Deliverable F: Prototype 1 & Customer Feedback

University of Ottawa

GNG1103: Engineering Design

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Group 14

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Abstract

Group 14 has successfully completed the first prototype of "Echoes of Tomorrow," a VR experience designed to highlight the dangers of autonomous robots. In the following report, Deliverable F, documents the iterative process of prototype development, client and user feedback integration, and project planning. Initially, the group established a clear set of objectives from the feedback given to the group via the first client meeting. With these new criticisms, the prototype was created and effectively captured the intended storyline while seamlessly integrating characters and maintaining the experience within the one-minute target duration. The feedback underscored the importance of emotional engagement, the challenge of animation dependence, and the necessity of avoiding gender stereotypes, leading to significant narrative and design adjustments. The report also outlines a detailed plan for the second prototype, addressing user feedback to improve animation quality and environmental interactivity, and planning for the integration of accessibility features in future iterations. Through the development of Deliverable F, the team not only validated the project's feasibility but also laid a robust foundation for what must be done to be successful by design day. This document captures the group's adaptive approach, showcasing our ability to manage resources, gather and incorporate critical feedback, and strategically plan for future enhancements. While successfully meeting our objectives, staying under budget, and completing our tasks under time restraints, the commitment to iterative design and the insights gained from this phase will be instrumental in refining the VR experience to achieve its educational and emotional objectives, with a keen eye on the broader implications for society's interaction with autonomous technologies.

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1 Introduction

In the following deliverable, our group will go over:

- Client feedback

This includes a brief overview of all the feedback given to the group by the client during the first meeting, which is then followed by an analysis in relation to how it affects our project's effectiveness, how it meets our criteria, and possible constraints it puts on our group. With all these points analyzed, our group will conclude a brief set of improvements that we have enacted for the first prototype, and a set of other improvements for future work that we are realistically able to fit within our time frame.

- Prototype 1

This includes a brief overview of what has been accomplished thus far by our group in regard to prototype 1. This comprises of objectives that we have set and achieved for this first prototype, images of how the project is looking thus far, and an analysis of all critical components that we have used in our prototype and why they were implemented.

- User feedback

This includes an overview of all feedback given to our first prototype from third party users, and this section comprises of all useful points that had been pointed out by these users, and steps that the group will take in order to implement these criticisms in our next design.

- Prototype 2 test plan

This portion includes the test plan for the next stage of the iterative phase of prototype and testing. Using all of the feedback that had been outline thus far in the deliverable, from client and user feedback, our group have devised a detailed plan as to how we will tackle and improve upon our current model for prototype 2.

- Task plans for the final concept

This section of the deliverable showcases the responsibilities of each group member for prototype one, and encompasses other responsibilities that the group had identified during development. The group will use this table to keep trach of who does what task, and this table will be expanded upon in future deliverables.

Intro Summary

Firstly, our group will analyze the feedback given to us by our clients and conclude what the necessary steps will be to effectively implement their comments into our project. Then, our group will showcase the prototype that we have developed thus far regarding the design criteria we had conceptualized in deliverable D and C, and with the feedback given to us in the first client meeting. Then, all components and aspects of our project will be re-evaluated in order to better understand their purposes in resonating with our clients demands, and to determine the importance to our story and message within our small time frame. With the first prototype done, our group had showcased our project to a handful of third-party perspectives which was recorded in a table and analyzed to implement in prototype two. Then finally, our group will discuss a task list for the criteria necessary to complete the final project, which allocates responsibility and a team member to each specific task that has currently been identified thus far.

1.1 Related Work

Group 14 has already completed the 5 previous deliverables, which is key to understanding before continuing in reading the content of the following deliverable.

In Deliverable B, which can be accessed through the hyperlink, outlined all the needs described by the clients that had to be taken into account when designing a conceptual design, with the needs being neatly organized into categories such as Accessibility, Storytelling, Communication, Logistics.

In Deliverable C, which can be accessed through the hyperlink, all of the identified needs were subsequently divided into a list of functional requirements, non-functional requirements, and constraints. In part A) all needs are listed and organized into a chart that separates all requirements, then in part B), all of the groups findings in regards to these criteria were benchmarked with other groups project's and other public VR simulations. This helped the group to better understand where to focus and how to change our list of criteria, as well as to set target specifications for the optimization of our design.

In Deliverable D, which can be accessed through the hyperlink, the group had brainstormed several different conceptual ideas in regards to the needs, requirements (functional, non-functional), and constraints identified from the previous deliverables, and merged ideas in order to create a global concept that best fit the client's expectations. The global concept chosen in the referenced deliverable is the one the group will continue to refer to for the duration of this Deliverable.

In Deliverable E, which can be accessed through the hyperlink, the group reinforced what needed to be employed to complete the project by deadline day, which encompassed: when each task must be done, what must be acquired, and how much money can be spent to fit under budget while meeting the expectations of achieving an A+ grade and meeting the deadline. In addition, the final design was conceptualized and from that point forward the first prototype started development.

All of the previous deliverables build off each other, and with a key understanding in: the needs of our client, all requirements to turn our conceptualized design into a finalized game, a proper system of task-sharing and task allocation, a budget, a task plan, and a global concept, the group can finally create the first prototype of our VR environment, "Echoes of Tomorrow".

2 Client's Feedback

2.1 Written Recordings of Feedback

The time with our clients were limited when we had presented during the first client meeting, as we had spent most of our time presenting our project rather than inquiring for question, therefore, the feedback we had received was limited and not as bountiful as it could have been. Nevertheless, the following set of bullet points consist of all the feedback that the client had given us during the meeting:

Note: The following points aren't direct quotes from the client, but a paraphrase of their general ideas.

