-by-step-guide-to-creating-mobile-app-wireframes-ed2e2e5c53a75>. [Accessed: 04-Apr-2020].
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- [3]“All-in-one prototyping tool for web and mobile apps,” *justinmind*. [Online]. Available: <https://www.justinmind.com/>. [Accessed: 19-Mar-2020].
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- [5] P. Chmielewska, “10 Awesome Development Tips to Create User Friendly App,” *itCraft*, 14-Jan-2020. [Online]. Available: <https://itcraftapps.com/blog/10-awesome-tips-to-developing-user-friendly-apps/>. [Accessed: 19-Mar-2020].
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- [7] “What is the Best Way to Design a Budget-Friendly Mobile App?,” *By Shifa Martin*. [Online]. Available: <https://hackernoon.com/what-is-the-best-way-to-design-a-budget-friendly-mobile-app-dk5qq31cl>. [Accessed: 19-Mar-2020].
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- [10] Y. Keshtcher, “Top 22 Prototyping Tools For UI And UX Designers 2020,” *Medium*, 04-Jan-2020. [Online]. Available: <https://blog.prototypr.io/top-20-prototyping-tools-for-ui-and-ux-designers-2017-46d59be0b3a9>. [Accessed: 19-Mar-2020].
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- [13] “App Store Review Guidelines” *Apple*, last updated: March 4 2020 [online]. Available: <https://developer.apple.com/app-store/review/guidelines/#health-and-health-research> [Accessed: 21-Mar-2020].

Appendix B - Milestone 1:

Problem: Lack of data makes it difficult to diagnose her condition, and the data recording process can be annoying and strenuous, especially since she struggles with writing/typing.

Objectives:

- Improve quality of life
- Support independence
- Have a short/long term function for the condition
- Easy to Use
- Easy to Access / Portable
- Resistant to Contamination
- Accurate
- Durable
- Power-efficient
- Cost-efficient

Functions:

- Addresses concentration fatigue
- Keeps track of symptoms
- Mediates symptoms
- Monitor symptoms in an attempt to identify patterns
- Maintains/helps her with her mental health

Constraints:

- Can't require fine motor skills to assemble or use
- Can't be heavy or require strength to handle
- Can't cause additional pain (/worsen her problem)
- Functional even with inflammation
- Cost limiting

Retractable door hook:

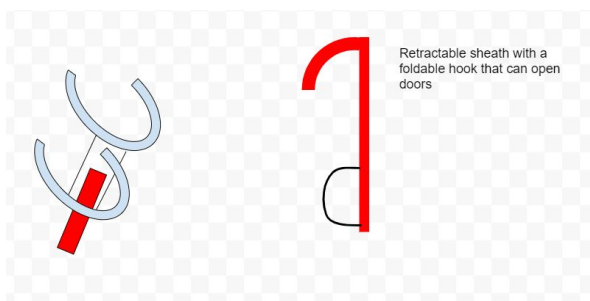


Figure 12: “Retractable door hook” preliminary graphic design.

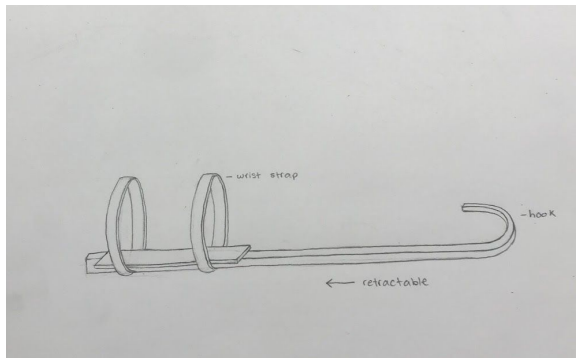


Figure 13: “Retractable door hook” concept sketch.

- Hook made of a flexible plastic that curves once its out of the sheath
- Brace latches onto hand, and can be easily pulled out to help her open doors
- Would save her the time and embarrassment of waiting for someone to open doors for her, and would make her day-to-day life more convenient

Wrist attachable door bracelet:

