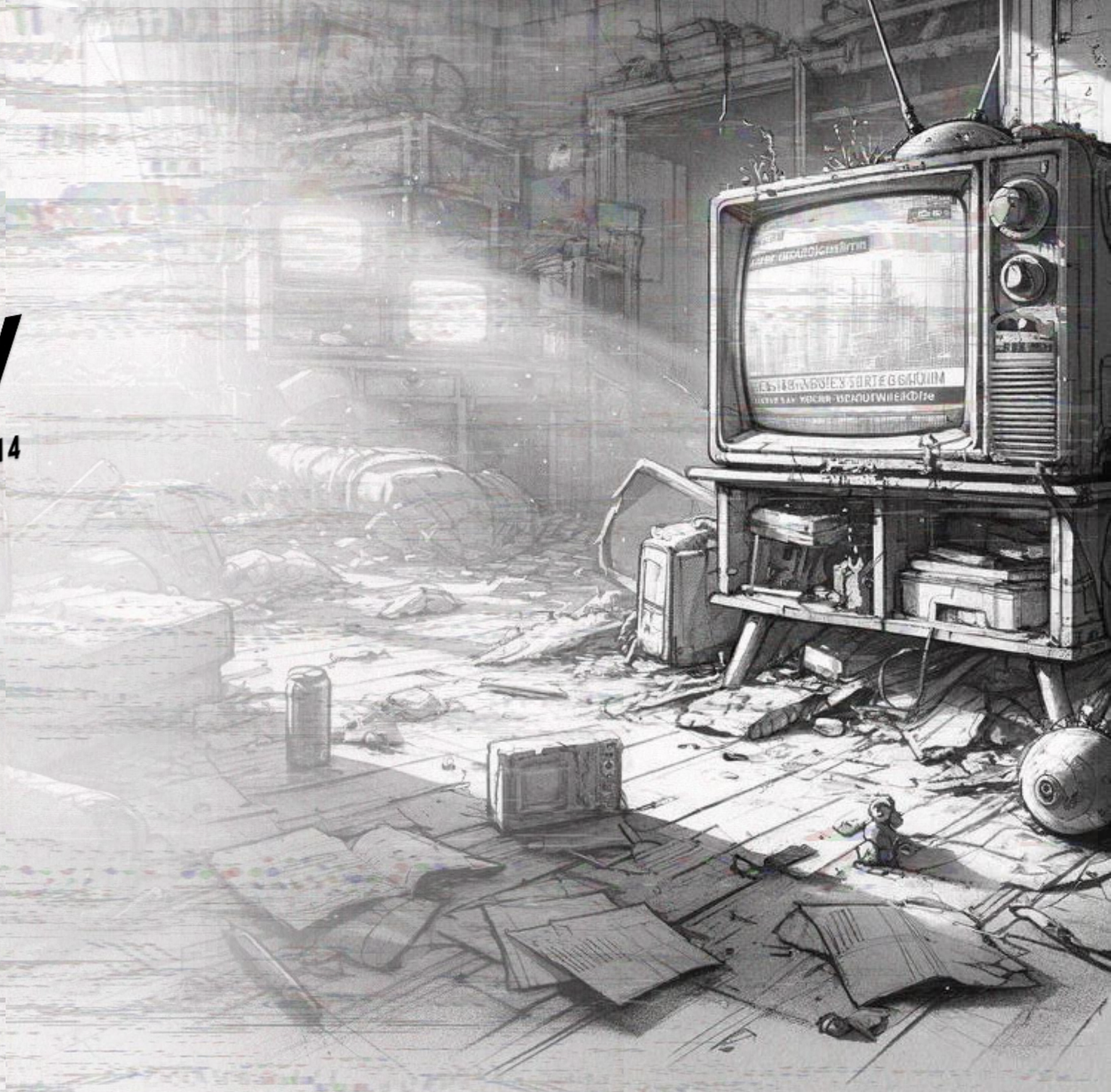


# Echoes of Tomorrow

Group 14



**1**

**Content Overview**

Problem statement &  
solution

**2**

**Design Criteria**

Engineering Design  
Specifications & benchmarking

**3**

**Conceptual Design**

Subsystems, sketches &  
chosen concept

**4**

**Management Plan**

Write schedule, project risks  
& BOM

**5**

**Prototypes & Customer Feedback**

Prototype test plan,  
illustrations of each prototype

**1**

# **Content Overview**

# Problem Statement

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Mines Action Canada requires a \$50 minute-long VR experience to communicate the dangers of autonomous weapons targeting human society. The solution must emphasize the client's values, and highlight the importance of **regulation**, all while maintaining accessibility to all potential audiences, **avoiding graphic content**, and ensuring a **clear understanding of the issue** for a broad audience with varying levels of **familiarity** with the problem.

# Mines Action Canada

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Mines Action Canada is a humanitarian international organization that advocates for peace and equality through many different initiatives, such as the campaign to Stop Killer Robots



**2**

# **Design Criteria**

#	Need	Design Criteria			
1	A short and simple VR experience that will be put into a video format	<ul style="list-style-type: none"> <li>Effective storytelling to convey the narrative clearly.</li> <li>Design a small VR environment for a concise experience.</li> </ul>	10	The experience will focus on how autonomous weapons have affected daily life	- Effective storytelling
2	Focuses on the cons of having autonomous weapons	<ul style="list-style-type: none"> <li>Effective storytelling to communicate the dangers.</li> <li>Proper VR demonstration of the risks associated with autonomous weapons.</li> </ul>	11	The main points of the experience must fit into a 1-minute video	- 1 Minute Time Constraint
3	Focus on the storytelling over intractability	- Prioritize effective storytelling to engage the audience.	12	\$50 cost limit for buying assets	- Ensure all assets fit within the \$50 budget.
4	Generic location (preferably not too big and does not need to be a city)	- Generic Environment - No harmful stereotypes & prejudices	13	Story must be easily understandable	- Effective storytelling
5	Focus on quality over quantity	- Prioritize quality of the environment and assets over quantity.	14	Accessible to those with sensory issues	- Design the experience to be accessible to individuals with sensory issues.
6	Do not focus on gory aspects, a bit of blood is fine	- Avoidance of Gory Content	15	The problem must be clearly understood by the customer watching it	- Prioritize effective storytelling for clear communication and assume the audience has relatively moderate background knowledge.
7	Focus on human behavior adaptability (for instance, how they would resist attacks)	- Effective storytelling	16	Avoid Copyright	- Copyright Compliance
8	Autonomous weapons that specifically target humans (can perfectly distinguish between humans and other living beings)	- Effective storytelling	17	Safe for parliament	- Safe for Parliamentary Viewing
9	Must emphasize the importance of regulating autonomous weapons	- Effective storytelling to underscore the need for regulation.	18	No harmful stereotypes & prejudices	- Generic Environment - No harmful stereotypes & prejudices
			19	Assume the audience has little knowledge of problem	- Effective storytelling
			20	Balance emotionality with information	- Effective storytelling
			21	Properly represent the values of the client - do not say unrelated or incorrect opinions on behalf of the client.	- Ensure that the storytelling aligns with the client's values and avoids unrelated or incorrect opinions.

