Project Deliverable C:
Design Criteria and Target Specifications
GNG 1103 – Engineering Design

Faculty of Engineering – University of Ottawa

GNG1103, Section # _B01_ Team # __5__

Team Members:
1) Uzochukwu Ekenedilichukwu Ebenebe
2) Nalida Awog-Badek
3) Nicole Meouch
4) Owen Haralovich
5) Kayden Wang

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Introduction:

The following deliverable will show how the client's needs have been deciphered into design criteria, the functional and nonfunctional requirements of the final solution and benchmarking of similar products that are already on the market. This data will be utilized to assist with characterizing the assumption for the eventual outcome and act as manual for use while evaluating potential solution ideas and give quantifiable plan objectives all through the planning cycle and give quantifiable plan objectives all through the design process.

Design Criteria:

Interpreted needs - Design Criteria Table

#	Interpreted needs	Design Criteria
1	Should bring about the kids escaping the vehicle safe	User safety
2	Should identify temperature and CO levels	Temperature and CO detector
3	Should caution parent when kids is left in vehicle	Safety warning
4	Need a gadget that can without much of a stretch be introduced by anybody on any vehicle	Can be controlled by one hand and has simple functions
5	Device or technology that can caution a bystander or proprietor of a kid locked vehicle	Safety warning
6	Must be accessible to everyone	-
7	Must be cost effective	Market research
8	Should be all inclusive for clients across various nations	Can be used at any country
9	Should be able to calm child	Take care of child

10	Function has a higher priority than visuals	Better performance with decent appearance

Functional Requirement:

- The product should be able to protect child
- The product is able to measure the temperature in vehicle and detect the carbon monoxide levels
- The product can warn parents and people pass by
- The product should be easy to use
- The product should have different language option

Constraints:

- The cost of prototype should not exceed 50$
- The product should not hurt child in vehicle

Non-Functional Requirement:

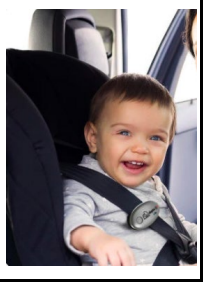
- No built-in training
- Can be used at different locations
- User-friendly navigation and interface

Technical Benchmarking:

Technical benchmarking: There are a wide range of design and price but they all share the same common overall function

Hot car device Specifications	The Baby Alert Wristband	Qushino Anti-abandonment Device	Bee-Alert Safety Device	Trouva Anti Abandonment Device	Elepho Baby Car Seat Alarm
cost	$14.00	$89.00	$20.00	$136.00	$50.00
size	Not specified but can fit around wrist	Not specified but meant for car seats (ages 0-6)	Not specified but can fit on inside of door hinge	Not specified but meant for car seats (ages 0-7)	Not specified but can fit on the seatbelt of any car
Ease of installation	No installation required	Very simple installation	Simple installation	Very simple installation	No installation required

Audible warning to parent	None	None	Yes, prompts the driver to check the rear seat, but only as soon as they open the door.	None	None
Phone application alert	None	Yes, when a user walks 15ft away from a vehicle a notification is sent.	None	Yes, notification is sent when 10 feet away from the vehicle.	Yes, notification & alarm sounds on phone when 20 ft away from the vehicle
Can detect CO	No	No	No	No	No
Can detect temperature	No	No	No	No	Has a built in thermometer that can be calibrated to the desired area and climate.
How it works (physical product makeup)	Wristband worn as a reminder, you take it off when the baby is out of the car.	Pressure pad installed to a car seat that detects the presence of a child	Works like a fridge alarm, when the driver door opens it warns the driver to check the back seat	Pressure pad installed to a car seat that detects the presence of a child	Seat belt clip that when turns on can detect if the parent leaves the vehicle without taking chile
User interface	Simple to use because there is no interface	Phone application is simple and easy to use	Problems calibrating volume, but simple due to no interface	Phone application is simple and easy to use	Phone application is simple and easy to use
Multilingual	Language has no effect	App is multilingual	Monolingual	App is multilingual	App is multilingual
material	Rubber, and metal frame	Soft plastic based cloth, rubber	Hard plastic	Soft plastic based cloth, rubber	Hard plastic
Warns bystander	No	No	No	No	No
Can calm the child	No	No	No	No	Depending on the age of the vehicle, the Elepho can manipulate the climate control