- "The setting being restricted to a household is effective in both keeping the project feasible, and to focus on quality rather than quality."
- "The emphasis your group has on emotional engagement can be very effective and is encouraged but will be difficult in your case due to the dependence on animations."
- "Ditch the TV idea [as described in Deliverable D] for a Radio to ensure you have enough time to finish the project."
- "Be aware of gender roles in your story."
- "Restrict the area to just one or two rooms instead of an entire house where you can freely move around."
- "Enhance the feeling of paranoia in your setting by using old appliances. Ex: instead of a microwave use a gas stove."
- "Don't kill two birds with one stone, if your mission is to focus on paranoia affecting the daily lives of people, don't just go and show the explicit violence of robots through a TV or secondary setting. That will kill your time and quality of the project"

2.2 Feedback Analysis & Implementation

2.2.1 Importance of Implementing Client Feedback

Setting and Focus on Quality Over Quantity:

The client appreciates the decision to restrict the setting to a household, which not only makes the project more feasible within time and resource constraints but also allows for a deeper focus on quality. This confirms that a well-developed, emotionally engaging narrative within a confined setting will be more impactful than a broader, less detailed environment – and as our clients prefer this, we have the greenlight to continue in this direction for prototype 1. The feedback is a reminder that the power of storytelling often lies in its ability to convey depth in a focused context.

Emphasis on Emotional Engagement:

The client encourages the emphasis on emotional engagement but also highlights the challenge of relying on animations to achieve this. This feedback is crucial as it points to the need for innovative storytelling techniques that can evoke strong emotional responses without solely depending on complex animations, which are time-consuming and technically demanding. As no one in our group has had prior experience to Unity and C#, therefore, we must make our animations simple, or do most character transitions (for instance, moving the child outside of the house) off-screen.

Accessibility:

Incorporating accessibility and sensitivity into our VR project is not only a matter of ethical responsibility but also enhances the project's appeal and relevance to a broader audience. If the storyline came off as slight sexist upon first pitch, then a final concept with the same storyline would highlight this issue much more clearly. Therefore, the feedback highlights the importance of being aware of gender roles, hinting at a deeper need to ensure that the project avoids perpetuating stereotypes or presenting content that could be interpreted as sexist or offensive. This is particularly relevant given the described domestic setting, where traditional gender roles are easily reinforced through everyday activities such as the man sitting on the sofa to listen to the radio, and the mom cooking breakfast, albeit, with her husband.

2.2.2 How These Suggestions Improve Project Success

Practicality and Emotional Depth:

By narrowing the focus to one or two rooms and leveraging old appliances to enhance the feeling of paranoia, the project can concentrate on building a rich, immersive atmosphere that taps into the viewer's emotions in respect to one problem with autonomous weapons. As stated by the client feedback, we should only focus on one problem regarding autonomous weapons, and by concentrating on the two rooms we can turn it into a capsule of a manifestation of paranoia in everyday living. The two rooms being the kitchen/living room and bedroom (the most used rooms in a house), the viewer will resonate with these changes more as they'd notice the changes. These constraints encourage creative solutions to storytelling, making the experience more memorable and impactful.

Narrative Clarity and Engagement:

The advice to avoid mixing messages by showing explicit violence directly aligns with the goal of focusing on the paranoia and degradation of daily life under the threat of autonomous robots. This allows for a more nuanced exploration of the theme, engaging the audience on a psychological level rather than relying on shock value.

2.2.3 Accomplishing These Suggestions:

Refined Setting and Atmosphere:

To implement the client's suggestions, we will start by redesigning the VR environment to confine the narrative to an open concept room, which includes a living-room and kitchen, as well as a small corridor to the bedroom. We will use the space to force users to examine the environment of their confined setting, which include elements that evoke a sense of the past and a world worn down by fear of autonomous robots, which is the goal of our project. For instance, all phones will be cracked and broken, all appliances such as a gas stove will be used instead of microwaves, to subtly enhance the atmosphere of paranoia.

Narrative Focus and Emotional Engagement:

Shift the storytelling approach to use the radio as the primary source of external information, which not only meets the client's request to ditch the TV idea but also adds to the atmosphere of suspense and uncertainty. This change requires crafting a compelling audio script that can convey the external world's chaos and threat, aligning with the project's themes.

Avoiding Gender Stereotypes:

To address concerns around gender roles, it's essential to portray characters in a way that challenges traditional stereotypes. For instance, instead of having fixed roles where the father listens to the radio and the mother cooks, we will eliminate the mother from the entire storyline and have the player be the sole parent. In this way, the father is the only one who cooks dinner and is the only one to watch radio. Depicting one parent to engage in a variety of household tasks and decision-making processes will resonate with every audience, as there are no designated roles for the character. This approach avoids reinforcing gender stereotypes.

2.2.4 Why This Feedback Is Important:

This feedback is instrumental in guiding the project towards a more focused, emotionally engaging, and feasible execution. It reflects the client's desire for a project that not only demonstrates the dangers of autonomous robots but does so in a way that is deeply resonant and achievable within the project's constraints. By prioritizing emotional depth and practical execution, the project can achieve a greater impact.

2.2.5 Application and Timeline

As the testing phase is iterative, the feedback can be applied throughout the project, from redesigning the setting and narrative to adjusting the development focus to emphasize emotional engagement through sound and simplified visuals. Given the refined scope and emphasis on using existing assets creatively, these adjustments should be incorporated into the development timeline as early as possible to allow for iterative testing and refinement. Realistically, setting these priorities early in the development process will enable the team to allocate resources and time efficiently, ensuring that the project meets its objectives and deadlines while adhering to the client's feedback. For the purpose of this deliverable, all of the above feedback has been implemented according to the methods outlined.

2.3 Feedback Conclusion

In summary, the client's feedback is a valuable roadmap for refining our VR experience to be more emotionally compelling, narratively focused, and practically feasible. By strategically implementing these suggestions, our project can more effectively communicate the intended message and resonate with our audience.