# Benchmarking

Values	Colours	#
High	Green	3
Average	Yellow	2
Low	Red	1

Killer Robots VR Project <i>Functional Requirements</i>	<u>Group A</u>	<u>Group B</u>	<u>Group C</u>	Importance
Proper VR demonstration of the Danger of Autonomous Weapons	The ruins of the cityscape that was built by the developers made clear the danger of AI weapons.	The effects of AI weapons mistaking common-day activities as dangerous acts highlighted the danger of these objects.	Video did not showcase the danger of AI robots at all in under a minute – focusing rather on the VR environment that did not reflect a world with dangerous AI weapons well.	5
Effective Storytelling <i>- Focus on Human Behavior Adaptability</i>	There was no clear storyline– the group showed off the destruction of AI weapons but did not have characters and a storyline to deliver the message through an emotional lens.	Good emotional impact by showing how AI can mistake a child’s water gun as a weapon.	There was no clear storyline Information was easily understood through the use of speech bubbles above characters.	5
Functional & Interactive VR world	360 degree vision. Environment was free to move in and interact with.	360 degree vision. Not interactive at all. VR Experience is purely a video with no freedom of movement.	360 degree vision. Environment was free to move in, and was able to interact with objects and dialogue.	5
Quality Over Quantity	Bad audio quality. Hard to focus on one thing at a time when the environment is too big to analyze in a minute.	Bad audio quality. Very unrealistic (Characters don’t mimic human movement).	The experience focused on one task at a time – making it easy to follow. Resolution of graphics and text was good and easy to read. Audio was immersive.	4





# Benchmarking

Values	Colours	#
High	Green	3
Average	Yellow	2
Low	Red	1

Killer Robots VR Project <i>Functional Requirements</i>	<u>Group A</u>	<u>Group B</u>	<u>Group C</u>	Importance
<i>Non-Functional Requirements</i>				
<b>Avoidance of Gory Content</b>	<b>The world was full of destruction and gore.</b>	<b>No gore was explicit. Drama was implied.</b>	<b>No gore was explicit.</b>	<b>3</b>
<b>Accessibility and Sensory Considerations</b>	<b>Audio issues pose difficulties to those with sensory issues. The abundance of destruction may cause discomfort in easily disturbed audiences.</b>	<b>Audio issues pose difficulties to those with sensory issues .</b>	<b>Clear audio. Clear visuals. Easy to follow.</b>	<b>2</b>
<b>Generic Environment/No stereotypes</b>	<b>Environment was generic and did not pose any possible stereotypes.</b>	<b>Environment was generic and did not pose any possible stereotypes.</b>	<b>Environment was generic and did not pose any possible stereotypes.</b>	<b>3</b>

