

GNG2101

DELIVERABLE B

Submitted by

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Introduction

This deliverable will cover the problem definition which includes; empathise, needs statement and customer priority, problem statement, list of metrics, benchmarking, target specifications and a reflection on the client meeting.

Problem definition process

1.1 Empathise

The first step to the problem definition process is empathise with the customer. This step is really important because it allows us to feel what the customer is experiencing and helps us to identify the needs. To do this, we had an interview with [REDACTED] who has hearing impairment. During the interview, we asked her open questions and made sure to ask the question why. This first section will present a list of the statements and the observations obtained from the clients interview.

Questions	Client statements	Need statements
Typical use	She wears hearing aids a couple hours a day	The hearing aids have good battery autonomy
	She takes off her hearing aids when she gets home to save the battery	The hearing aids have good battery autonomy
	During school day, she wears her hearing aids for up to 12 hours	The hearing aids have good battery autonomy
	She gets wax often and finds it difficult to clean	The hearing aids have to be easy to clean
	She wears her hearing aids at the beach	The hearing aids have to be waterproof
	She has to take off her hearing aids when she walks in the rain	The hearing aids have to be waterproof
	She wears swimming cap, but water gets in anyway	The hearing aids have to be waterproof
Things to consider	Presently, she has a disposable battery and found it expensive	The hearing aids have a rechargeable battery
	During the summer, she works 40 hours a week and needs to change the battery often	The hearing aids have good battery autonomy
	The small piece inside the ears gets uncomfortable after a while	The hearing aids are comfortable

	It's been a while that she has the same model of hearing aids	The hearing aids are durable
	For her, the most important thing is that she hears with her hearing aids	The hearing aids have a quality microphone
What she likes	She likes rechargeable battery	The hearing aids has a rechargeable battery
	She likes the fact that her hearing aids are small	The hearing aids are compact
	She doesn't really care about the aesthetic, she just wants to hear well	The hearing aids are functional
	She doesn't mind if people see her hearing aids	The hearing aids are functional

1.2 Needs statements and prioritize the customer needs

The second step to the problem definition is to turn the customer statements and actions into needs statements. The need statements are important because they help us to define the problem. This section will present a list of the need statements obtained after empathising with the customer ranking in order of priority.

Number	Needs	Ranking
1	The hearing aids have good battery autonomy	5
2	The hearing aids have to be easy to clean	4
3	The hearing aids have to be waterproof	3
4	The hearing aids have a rechargeable battery	5
5	The hearing aids have a quality microphone	5
6	The hearing aids are compact	4
7	The hearing aids are durable	4
8	The hearing aids are functional	5

****The ranking is 1 to 5, where 5 is satisfying the needs is critical and 1 is satisfying the need is undesirable**

1.3 Problem statement

Another important step in the problem definition process is to create a problem statement. A good problem statement is crucial in order to properly focus the team's efforts on solving the specific problem at hand

The statement to the problem is : To design and produce a functional set of waterproof hearing aids while still optimizing the functionality and user experience for people who suffer with hearing loss.

1.4 List of metric

The next step of the problem definition is to create a list of metrics. Metrics are a measurable attribute that we want our solution to take in consideration. They are used to measure the efficiency of the solution. The metrics are based on the needs statements expressed in measurable attributes and also on the benchmarking. The fourth section will present a list of the metrics that will be important to consider in our solution.

Metric #	Needs #	Metric	Importance	Units
1	1	Battery life	5	Hours
2	3	Water resistance	3	IPXX
3	4	Rechargeable	5	Binary
4	5	High quality microphone	5	kHz
5	6	Hearing aid size	4	cm ³
6	7	Durable	4	x/100
7	8	User satisfaction	5	subjective
8	2	Easy to clean	4	subjective

1.5 Benchmarking

The fifth step that we will discuss is the benchmarking. As it was discussed in the previous section, benchmarking is useful in the process of creating a list of metrics. Benchmarking is also important because learning what competitors can do allows us to create a superior solution. The fifth section will present the benchmarking made on different products.

Company	Philips Hearlink	Phonak Brio 4	Kirkland Signature 9.0	Starkey Livio
Cost	\$1249.99	\$1249.99	\$1499.99	1580.00
Water Resistance	IP68	IP68	IP68	IP58
Weight	Not specified	Not specified	Not specified	Not specified
Battery	Disposable	Disposable	Disposable	Rechargeable
Estimated Battery Life	18 hours	18 hours	18 hours	16 hours
Fit	Behind the ear (BTE)	BTE	BTE	BTE

1.6 Target specifications

The target specification is an important step to the problem definition because it determines the ideal and marginally acceptable values of each metric. This section will present the target specifications based on the benchmarking made in the previous section.

	Metric	Units	Marginal Value	Ideal Value
1	Cost	CAD\$	100	<100
2	Water resistance	IPXX	<IP58	IP68
3	Weight	Grams	>150	>145
4	Battery	Type	Disposable	Rechargeable
5	Estimated Battery Life	Hours	<16	<18
6	Fit	BTE or ITE	BTE	BTE

1.7 Reflection

Our client meeting had a few hiccups as we had to switch clients and reschedule a meeting. Waiting for a rescheduled meeting set us back a few days. Once we had our rescheduled client meeting things went well. For the most part, we already seemed to have a good understanding of what the client wanted. The client meeting mostly confirmed what we already suspected. The

biggest thing we learned in terms of our approach was the client didn't care as much about the look and aesthetic of the hearing aid and cared much more about its functionality.

Conclusion

Our project is to design and test a set of functioning waterproof hearing aids. Our main focus will be on the functionality of the hearing aid. This following week we will brainstorm potential solutions to the problem as well as begin the design of a prototype.

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