GNG1103 Report

Project Deliverable - G

Submitted by

Group B03-5

Briar Vandenberg, 300058322

Victoria Jancowski, 300203985

Lauren Healy, 300131780

Edwin Jazvac, 300211195

Maya White, 300117859

Date

Nov 20, 2020

University of Ottawa

Abstract

This report details the organization of a prototyping test plan to develop a comprehensive prototype that ultimately fulfills the previously identified needs and design criteria of the client, EllisDon Construction, represented by Patrick Lalonde. The team plan includes identified objectives that should be achieved in the prototyping phase. Primarily, this report outlines the prototyping plan of prototype II: the comprehensive prototype based on the previously identified six focused prototypes (as described in the previous deliverable). Furthermore, the testing summary and feedback from potential clients/users are analyzed to ultimately determine where this protype needs to be improved or modified in the final prototype III.

Table of Contents

List of Tables

List of Figures

1 Introduction

This report outlines a detailed prototyping test plan which was developed to advance and integrate the six focused protypes into a functioning comprehensive prototype II. After the six focused prototypes were identified: main menu interface, navigation toolbar, camera navigation system, multi-user interface and programming, safety warning pop ups, and a dimensioning tool, they were combined to form a functioning program for prototype II. Similar to the focused prototype I, prototype II was tested and appraised based off of client and user feedback. According to the plan, this comprehensive prototype will later be advanced to better fulfil the previously identified criteria in the final protype III. Based on the analysis of this prototype, within the last weeks of the design process, the third prototype will be the complete and fully functioning prototype which will be distributed to the client: EllisDon Construction, represented by Patrick Lalonde.

2 Prototype II Testing Plan

The prototype testing plan is developed based off the 'Prototyping Testing Plan' template from lecture 11.

2.1 Prototype Objectives

Capture the reasons for the test, giving enough background information to justify doing any prototyping at all. Is the general objective one of: learning, communication, de-risking, etc.

In order to create an application that fulfills all the needs and criteria requested by EllisDon Construction, prototyping is being done in stages which began with prototype I; the alpha prototype which was several focused prototypes, the second prototype as outlined in this document will be a comprehensive prototype which was developed by combining and integrating the alpha

prototypes, next a third prototype which will be the complete and functioning prototype which will be distributed to the client.

The objective of the beta prototype presented in this document is to represent the most critical systems of the application and further develop our solution by combining the alpha prototypes. Prototyping and prototype evaluation is very important to creating the product which the client requested, it also gives the designers the opportunity to modify the concept early on in development in order to improve it.

What are the specific test objectives?

The ultimate objective of prototyping testing is to confirm that the prototype fulfills the clients needs and reaches the outlined target specifications. As well, the prototype should address the problem statement posed by the client; “Design a technology that allows construction workers to view all aspects of 3-D Building Information Models (BIM), including mechanical, electrical, structural and architectural systems in Virtual or Augmented Reality. The product should be cost effective, user friendly and accessible on all mobile devices.”

Testing will also serve as a learning experience to determine where our concept needs to be improved or modified in order to provide a seamless user experience while providing all the functionality requirements which the client asked for. The specific test objective of prototype II is to confirm that the subsystem alpha prototypes can be combined into a comprehensive but not yet entirely functioning application.

What exactly is being learned or communicated with the prototype?

This prototype is communicating and displaying a single comprehensive prototype that is comprised of the focused prototypes. This prototype will allow the designers to identify any issues with the app and further develop and integrate all the user interface features. This prototype will also be very useful for gathering client and user feedback that can be applied and implemented before the final prototype is created

What are the possible types of result?

Prototype II is thoroughly outlined and displayed in the following sections and is tested against the previously determined metrics. The results of testing will indicate the strengths and weaknesses of the prototype based on the client's needs which were used in developing the metrics. The results of the testing will indicate whether or not our concept is on the right track to satisfying all the client's needs as well as where it needs to be improved.

