GNG1103 Report

Project Deliverable - B

Submitted by

Group B03-5

Briar Vandenberg, 300058322

Victoria Jancowski, 300203985

Lauren Healy, 300131780

Edwin Jazvac, 300211195

Maya White, 300117859

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University of Ottawa

Abstract

This report details the problem definition process that is applied to develop a product at the request of the client EllisDon Construction represented by Patrick Lalonde. The construction industry has not progressed at the rate in which technology has and the industry is seeing decreased productivity due to labor shortages and changing complexity. EllisDon and Lalonde are looking to get at the forefront of construction technology and address the universal need in construction to increase productivity. Lalonde wants to implement a cost effective, and user friendly software platform that would eliminate the use of 2D drafts and carry 3D modelling straight through from Building Information Modelling (BIM) to construction, via a mobile device. As a result of the prioritized needs generated off of customer statements in the initial client meeting on September 25th, a problem statement was proposed. Based off of this problem statement and the interpreted needs, several benchmarks were identified including WalkingApp and Gamma AR which are both existing software's that fall short in addressing the needs of user experience quality and the ability to view 3D BIM.

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1 Introduction

The contents of this report provide a summary of the initial client meeting on September 25th with Patrick Lalonde who is the Director of Virtual Design and Construction (VDC) for Eastern Canada at EllisDon. In order to adequately identify needs of the customer, empathizing and understanding the problem that is being faced by EllisDon is crucial. Based on Lalonde's statements and responses to the designer's questions during the meeting, a list of client needs was developed and prioritized by its importance to the final prototype. Using these identified needs and the project goal as presented by Lalonde, a problem statement was developed to completely encompass the scope of the project. Furthermore, a thorough benchmarking analysis was conducted to reveal competitors in the market and where they fall short in fulfilling all of Lalonde's needs for an optimal work experience for workers at EllisDon.

2 Client Meeting and Needs Identification

In order to establish a greater understanding of the specific needs and desires of the client, a meeting is essential. This allows a chance to empathize with the client, and gain a further understanding of their problems, limitations, frustrations and needs. The client meeting allows a chance to build a relationship with the client that will aid in problem solving during the course project.

2.1 Client Meeting Summary

With labour shortage, increasing construction complexities and disruptive technologies, construction companies are seeing a decrease in productivity due to quickly falling behind in the technological world. A virtual meeting was held on Friday, September 25 in order to begin accessing the needs of the client. The client, Patrick Lalonde of EllisDon, expressed the challenges of introducing technology into construction including: hardware requirements, ease of use and software costs. Taking these challenges into account, Lalonde expressed a need for a cost effective, and user friendly software to eliminate the process of 2D drafts and important data loss and carry 3D modelling straight through from Building Information Modelling (BIM) to construction, via mobile devices.

2.2 Customer Needs

Table 2.1 Customer Statements and Interpreted Needs

#	Customer Statement	Interpreted Need	Importance
1	Important to have the ability to view 3D Building Information Models in Virtual or Augmented Reality.	The product provides the user with the ability to view and interact a building in an augmented reality environment.	5
2	The product will be easily accessible on all mobile device.	The product will be compatible with IOS and android platforms.	4
3	Product can be used with Google cardboard or an alternative device.	The product will be used on a mobile device.	3
4	The product will be user friendly and simple to use.	The product serves a specific purpose and provides users with training and tutorials.	5
5	Software application will be free to use or open source.	The product will not cost the user any money.	4
6	The product will have viewing of multiple disciplines.	The product will have the ability to isolate mechanical, electrical, structural and architectural systems.	5

7	Training and implementation document will be provided.	The product will include a user guide and a tutorial.	4
8	The product will use unity plug-ins and free 3rd party plug-ins	The product will be cost effective.	3
9	The product needs to work offline in case of remote locations but be able to link up to a cloud for storage.	The product will work offline but have online capabilities in range of internet.	5
10	Safety warning and precautions are an asset	The product will include warning notifications and necessary safety equipment reminders.	3

2.3 Needs Hierarchy

Based on the client meeting, the importance of the needs have been interpreted and ranked on a scale of 1 to 5, with 1 being features that are least important to the client and most unnecessary, and 5 being the needs most essential and critical to the client, respectively. The hierarchy of needs allows for a brief analysis of the importance of the features to the design of the overall product.

2.4 Problem Statement

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.

3 Benchmarking

While AR (augmented reality) and VR (virtual reality) technologies have only recently made an appearance in construction, there are already many options for clients looking to invest in the technology. WakingApp and Gamma AR are two companies that provide AR and VR for use in

construction. However, none of these programs fit all the needs of our client. The program developed by WakingApp cannot be used on mobile devices, is costly and does not allow the user to view the multiple layers of a construction project. Gamma AR has come much closer to meeting our needs – with an iOS/Android app capable of bringing BIM models to the real world with AR – but consumers must still pay for a subscription to the program.

4 Conclusions and Recommendations for Future Work

After meeting with the client, the main needs were identified and taken into consideration when formulating an effective problem statement to encompass the main goal of the product as seen through the clients eyes. With the clients statements in mind, a benchmarking analysis was conducted to examine where present solutions don't address all the needs of our client.

Moving forward, a list of prioritized design criteria will be produced and categorized into functional and non-functional requirements as well as any constraints. This will allow design specifications to be made and aid in finding a solution that will satisfy all of the clients needs.

5 Bibliography

Augmented Reality Showcase. (n.d.). Retrieved October 01, 2020, from https://www.wakingapp.com/showcase-old

BIM Construction Management and Facility Management App. (n.d.). Retrieved October 01, 2020, from https://gamma-ar.com/

APPENDICES

APPENDIX I: Rating (1-5)

1 – Unsatisfactory

2 – Hardly satisfactory

3 – Satisfactory

4 – Very Good

5 - Excellent