# Benchmarking

Values	Colours	#
High	Green	3
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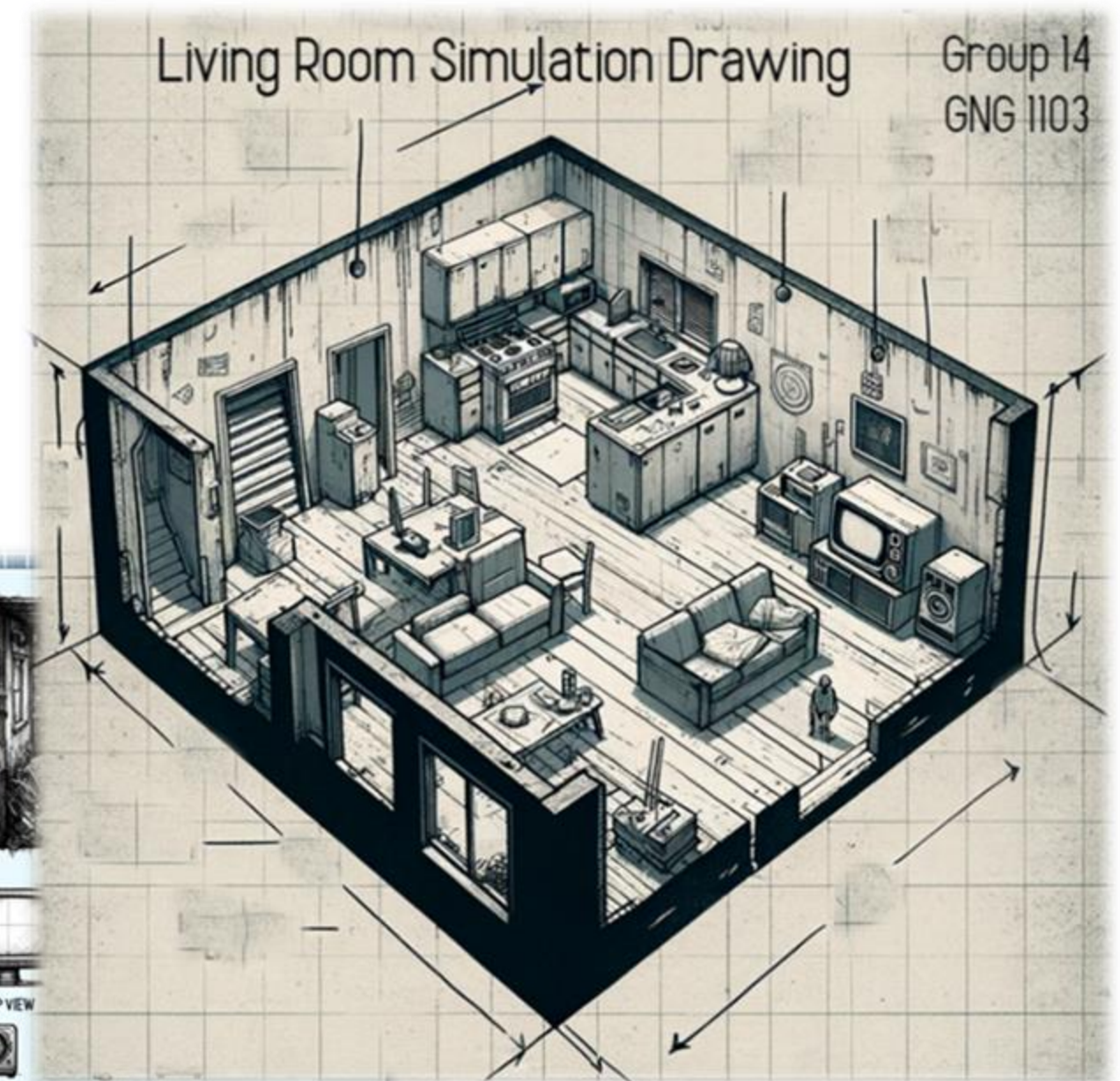
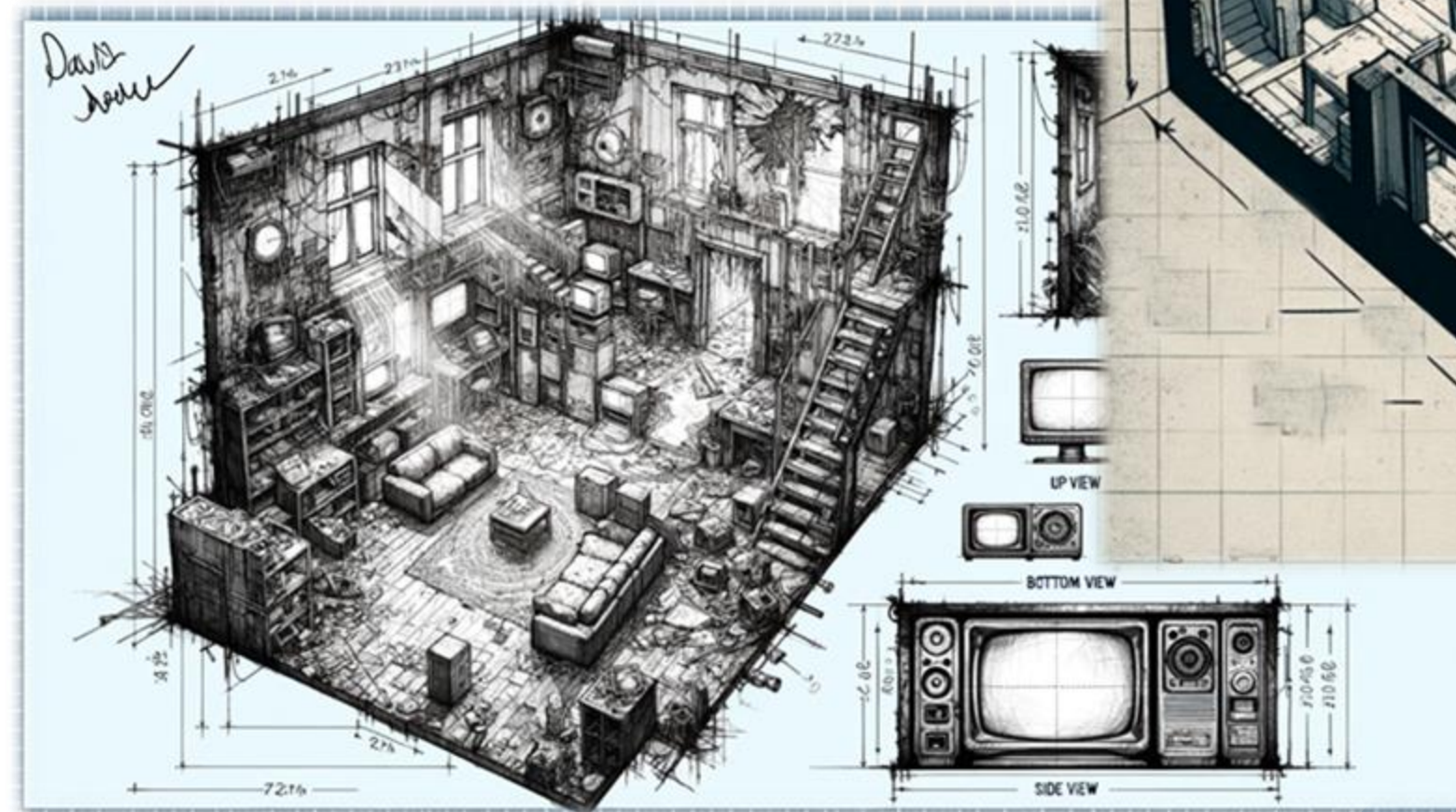
Miscellaneous VR Projects <i>Functional Requirements</i>	Meet your carbon Footprint (UN)	Home After War (Gayatri Parameswaran)	The Fight for Falluja (Ben C. Solomon)	Importance
<b>Effective Storytelling</b>	<ul style="list-style-type: none"> <li>- <i>Must emphasized the message of the intended purpose effectively</i></li> <li>- <i>The experience was abstractly emotional but still informative</i></li> <li>- <i>Problem was clearly understood by the customer without rewatching</i></li> </ul>	<ul style="list-style-type: none"> <li>- <i>Must emphasized the message of the intended purpose effectively</i></li> <li>- <i>The experience was emotion and informative</i></li> <li>- <i>Problem was clearly understood by the customer without rewatching</i></li> </ul>	<ul style="list-style-type: none"> <li>- <i>Must emphasized the message of the intended purpose effectively</i></li> <li>- <i>The experience was emotion and informative</i></li> <li>- <i>Problem was clearly understood by the customer without rewatching</i></li> </ul>	<b>5</b>
<b>Functional &amp; Interactive VR world</b>	<ul style="list-style-type: none"> <li>- <b>360 Vision</b></li> <li>- <b>Interactive</b></li> <li>- <b>Not Able to walk</b></li> </ul>	<ul style="list-style-type: none"> <li>- <b>360 Vision</b></li> <li>- <b>Interactive</b></li> <li>- <b>Not Able to walk</b></li> </ul>	<ul style="list-style-type: none"> <li>- <b>360 Vision</b></li> <li>- <b>Interactive</b></li> <li>- <b>Not Able to walk</b></li> </ul>	<b>5</b>
<b>Quality Over Quantity</b>	<p><b>Stylized in a way that put the audience's attention on too many things at once.</b></p> <p><b>Audio was clear.</b></p> <p><b>Resolution was good quality.</b></p>	<p><b>Audio was clear.</b></p> <p><b>Resolution was good quality.</b></p> <p><b>Story was paced well.</b></p>	<p><b>Audio was clear.</b></p> <p><b>Resolution was good quality.</b></p> <p><b>Story was paced well.</b></p>	<b>4</b>

