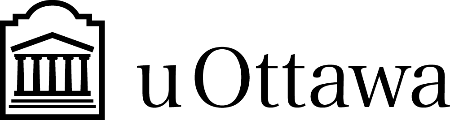
**GNG2101 Report**



**Project Deliverable B: Needs, Problem Statement, Metrics, Benchmarking and Target Specifications**

Submitted by

Team 4.2 - Immersive VR Experience

| Student Number |  | Name |
| --- | --- | --- |
| 300231269 |  | Brevin Baskaran |
| 300228908 |  | Henry Radar |
| 300126254 |  | Jiachen Wang |
| 300231222 |  | Nicholas Yeung |
| 300231531 |  | Reyaan Trimizi |
| 8737165 |  | Uziar Mohiuddin |

Faculty of Engineering

**Table of Contents**

[Introduction](#_74hgyyhm9sbj) ……………………………………………………………………………………………….. 3

[Client Needs](#_8zd8rgpkgt2n)………………………………………………………………………………………………...3

[Benchmarking](#_p4xxoxcpb825)………………………………………………………………………………………………7

[Target Specifications](#_1os20n6gi6t3)………………………………………………………………………………………11

[Conclusion](#_hvmrxw57fc8v)…………………………………………………………………………………………………12

[Citations](#_a7rrk0nmzztn)……………………………………………………………………………………………..……13

# **Introduction**

There is a constant need for diversity and inclusion in the society we live in right now, and there is a need to create an experience in which people can put themselves in the shoes of others. Thus we met with the client, Hanan, a professor of Engineering Design at the University of Ottawa. From the client we learned that we need to develop a VR immersive experience to develop empathy about things people are not familiar with to help create a more inclusive culture. The objective is to develop a library that has various modules to educate herself (mental health, indigenous issues, accessibility issues on campus). In the simple case of using this VR tool by a customer using Google Cardboard, moreover it should not be a struggle for another group of students to use this product. When talking to the client we learned. The client herself has faced discrimintation, since she is a woman of color and she has taught herself that there are other forms of discrimintation. Even when people think that they are totally aware of discrimintation, everyone has blindspots and this tool would be useful to all.We also learned that the technology is not as important as the storyboard, it is important not to jump into the technology first hand. It is important to focus on the user experience and not just about the new technologies that are being used. As university students we have access to a wider variety of perspectives from other students. This product can be used as an education tool for someone who wants to learn and have an interactive experience on an issue society is suffering with to help build empathy.

# **Client Needs**

Following the client interview and further, we have created a list of prioritized customer needs which is divided into three different categories. The needs are scored on a scale from 1 to 5, representing the relative importance of the need (5 being the highest importance and 1 the lowest importance).

| **#** | **Need** | **Category** | **Importance** |
| --- | --- | --- | --- |
| 1 | Create a VR immersive experience that creates a response of empathy | Diversity and inclusion | 4 |
| 2 | The VR tool is easy to use | User Experience | 4 |
| 3 | Has an an interactive experience that keeps the user engaged | User Experience | 3 |
| 4 | The technology being used is mostly using VR | Diversity and inclusion | 1 |
| 5 | Low-cost or no cost to use | Accessibility | 3 |
| 6 | Educates the end-user and makes a social impact | User Experience | 4 |
| 7 | The VR tool has accessibility aids such as visual and auditory aid | Accessibility | 2 |
| 8 | Be inclusive in terms of content and ease of readability for all ages (10+) | Accessibility | 2 |
| 9 | Identify and analyze all types of discrimintarion, including invisible disabilities. | User Experience | 1 |
| 10 | The VR experience is engaging and also an informative experience | User Experience | 5 |
| 11 | Immersive VR experience platform is accessible across all platforms (e.g ios, Android) | Accessibility | 2 |
| 12 | VR experience allows user to reflect on what they have learned through the experience | User Experience | 5 |

With all these needs in mind, our team has created the following problem statement: *The problem is the general population are oblivious to forms of discrimintation of others, thus there is a need for an interactive VR solution that would allow people to empathize allowing them to experience the struggles of minorities.*

Our team has also developed a set of matrices with associated units and have specified if the metrics are functional, non-functional or constraint.