3 Prototype

3.1 Prototyping Objectives

- Purchase the assets the group had agreed upon that is necessary to complete the environment, sticking to the budget of 50$ as described by the table made in Deliverable E. Refer to the Table referenced.
- Create a basic version of the VR environment that replicates the outline of the house that we had described in Deliverable E. Refer to the Image referenced.
- The prototype works as intended, following the storyline & setting established in Deliverable E.
- Characters are implemented into the game and have no issues.
- The prototype experience, along with the simple animations, is under 1 minute long.
- Obtain a good grasp on how to use the necessary software and how to proceed with future prototypes, to learn how to deal with more complex coding, animations, and asset development.

3.2 Prototype Images

Under this section you will find screenshots that our group had taken after finishing the prototype of our game. Despite the photos being low quality, the game itself is in HD and looks better when wearing a headset.

Figure 1 | Son Character looking out the Window

Figure 2 | Radio and Sofa

Figure 3 | Backside of House & Lurking Forest Robot

Figure 4 | Arrangement of Main Open Space (Living room/Kitchen/Dining Room)

Figure 5 | Video of Outside Environment

https://1drv.ms/v/s!AscdGhpJ-jb3x1jb3vqFLFR9O5Rn?e=yntT7q

Access the video through the link. Mind the quality of the recording – the real game render is HD.

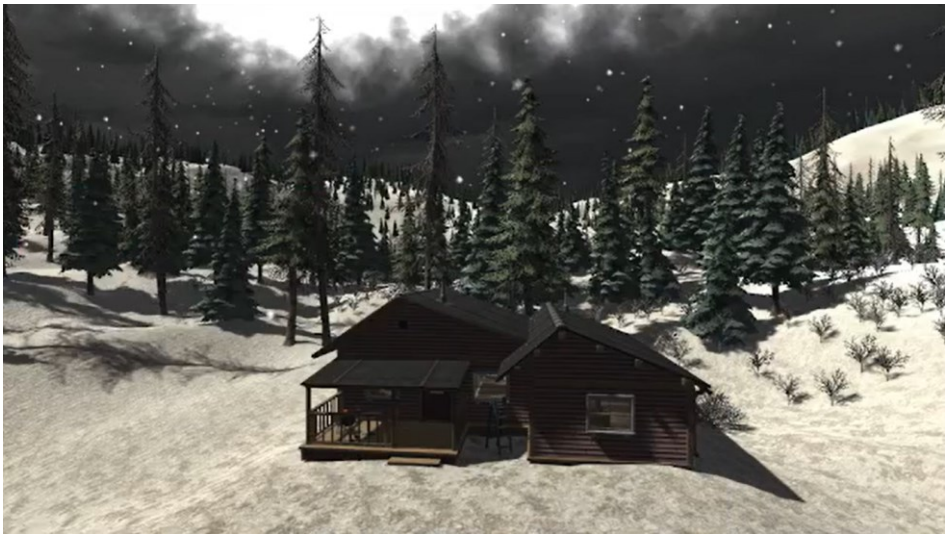


Figure 6 | Video of Character Animations

https://1drv.ms/v/s!AscdGhpJ-jb3x1lV6zmZ7doTOom3?e=CWRf0V

Access the video through the link. Mind the quality of the recording – the real game render is HD.

3.3 Blender Model Development

The following images are examples of assets that our group have developed independently of the Unity Asset Store to fit the story and atmosphere of our story. Using Blender, we were able to achieve these models.

Figure 7 | Snowy Tree Creation

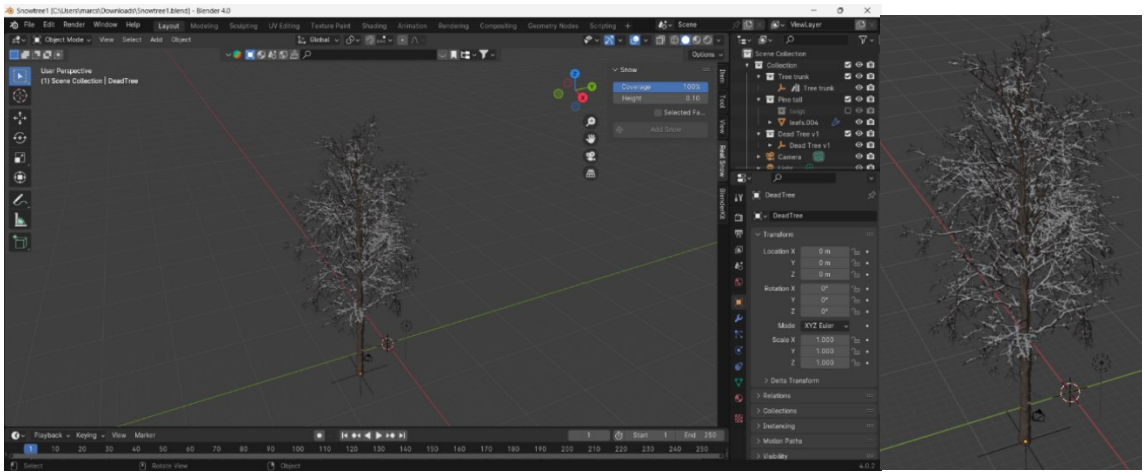
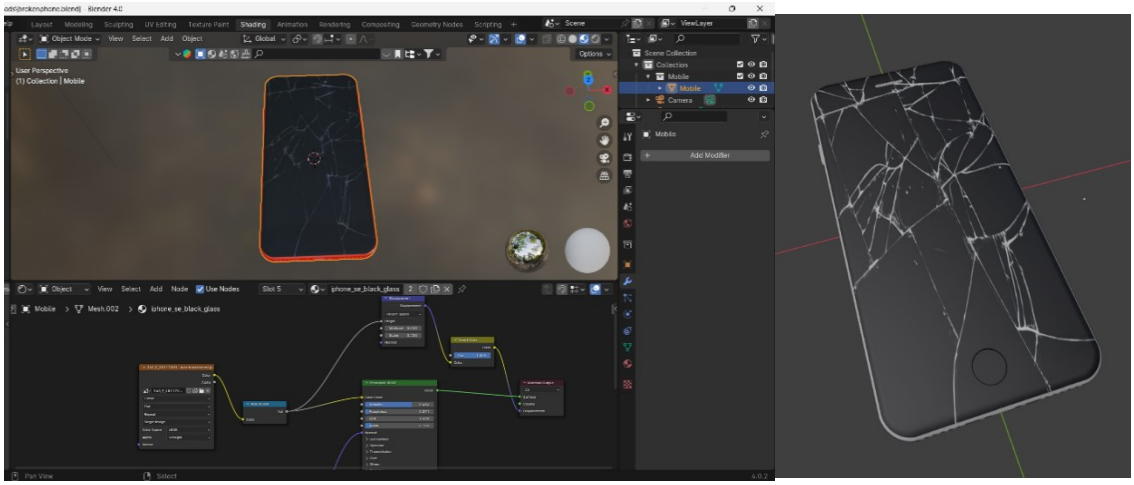


