Project Deliverable E:
Project Schedule and Cost

GNG 1103
Group C6

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Introduction

The objective of this deliverable is to develop a project plan and a schedule to ensure that our team is able to complete all three project prototypes from now until the end of the semester and provide an estimation of the costs and the components that will be required for our project.

Our team's goal is to create a reliable opioid overdose detection device for our client. In our previous deliverable, we finally decided on a few designs and solutions that our team wants to work on. Now, we are getting ready to create our prototypes for these designs (both focused and comprehensive) by planning out what each team member needs to buy or do to create them. In addition to that, a tentative schedule will be made to ensure that our team will complete our tasks and prototypes on time.

Analysis of Client Meeting #2

During the second client meeting, our group presented the Glove, Ear-clamp, and Watch designs that we developed in our last deliverable. We received many great feedback and suggestions towards our designs which we then used to create an improved design for our prototyping.

It was recommended to us that the Glove design wouldn't be ideal for some patients as it wouldn't let the opioid users to actually feel and perform the injections comfortably. If our group were to develop this design, it was suggested that the material of the glove should be thin and almost feel "gloveless" when the patients wear it.

For the Watch design, it was commented that many groups are designing this and that it is the most difficult and expensive solution. We agreed with the comment as we analyzed during our last team meeting and deliverable that it would require a lot of materials and would be the most expensive to create.

For the Ear-clamp it was suggested that our group should go towards this design as they liked the concept of the device looking like an accessory. They also liked the idea of having a main box/hub for the ear-clamp to be connected to. It was also suggested that the idea of an interchangeable model with the ear-clamp and glove would be good as some patients would prefer the glove model if they are not comfortable with the ear-clamp and vice versa. It was also commented that the idea of having earbuds with the ear-clamp would be a good idea as it can provide an intervening sound for the patients if they are overdosing.

With all this feedback given to our group, we decided to go with our Ear-clamp model and improve it by adding the earbuds part with the sounds and making the box hub interchangeable with another accessory like a glove. After analyzing and choosing this design, we are going to use this new solution to create our upcoming prototypes and to present in our next client meeting.

In preparation for our next client meeting, we will be creating our first prototype which we will show to our client for our next meeting. Below is our plan/schedule for completing the prototypes on time.

Prototype 1 (The box):

Our first prototype is inspired by our clients feedback on our mock-up prototype we presented. They suggested the sensor and arduino controller be separate entities. One sensor model (i.e. the glove) could be removed from the arduino and replaced with another sensor model (i.e. the earpiece). This means we must develop the arduino controller (The box) seperate from the sensor.

We will design our box's shell using Solidworks to fit all of the components of the arduino. The materials for this will be relatively cheap and accessible as the MakerLab is free for 3D printing. Solidworks provides a lot of creative potential for the box because small details like sm

The objective of our first prototype is to create the optimal design that can fit all the components of the arduino while also fitting comfortably in somebody's pocket. As such, the material of the box and the components don't really matter as if they are not shipped in time, we can use other objects of the same dimensions specified online.

For testing the box, there will be 2 steps:

1. Step 1: Fit all the needed arduino parts in the box's shell. Analysis if there is room for improvement with making it smaller or larger.
2. Step 2: Put the box with the components inside into multiple pockets with varying space. Examples of different types of pants are the following: skinny jeans, cargo pants, and straight jeans. These will be used by multiple people to obtain an average opinion on the comfortability of the box. Opinions will be analysed and used to improve on the shape, weight, or size of the design.

Dates for all the tasks performed for prototype 1 are in the table below under task assignment.

