University of Ottawa

GNG 2101 B03: Intro to Product Development and Management for Engineers

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

Submitted by

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Abstract

This document determines the objective of this project and sets targets for our project based on metric and benchmarking of other similar solutions.

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1.0 INTRODUCTION

In this deliverable, the planning and key metrics required for this project are produced. In this document, the client's statements are translated into a list of interpreted needs and prioritized. This provides a better idea of what the actual problem is and what we need to address with our product. Then, from the client's needs, a problem statement was developed to clearly state what the project is about and is working towards. Based on the client's needs, a list of metrics and benchmarks of other products that solve the same problem and define target specifications was created. Through these metrics, a better understanding of the targets that need to be met are clearly outlined for future prototyping and testing.

2.0 CLIENT STATEMENTS AND OBSERVATIONS

The clients provided the team with a lot of freedom regarding the development of the wayfinding solution. Many technical specifications suchs as battery life of beacons, bilingual compatibility, device compatibility, or the coverage of the library within the app was left for the team to decide and as a result, a reasonable specification will have to be initially decided through discussions and once the prototype is completed, the client's feedback will be taken to narrow down the specifications.

The table below shows the translation of the client statements gathered from the client meeting into client needs.

Table 1. Client statement translations

#	Client Statements	Client Needs
1	The app should be accessible for all users, with and without disabilities	The app is accessible to users with vision impairments
2	Guide the user using the app around the library	The app is accurate (Location-wise)
3	Can be used on all mobile devices, but supporting IOS may not be possible within the budget	The product is compatible with both android and ios
4	Toggle between audio and visual within the program	*Same need as 1
5	If there is time, have both English and French implemented into the app	The app is accessible to english and french speaking users

6	Can either be an app or on a web browser	-
7	Be better than Carleton	-
8	Long battery life	The beacons can operate without frequent charging
9	Easy to use	The application is design intuitive
10	Be portable and can be placed on top of the shelves	The beacons are portable

3.0 CLIENTS NEEDS

The table below shows the classification and prioritization of the clients needs where 1 represents the lowest importance to 5 representing the utmost importance.

Table 2. Client need classification

#	Need	Design Criteria	Importance (1<5)	Functional , non functional or constraint
1	The app is accessible to users with vision impairments	Audio / sensory cues	4	Functional
2	The beacons can operate without frequent charging	Larger / more efficient batteries	3	Constraint
3	Accessible to non english speaking users	Bilingual	2	Functional
4	The application is design intuitive	Usability	5	Functional
5	The product is compatible with both android and ios	Compatibility	3	Functional
6	The product is affordable	Minimum cost	4	Constraint
7	The app is accurate (Location-wise)	Accuracy / User safety	5	Functional
8	The beacons are portable	Portability / Size	3	Constraint

The intuitive user interface and accuracy of the location tracking was determined to be the most important.The accuracy of the app was important because it is the core functionality of the program and inaccuracies can pose a safety risk as the user may bump, trip, or fall on an object. The easy to use interface was also determined to be a high priority because a lack of usability would take away the usefulness of the application. If the user is unable to navigate the app, they will also not be able to navigate around the library, and as a result, intuitive design was put high on the list. Accessibility for visual impairments was also put relatively high, but was placed lower as having a functional app was the first priority and additional features can be added to the application easily in the future.

4.0 PROBLEM STATEMENT

The client is working on making the uOttawa Library accessible to all, and they need a product that will be able to guide users, with and without disabilities, in an accurate and simple to follow way. The product will be in the form of an application that requires no assistance to operate.

5.0 METRICS

The table below shows the client's needs that can be measured. A measurable metric is very important because it creates goals and objectives.

Table 3. Defining and classifying metrics

Metric#	Client need	Metric	Unit	Description
1	6	Cost	$CAD	Have functional prototype while staying under budget of $50
2	4,7	Accuracy	cm	Have the app locate and track the user's location within a very small error range
3	8	Size	cm	Size of casing should be able to be easily carried with one hand
4	8	Weight	g	Have the casing be well under 500 grams
5	2	Battery Life	Hours and or Days	Battery life of beacons

				should be above 6 months
6	1,4	Aesthetics	Scale from 1-10	The application should be visually pleasing
7	3	Multilingual	Binary	The application supports multiple languages
8	5	Compatibility	List	The app is compatible with both android and ios

6.0 BENCHMARKING

This table discusses three different Library Wayfinding Systems; BKFNDr, insoft and Centrak. Metrics were chosen based on the client needs and ranked based on importance. The importance scale goes from 1 to 5 where 5 being the most important.

