SYNTHETIC SOLUTIONS INC.

Project Deliverable C: **Design Criteria and Target Specifications**

GNG 1103 – Engineering Design

Faculty of Engineering – University of Ottawa

Team C01-1

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Abstract

The purpose of this report is to expand the client's needs from the previous deliverable into elaborate design criteria. The criteria were of three types: functional criteria, non-functional criteria, and design constraints. Moreover, benchmarking research was performed between three AR-based apps in order to obtain target characteristics for the mobile application. Overall, it was deduced that BBC Civilizations AR and Pokémon GO had the most suitable criteria, and thus will be used as the main references for the development of our AR mobile application. Regarding the educational game application section of the app, a similar process was followed that concluded with Category Therapy being the ideal model to use.

Introduction

The preceding deliverable established that the computerization basis upon which the architectural design will be fulfilled is through the development of augmented reality (AR) mobile applications. This deliverable outlines the design criteria of the application through analysis and interpretation of the needs discussed in the previous deliverable. The design criteria will be separated into functional and non-functional criteria, as well as the design constraints. These criteria will then be further implemented onto three AR model visualization apps for benchmarking to efficiently define target specifications. **Table 1** below presents the needs of the client in descending order of importance from the last deliverable.

Number	Needs of Client	Importance
1	Accurate Item Scanner	5
2	Compatibility with Mobile Devices	5
3	User Friendly	4
4	Expandability	4
5	Educational Game	3
6	Extra Educational Information	3
7	Incentive System	2

Table 1: Ranked Client Needs

Design Criteria

The client's overall needs were interpretated as design criteria to have a clearer overview and objective of the application. The design criteria of each need are outlined in **table 2**, which can be described as the specifics in the app design that will help achieve that particular client need. Furthermore, the criteria were then subdivided into 3 main aspects: Functional, Non-Functional and Constraints as seen in **table 3**. The functional criteria relate to the functionality of the app, whereas the non-functional does not. Additionally, design constraints are certain criteria that must be met and therefore define that part of the design.

Number	Needs	Design Criteria
1	Accurate Item Scanner	- Number of items recognized - Correct items ratio - Resolution - Accuracy
2	Compatibility with Mobile Devices	- Crossmatch with different platforms
3	User Friendly	- Easy to use - Guided tips - Clean Presentation
4	Expandability	- Consistent - Navigation
5	Educational Game	- Entertainment - knowledgeable
6	Extra Educational Information	- Informative - Useful
7	Incentive System	- Engaging - Interactive

Table 2: Design Criteria

Functional Criteria	Non-Functional Criteria	Constraints
- Resolution - Accuracy - Easy to use - Guiding tips - Navigation	- Clean Presentation - Useful - Interactive - Steady camera - Consistent - Geolocation	- Free app - Compatible with most OS - Wireless Connection

Table 3: Design Criteria and Constraints

Benchmarking

When researching benchmarking for similar products for our solution it was apparent that not one app does exactly what our app is going to do. Because of this, we decided to break the app into its main features/aspects and analyze the competition based on that. It was decided that it would be divided into AR applications with scanning feature and games that focused on sorting. **Table 4** and **Table 5** look at different AR applications based on specific criteria that is important to our design. After comparing the apps selected, it was decided that *AR Pokémon Go* and *BBC Civilisations* are the best two AR apps to compare with. **Table 6** and **Table 7** analyzed different sorting games to determine which model was best. For the game portion it was decided that using *Category Therapy* as a reference was the best option.

AR Scanning Apps

Specifications	Froggipedia	BBC Civilisations AR	Pokémon GO
Cost	$5.49	Free	Free
Cross Platform Usage	iOS	iOS & Android	iOS & Android
Ease of use	Yes	Yes	Yes
Rating	3.6	4.5	3.8
Accuracy	Low	High	High

Table 4: Benchmarking Similar AR apps using Design Criteria

Specifications	Importance	Froggipedia	BBC Civilisations AR	Pokémon GO
Cost	**3**	1	3	3
Cross Platform Usage	**5**	2	3	3
Ease of Use	**4**	3	3	3
Rating	**2**	1	2	2
Accuracy	**5**	1	3	3
Total		27	55	55

Table 5: Benchmarking Similar AR Products Based on Scored Values

Educational Game Application

	Games with Sorting Features			
Specifications	**Factory of Categories**	**Category Therapy**	**Categories Learning Center**	**Count, Sort, and Match**
Cost	$5.99	$19.99 (lite=Free)	$11.99	$1.99
Cross platform Usage	iPad	iOS	iPad	iPad
Complexity	100 categories and 4 Activities	70 categories and 700 Words	5 Activities	1 Activity
Easy to Use	Complaints	Yes	Yes	Yes
Rating	2.3/5	4.9/5	4.6/5	4/5
Target Audience	Children	All ages	Children	Children

Table 6: Benchmarking Similar Games with Design Criteria

		Games with Sorting Features			
Specifications	**Importance**	**Factory of Categories**	**Category Therapy**	**Categories Learning Center**	**Count, Sort, and Match**
Cost	3	2	1	1	3
Cross platform Usage	5	1	2	1	1
Complexity	3	3	3	2	1
User Friendliness	4	1	3	3	3
Rating	3	1	3	3	2
Target Audience	2	2	3	2	2
Total		**31**	**49**	**39**	**39**

Table 7: Benchmarking Similar Games with Scored Values

Conclusion

After understanding the importance of each of the client needs and design criteria, benchmarking was done to compare applications that already exist against our design criteria. Since the application we are aiming to create does not currently exist in one app, this was conducted for both the AR scanning section and educational game section. After using a system to measure which applications were best, it was concluded that *BBC Civilizations AR* and *Pokémon GO* were the best models for the AR section and *Category Therapy* was the best suited candidate for the sorting game feature.

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