3

# Conceptual Design

# Environment Objectives

- **Small** but **detailed** setting
- Storyline-reliant
- Capitalizes on **Emotional Engagement**
- Avoid Direct Violence



# Storyline #1



**Opening:**  
**Cook Breakfast**

**Information:**  
**Watch TV to learn  
about recent events**

**Emotion:**  
**Frantically Search  
for Son**

**Conclusion:**  
**Son innocently talks to  
robot and is shot**

# Storyline #2



**Opening:**  
**Cook Breakfast**

**Information:**  
**Listen to radio's alert to learn you  
are being targeted**

**Emotion:**  
**Frantically Barricade  
Windows**

**Conclusion:**  
**Son innocently walks outside  
to talk to robot and is shot**

**4**

# **Management Plan**

# Trello Schedule

To Do	In Progress	Completed
<ul style="list-style-type: none"><li>• Create user guides and documentation for users</li><li>• Document the development process for future reference.</li><li>• Present finalized product to the clients.</li></ul>	<ul style="list-style-type: none"><li>• Code user interface</li><li>• Code VR interactions</li><li>• Implement sound effects</li><li>• Implement background music</li><li>• Complete prototype 3</li></ul>	<ul style="list-style-type: none"><li>• Create a VR environment</li><li>• Implement basic controls</li><li>• Develop textures</li><li>• Develop visual effects</li><li>• Complete prototype 1</li><li>• User feedback for prototype 1</li><li>• Complete prototype 2</li><li>• User feedback for prototype 2</li></ul>



# BOM

Item Number	Description	Quantity	Store	Price (CAD)
1	House Model with Interior	1	Unity Asset Store	\$25
2	Footstep Sound Effects	2	Unity Asset Store	Free
3	Smartphone Model	1	TorbuSquid	Free
4	Radio Model	1	Unity Asset Store	Free
5	Gunshot Sound Effects	1	Unity Asset Store	Free
6	Autonomous Weapon Model	1	Unity Asset Store	Free
7	Gas Lantern Model	1	Unity Asset Store	Free
8	Newspaper Model	1	TorbuSquid	Free
9	Book Stack Model	1	TorbuSquid	Free
10	Realistic Young Kid Model	1	Unity Asset Store	\$19
11	Animation Scripts	3	Mixamo	Free
12	Foliage Models	1	Unity Asset Store	Free
13	Kids Toy Models	1	Unity Asset Store	Free
Total				\$44