Task assignment

Student(s)	Task	Start date	Length	Dependencies
Rikki Romana	Purchasing materials	14/02/20	1 week	None
Viktor Stojanovic	Coding the app	16/02/20	2 weeks	None
Daniel Trela	Designing the box	16/02/20	1 week	None
Parsa Sheykholeslami	Solidworks & printing	23/02/20	1 week	Designing the box
Rikki Romana	Wiring the arduino	01/03/20	1 week 4 days	Purchasing materials
Abdelrahman Nasr	Sensor Clip Creation	01/03/20	1 week	Purchasing materials
Daniel Trela	Unifying the wires for the headphones	01/03/20	1 week	Purchasing materials
Group	Putting all components together	08/03/20	2 weeks	All of the above
Group	Prototype 1 testing	01/03/20	1 week	Solidworks & printing (and above)
Group	Prototype 2 testing	08/03/20	1 week	Unifying the wires… (and above)
Group	Prototype 3 testing	21/03/20	1 day	All of the above

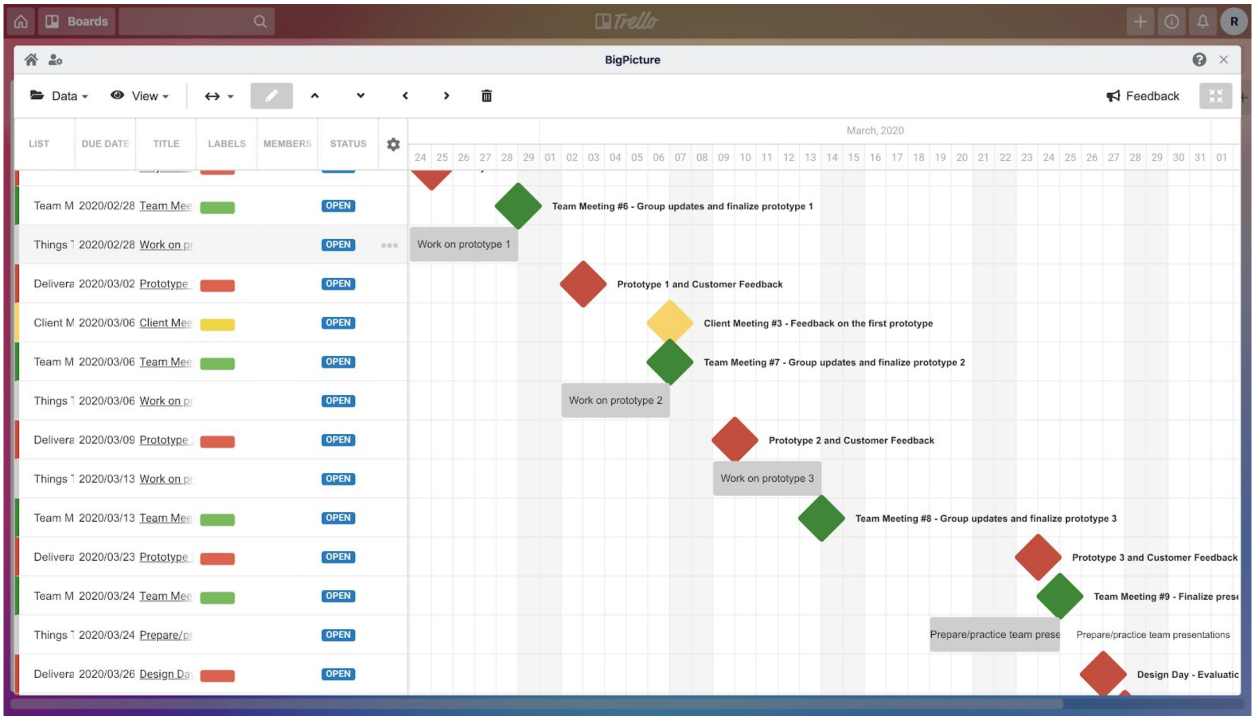
BOM

Bill of Materials				
#	Item Description	Quantity	Unit Price ($)	Overall Price ($)
1	Arduino UNO R3	1	17.00	17.00
2	Tiny Breadboard	1	4.00	4.00
3	Plastic Box (Laser cut)	1	3.00	3.00
4	Breadboard-friendly 3.5mm stereo headphone jack	1	3.00	3.00
5	Earbuds 3.5mm	1	5.00	5.00
6	J-DEAL® HC-05 Wireless Bluetooth Host Serial Transceiver Module Slave and Master RS232 For Arduino	1	11.00	11.00
7	Wires (10)	2	2.00	4.00