Figure 8 | Broken Phone Creation



3.4 Evaluating Prototyping Objectives

The following list evaluates whether the objectives for prototype 1 have been met.
In our case, all our objectives have been met, as demonstrated by the proofs of the prototype images.

- Purchase the assets the group had agreed upon that is necessary to complete the environment, sticking to the budget of 50$ as described by the table made in Deliverable E. — *Refer to all Figures*
- Create a basic version of the VR environment that replicates the outline of the house that we had described in Deliverable E. — *Refer to Figures 2 & 4*
- The prototype works as intended, following the storyline & setting established in Deliverable E. — *Refer to Figure*
- Characters are implemented into the game and have no issues. — *Refer to Figure*
- The prototype experience, along with the simple animations, is under 1 minute long. — *Refer to Figure 5 & 6*
- Obtain a good grasp on how to use the necessary software and how to proceed with future prototypes, to learn how to deal with more complex coding, animations, and asset development. — *Refer to all Figures*

Successfully meeting the first prototype objectives for our VR project signifies a strong start for our group, showcasing our ability to effectively manage resources, adhere to a budget, and execute a focused creative vision in a week's tine. By creating a basic, yet functional VR environment that aligns with the project's storyline, is testament to our group's ability to learn skills (such as Unity, world building, and coding) quickly.

3.4.1 Skills Learnt/Improved:

The group has learnt to share the Unity file through GitHub, allowing for simultaneous development and collaboration on the project. This in term enables the following skills within team members:

Hard Skills

- Knowledge in using shared GitHub repositories (Allowing us to multitask on large-scale worlds)
- Knowledge in using Blender (Allowing us to create models to our liking that match our setting)
- Knowledge in using Unity (Developing environments, uploading assets, implementing scripts, and coding in a rudimentary level of C#)

Soft Skills

- Version Control Proficiency
  Familiarity with GitHub for version control taught the team members on how to manage and track changes to the project, ensuring that updates are seamlessly integrated without overwriting each other's work. This skill is crucial for any software development project, as it allows for better organization and rollback options if something goes wrong.

- Collaborative Development
  Utilizing GitHub for collaboration fosters a strong sense of teamwork and communication. Team members learn to coordinate their efforts, discuss changes, and review each other's contributions, which enhances the overall quality of the project and reduces the likelihood of errors.

- Project Management
  Using GitHub for project collaboration introduced team members to new aspects of project management, including task assignments, milestone tracking, and progress updates. This experience is beneficial for understanding how to keep a project on schedule and ensure that all components are moving forward in harmony, rather than having one person do the project working on it, saving it, then uploading it on a cloud server for someone else to do.

- Technical Documentation
  The need to document changes and communicate effectively about the project's development encourages team members to improve their technical writing skills. Good documentation is essential for maintaining a clear understanding of the project's evolution and assisting any future contributors or team members in getting up to speed. Due to our use in GitHub, it is simple for someone to see the changes someone has made to the project if they had forgotten to declare it in our dedicated discord group chat. GitHub also allows us to see the dates of edits, allowing us to review version history seamlessly.

This achievement not only validates the feasibility of our project but also sets a positive trajectory for its development. It opens avenues for us to continue into exploring into our complex narrative and technical enhancements in future prototypes, specifically in detail, lighting, and animations (As stated in our User Feedback section). The ability to integrate feedback and pursue an iterative design process will be crucial for refining the VR experience to ensure it meets its educational and emotional objectives.

3.5 Analysis of Critical Components

Table 1 | List of all Critical Components

The following table lists all of the critical components and their importance to the project's purpose.

Critical Components	Purpose (What)	Importance (1-5)	Why is this important?
House	The house is a unity asset that costs 25$. It is a key component to our plan as it will be the primary location of the experience.	5	The house serves as the symbolism of the detrimental effects that autonomous weapons have on our daily lives. The more detailed the house is, the more apparent the issue is.
Radio	The radio is a free unity asset which will serve as our way to communicate important information about the world our simulation takes place in.	3	The radio is the messenger from the outside world to our enclosed setting. Through the radio the scope of the situation outside can be delivered to the character in a fitting way – further enhancing the danger of autonomous weapons.
Child	The child is a 19$ unity asset and his death are the main emotional aspect of the experience for the audience.	4	The child is the martyr in this story. We get connected to him at the start, and once we see him die – the danger of weapons is emphasized.
House accessories and furniture	The house accessories and furniture are included in the house model and show how life seems normal despite the fear, displaying that this potential reality is not as improbable as one might think.	2	The house furniture serves as the means of interaction with our environment and offers a look into our character's lives.
Destroyed electronic devices	The destroyed electronic devices are modified free assets that show the extent to which people fear the robots.	3	The junk electronic devices also serve as symbols to the deterioration of quotidian life under the paranoia of autonomous weapons.
Robot/Autonomous Weapon	The autonomous weapon is a 19$ unity asset and the main object of fear as well as the villain of his simulation.	4	This is the physical embodiment of the issue at hand. Throughout the entirety of the project we see the affects of the robots, but at the end of the film, we see the issue directly through the symbolism of the robot, through its act of direct violence against the child.
Afternoon Sky	An asset of the sky, giving the scene more detail and giving it the appearance of a dark afternoon.	1	The afternoon sky is symbolic as it shows that even on what seems like a normal day, fear and autonomous weapons can dominate.