Universal across countries	Yes, is not temperature based and has no limitations since it is only a wearable reminder	Yes, is based around pressure or weight on the device therefore no restrictions (unless in space)	Yes, because it is not wifi dependant and does not read any values that vary between countries	Yes, is based around pressure or weight on the device therefore no restrictions (unless in space)	Yes, the built in thermometer can be calibrated depending on the local climate
Not wifi dependant	Yes, has no technology built in.	Requires access to internet to be able to send a notification	Yes, the alert comes directly from the product	Requires access to internet for notification	Needs to be connected to internet
Total rating	17	15	11	14	22
Picture					

(Rating scale: green = 2 points, yellow = 1 point, red = no points)

Conclusion:

Based on the user needs, the best product is the Elepho Baby Car Seat Alarm because it meets most of the functional requirements that our client is proposing, as well as bein g cost effective. This product is a good indication on what the competition looks like, while giving us a chance to improve on their product design. For example, instead of connecting to the seatbelt it would clip onto the car seat so it could not be remov ed by the child and is overall more secure.

User benchmarking:

Product	User reviews
Baby alert wristband	• No installation required • Appreciate the simplistic design • Product is not overloaded with redundant features
Qushino Anti-abandonment Device	• Product is simple to install • Handy mobile app that politely warns of a child being left in the car • Durable material that is easy to clean • Universal product that can be installed onto many different types of car seats
Bee-Alert Safety Device	• Users did not like this product • Poor quality of construction • The alarm is a nuisance rather than a reminder • Alarm goes off unnecessarily
Trouva Anti	• High quality of construction

Abandonment Device	• Phone application is buggy • Simple to install • Light weight • Users child finds it makes the car seat more comfortable
Elepho Baby Car Seat Alarm	A large majority of users enjoyed this product • Simple to install • The app is very easy to use • High quality of construction • "Is a neat safety app" • Provides peace of mind to user • Very helpful and part of the customers' daily routines

Target Specifications:

Engineering Design Specification: Functional Requirements

	Design Specifications	Relation (=,< or >)	Value	Units	Verification Method
1	Multilingual Interface				
2	Temperature Detection	=	Not fixed	Degree celsius	Test
3	Co Level Detection	Not available	Not available	Not available	Not available
4	Notify Parents and Passer's by	<	10	ft	Test

Engineering Design Specification: Constraints

	Design Specifications	Relation (=,< or >)	Value	Units	Verification Method
1	Cost	=	50	$	Firm Estimate

2	Child Safety	none	none	none	Test

Engineering Design Specification: Non-Functional Requirements

	Design Specifications	Relation (=,< or >)	Value	Units	Verification Method
1	Easy Installation	=	None	None	Test
2	Multi Location Functionality	=	None	None	Test
3	User Friendly Navigation and Interface	none	none	None	Test

Customer Reflection:

As part of the design process, product developers are urged to hold an interview with the client, to form a bond through empathizing with them. The meeting results in a deeper understanding of what is expected by the client in terms of the products they desire. Before the meeting, members of the team had made assumptions about the expectations that were supposed to meet the client's needs. After the meeting, there was a clear understanding of the reason behind building a device that detects not only temperature but also CO levels in a car. Empathizing with the client from the meeting led the team to reinterpret the needs, therefore setting a design criterion that satisfies said needs. From the meeting, the client suggested that the device created should result in the safe removal of passengers from the vehicle, monitor the CO and temperature levels, and come with a universal design that is not only easy to install but can be adaptable in countries all around the world and is cost-effective. These needs resulted in the creation of the design criteria that recognizes safety, a temperature and CO detector, market research, and the overall effectiveness of the device. The design criteria created highly prioritizes the client as we strive to create a device that is not only easy to install but is cost-effective which could be accessible to the public like the client preferred. The criteria

also prioritize the safety of the users, therefore suggesting a device that not only solves the problem without raising any safety concerns but uses safety warnings using technology.