How will these results be used to make decisions or select concepts?

The results of the prototype testing will provide crucial data that will influence development of the final prototype. The results of the testing will be analyzed to ensure that this prototype like prototype I fulfills the needs of the client. If it does not fulfill its purpose and provide the client with what they requested, the decision will have to be made to replace problematic subsystems with a new idea or one of the previously eliminated ones. As well, these results will be used to show the strengths of the design and aid in the progression of the prototype.

What are the criteria for test success or failure?

In the case of the prototype testing outlined in this document, the metrics will be used to measure whether the prototype was a failure or a success. The comprehensive prototype is a success if it fulfills the criteria and it is a failure and will need to be modified or replaced if it doesn't fulfill its required specifications.

2.2 Prototyping Process

Describe the prototype type (e.g. focused or comprehensive) and the reason for the selection of this type of prototype.

As aforementioned the prototype documented in this report will be a single comprehensive prototype comprised of the previously developed focused prototypes in the previous deliverable. This prototype will be a low fidelity version of prototype III.

A comprehensive prototype was created at this stage to represent the most critical systems of the application and allow for adequate testing and sufficient feedback from the client as well as users in order to move forward with development.

Describe the testing process in enough detail to allow someone else to build and test the prototype instead of you.

The testing process will involve interaction with the prototype in order to determine if it fulfills all associated metrics. In the case of the prototype outlined in this document, to execute prototype testing the tester would need to use unity and navigate through the individual scenes of each prototype and determine if it satisfies the metric of which the majority are yes or no answers.

What information is being measured?

The protypes competency to fulfill the client's needs is being measured based off of the metrics and specified target value.

What is being observed and how is it being recorded?

The prototype's features are being observed in order to determine if it satisfies the metrics outlined in this document. The results are being recorded by the designers in tabular format.

What materials are required and what is the approximate estimated cost?

Like the initial prototype, there will be no cost associated with prototype II, only Unity and the Unity asset store will be required as no physical materials will be required to create the application.

What work (e.g. test software or construction or modeling work or research) needs to be done?

The completion of prototype II will require the combination of each group members focused prototypes into a single Unity file to begin creation of the actual application. As well, prototype II includes the addition of user interface features and design.

2.3 Prototyping Schedule

How long will the test take and what are the dependencies (i.e. what needs to happen before the testing can occur)?

Testing of this prototype will not require much time, however before testing can occur the prototype will need to be complete which will require the integration of all the focused prototypes. Total testing time should not exceed one day, we do however plan to distribute this prototype to peers for feedback which may take up to 3 days.

A separate test planning Gantt chart can be created to help making sure that the testing fits with the overall project schedule or it can be defined as part of that schedule (i.e. as a sub-task).

In the project deliverable E a Gantt chart was created, in which subtasks were defined to account for prototype testing time to ensure our team stays on track with prototype development and testing. This schedule has been followed thus far without issues and we are on track for successful competition of prototype II for the submission of this deliverable this week and the completion of prototype III for design day on November 26th.

When are the results required (i.e. what depends on the results of this test in the project plan)?

The results of the testing of prototype II are required by November 20th for the submission of this deliverable which will also keep us on schedule for creating the final prototype by November 26th using the results of testing prototype II.

3 Prototype II and Prototype Appraisal

This section of the report thoroughly and concisely documents prototype II using figures and explanations, this prototype is then appraised and analyzed through testing.

3.1 Prototype II

The following figures show the user interface, the figures are in order based off the sequence in which they appear in the final app. The user interface has been designed in both French and English to improve overall user experience and accessibility.