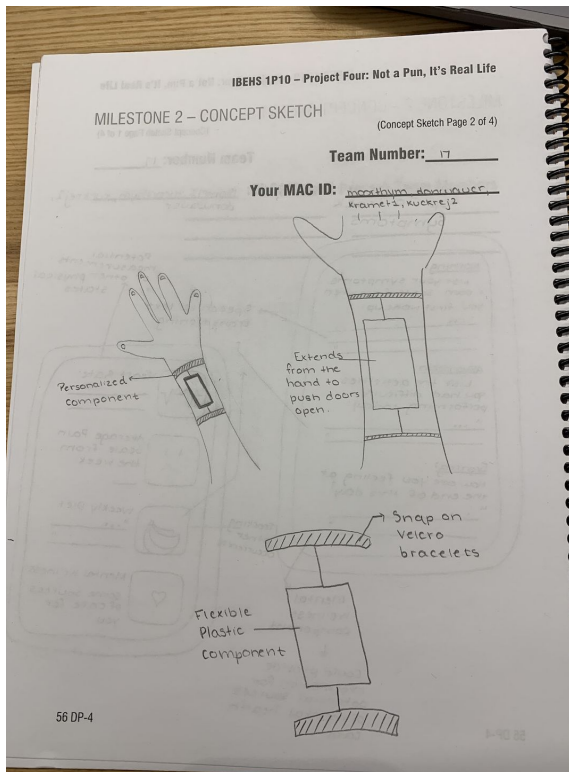


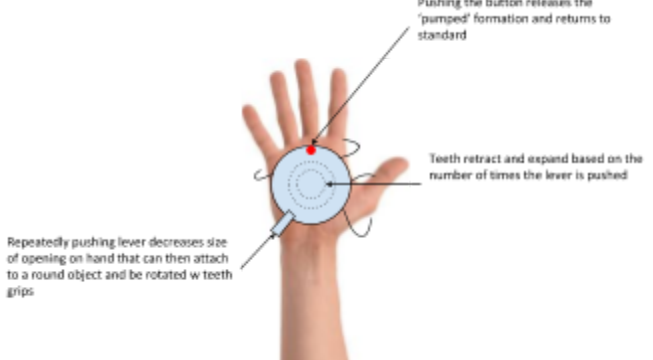
Figure 14: “Wrist attachable door bracelet” concept sketch.

- Contains a physical element that’s worn like a bracelet and can help her to perform fine motor movements
- Could potentially contain a flat face she could use to push open doors

Motorized glove:

 Figure 15: “Motorized glove” preliminary graphic design.	• A comfortable, cotton-like glove that would help conduct specific tasks • Contains a cooling gel along the fingers and knuckles to instantly help with inflammation and pain • Incorporates motors programmed to adhere to specific tasks, ie. ○ To turn a doorknob, it would assume a dripped position ○ To hold a pencil, it would maintain a finer grip at the fingertips ○ To help her play the piano (which she likes to do as a distraction), it would hone in on those specific skills • The default position would keep her palm open, as she stated this is her most comfortable position
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Smart glove:

 Figure 16: “Smart glove” preliminary graphic design.	• Another glove concept that would help with the specific task of rotating door knobs
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Badminton glove:



- Glove with an incorporated racket
- Allows her to pursue a new hobby and maintain some sort of distracting physical activity
- Improve mental health by allowing her to be active, which is a good distraction

Figure 17: “Badminton glove” preliminary graphic design.

Concept Evaluation

WR - Weighted Rating

R - Rating

	App Design		Retractable Door Hook		Wrist Attachable Door Bracelet		Motorized Glove		Smart Glove		Badminton Racket	
<u>Component + Weight</u>	R	WR	R	WR	R	WR	R	WR	R	WR	R	WR
Supporting Independence (0.25)	1	0.25	3	0.75	3	0.75	3	0.75	4	1	2	0.50
Easy to use (0.25)	4	1	4	1	2	0.5	4	1	3	0.75	4	1
Cost-Efficient (0.15)	5	0.75	5	0.75	2	0.3	2	0.3	4	0.60	5	0.75
Accurate (0.05)	3	0.15	2	0.1	2	0.1	3	0.15	2	0.1	2	0.1
Relation to Mental Wellness (0.1)	4	0.4	1	0.1	0	0	2	0.2	2	0.2	3	0.3
Resistant to Contamination (0.05)	5	0.25	2	0.1	2	0.1	2	0.1	4	0.2	4	0.2
Durable (0.15)	5	0.75	3	0.45	3	0.45	3	0.45	3	0.45	3	0.45
Final Rating		3.45		3.25		2.2		2.95		3.30		3.30

SUMMARY: We chose to pursue the app for our design. We're hoping that this app can help Ms. Liu to learn more about her undiagnosed disorder by keeping track of her symptoms. This should help physicians to understand more about her symptoms for when she's unable to recall the details of her more difficult days. Based on the above decision matrix, this design will be easy to use, accurate, cost-efficient, durable and have a good relation to her level of mental wellness. We were hoping to include various components within the app that could help Ms. Liu to feel more comfortable with her disorder and help to improve her mental health. Although the design did not score very high in the supporting independence sector of the decision matrix, we're hoping that the data earned from this app could help physician's to better understand the progression of her condition that could lead to finding a cure.

Appendix D - Milestone 3:

Low Fidelity Prototype

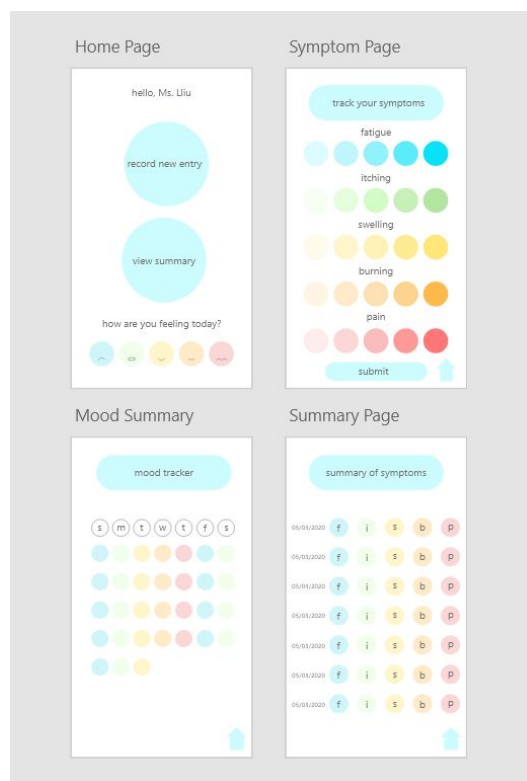


Figure 19: “Low Fidelity Prototype”: a wireframe displaying the basic LogMe layout, built in Adobe XD.

Figure 20: *Preliminary Gantt Chart*