# SCHEDULE



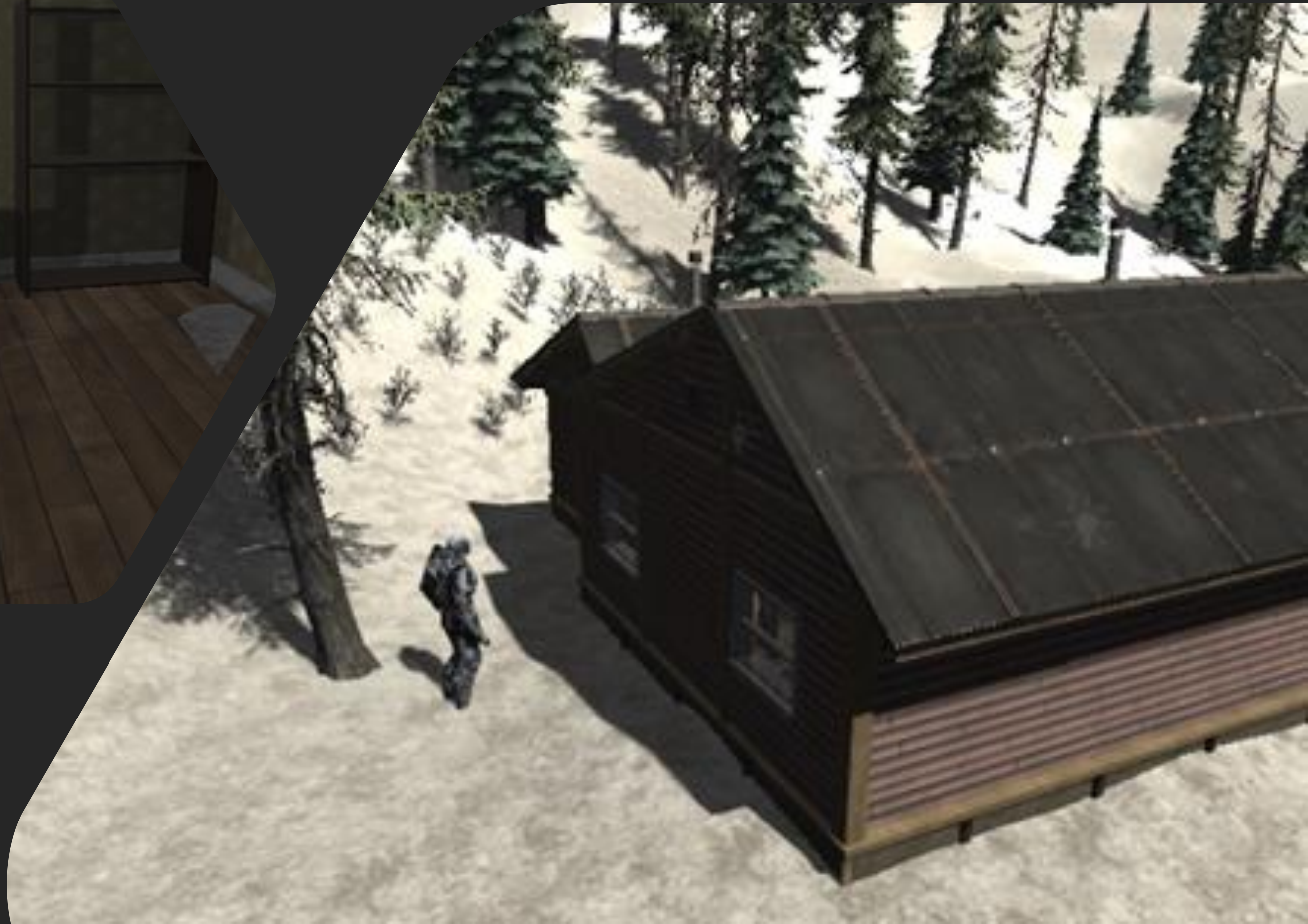
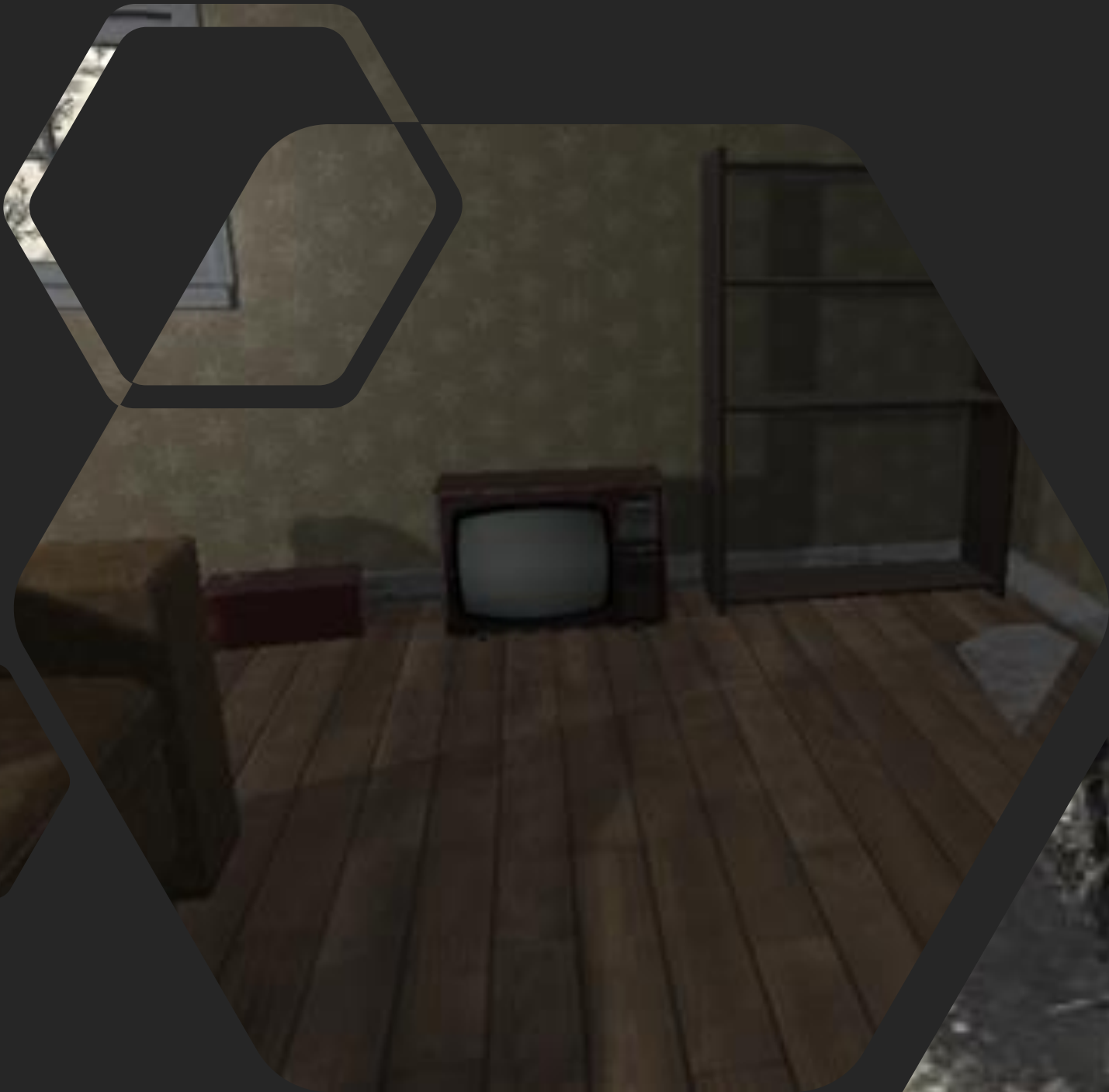
Mon	Tue	Wed	Thu
<ul style="list-style-type: none"><li>Gather participants to voice act the characters within our game.</li></ul>	<ul style="list-style-type: none"><li>Compose the background music for the experience</li><li>Record dialogue in French &amp; English</li></ul>	<ul style="list-style-type: none"><li>Add recordings to game with subtitles</li><li>Add Ambient Noises to Game</li></ul>	<ul style="list-style-type: none"><li>Adjust animations of characters to match timeline of the storyline</li></ul>
Fri	Sat	Sun	
<ul style="list-style-type: none"><li>Show prototype to 3rd party users</li><li>Document all feedback</li></ul>	<ul style="list-style-type: none"><li>Test the experience in VR</li><li>Iterate the Prototype according to feedback</li></ul>	<ul style="list-style-type: none"><li>Show prototype to 3rd party users</li><li>Iterate the Prototype according to feedback</li></ul>	