Figure 3.1.1 Application Icon

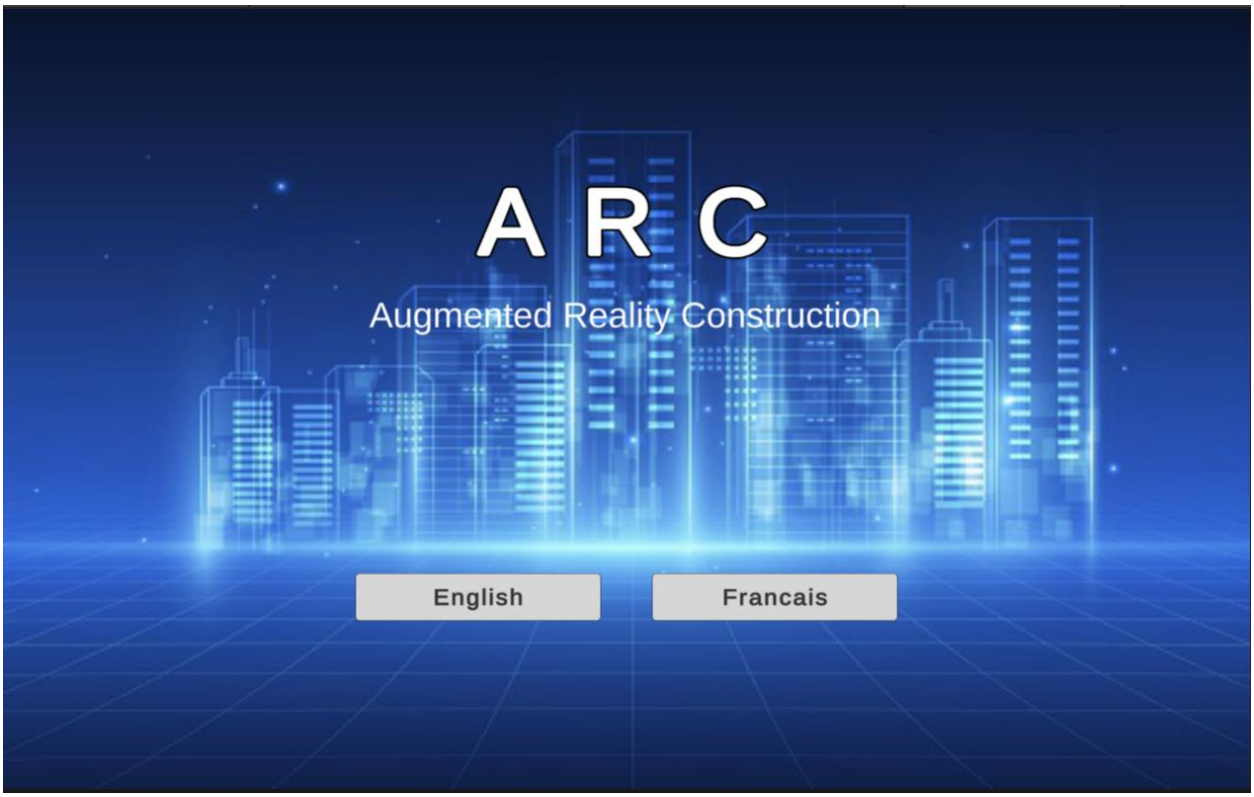

Figure 3.1.2 Language Selection Screen

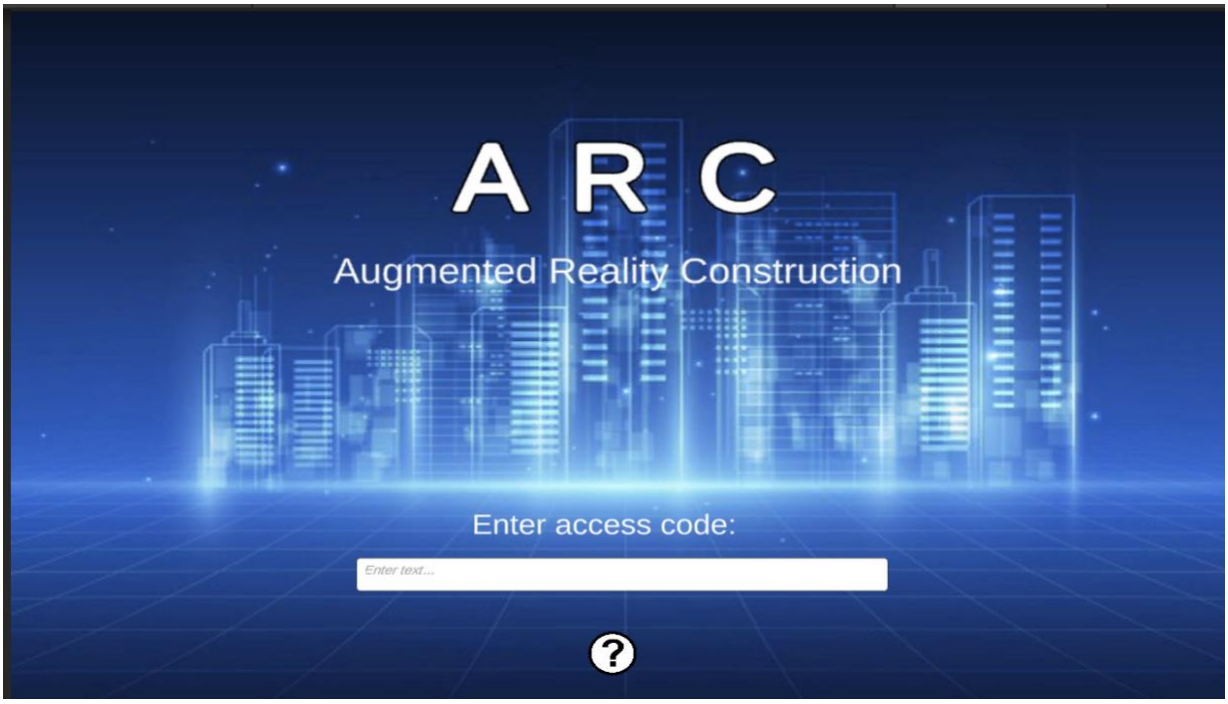

Figure 3.1.3 Main Menu Access Code Screen with Button to Tutorial

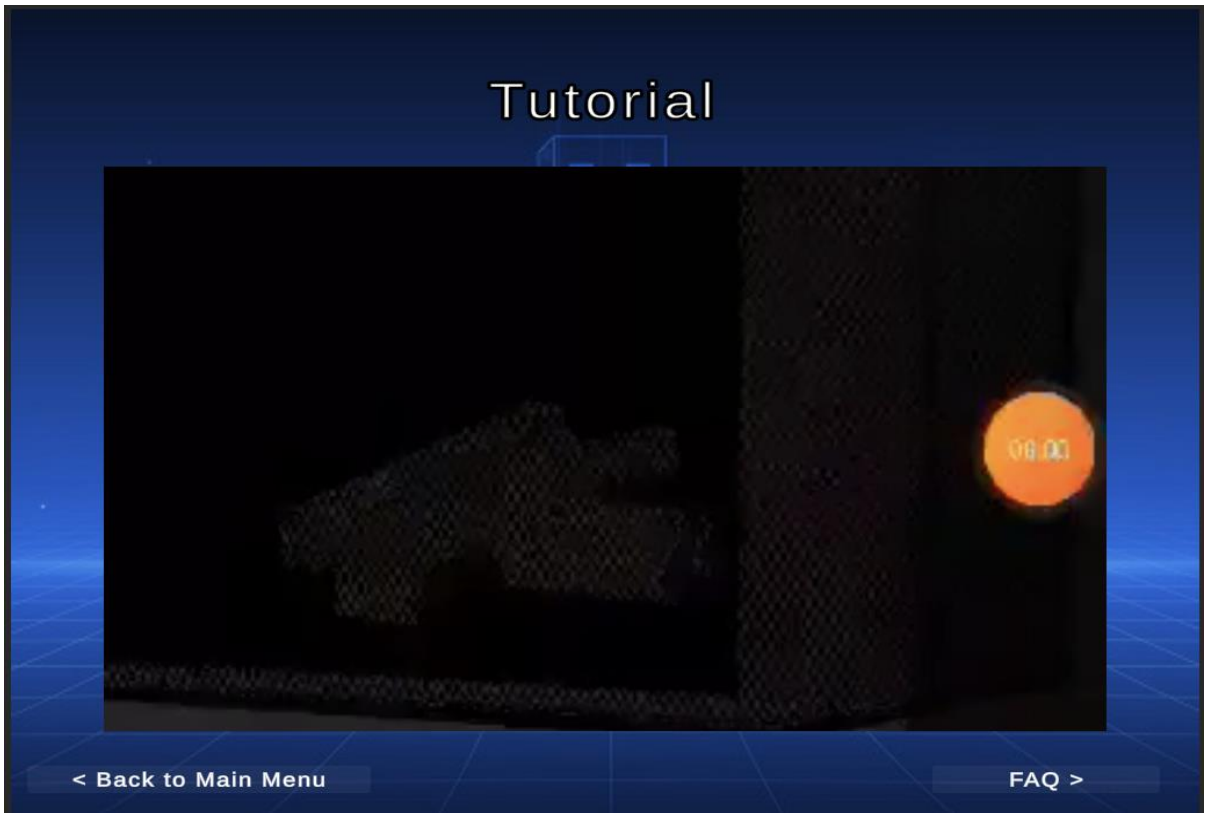

Figure 3.1.4 Tutorial Interface with Place Holder Video

Figure 3.1.5 FAQ Page

Figure 3.1.6 File Import Screen

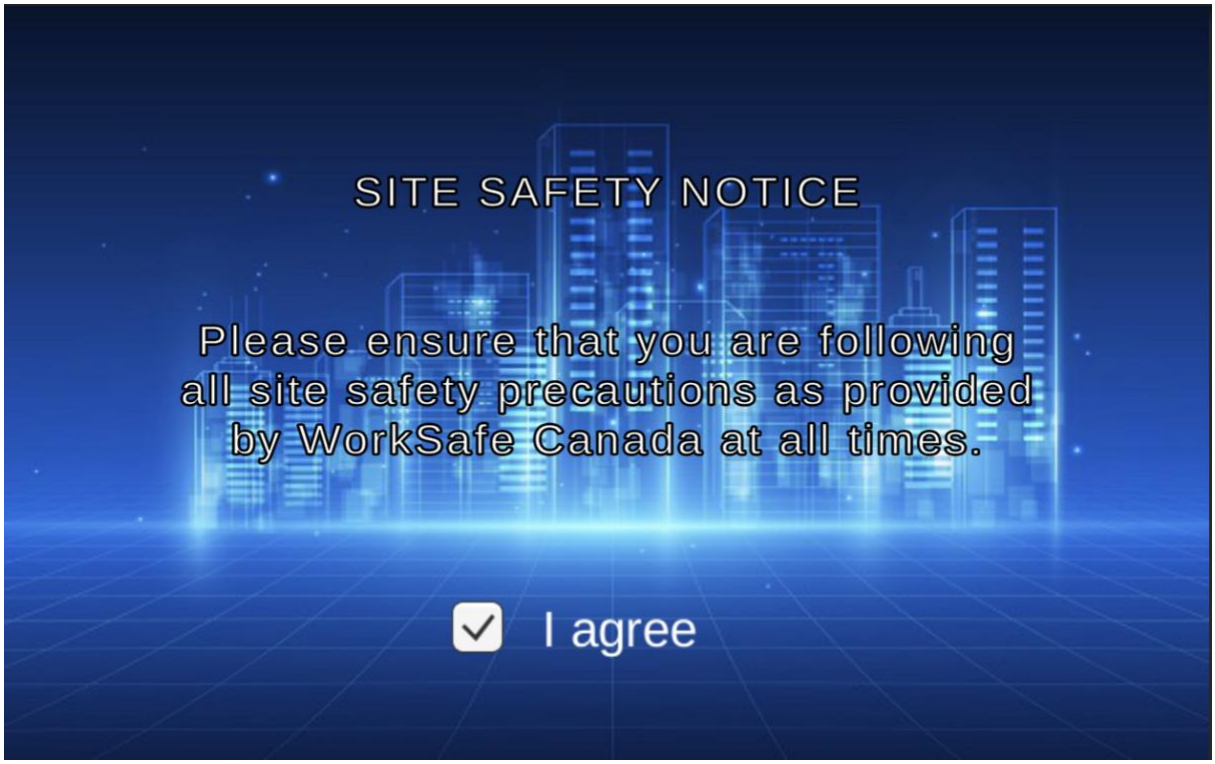

Figure 3.1.7 Site Safety Reminder

Figure 3.1.8 File Viewing Screen with Toolbar

Figure 3.1.9 AR Camera View (1/6)

Figure 3.1.10 AR Camera View (2/6)

Figure 3.1.11 AR Camera View (3/6)

Figure 3.1.12 AR Camera View (4/6)

Figure 3.1.13 AR Camera View (5/6)

Figure 3.1.14 AR Camera View (6/6)

3.2 Testing and Appraisal

This prototype was tested against the previously defined target specifications. The results of the prototype testing are detailed in table 3.2.1. The test