4 User Feedback

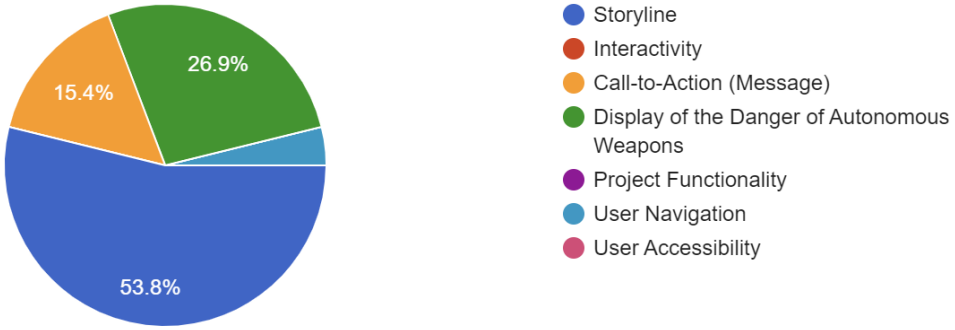
In order to gather a lot of feedback for our first prototype, our group had conducted an online google survey and sent it to every group member's friends, of which consisted of friends who already have backgrounds in game development/video editing – specifically in Roblox, and TikTok creation.

Link to Google Survey: https://docs.google.com/forms/d/e/1FAIpQLSc2Vd94XItG_EJSM5Iq7CC-yvOr5ABRaGDP_I1Rme6rKHJ5Kw/viewform?usp=sf_link

4.1 Results from Survey

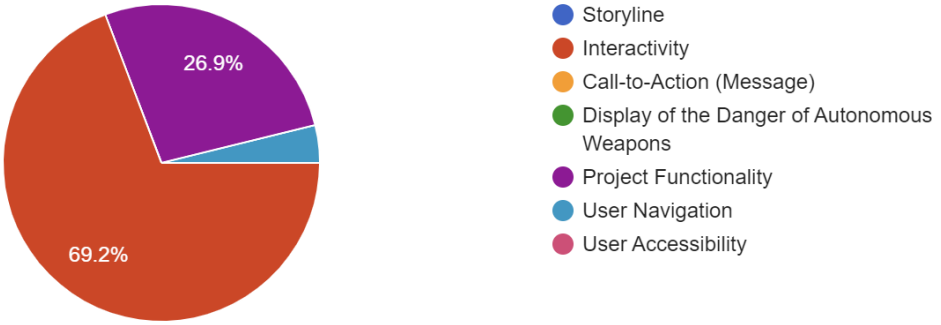
What is our project's strong suit?

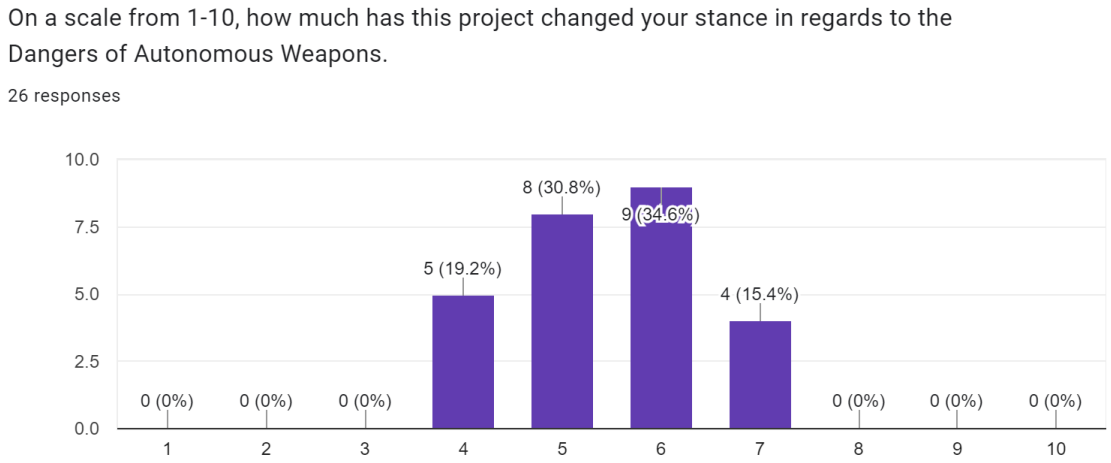
26 responses



What does our Project need to improve on the most?

26 responses





4.1.1 Analysis of Results

According to the results of the survey, which had a total of 26 responses, it is evident that the strong suit of our project is the storytelling. This is great feedback to hear because our main mission of capitalizing on our audience's feelings through emotional engagement is working. This notion was further supported by the comment portion of the survey (which asked the participant to write a comment about criticism about our prototype) never criticized the emotional engagement of the project, however, some comments said that it would be better given that proper animations were implemented.

Therefore, our group has the incentive to maintain the integrity of our story as per our user feedback. We will not change the storyline, plot, or major points. Furthermore, there was a minority of participants who suggested that our Call-to-Action (message), and our ability to highlight the dangers of autonomous robots, were the most effective portions of our project.