8	Pulse oximeter	1	20.00	20.00
9	Adjustable plastic clamps	2	1.00	1.00
10	Plastic tubing	1	2.00	2.00
11	Battery	1	9.00	9.00
		-		79.00

Significant Risks

- The arduino fails to connect to the app via bluetooth. Use a different method of connections, such as a wire.
- The earbuds do not properly connect to the arduino. Use specialized arduino speakers to make DIY earbuds.
- Some of the parts do not arrive on time. Find alternative parts from local vendors.
- Box material is not adequate for the design. Pay for a more premium alternative material.
- The coding for the app is too difficult to apply. The app will not be used and the arduino will send the signal instead.

Gantt diagram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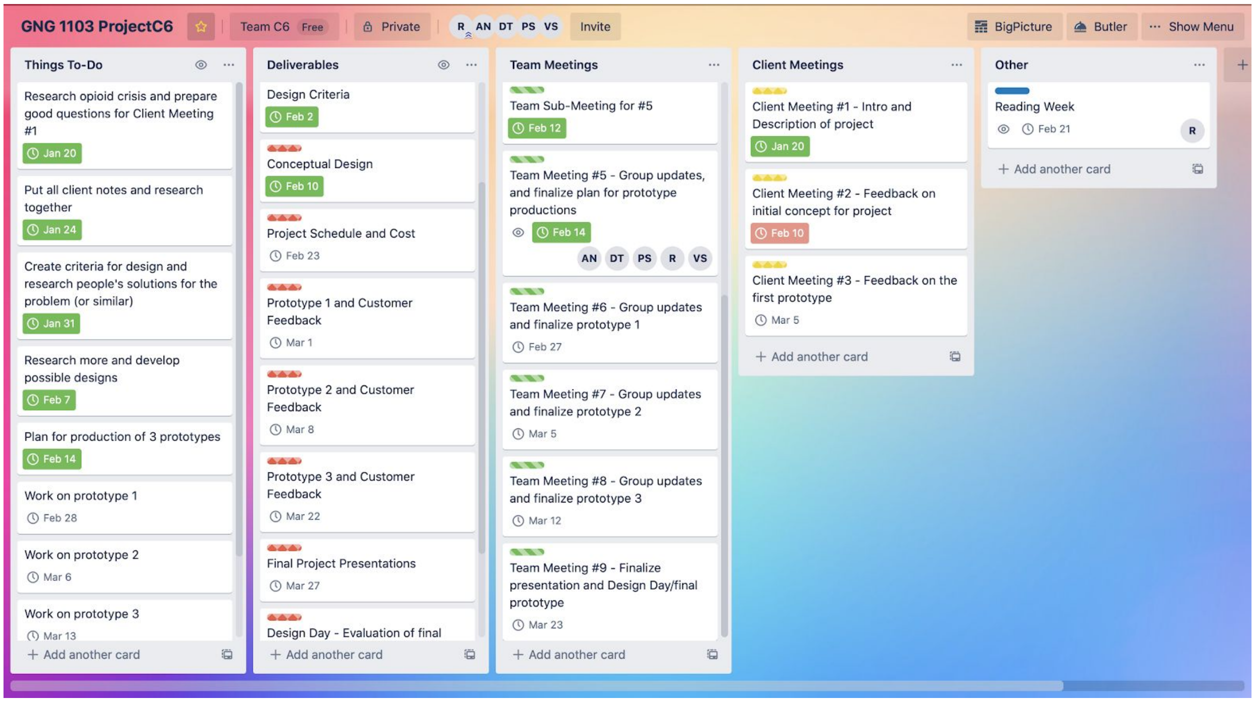
Team Meeting #6 - Group updates and finalize prototype 1
Work on prototype 1
Prototype 1 and Customer Feedback
Client Meeting #3 - Feedback on the first prototype
Team Meeting #7 - Group updates and finalize prototype 2
Work on prototype 2
Prototype 2 and Customer Feedback
Work on prototype 3
Team Meeting #8 - Group updates and finalize prototype 3
Prototype 3 and Customer Feedback
Team Meeting #9 - Finalize prese
Prepare/practice team prese
Prepare/practice team presentations
Design Day - Evaluatic