results indicate that good progress has been made in prototype development and we are on track to fulfilling all the criteria and functionalities that we planned on implementing into the final prototype.

Table 3.2.1 Prototype Testing Results

No.	Metric	Units	Target Value	Tested Value
1	Ability to view 3D Building Information Models (BIM) in Virtual Reality.	Y/N	Y	Y
2	Compatible with common Mobile Devices (iOS or Android).	Y/N	Y	Y
3	Viewing of BIM is available offline and cloud syncing available online.	Y/N	Y	Y
4	Ability to view 3D internal systems in BIM's in Virtual Reality.	Y/N	Y	Y
5	Navigation and interface must be user friendly.	Subjective Rating*	6	8
6	In app safety reminders and warnings for hazards on work site.	Y/N	Y	Y
7	Software application must be open source or free to use.	Y/N	Y	Y
8	Training and implementation documentation must be provided.	Y/N	Y	Y
9	Software application must be free to users.	$	0	0
10	At minimum be accessible in the form of a mobile application.	Y/N	Y	Y

4 Prototype Testing Summary and Feedback

In the previous deliverable, prototype I was done and documented with thorough testing and analysis. This prototype was presented to our client; EllisDon and we received good feedback. Lalonde was very impressed with our progress so far and offered no criticism or suggestions that would need to be implemented into this prototype. We as well gathered feedback from peers and colleagues, the main suggestion we received was to improve the user interface by ensuring everything including font sizes etc was consistent throughout all the subsystem prototypes.

The testing results of prototype II indicate that good progress is being made and we are on track to complete our final prototype which will fulfill all of the client's needs by Design Day on November 26th. This prototype provided a great learning opportunity and gave a lot of insight into what needs to be done before the final prototype is complete.

5 Conclusions and Recommendations for Future Work

In conclusion, the contents of this report thoroughly outline the prototype II testing plan in detail and then prototype II is detailed and documented using figures. Testing and appraisal was conducted on the prototype and previous feedback was analyzed and implemented into the development of this prototype. Results of the prototype testing and appraisal is being used to finish the development of a product that fulfills the previously stated needs and design criteria given by the client. Based on the testing results, this prototype indicates good progress and has been made and we are on a track for completion of a functioning product that satisfies the client's needs by Design Day.