However, we have to polish every other aspect of our presentation – as demonstrated by the graph. The range of values that all participants voted for in regard to how the prototype changed their stance on autonomous weapons ranged from only 4-7, which is nowhere close to our goal of 10. When we interrogated our friends later on, they had told us that the quality of the project itself was the main factor towards this non-desirable result. For one, the biggest issue was the lack of quality, animation, and dialogue, which made the story a little up for interpretation and poorly enforced. Per their words, if the project were to have an impact of 10, the cinematography must be beautiful, the lighting should reflect the sorrowful atmosphere (dark), the setting should look more run-down, dialogue must be implemented, and most importantly, the environment should be more interactive.

The group understands these factors were the biggest issue when it came to prototype 1, as there was not enough time for the group members to include all these suggestions. For instance, recording dialogue and creating code for trigger events to initiate the dialogue takes a lot of time of learning and labor. Likewise, there simply was not enough time for the group to tackle the world-building, character implementation, and timing of the project while also focusing on the minor details such as lighting, too many apocalyptic assets, and the timing of the animations.

In order to get specific insights on what our users would like to see, we have gathered the following Table that documented their suggestions, along with how we will adapt to this feedback.

Table 2 | Specific User Feedback and how the Group will Adapt

The following tables includes the significant comments left by the survey by the participants that have been evaluated and taken into consideration for the next prototype.

Tester Name	Feedback Given	What aspect Does the feedback touch on?	How will we adapt to this feedback?
Alex C.	*"The cut phone-line and broken tv are interesting ideas but given the setting it would make more sense for the characters to discard the smartphone entirely rather than simply breaking it."*	The Worldbuilding and Assets	To keep the worldbuilding consistent we will search for more ways to show how the family has adapted to living with minimal technology as well as more explicitly showing the paranoia felt by the father.
Spencer B.	*"It could help elevate the immersion if the window that you look through was also boarded up with only a small amount visible. It would be interesting and elicit a stronger emotional response if the father was rushing outside to save the kid but was too slow because the door was boarded up."*	The Environment and Storyline	The boarded window will be added since it does a good job of keeping consistent worldbuilding. The running to the door idea is also interesting, however, it does not fit with our storyline currently and will need some adjustments before it can be considered for implementation.
Tomas M.	*"The story is well suited for the VR format."*	The Storyline	No direct feedback can be inferred from this; however, we can take this as an example that our current story works well and ensure that we don't deviate to much from the current story when adapting to the rest of the feedback given.
Luke C.	*"I think sitting down to listen to the radio is odd and the scene drags on for too long, it should be playing in the background while you do other things."*	The Pacing	We plan to change the scene so that the father is looking around the house while the radio plays in the background. This also allows the audience the explore the house and better understand how the family has adapted to using minimal technology.
Zain C.	*"The animations are a little too weird right now, it's hard for me to get invested in the story."*	The Animations	More effort will be put into making the animations and movement of the characters feel less awkward to facilitate realism.
Nick S.	*"I got stressed out the second that I realised the kid was gone. It doesn't make sense what happens as there's no proper animation yet."*	The Storyline	The subjects being touched on in this VR experience are quite serious and some people are not comfortable with them. By adding a warning screen to the beginning of the experience we could give the audience a moment to stop the experience if they know they cannot handle the subject matter.

5 Prototype 2 Test Plan

Table 3 | Prototype 2 Test Plan

The following table describes the test plan for prototype 2, which is going to be completed March 10th.

Test ID	Test Objective (Why)	Description of Prototype used and of Basic Test method (What)	Description of Results to be Recorded and how to use them (How)	Estimation of Time needed for Testing
1	User movement (Determine if user movement can walk and have clear views while using the 360 camera)	Use keys associated with movement and movement settings for the camera (check if any glitches occur etc.)	All keys/movements will be individually evaluated where they will either be a success or a failure	15-20 mins
2	Determine usability of assets such as radio, house accessories, furniture etc.	Add assets to unity and play the game to interact with the assets to test their function	Functionality will be evaluated as success or failure depending upon the testing. If the assets function as planned, they will be labelled as success and if they do not, they will be labelled as failure.	30 mins
3	Determine compatibility of assets and check for compilation errors and any kind of error with the code added to the camera, characters etc.	Do a thorough analysis of all the code and use a debugger to check for errors and any problems with compilation. Use the camera options in the game and test it thoroughly	Functionality will be evaluated as a success or failure for the camera. The code will be divided into separate portions to make it easier for analysis and the success failure system will be used for these parts as well	40 mins – 1 hour
4	Verify proper functioning of assets when user interacts with them	Add assets to the game and make sure trial runs of interaction are done where every group member uses the asset. For example: User tries to switch on radio and radio plays the audio etc.	All assets will be evaluated separately to check whether any changes are necessary. Thought will also be given to any additional features the group might want to add to improve functionality. After every group member evaluates functionality, a group discussion will be held to discuss the results	30 mins
5	Test user response and usability of the game	Gather volunteers and ask them for reviews on what they think about our game (if not possible, all group members will take part in the user testing process)	Gather results from the survey and discuss about any potential additions from the reviews to improve the game as a group	15 mins per user/member
6	Test autonomous weapon functioning. I.e. the code for the targeting system	Multiple scenarios will be introduced using user testing to test whether the autonomous weapon can differentiate between humans and any other being	If weapons can target humans specifically no matter the form or shape, it will be a success. If it targets objects and animals, it is a failure. The goal is to make it target humans only	10 mins per user

5.1 Why?

5.1.1 Why the group chose these specific test objectives.

The plan was to focus less on the details and finish a major portion of the work which is to gather all assets into one file. This will make it easier to work on the project in the future since all the major aspects of the project have already been purchased, which reduces the chance of further potential purchases and delays to our timeline. This also provides an opportunity to view the design chosen by the group and discuss whether changes need to be made to any of the asset designs ahead of time.