5

# Prototypes

**Prototype 1**



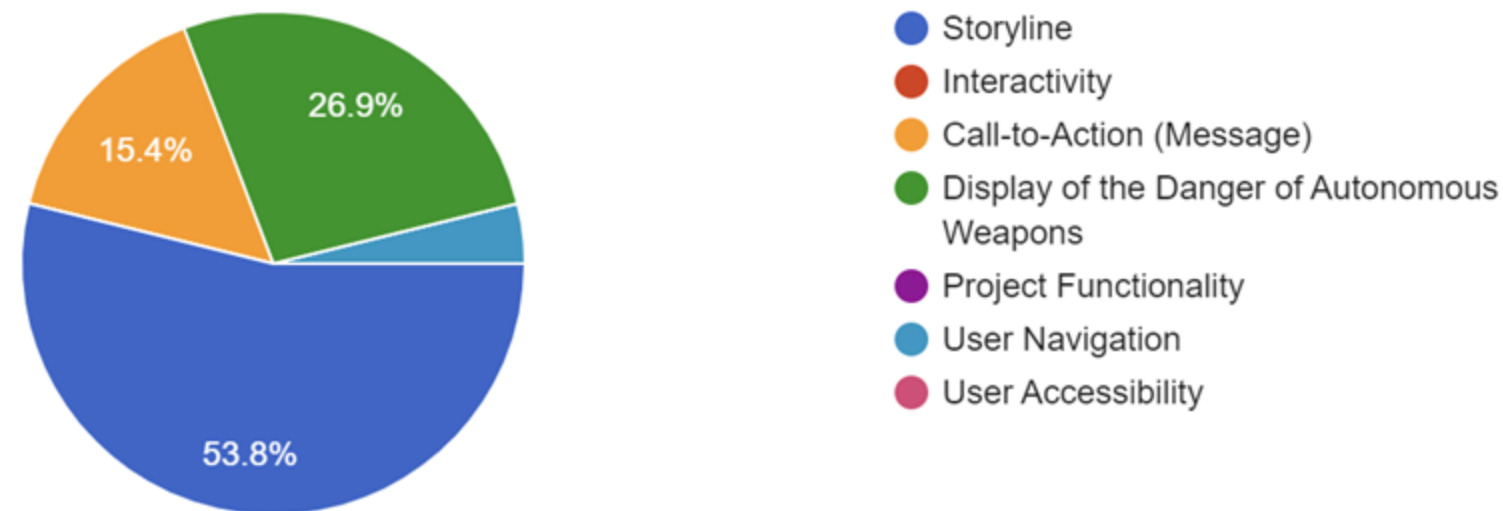




# User Feedback

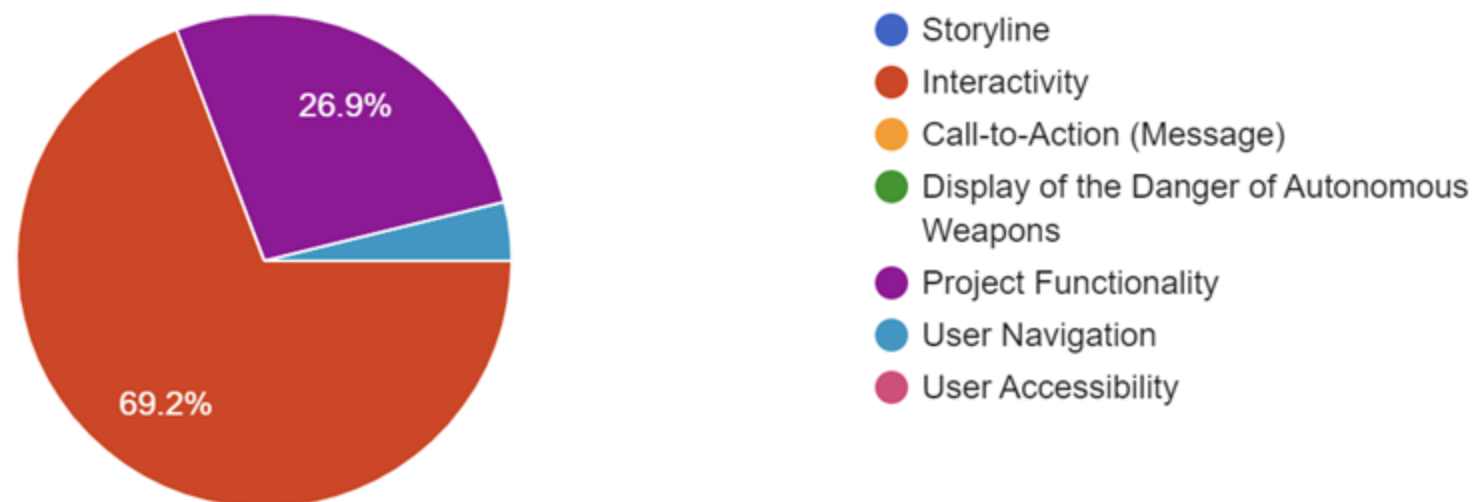
What is our project's strong suit?

26 responses



What does our Project need to improve on the most?