References

For benchmarking:

[1] "The Baby Alert Wristband | Etsy." https://www.etsy.com/ca/listing/873530515/the -baby-alert-wristband?utm_source=OpenGraph&utm_medium=PageTools&utm_campaign=Share (accessed Oct. 07, 2021).

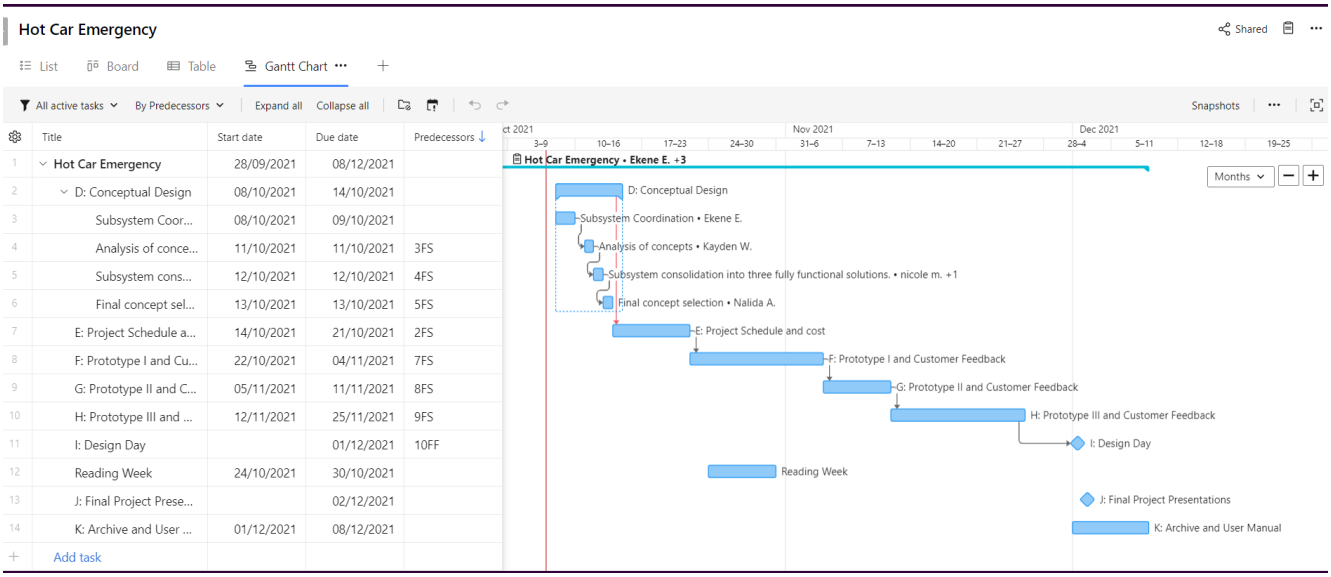
[2] "Qushino Anti-abandonment Device," *MotoStorm*. https://www.motostorm. it/en/accessories/motorcycle -parts/qushino -ainu300-anti-abandonment-device.html (accessed Oct. 07, 2021).