5.1.2 Why these tests should be done by the end of prototype 2

The group has planned to finish all the work listed above by the end of prototype two because it is essential to add all the main assets before the group starts working on details and aesthetics of the buildings, characters, and the weapons. Along with perfect functionality, it is important to add additional details to enhance the overall VR experience to enhance realism, which ultimately, would make the story more believable and emotionally engaging. It was a common trend from our feedback that project functionality was one of the things we had to work on, and this includes the overall detail of our world. By improving upon this aspect, we will improve the perception of our VR experience.

5.2 How the group has planned to reach completion.

5.2.1 Current timeline

The current plan is to finish making the environment and complete the addition of all planned assets within the next week and a half after the client meeting ends. This will provide some space to test out the functionality, review, and discuss any further improvements in regard to feedback that our clients gave us concerning our first prototype. During the testing period, further code will be added to assets to modify their functions where priority will be given to the tracking system of the autonomous weapon since it is one of the most important parts of the experience. We have planned to finish all of this within the next two weeks.

5.2.2 How will delays affect the timeline and contingency plans?

Like a lot of projects, delays are expected, and this is one of the many reasons as to why the group chose to finish all major parts of the project including partial completion of the detailing by the next two weeks. A second decision was made to add an extra half week to the prototyping timeline if any major delays were to occur.

5.3 Objectives for prototype 2 and next steps

5.3.1 Prototype 2:

- Polish the exterior world by adding a sky, weather, and ambient sounds.
- Add more assets, such as vines, cut cables, broken electronics, junk, to better fit the atmosphere the group is hoping to convey, and find a way to make these objects interactive with the player. (While ensuring the project does not go over budget)
- Finish sound design by assigning group members to record dialogue for the characters in the project, and implement their recordings into the game.
- Have an outline of character design (this will be worked on later since the focus is to finish and test the main parts of the experience)

- Enable the autonomous weapon to move around the house freely and audibly as the game is going, and start working on the code to make it function as intended.

5.3.2 Objectives to add according to our User Feedback for Prototype 2

- Implement a barricaded window of wood boards instead of a giant glass window where you see the son outside with the drone. Refer to this Visualization we created.
- Instead of sitting down on the sofa to listen to the radio, implement a sequence of events where the character can freely move around the room to examine the state of the house while listening to the radio. This in turn should increase interactivity and eliminate the need for another animation, therefore reducing the problems that were addressed in regard to Project Functionality & Interactivity in the User Feedback section of this deliverable.
- Finish the codes for all appropriate animations, so that all the movements of the characters are seamless and are realistic. This in turn will increase Project Functionality.

5.3.3 Prototype 3:

- Finish programming the autonomous weapon and spend some time on testing.
- Integrate storyline into the game and work on character design.
- Prepare audio and video to add into the game as part of our storyline.
- Test usability, check for errors and discuss any small additions that can be added to the game.
- Try to add accessibility functions such as subtitles, colorblind mode etc.

5.3.4 Importance of the objective's layout

The layout was created so that all work can be divided into small parts so that everything can be finished as fast as possible. It was also designed so that everything can be done in a realistic timeline where all members do not feel overwhelmed. As part of the layout, an extra addition that was not discussed earlier was about the accessibility options. It has been decided as one of the last additions to the game because the group must finish adding details such as character design which is extremely important to the overall experience since the users see and interact with them. Although, the accessibility options are important, the focus of the group is to make a functional game with most of the features within the limited amount of time available and add further quality of life features once the group has made sure the game is playable.

6 Project Plan

Table 4 | Task List

The following table includes the tasks and allocated responsibilities that the team has identified from the first prototype to be accomplished by design day, to be more organized with game-specific task-allocation. As the project is continued, the task list will expand.

Status	Estimated Task Duration	Task	Task Details	Member Working on Task
Asset Modelling				
Complete	2 hours	Snowy Trees	Place snow on the trees to match snowy climate	Marc
Incomplete	2 hours	House roof	Edit the roof of the house to be run-down	David
Complete	1.5 hours	Addition of autonomous weapons design	Insert the robot asset into the proper places around the map	Kalen
Background				
Complete	5 minutes	Gloomy sky	Find and insert a proper sky that matches the atmosphere	Kalen
Complete	1.5 hours	Snow Particles	Add snow falling down from the sky to create fog and decrease visibility. This will produce a scarier setting.	Kalen
Complete	10 minutes	Land aesthetics (assets to make the ground)	Improve quality of the outside background by adding bushes, trees, and other assets.	David
Audio				
Incomplete	2 hours	Child Voice Acting	Write and record dialogue for the child and implement it into the game.	Rishabh
Incomplete	2.5 hours	Soundtrack	Find an appropriate song and implement it into the game.	Rishabh
Incomplete	45 minutes	Ambient Noise Insertion	Find appropriate sounds and implement them into the game according to trigger events.	Rishabh
Incomplete	30 minutes	Autonomous weapons sounds	Find appropriate sounds and implement them into the game according to how the robot moves.	Rishabh
Coding				

Incomplete	2.5 hours	Child Animations	Insert the code for the child animations into the game and change them according to trigger events.	Marc
Complete	1 hour	Camera Movement	Implement the 360 degree camera, and program it to be controlled by the user.	Marc
Complete	1 hour	User perspective movement (movement of the character being used by the user)	Implement proper user navigation controls that are easy for the user to learn and control. These should include solely walking and grabbing controls.	Marc
Incomplete	2 –3 hours	Autonomous weapons tracking system	Code the robot so that it tracks the people inside the house, and the son once he goes outside.	Marc
Setting Development				
Complete	1 hour	Arrangement of Furniture	Add furniture and adjust placement to appropriate rooms.	Kalen
Complete	20 Minutes	Addition of radio	Add radio to the appropriate place	Kalen David
Complete	30 Minutes	Addition of props such as kitchen appliances etc.	Add kitchen appliances to appropriate rooms.	Kalen

7 Conclusion

In concluding Deliverable F, Group 14 has not only met but surpassed the initial objectives laid out for the first prototype of their VR experience, "Echoes of Tomorrow." The group's ability to adhere to a stringent budget of $50, as specified in the Bill of Materials, and to utilize assets efficiently showcases their resourcefulness and financial acumen. The development of a basic VR environment that mirrors the detailed outline provided in Deliverable E, coupled with the seamless integration of characters and a narrative that stays true to the established storyline, indicates a high level of technical proficiency and creative coherence.