BKFNDr uses beacons set up in a grid to help the user navigate to their destination.

Centrak uses an extension of Google Maps which uses the phone's GPS as well as QR codes to guide the user.

infsoft is a real time location system software company that provides full in door positioning systems

Table 4. Product Benchmarking

Metric #	**Metric**	**Unit**	**Importance (1<5)**	**BKFNDr Mobile App**	**infsoft**	**Centrak**
1	Cost	$CAD	4	2920 for 280 beacons ($10/beacon)	29.7 / beacon (1.49 CAD:1 EURO conversion)	Free
2	Accuracy	m	5	4.7	<1	<4.9

3	Size	cm	4	-	72 x 72 x18	N/A
4	Weight	g	2	-	142	N/A
5	Battery Life	year	3	1/2	10	N/A
6	Ease of Use	User rating out of 5	5	-	4.8	-
7	Multi-lingual	Binary	2	No	No	No
8	Location tracking technology	List	2	Bluetooth (BLE beacons)	Bluetooth beacons	Phone GPS
9	Range	m	3	Up to 6.5	upto 75	N/A

The table below shows the results of comparing the different products.

Table 5. Benchmarking results

#	**Metric**	**Importance (1<5)**	**BKFNDr Mobile App**	**infsoft**	**Centrak**
1	Cost	4	3	2	5
2	Accuracy	5	3	5	3
3	Size	4	3	3	5
4	Weight	2	3	3	5
5	Battery Life	3	5	4	5
6	Ease of Use	5	4	5	4
7	Multi-lingual	2	0	0	0
8	Location tracking technology	2	5	4	4
9	Range	3	3	5	5
	Total	**30**	**29**	**31**	**36**

A scale was devised to compare and rank the apps listed in the table above. The group chose specific metrics that were deemed important to the user and then ranked said metrics on a scale from one to five (five being the most important). After the metrics had been ranked, the apps were also ranked on their fulfillment of these categories. The totals of the 3 apps were then recorded and compared. The Location Tracking Systems with the most similar total importance to the desired design criteria and metrics are BKFNDr and insoft.

7.0 TARGET SPECIFICATIONS

The table below shows the requirements the design must have and its importance. The scale goes from 1 to 5 where 5 is the most important.

Table 6. Functional requirements

#	**Design Specifications**	**Value**	**Units**	**Importance (1<5)**	**Verification Method**
Functional Requirements					
1	Compatible with different operating systems	-	IOS & Android	3	Testing
2	User Friendliness	-	-	5	Testing
3	Bilingual	-	French and English	2	Testing
4	Accessible to users with vision impairments	-	-	4	Testing
5	Accuracy		cm	5	Testing

The table below shows the specific restrictions the final prototype must have and their importance. The scale goes from 1 to 5 where 5 is the most important.

Table 7. Constraints

#	**Design Specifications**	**Value**	**Units**	**Importance (1<5)**	**Verification Method**
Constraints					
8	Extended battery life	6-12	Months	3	Testing
9	Mobile Phone Software	>11 >7.0	IOS Android	2	Testing

10	Cost	50	$CAD	4	Estimate
11	Time	70	days	4	-
12	Size	-	cm	3	Testing

The table below shows a requirement of the final design which has no functional purpose. The scale goes from 1 to 5 where 5 is the most important.

