**Project Deliverable B: Needs Identification and Problem Statement**

GNG 1103C – Engineering Design

Faculty of Engineering – University of Ottawa

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**User Needs**

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| --- | --- | --- | --- | --- |
| ID |  |  | Imp | Category |
| 1 | Raw | *“We need these to be banned before they are even made. People are listening and the UN about the current issues and voting currently, deciding about treaties.”* | 1 | Target audience |
| Need | The VR experience should be convincing to decisions makers in politics and the UN. |
| 2 | Raw | *“We want you to represent ethical issues from within your VR environment.”* | 2 | A robot does not think like a human |
| Need | The VR experience should outline ethical issues regarding killer robots. |
| 3 | Raw | *“We want to see how people would compensate to autonomous killer robot existing in their environment.”* | 1 | Content |
| Need | The VR experience must show how a normal average citizen would adapt in their new environment. |
| 4 | Raw | *“We want to stigmatize the robot so much that they won’t use it.”* | 1 | User perception |
| Need | The VR experience should be extremely critical of killer robots. |
| 5 | Raw | *“We want some level of hope/motivation, the message should be act now. Biggest emotion should be concern and fear.”* | 2 | Target audience,  User perception |
| Need | The VR experience should induce fear and concern in users towards killer robots, while giving hope that stopping killer robots is still possible. |
| 6 | Raw | *“Keep it simple”* | 3 | Content of Simulation |
| Need | The project should not involve complex VR features. |
| 7 | Raw | *“It should be an immersive environment.”* | 1 | Complexity |
| Need | … be immersive to the user |
| 8 | Raw | *“We have concerns about the whole idea of turning people into their sensor data and using that data to decide who lives and dies. There are concerns about their ability to abide by international humanitarian law and make those distinctions between combatants and civilians.”* | 3 | A robot does not think like a human |
| Need | The project should demonstrate the issues in reducing human to data, and the inability of a computer to make a judgment call. |
| 9 | Raw | *“We have concerns about bias based on race, gender, ethnicity, language, ability, or disability.”* | 3 | A robot does not think like a human |
| Need | The project should demonstrate the capacity of a robot to reduce people to categories and make decisions from that |
| 10 | Raw | *And we also have concerns about explainability and complexity.* | 2 | A robot does not think like a human |
| Need | The simulation should illustrate the inability of a robot to justify its decisions |
| 11 | Raw | *So we’d like you to use virtual reality to show how a city civilians in a city would start to protect themselves from.* | 1 | Content,  Human adaptation |
| Need | The simulation should showcase the adaptation of human society under a war zone |
| 12 | Raw | *What we’re hoping for is a built environment that has really low-tech solutions to educate people that you think an average citizen should create would create.* | 1 | Content,  Human adaptation |
| Need | The simulation should demonstrate how an average citizen would adapt using only day-to-day objects/means. |
| 13 | Raw | *You don’t need to show the robots or even the people here.* | 3 | Content of Simulation |
| Need | The simulation should focus on the predicted landscape under war |
| 14 | Raw | *the idea really is, we want to be able to show decision makers, whether they’re parliamentarians or diplomats, stills, or the little 1 min video of these environments that you’ve created to show them the reality of what could happen if they delay making a decision on autonomous weapons if they let this happen.* | 1.2 | Target Audience,  Duration,  User perception |
| Need | The video should last less than one minute.  The video should be potent and educational to decision makers. |
| 15 | Raw | *We don’t want to, you know, show blood and gore and things, but just like, a sort of our best guess at a reality of what it would look like if we let these.* | 1 | Content |
| Need | The simulation should not contain graphic elements to convey fear and concern of killer robots |
| 16 | Raw | *people who are experiencing this VR experience to have an immediate and visceral reaction to what they’re seeing in terms of what would have to happen in the built environment to protect.* | 1 | User perception  Human adaptation |
| Need | The user should have a very strong negative reaction towards the impact of killer robots |
| 17 | Raw | *“Canada wants these weapons systems banned preemptively. That’s your clients need.”* | 2 | User perception |
| Need | The client wants the VR model to demonstrate the negative effects of these weapons systems to help prove the need to ban these systems. |
| 18 | Raw | *“stay away from crude stereotypes of any particular region, please ‘.* | 1 | Content |
| Need | The video/VR experience should not reduce people or regions to stereotypes |