26 responses

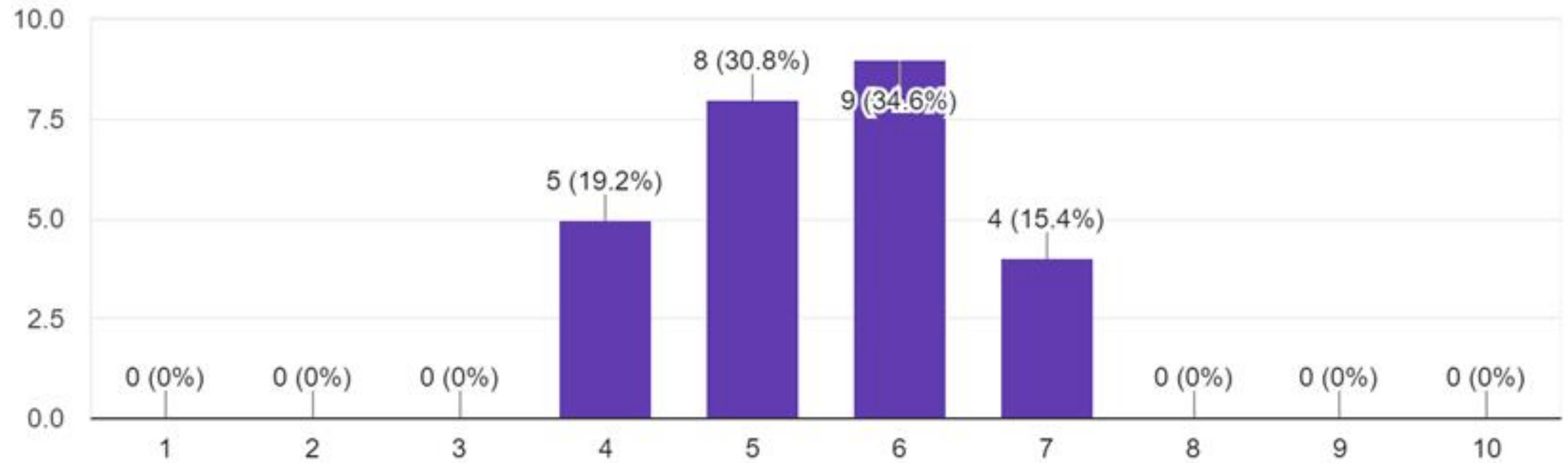


- Storyline needs to be polished through **animations** and **character dialogue**.
- The dangers of Autonomous weapons were cleverly demonstrated through both indirect and direct consequences of AI weapons.
- Lack of **Interactivity** with the environment
- The project has issues in its **Functionality**
- The environment has yet to match the apocalyptic atmosphere set by the sketch.
- Lack of genuine **Fear** towards robot.



On a scale from 1-10, how much has this project changed your stance in regards to the Dangers of Autonomous Weapons.

26 responses



**Prototype 2**

• The environment has yet to match the apocalyptic atmosphere set by the sketch.







• Storyline needs to be polished through **animations** and **character dialogue**.



• Lack of genuine **Fear** towards robot.



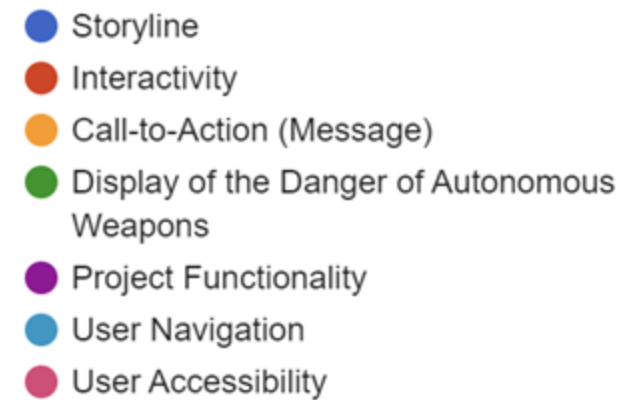
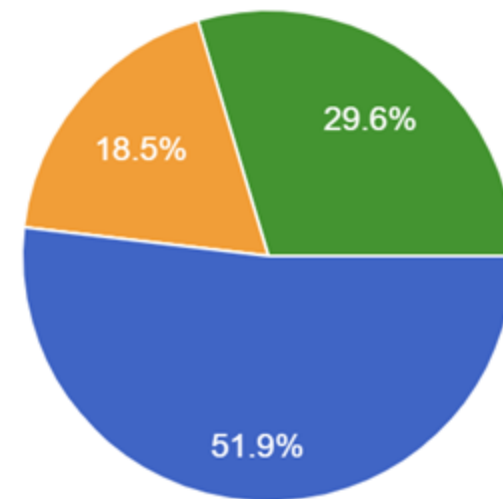




# User Feedback

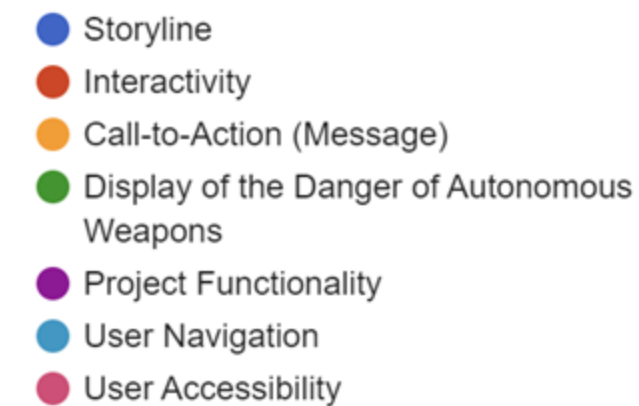
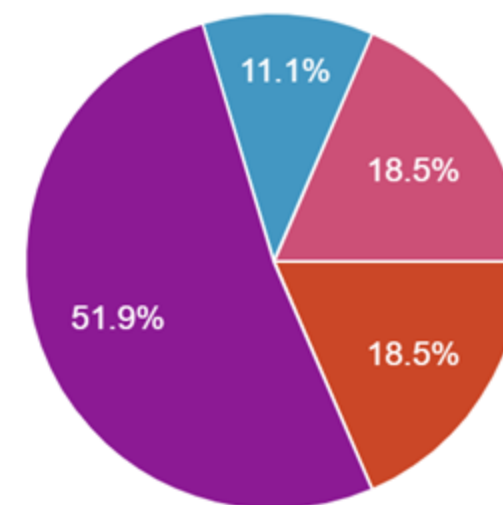
What is our project's strong suit?

27 responses



What does our project need to improve on the most?