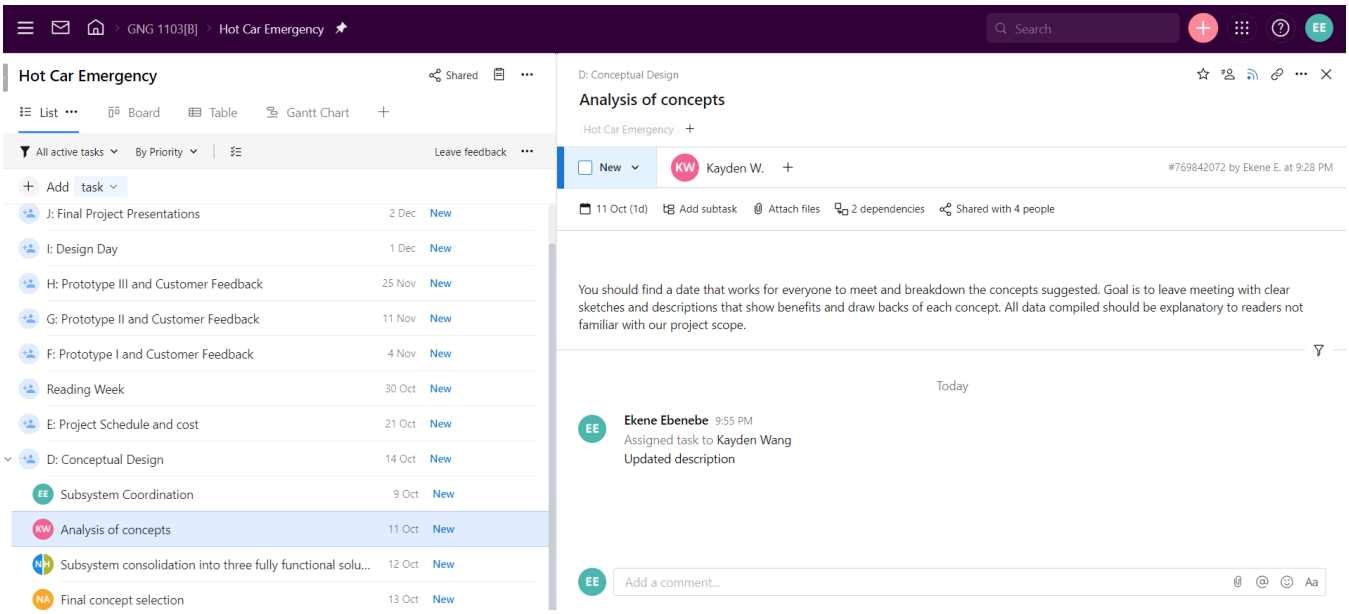
[3] "BE SAFE Anti Abandonment Device,"*Trouva*. https://www.trouva.com/products/be -safe-anti-abandonment-device (accessed Oct. 07, 2021).

[4] "eClip," *Elepho*. https://elepho.com/products/eclip -baby-reminder-for-your-car (accessed Oct. 07, 2021).

[5] "Keep Babies Safe From Hot Cars! New BeeAlert Safety Device Audible Car Alarm,"*eBay*. https://www.ebay.ca/itm/ 351605564428 (accessed Oct. 07, 2021).

Appendix

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Hot Car Emergency
Search
EE
Hot Car Emergency
Shared
List
Board
Table
Gantt Chart
All active tasks
By Priority
Leave feedback
Add task
J: Final Project Presentations 2 Dec New
I: Design Day 1 Dec New
H: Prototype III and Customer Feedback 25 Nov New
G: Prototype II and Customer Feedback 11 Nov New
F: Prototype I and Customer Feedback 4 Nov New
Reading Week 30 Oct New
E: Project Schedule and cost 21 Oct New
D: Conceptual Design 14 Oct New
Subsystem Coordination 9 Oct New
Analysis of concepts 11 Oct New
Subsystem consolidation into three fully functional solu... 12 Oct New
Final concept selection 13 Oct New
D: Conceptual Design
Analysis of concepts
Hot Car Emergency
New
Kayden W.
#769842072 by Ekene E. at 9:28 PM
11 Oct (1d)
Add subtask
Attach files
2 dependencies
Shared with 4 people
You should find a date that works for everyone to meet and breakdown the concepts suggested. Goal is to leave meeting with clear sketches and descriptions that show benefits and draw backs of each concept. All data compiled should be explanatory to readers not familiar with our project scope.
Today
Ekene Ebenebe 9:55 PM
Assigned task to Kayden Wang
Updated description
Add a comment...
Aa