Table 8. Non-functional requirements

#	**Design Specifications**	**Value**	**Units**	**Importance (1<5)**	**Verification Method**
Non-Functional Requirements					
11	Aesthetics	-	-	3	Testing

8.0 CLIENT MEETING REFLECTIONS

The client meeting removed a lot of uncertainty of how the project would be implemented. With this meeting, the team was able to narrow the scope of the library wayfinding project. Through the planning process, the group developed a clearer understanding of the problem and the key solutions that other organizations have used to direct users to their destinations within buildings. One of the findings being that most of the solutions benchmarked for this deliverable utilized bluetooth for location tracking. Since the clients left a lot of the technical aspects of the program up to the team, we will have to actively communicate and receive feedback on our prototypes to meet a satisfactory result.

9.0 CONCLUSION

To conclude, the document outlines the client's needs, a problem statement, a list of metrics that helps compare other products, and specifies target specifications. Finally the reflections of the client meeting were listed and they helped keep the final product on track. The client’s needs were translated from the client’s statements and were ranked on their importance. The problem statement was able to encapsulate the main goals of the project in a concise and specific manner. The target specifications were generated from a list of metrics. The metrics were characteristics of the design that could be measured. All of these aspects were able to focus the team into the future steps. The team will now be working on ideation and generating a final concept.

The figure below shows the wrike planning and what needs to be done. Planning ahead until deliverable D was made. The wrike will be updated accordingly to the changes of the project and the completed tasks.

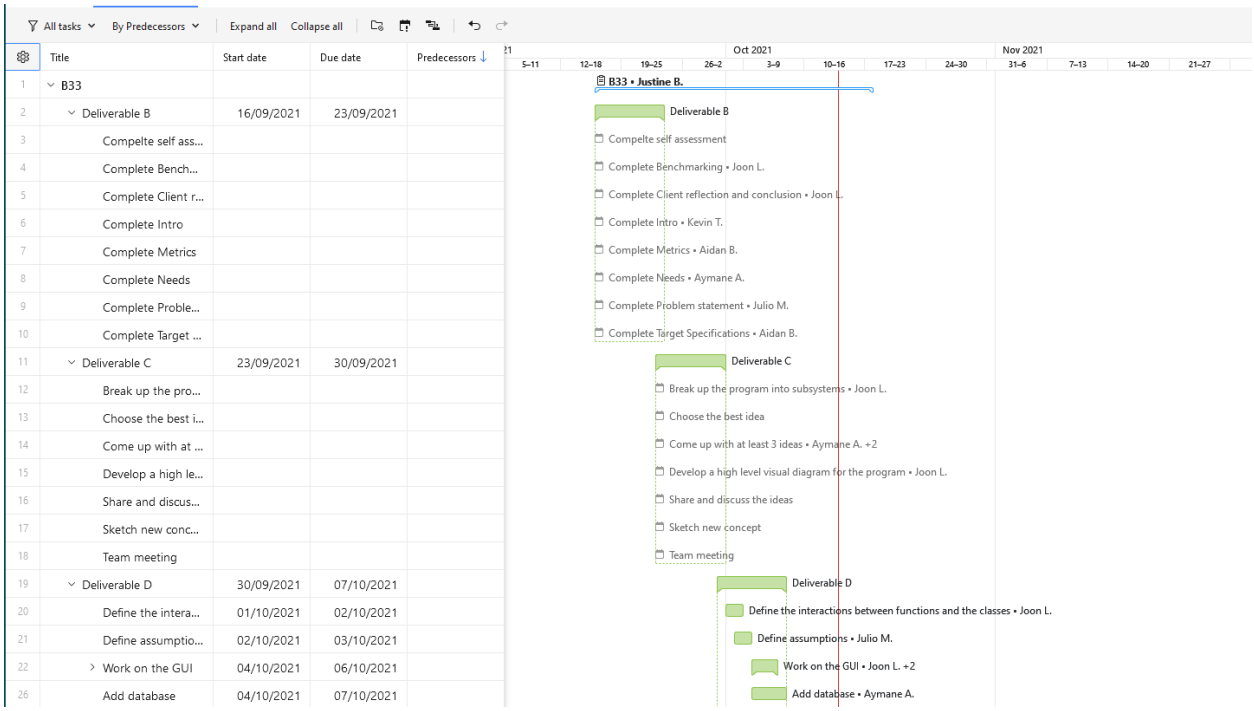

Figure 1, Wrike planning and future steps

10.0 REFERENCES

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