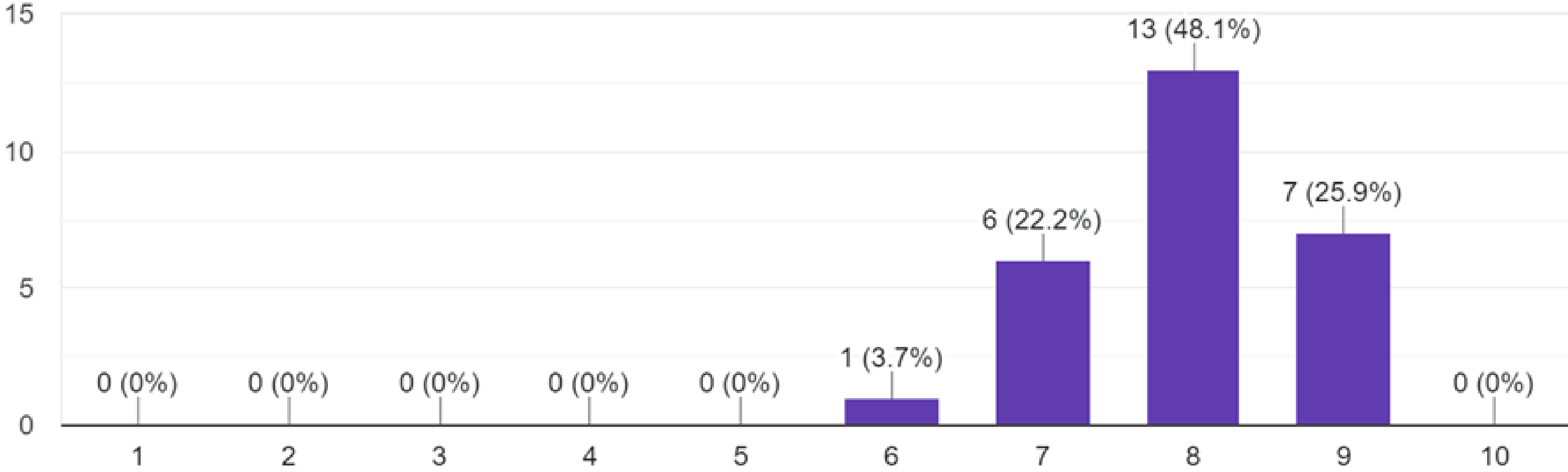
27 responses



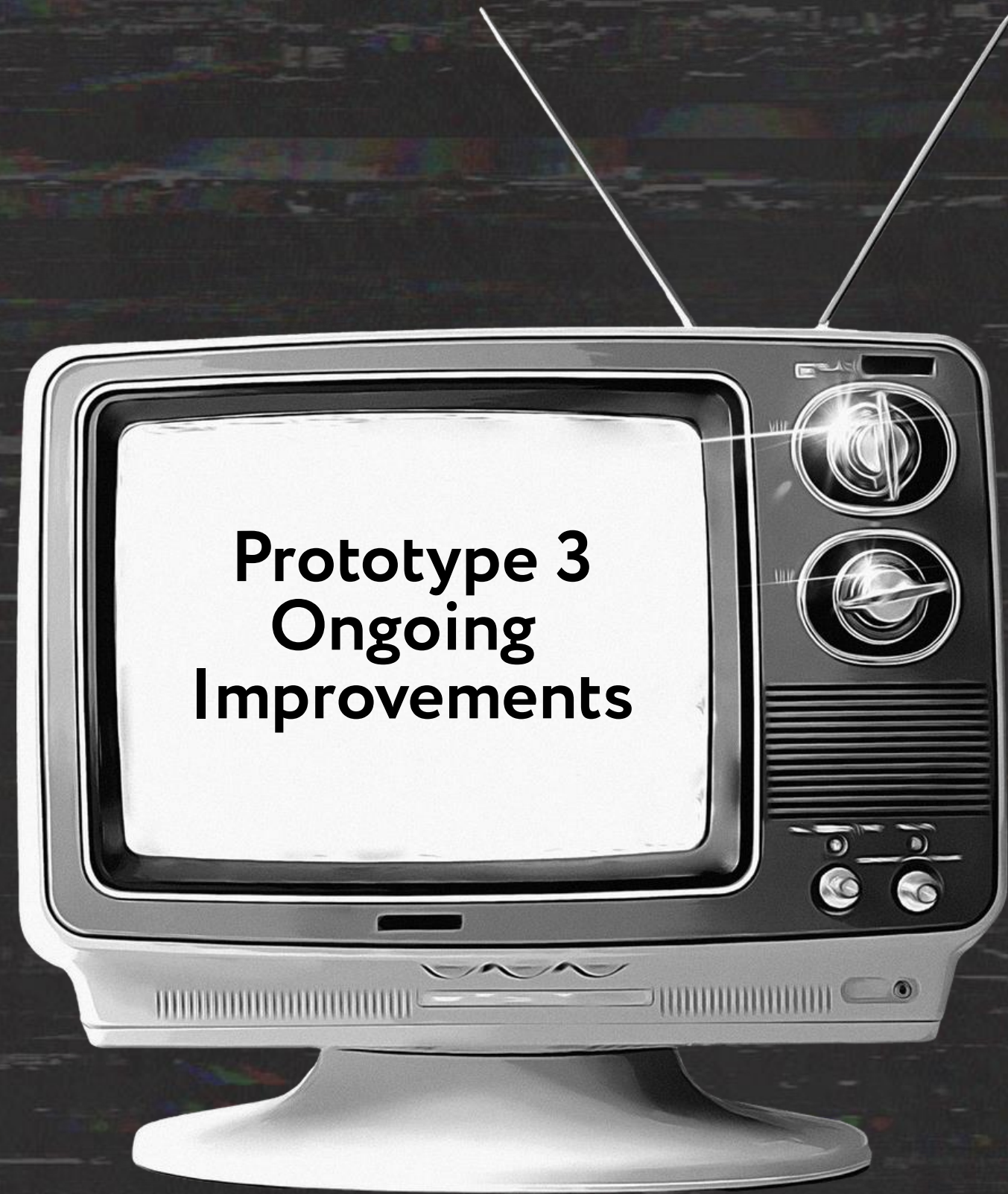
- Storyline needs to implement matching **character dialogue**.
- Include **ambient noise** and **background soundtrack** to make the environment feel more uneasy.
- Finish the animations according to the **ti meline** of the story.

On a scale from 1-10, how much has this project changed your stance in regards to the Dangers of Autonomous Weapons.

27 responses



**Prototype 3**



**Prototype 3  
Ongoing  
Improvements**

**01**

**Dialogue**

Record and implement child voice actor and parent voice actor

**02**

**Background Music**

Compose an unsettling song on piano to implement into the game

**03**

**Timeline Animations**

Match the character animations and movement to the script of the dialogue and story

**04**

**Interactive Barricade Animation**

Create code that allows the character to go up to windows to place down barricades

# Speedbumps and Issues (and how we rectified them)

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- *Initial ideas:*

- Parents would be normal citizens
- Urban theme
- Addition of multiple social issues affecting time restrictions
- Addition of a television which shows destruction

- *Alternatives*

- Parents having a job
- Robot being more human like
- Family living in an isolated space with child having little to no education



# Echoes of Tomorrow