| **#** | **Metrics** | **Unit** | **Needs Addressed** | **Functional/Non-functional or Constraint** |
| --- | --- | --- | --- | --- |
| 1 | FPS | FPS (smooth, lag) | 3 | Non-functional |
| 2 | Load time | Second | 3 | Non-functional |
| 3 | Memory size | GB | 11 | Constraint |
| 4 | Usage Data | GB | 11 | Constraint |
| 5 | Completion time | Minute | 3 | Non-functional |
| 6 | Progress Indicator | Boolean (True, false) | 6, 7, 12 | Functional |
| 7 | User interface | List (straightforward, acceptable, confused ) | 2 | Non-functional |
| 8 | Text & Voice Guidance | List (clear, acceptable, unclear) | 2,7 | Functional |
| 9 | Money for purchasing App | Canadian dollar | 5 | Constraint |
| 10 | Contents relevant to real life problems | Rank (1-10) | 10, 1 | non-functional |
| 11 | Multiple VR device support | List (VR headset & controller) | 4 | Functional |
| 12 | Contents accord to E(everyone) level of Entertainment Software Rating Board (ESRB) | Boolean (True, false) | 8 | Non-functional |
| 13 | Comprehensive contents | Rank (1-10) | 9 | Non-functional |

# **Benchmarking**

Our group has benchmarked the experiences described by the interviewed panel in order to provide a framework around which the VR experience can be developed. Gender & Disability by Equal Reality (Equal Reality 2021) is an immersive VR experience that allows users to role-play that demonstrates unconscious bias geared toward women in the workplace and employees using wheelchairs. In this case, you are stepping into the shoes of a person called Allie, responsible for running the company’s events team. The module will put the end user in the shoes of Allie, teaching them about gender discrimination. 

Another VR experience is VOISS ([Project VOISS – Giving Students a Voice](https://www.projectvoiss.org/)). A virtual reality experience to teach social skills using real social situations. The VR solution allows the user to experience multiple school-based environments such as the classroom, hallways where students move through social stories and are presented with social stories and social situations where they need to problem solve interactions. 

The third application is called Virtual Reality Experiment Framework ([Steam Virtual Reality Experiment Framework](https://store.steampowered.com/app/847650/Virtual_Reality_Experiment_Framework/) )provided by Scott Howie. This application is aimed at academic experiments to aid VR research. The current project is aimed at “assessing the technical feasibility of teaching fire training in rural areas”.

|  | **Equal Reality** | **VOISS** | **Scott Howie** |
| --- | --- | --- | --- |
| **User Benchmarking** | Youtube account registered on 2017-04-12, 352337 views, 586 followers, 43+ videos, few comments, and hundreds of thumb ups.  Facebook business account, 999 likes, 1056 fans, few but all good comments. | Youtube account registered on 2021-04-01, 4034 views, 75+ videos, no comments, few thumb ups.  Facebook account, 184 users like it, 188 users followed, no comments. However, from the recent update, VOISS is concerned by the Egyptian educational system and is going to have international collaborations. | Issue Date:13 Jun, 2018  50% of the 10 user reviews for this game are positive. |
| **Technical Benchmarking** | Viveport (Personal computer) | Google play(Android),  Test Light(ios) | Steam (Windows) |

| **Benchmark on Metrics** | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Metric #** | **Need #** | **Metric** | **imp** | **unit** | **Equal reality** | **VOISS** | **Scott Howie** |
| 1 | 3 | FPS | 3 | FPS (smooth, lag) | smooth | smooth | smooth |
| 2 | 3 | Load time | 3 | Second | N/A | N/A | N/A |
| 3 | 11 | Memory size | 1 | GB | N/A | N/A | 16 |
| 4 | 11 | Usage Data | 1 | GB | N/A | N/A | 8 |
| 5 | 3 | Completion time | 3 | Minute | 68 | 4 | 30 |
| 6 | 6, 7, 12 | Progress Indicator | 5 | Boolean | False | True | False |
| 7 | 2 | User interface | 4 | List (straightforward, acceptable, confused ) | straightforward | straightforward | straightforward |
| 8 | 2,7 | Text & Voice Guidance | 4 | List (clear, acceptable, unclear) | clear | acceptable | acceptable |
| 9 | 5 | Money for purchasing App | 3 | Canadian dollar | Free on SIDEQUEST  Need payment to access to the library | Free on Google Play and Test Light | $28.99 |
| 10 | 10, 1 | Contents relevant to real life problems | 5 | Rank | 9 | 7 | 5 |
| 11 | 4 | Multiple VR device support | 1 | List (VR headset & controller) | Headset:  Vive,  Oculus Rift  Controller:  Tracked motion controller | Smart phone with Google Play, Apple device | Headset: Valve Index, HTC Vive, Windows Mixed Reality  Controller:  Tracked motion controller |
| 12 | 8 | Contents accord to E(everyone) level of Entertainment Software Rating Board (ESRB) | 2 | Boolean | True | True | False |
| 13 | 9 | Comprehensive contents | 1 | Rank | 9 | 7 | 5 |

