uOttawa

University of Ottawa

GNG 1103: Engineering Design

Deliverable C: Design Criteria

Project Group C12

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1. Introduction

This deliverable organizes and prioritizes the design criteria developed from the interpreted needs of Project Deliverable B. By assessing which design criterias are functional and which are non-functional, target specifications were implemented. These specifications are organized into three categories – functional, constraints and non-functional – which will be referenced throughout the product development. Benchmarking was performed on three already existing products in order to determine the target range of design specifications.

2. Needs and Design Criteria

Table 1 - Interpreted needs, design criteria and functionality of needs

Importance (5>1)	**Need**	**Design Criteria**	**Functional / Non-Functional**
5	User friendly interface with easy navigation of application	User friendliness and visual aesthetic	Non-Functional
4	Globalization of application	Accessible to everyone, everywhere	Non-Functional
5	Accuracy of information accessible to user	>95% accurate	Non-Functional
3	Item scanning feature	Easy to use item identification feature	Functional
2	Colour code for recyclable items	Items are accurately colour coded based on how to recycle them	Functional
2	Game format	Makes recycling entertaining	Functional
3	Location of local recycling facilities	Shows users where recycling facilities are located as well as what can be recycled there	Functional
2	Incentives for users	Offers users rewards for constant recycling	Functional

3. Benchmarking

Table 2.0 - Metric and benchmarking

#	Metric	iRecycle	RecycleRight	Eugene by Uzer
1	User friendliness and visual aesthetic	Easy to use. Looks alright Well organized	Simple blue and white style; neither bold or loud in appearance. Reminiscent of a search engine: user friendly, indeed	Yes - bar code scanner Aesthetic and organized
2	Geographically accessible to everyone, everywhere	Made for the USA. Very slight usability in canada.	Exclusive to Washington, USA, specifically Vancouver and Clark County	Certain European countries only
3	Available on various platforms (website, IOS and Android)	Yes - available on all mobile platforms	IOS (9.0 and up) and Android (4.1 and up), only [2] Compatible with iPad, iPod touch, iPhone [2] Website has a searchable A-Z directory	Yes - IOS and Android apps [1] IOS: 11.0 and up Android: 5.0 and up
4	>95% accurate	Information is accurate	Yes: extensive searchable items and limited applicable area, combined ensure a lower bar for accuracy	No - only nutritional items
5	Easy to use item identification feature (scanner)	No	No	Yes - barcode scanner
6	Items are accurately colour coded based on how to recycle them	No	No	No
7	Makes recycling entertaining	No	No	Yes
8	Identifies correct recycling bin	Yes	Yes	Yes
9	Recycling facility locator	Yes	Yes	No

			Also donation sites for reusable supplies (tools, baby supplies)	
10	Provides information on recycling facilities (Hours of operation, location…)	Yes	Yes - collection schedule for a residential address or facility is searchable	No
11	Offers users rewards for constant recycling	No	No	Yes
12	Supplementary information for user (articles)	No	Yes - donation sites are searchable	Yes - nutritional information
13	Cost of application	Free	Free	Yes - additional device required £79 [1]
14	Available languages	English Only[3]	English only [2]	French and English
15	Memory size requirement	50.2 MB for IOS 39MB for Android [3]	40 MB for Android [2] 116.5 MB for IOS [2]	34MB for Android 78.6 MB for IOS
16	Latest Update	July 25th 2019	Nov. 27, 2020 [2]	Feb. 4, 2021

Table 2.1 - Comparison of importance for benchmarking research

#	Metric	Importance (5>1)	iRecycle	RecycleRight	Eugene by Uzer
1	User friendliness and visual aesthetic	5	1	3	2
2	Geographically accessible to everyone, everywhere	4	2	1	2
3	Available on various platforms (website, IOS and Android)	4	3	3	2
4	>95% accurate	5	3	3	2
5	Easy to use item identification feature	3	N/A	N/A	3
6	Items are accurately colour coded based on how to recycle them	2	N/A	N/A	N/A
7	Makes recycling entertaining	2	1	1	2
8	Identifies correct recycling bin	3	3	3	3

9	Recycling facility locator	3	3	3	N/A
10	Provides information on recycling facilities (Hours of operation, location…)	3	3	3	N/A
11	Offers users rewards for constant recycling	2	1	1	3
12	Supplementary information for user (articles)	2	3	2	3
13	Cost of application	3	3	3	1
14	Available languages	4	1	1	3
Total			99	94	85

3.1. Definitions

User friendliness and visual aesthetic: Allows users to easily navigate the app while being pleasing to the eye.

Geographically accessible to everyone, everywhere: Can be used in any location and still have the full range of functionality.

Available on Various platforms: Application is available on both IOS and Android as well as a website with supplementary information

>95% accurate: The information given is accurate and up to date by a standard of >95%

Easy to use item identification feature: Users can take a picture of an item and the app will tell users exactly how to recycle it.

Items are accurately colour coded based on how to recycle them: Items that are recycled the same way are grouped together by colour.

Makes recycling entertaining: using either a game or competition the app keeps users interested and entertained.

Identifies correct recycling bin: Application can indicate with recycling or waste bin the item should be placed

Recycling facility locator: Shows the location of where items can be recycled and what else can be recycled there.

Provides information on recycling facilities: Information such has hours of operation and address, available for located recycling facilities

Offers users rewards for constant recycling: Rewards users for reaching recycling milestones and for winning competitions.

Supplementary information for user: Additional links, articles or interesting information available for user

Cost of application: How much does the application cost the user

4. Target Specifications

Table 3.0 - Functional Requirements

#	Design Specification	Relationship (=, < or >)	Value	Units	Verification Method
Functional Requirements					
1	Item scanning feature	=	Yes	-	Test
2	Colour code for recyclable items	=	Yes	-	Test
3	Game format	=	Yes	-	Test
4	Location of local recycling facilities	>	50	Km	Test
5	Incentives for users	=	Custom	$	Estimation

Table 3.1 - Contraints

#	Design Specification	Relationship (=, < or >)	Value	Units	Verification Method
Constraints					
1	Compatibility (IOS, Android, website; multiple devices)	=	Yes	-	Test
2	Memory size	<	120	MB	Analysis
3	Cost	<	100	$CAD	Estimation; comparison
4	Language (multiple: English, French)	=	Yes	-	Test
5	Internet access	=	Yes	-	Test
6	Operating speed	>	4	GB	Test

Table 3.2 - Non-Functional Requirements

#	Design Specification	Relationship (=, < or >)	Value	Units	Verification Method
Non-Functional Requirements					
1	User friendly	=	yes	-	test
2	Globalization	=	yes	-	test
3	Accuracy	>=	95	%	analysis

5. Conclusion

This document will serve as a reference during the solution development stage of the project. By comparing three pre-existing products with the design criteria, realistic goals can be set and realized. Although constraints were implemented and analyzed, they can be eliminated or modified with further benchmarking. The product called iRecycle scored the highest (Table 2.1) when compared to the metrics, making it a good reference point for the development of our application. By combining desirable features from various products, we have the opportunity to fulfill the customer, Mr Bouchards, needs and desires.

6. References

[1] “Eugene by UZER I Waste less. Save more. Live better.” https://www.eugeneapp.io/ (accessed Feb. 06, 2021).

[2] “Recycling Right Made Easy!” https://www.cityofvancouver.us/publicworks/ (accessed Feb. 06, 2021).

[3] “Download the iRecycle App | Earth 911.” https://earth911.com/irecycle/ (accessed Feb. 06, 2021).