Project Deliverable B: Needs, Problem Statement, Metrics, Benchmarking and Target Specifications

GNG 2101D
Team D1
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Introduction:

When the process of design thinking is generated, one must first empathize with the user they are designing the product for. It is arguably the most important step in the design process and in this empathizing stage, an interview with the client was conducted so our team could fully understand their personal situation and gain insight into the day-to-day life of the user through making observations and taking note of their challenges and struggles. Moving onto the defining stage process, this is where a list of prioritized customer needs must be generated, and the importance of each need must be stated upon the basis of a numerical ranking system. After creating the list of customer needs, a problem statement will be created for our application. From the list of needs, a table of metrics is produced which contains a set of quantitative and qualitative attributes, as well as the units for each respective metric. Even though we will eventually create our own application, the list of metrics will be used to benchmark similar applications currently available on the market. The reason why benchmarking is beneficial is because it will better our team's judgement when deciding on what the final design concept must entail. Then, based on the specific values observed from the benchmarked products, a set of target specifications will be created that entails a list of marginally acceptable and ideal values for each respective metric. Finally, using the marginal and ideal values, the final target specifications will be produced. The conceptual design, project plan, and feasibility study will come in the next assignment, entitled, "Project Deliverable C."

1. **Client Statements and Observations:**

- Our client's name is Mark. He is 50 years old and is currently studying for a master's degree and has a background in biology and nursing.
- He currently attends online classes from home 3 days a week, and does telework at NCF (National Capital FreeNet) for two days a week.
- Mark has type 2 diabetes and tracks it almost daily (5 times a day). He tracks his insulin levels after almost every meal, and is reminded of his blood glucose level every 15 minutes.
- Our client also suffers from inattentiveness ADD (Attention deficit disorder) but keeps up with his diet pattern. He eats regularly and also measures his insulin after every diet.
- Mark has a moderate activity level, and tries to spend time outside when not in school or working.
- His behavior can be described as energetic and is a very happy-go-lucky individual.
- Mark uses an Android phone, specifically a Samsung Galaxy A.
- He has used a blood glucose test meter to track his insulin levels when they're very low or high. This is done through finger pricking, but Mark has found it to be inefficient because it is missing the hidden sugar content in various foods/drinks.
- Mark is usually in target within 75% of the time when keeping track of insulin levels
- "Is a tool that helps me find all the hidden sugar, so while it's labeled a mealtime insulin calculator, I want you to think of it as a hidden sugar escape room"
- "I do not want you to worry about my correction factors, and they mess up math."
- "What I have problems with because I have ADD as well, is looking at a cup of coffee. If you lookup coffee in a myFitnessPal app, it's got nothing in it. Well that's not true because it has 15 grams of sugar, which is a unit and a half worth of insulin. If I forget I'm having coffee with my breakfast, I don't calculate the extra 40 grams of sugar I would be getting, it will spike like crazy, and I don't think about it and it will spike up very high."
- "Looking for a visual guide and these are my starches, what I have had, what I've added to it. I want to see the starches, carbs, and proteins."
- Major focus on foods like carbohydrates (sugar, starch and glucose) and fiber because fibers help regulate the body's use of sugars, helping to

keep hunger and blood sugar in check. This would help his health practitioners in figuring out his corrective factors.

- He requires an app that will ask what he is eating with regards to carbs and fibers, so as to figure out what is his sugar debt for insulin. It should also require inputting a beverage associated with the specific meal.
- Mark also prefers the tool to be simple and easy to use. For instance, a visual guide that contains the photos of food. “The use of radio buttons because I hate swipes… Also nested menus are not a bad option.”
- All in all, Mark is a happy-go-lucky individual that wants our group to create a mealtime insulin tracking app where the main objective is to find the hidden sugars in the foods that he consumes. This will aid in bettering his physical health, and overall well-being.

2. Translated Needs from Client Statements:

The table below consists of a numerical ranking system with a scale of 1 - 5, one being the least important and 5 being the most important.

#	Attribute	Need	Importance
1	The mealtime insulin tracker	has a simple interface and is easy-to-use	**5**
2	The mealtime insulin tracker	is a visual guide that stores photos of food/beverages	**4**
3	The mealtime insulin tracker	contains a reminder that notifies the user what type of food he/she is consuming	**3**
4	The mealtime insulin tracker	allows the user to input different grams of sugar	**5**
5	The mealtime insulin tracker	figures out the sugar debts for insulin	**4**

6	The mealtime insulin tracker	finds all the hidden sugar contents	**5**
7	The mealtime insulin tracker	is easy to install and Wi-Fi independent	**2**
8	The mealtime insulin tracker	is free for the user	**5**
9	The mealtime insulin tracker	is a commercially available app for diabetic patients	**4**
10	The mealtime insulin tracker	protects the user's private information	**5**
11	The mealtime insulin tracker	accurately calculates the inputs of carbohydrates and fibers	**5**
12	The mealtime insulin tracker	contains radio buttons and nested menus	**1**
13	The mealtime insulin tracker	is bug-free and does not crash at any point during the application's usage.	**4**
14	The mealtime insulin tracker	is non-intrusive	**5**
15	The mealtime insulin tracker	records the daily insulin by the user	**3**

3. Problem Statement:

After carefully prioritizing the various needs of the user, we have developed the following problem statement; a mealtime insulin tracking application for diabetic users that will regulate their diabetic conditions and increase harm-reduction efforts amongst all users.

