Deliverable B

Due September 19, 2019

Group 9 Members:

Kyle Lee #300064565

Aaron Teske #8928333

Ahmad Hijazi #300047946

Reza Fetanat #300075044

Dominique Negm #300080326

Problem Statement

The client suffers from multiple sclerosis, a condition which severely limits his motor function and ability to communicate. Our client finds communicating with nurses is a challenge without his device, therefore he has requested us to create a product that will allow him to communicate effectively while laying in hospital beds.

Client Statements

The client, Jorge, does not have access to his communication device while he is on the bed. When he is in pain, he is unable to use his device and has to answer 20 questions by nodding yes or no. These questions are to locate the pain and assist him as quickly as possible. This method of communication in hospitals is ineffective since nurses do not have time or patience to listen to him. As a result, Jorge wants us to design a device that enables him to communicate with other people while he is on the bed. The software for the new device should be same as the current one since Jorge is familiar and comfortable with the current software. Jorge demonstrated that majority of the movement will have to be done with his left foot since it is significantly stronger than the right. The current buttons on his wheelchair are not big enough for it to be convenient and are frustrating for him to reach.

Table 1: Needs, Design Criteria and Metrics.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Number. | Needs. | Design Criteria. | Metrics + Units. | Weighting. |
| 1 | Quick easy Setup. | Product needs to have a simple structure so nurses can use this product easily. | Can be setup by one person in 1 minute. | 1 |
| 2 | Be able to communicate in bed. | Communication between nurses and Jorge is essential. | True. | 3 |
| 3 | Input must be larger, uses push buttons as input for mouse click. | Product needs to be bigger to facilitate the process for the patient. | Diameter of joystick, 5 inches | 2 |
| 4 | Left foot is dominant. | Product needs to be accessible to the patient’s left foot. | True. | 3 |
| 5 | Easy of use | Patient is used to this function in his current system. | Electronics powered by usb port (5V 500mA). | 1 |
| 6 | Lightweight. | Product needs to be lightweight so nurses can use this product easily. | Must be lightweight (5lbs-10lbs). | 2 |
| 7 | Cost | Cost is under $100 CAD |  | 4 |

Table 1: The table above shows the customer needs provided by the client and the interpreted design criteria from the needs in addition to their weighting. The scale is measured from 1-3 and the higher the number, more importance will be put on that client need.

Table 2: Constraints

|  |  |
| --- | --- |
| Number | Unit |
| Cost | <100$ |
| Weight | <10 lbs |

Table 2: The table above shows the constraints we have been presented with. For our product, the cost of it should be under 100$ and under 10 pounds.

Table 3: Benchmarking

|  |  |  |  |
| --- | --- | --- | --- |
| Specification | Ranking | Invacare ASL Technologies Foot Control Joystick | Foot-Powered Motion Controller |
| Lightweight | 2 | 1 | 3 |
| Cost | 1 | 1 | 3 |
| Ease of Use | 3 | 2 | 2 |
| Maintenance | 1 | 1 | 2 |
| Total |  | 10 | 17 |

From table 3, the benchmarking table, we looked at two products that are similar to the one we are designing. We compared the the weight, cost, ease of use and maintenance of each product. The red highlighted boxes are areas where the product is lacking, the yellow boxes are neutral boxes where the product isn’t lacking but also isn’t amazing. The green boxes are showing the strong areas of the product.

Target Specs:

|  |  |  |
| --- | --- | --- |
| Number | Specification | Target Specifications |
| 1 | Size | Fit inside a 40L Backpack |
| 2 | Cost | <100$ |
| 3 | Weight | <10lbs |
| 4 | Product Life | Lasts longer than a year |
| 5 | Safety | No sharp edges or corners |

Reflection

The project description stated that the product was a ‘joystick’ which left us with the impression that Jorge had control of his hands so many of our initial design plans revolved around that. After the meeting we discovered that the joystick was controlled with his feet. This had the team reimagining the whole design trying to make it much simpler and easier to use.

After talking to Jorge it became clear how necessary this device is for him in everyday life and being forced to stay in hospitals without it could be a major source of stress. This meeting allowed us to put true meaning behind what we have been creating and added a strong motivational factor behind it.