**User Needs and Relative Importance**

To attribute relative importance to the user needs and the needs categories, we based the ranking on how often the users mentioned them (frequency), their tone of voice and posture, as well as the actual intent of the project. The user told us the project’s purpose is to influence decision makers in national politics and on the international stage such as the UN. Because of this, every need that involves the target audience is incredibly important. Further, they were very adamant about the VR experience to be hyper critical of killer robots (ID 2,4,5,8-10, 14.16–17). We justify the high importance of this need (user perception) from both their frequency and the project description.

The clients were also clear in wanting the VR experience to highlight how an average citizen would adapt in their environment to the presence of killer robots (ID 3.11–13). It must therefore be one of the other main focuses of the design requirements.

Finally, the users also suggested to have a low complexity regarding the VR experience. However, this is not directly an important need. Rather, the clients wish us to avoid pitfalls that groups have encountered in the past, namely to bit-off more than they could chew. Therefore, the user need for simplicity isn’t as important as having a very potent and concise VR experience, as stated above. If the latter is respected, along with good project management, the former should fall right out of the design.

**Problem Statement**

Killer robots are a readily available technology that could be deployed in warfare any day, but raise ethical, moral, and humanitarian concerns. A concise, catered, and potent VR experience can demonstrate to decision makers on the national and international stage the terribly negative impacts that these robots could pose, ending the possibility of killer robots in its tracks.

**User Benchmarking**

The following products are virtual reality (VR) experiences developed by previous students undertaking a similar task given by Mines Action Canada, our client. Furthermore, “The Enemy” is a VR exhibit experience created by Karim Ben Khelifa to let viewers observe and listen to fighters of war to reveal their humanity in the realities of war. Our overall client’s perception regarding similar past projects is that most teams made their VR experiences too complex, with added storylines, characters, and other elements.

Group F13’s Project: Stop Killer Robots — A VR Experience (Alex Laver et al., 2023) (Won Design Day)

The project resulted in a video of the VR simulation walkthrough where killer robot interactions are shown in a neighbourhood. In terms of interactivity, the project follows a storyline where the user listens to an interview with the Chief of Police at his office. We then see his child and his friends playing in front of the house with a water gun when the killer robot comes in. He detects a weapon in the child’s hand and eliminates him.

Comments from client throughout the development process:

* The team focused on one ethical issue and made it obvious, which they liked.
* The storyline was brief and easy to follow. It conveyed the message effectively.

Group F21’s Project: uOnity (Shiven Joshi et al., 2023)

It was also a video of the VR simulation walk through that presented a foreign military war zone. The project follows an interactive storyline where the user listens to his senior officer to complete the assigned mission: to find any civilian that did not evacuate the zone. The user hides from killer robots roaming and interact with a child still found in the war zone. The drone struggles to identify the child because he is scared, and mistakes that for erratic hostile behaviour.

Comments from client throughout the development process:

* They felt like the video and storyline was too long and complex to convey the message.
* They wanted the experience to focus on one ethical issue and to make that more obvious.

Virtual gallery by Karim Ben Khelifa (Centre & Carter, 2018)

The VR experience was a virtual journalistic exhibition for viewers to see in real time combatants’ interviews on war. It gave an immersive experience that enhances the impact of war. The creator’s goal for this project was to focus on facing a fighter of war and exchanging with him. (T’Cha Dunlevy, 2018). The environment depicted in the VR experience is a gallery with 3 fighters of war walking towards you. The users listen as they are answering questions directly to them, staring at them closely. People form direct connections with the combatants as they are reacting to the virtual characters.

Comments from client throughout the development process:

* A personalized experience that was based on the biases of user prior going into the exhibit. The simplicity of the presentation lets users be deeply moved by what fighters go through in war, making the users question its value.
* The presentation focuses on displaying the concept in a gallery, which users have found to be familiar when being faced with fighters directly, an unknown concept for most participants. (Coralie Kraft, 2017)

Bibliography

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