4. Metrics and Units:

The table below consists of a numerical ranking system with a scale of 1 - 5, one being the least important and 5 being the most important.

Metric #	Needs #	Metric	Imp	Unit
1	**7, 13**	Bug rates - average number of bugs that are generated as new features are being deployed.	**3**	Numerical system
2	**4, 5, 6, 11**	Accuracy of insulin needed per meal	**5**	1 unit/100 mL
3	**11**	Time taken for completion of tasks	**3**	Time (s)
4	**13**	Reduction of lines of code	**1**	% of reduction
5	**1, 8**	User feedback	**5**	Satisfaction Ranking (1-10)
6	**7**	Wifi dependence	**2**	Yes/No
7	**1**	Ease-of-use	**5**	Satisfaction Ranking (1-10)
8	**2-9, 11-13**	Software application testing	**5**	Pass/Fail
9	**8**	Cost	**3**	$CAD
10	**13**	Product quality	**5**	Numerical system
11	**1, 2**	ADD (Attention deficit disorder) friendly	**5**	Satisfaction Ranking (1-10)
12	**15**	Data Storage	**3**	Yes/No

5. **Benchmarking:**

Description of benchmarked products:

- **MySugr:** Mobile app centered around the tracking of insulin levels through Bluetooth connection to the blood glucose meter and notifies users throughout the day with pertinent information such as the last meal and exercise levels. https://play.google.com/store/apps/details?id=com.mysugr.android.companion

- **Diabetes:M:** Diabetes logging app that allows the user to enter insulin levels, estimates insulin levels with logging of food and tracks exercise. This app does not connect to blood glucose meters. https://play.google.com/store/apps/details?id=com.mydiabetes

- **Glucose tracker & diabetic diary. Your blood sugar:** The purpose of this app is to simply log user input of insulin levels throughout the day and provide this information to their health care provider. https://play.google.com/store/apps/details?id=melstudio.msugar

- **Diabetes Recipes:** This software is exactly as it sounds; it provides diabetic-friendly recipes that are adjustable by the user and provides the exact amount of carbohydrates in the user's meal to then reflect on how that will affect their blood glucose levels. https://play.google.com/store/apps/details?id=com.riatech.diabeticrecipes&hl=en

- **Mealtime Manager Insulin Calculator App - E12:** This was a student project from the Fall 2020 semester that attempted to create an ADD friendly mealtime insulin tracker. The way in which this app works is that the user inputs a food they are consuming with its specific amounts of carbohydrates, and a carb coverage ratio for the individual as well as an estimated insulin increase amount is generated. https://makerepo.com/TanishSwarnan/gng2101-mealtime-manager-insulin-calculator-app-e12

Grade of specification achievement of the various apps (/5)

“Diabetes: M”	“MySugr”	“Glucose tracker & diabetic diary. Your blood sugar”	“Diabetes Recipes”	“Mealtime Manager Insulin Calculator App - E12”	Metric
5	**4**	**5**	**5**	**2**	Product quality
4	**5**	**5**	**4**	**1**	User feedback
4	**3**	**2**	**4**	**2**	Ease-of-use
2 (more useful tools with additional cost)	**2** (more useful tools with additional cost)	**2** (more useful tools with additional cost)	**2** (more useful tools with additional cost)	**5**	Cost (A grade of five being free)
2	**1**	**1**	**1**	**4**	ADD (Attention deficit disorder) friendly
17	**15**	**15**	**16**	**9**	Total

<u>Order of placings from best to worst:</u>

1. Diabetes:M
2. Diabetes Recipe
3. (tie) MySugr
4. (tie) Glucose tracker & diabetic diary. Your blood sugar
5. Mealtime Manager Insulin Calculator App - E12

6. Target Specifications:

#	Specifications	Marginal Value	Ideal Value	Final Value
1	Accuracy of insulin needed per meal	0.5 unit/100 mL	1 unit/100 mL	1 unit/100 mL
2	User Feedback	Between 0 & 9	9	8/10
3	Ease-of-use	Between 0 & 10	10	10/10
4	Software application testing	Pass	Pass	Pass
5	Cost	Free	Free	Free
6	Wifi dependence	No	No	No
7	Product quality	Between 0 & 10	10	9/10 (smooth running & user friendly)
8	ADD (Attention deficit disorder) friendly	Between 0 & 10	10	10/10 (simple user interface)
9	Data Storage	Yes	Yes	Yes (records upto 2 months of daily use)

As observed from the above table, specifications are required for the project to run smoothly. Therefore, metrics such as user feedback, ease-of-use, cost, product quality, ADD friendliness and data storage are quality oriented because they reflect the product from the user's perspective.

7. Conclusion:

The client interview provided a lot of insight into the day-to-day activities that the client performs as well as the challenges and struggles that are faced on a daily basis. We were able to empathize with the client and put ourselves in his shoes and determine a list of customer needs, quantitative and qualitative metrics, benchmark several apps on the market, and finally, create a set of target specifications for our potential application. The client meeting greatly impacted our results because only through understanding what the client needs in a mobile application, could we then list the needs, find the metrics, and much more.

In conclusion, our process of prioritizing customer needs, metrics, benchmarking, and target specifications provided our team with valuable information regarding the user's statements and observations. This will be essential moving forward into the ideation stage which focuses on the divergence and convergence of all possible ideas to develop a final solution.