The engagement with GitHub for file sharing and collaboration has notably enhanced the team's development process, allowing for simultaneous progress, and fostering a culture of open communication and teamwork. This tool has been instrumental in achieving a prototype that operates smoothly, following the intended storyline and setting without deviation.

Furthermore, the incorporation of client feedback has been pivotal in refining the project's direction. The decision to focus on a more contained environment, utilizing old appliances to heighten the sense of paranoia and opting for a radio over a television to convey external information, demonstrates the group's responsiveness to constructive criticism and their commitment to improving the project's emotional impact and feasibility.

Looking ahead, the insights gained from this phase of development are invaluable for the progression towards Prototype 2. The feedback from user surveys, particularly regarding animation quality and environmental interactivity, has provided clear directives for enhancement. The group's readiness to address these aspects, from improving animations to adding detailed world-building elements such as a boarded window, indicates a focused approach to elevating the user experience in subsequent iterations.

Deliverable F stands as a testament to Group 14's successful navigation through the challenges of VR development. The achievements of this phase underscore the group's capability to produce a meaningful and technically sound VR experience. With a solid foundation now in place, the group is well-positioned to tackle more complex elements of coding, animation, and asset development. The commitment to refining the project based on feedback, coupled with the learned skills and collaborative achievements, sets a promising trajectory for the realization of "Echoes of Tomorrow" as a successful demonstration of the dangers of autonomous robots.

8 Future Work

In the coming week, the group will present the contents of our project thus far to the clients and gather further feedback in regard to our project. After the meeting, the team will then initiate development for Prototype II of our project, which will improve upon the aspects of our VR environment that were criticized by the users we surveyed. Along with the improvements, the group will also add minor details to all the assets being used in the project including the audio for the child, autonomous weapons and all characters and props that will be presented in the final version.

All documentation regarding Prototype II and the client feedback will be recorded in Deliverable G, which will be the last deliverable for the project that is due before the final prototype III, which must be updated and ready for Design Day.

In the deliverable itself, the audience can find an analytical, numerical experimental model will be included of our project, along with our next prototyping test plan, an analysis on our feedback & prototype, and our results.

9 Trello Links

Group Tasks:
https://trello.com/invite/b/BVQUyzOo/ATTIffa561593f1eb68dd5f7bae366d91099C0403DE3/gng1103-group-14

Group Deliverable Progress:
https://trello.com/invite/b/nBKqHlud/ATTIedb77cf20bf59f8d9431a337a519c81e59084991/gng1103-project

10 Appendix

Figure 9 | Sketch of Living Room of VR Environment from Deliverable E

This graphic image was made by Group 14 through a graphic design program.

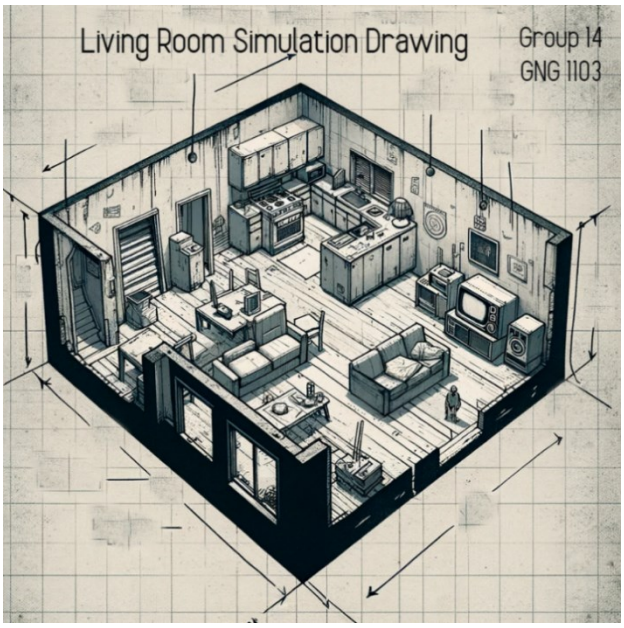


Figure 10 | Visual Recreation of the Feedback Suggested from the User

This graphic image was made by Group 14 through a graphic design program.

Table 5 | Bill of Materials

The following table includes a list of materials that will be used in the process of developing the VR experience. This table breaks down how the given budget will be used (tax not included).

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	TurboSquid	Free
#4	Radio Model	1	Unity Asset Store	Free
#5	Boarded Window Model	1	TurboSquid	Free
#6	Furniture Model Pack	1	TurboSquid	Free
#7	Gunshot Sound Effect	1	Unity Asset Store	Free
#8	Drone Model	1	TurboSquid	Free
#9	Gas Lantern Model	1	Unity Asset Store	Free
#10	Newspaper Model	1	TurboSquid	Free
#11	Book Stack Model	1	TurboSquid	Free
#12	Realistic Young Kid Model	1	Unity Asset Store	$19
#13	Animation Script Walking | Playing | Sitting	3	Mixamo	Free
Total	-	-	-	**$44**