# Target Specifications

From the client meeting, we have determined specific target specifications for VR simulation and we analyzed the actual technological constraints and expected production costs.

| **#** | **Need Adressed** | **Target Specifications** | **Ideal** | **Marginally Acceptable Values** | **Reason** |
| --- | --- | --- | --- | --- | --- |
| 1 | 3 | FPS | 60 FPS | 30 FPS | Frame rate is the at which consecutive images are captured or displayed. This is important for a VR game so images are displayed. |
| 2 | 3 | Load time | 60 Seconds | 120 Seconds | Load time is essential for the VR game for a good VR experience. |
| 3 | 11 | Memory size | 1.5 GB | 3 GB | The memory of the VR game should be as low as possible as the lowest memory provides a more optimized experience. |
| 4 | 11 | Usage Data | 10 GB | 8GB | From the branchmarking, most of the applications are 5-8 GB |
| 5 | 3 | Complete time | 15 mins | Min:10 mins Max: 25 mins | The time the VR takes to complete gives the user an estimate of how long the module is and helps the user better accommodate their time. |
| 6 | 6,7,12 | Progress Indiccator | True | True | The progress provides a better experience by showing the end user how close he/she is to finishing the module. |
| 7 | 2 | User Interface | Straightforward | Acceptable | This will make the application look and feel better to use. |
| 8 | 2,7 | Text & Voice Guidance | Clear, Concise | Acceptable | This will help the user understand what is happening within the experience |
| 9 | 5 | Money for purchasing App | Free | Free | Ideally this should be widely available so anyone can learn. |
| 10 | 10,1 | Contents relevant to real life problems (1-10) | 10 | 7 | The situation should be realistic as it will help the user empathizse with the story |
| 11 | 4 | Multiple VR device support | VR Headset and Controller, Mobile | VR Headset and Controller | The application must run on a VR headset, mobile functionality is extra. |
| 12 | 8 | Contents accord to E(everyone) level of Entertainment Software Rating Board (ESRB) | E | E | The experience will not contain mature subject matter. |
| 13 | 9 | Comprehensive contents (1-10) | 10 | 7 | The experience should cover the subject matter comprehensively. |

# **Conclusion**

After talking to our client, we got a much better understanding of what type of issues we need to address and what the end goal of our project is due to the discrimination the client has faced as a women of colour. The client gave us a greater insight into what issues are important to her and how we should try to approach our project. The client helped us in setting some guidelines and taught us to focus more on user experience by creating a well designed and defined story based project. We also got to know how to create an appealing project and how empathy for the user goes a long way in determining what direction to take the project.

Wrike Snapshot Link: <https://www.wrike.com/workspace.htm?acc=4975842&wr=20#/folder/965918825/tableview?viewId=108819336>

# **Citations**

*Gender & Disability*. Equal Reality. (2021, August 12). Retrieved September 23, 2022, from https://equalreality.com/app/gender-disability/

*Virtual reality experiment framework on steam*. Virtual Reality Experiment Framework on Steam. (n.d.). Retrieved September 23, 2022, from https://store.steampowered.com/app/847650/Virtual\_Reality\_Experiment\_Framework/

*Virtual reality for social and emotional learning*. VOISS. (n.d.). Retrieved September 23, 2022, from https://www.projectvoiss.org/