LIST	DUE DATE	TITLE	LABELS	MEMBERS	STATUS
Team M	2020/02/28	Team Mee	🟩		OPEN
Things 1	2020/02/28	Work on pr			OPEN
Delivera	2020/03/02	Prototype	🟥		OPEN
Client M	2020/03/06	Client Mee	🟨		OPEN
Team M	2020/03/06	Team Mee	🟩		OPEN
Things 1	2020/03/06	Work on pr			OPEN
Delivera	2020/03/09	Prototype	🟥		OPEN
Things 1	2020/03/13	Work on pr			OPEN
Team M	2020/03/13	Team Mee	🟩		OPEN
Delivera	2020/03/23	Prototype	🟥		OPEN
Team M	2020/03/24	Team Mee	🟩		OPEN
Things 1	2020/03/24	Prepare/pr			OPEN
Delivera	2020/03/26	Design Da	🟥		OPEN



Things To-Do

- Research opioid crisis and prepare good questions for Client Meeting #1 — Jan 20
- Put all client notes and research together — Jan 24
- Create criteria for design and research people's solutions for the problem (or similar) — Jan 31
- Research more and develop possible designs — Feb 7
- Plan for production of 3 prototypes — Feb 14
- Work on prototype 1 — Feb 28
- Work on prototype 2 — Mar 6
- Work on prototype 3 — Mar 13
- + Add another card

Deliverables

- Design Criteria — Feb 2
- Conceptual Design — Feb 10
- Project Schedule and Cost — Feb 23
- Prototype 1 and Customer Feedback — Mar 1
- Prototype 2 and Customer Feedback — Mar 8
- Prototype 3 and Customer Feedback — Mar 22
- Final Project Presentations — Mar 27
- Design Day - Evaluation of final
- + Add another card

Team Meetings

- Team Sub-Meeting for #5 — Feb 12
- Team Meeting #5 - Group updates, and finalize plan for prototype productions — Feb 14 — AN DT PS R VS
- Team Meeting #6 - Group updates and finalize prototype 1 — Feb 27
- Team Meeting #7 - Group updates and finalize prototype 2 — Mar 5
- Team Meeting #8 - Group updates and finalize prototype 3 — Mar 12
- Team Meeting #9 - Finalize presentation and Design Day/final prototype — Mar 23
- + Add another card

Client Meetings

- Client Meeting #1 - Intro and Description of project — Jan 20
- Client Meeting #2 - Feedback on initial concept for project — Feb 10
- Client Meeting #3 - Feedback on the first prototype — Mar 5
- + Add another card

Other

- Reading Week — Feb 21 — R
- + Add another card

Conclusion

In this deliverable, we have shown the following: an analysis of our second client meeting, a plan for our first prototype, a method of testing the first prototype, a brief list of tasks with appropriate people assigned to each, a bill of materials, a list of significant risks the project may have, and a gantt chart of future tasks.

We believe this deliverable will help us with organising our time and resources for the prototyping process. It also gave us insight on the availability and price of certain components to be used in the prototypes to come. This helped us to find optimal parts that fit our 100$ budget as well as making our product more affordable as specified by the clients. Lastly, this deliverable had us analyse the client's statements, which will let us create a prototype more inline with what they are asking for.