Technical Design Report

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Abstract

This is a technical design report showcases a list of design ideas following the design criteria for the project. Each concept is described with a storyboard or illustration of the simulation story and discussed in relation to the design criteria. The ideas are summarized and ranked with one concept selected in conclusion to be featured in the report.

Table of Contents

1. Introduction: 4
2. Design Ideas Per Group Member: 4
3. Conclusions and Recommendations: 9
References 10
Trello Management 11

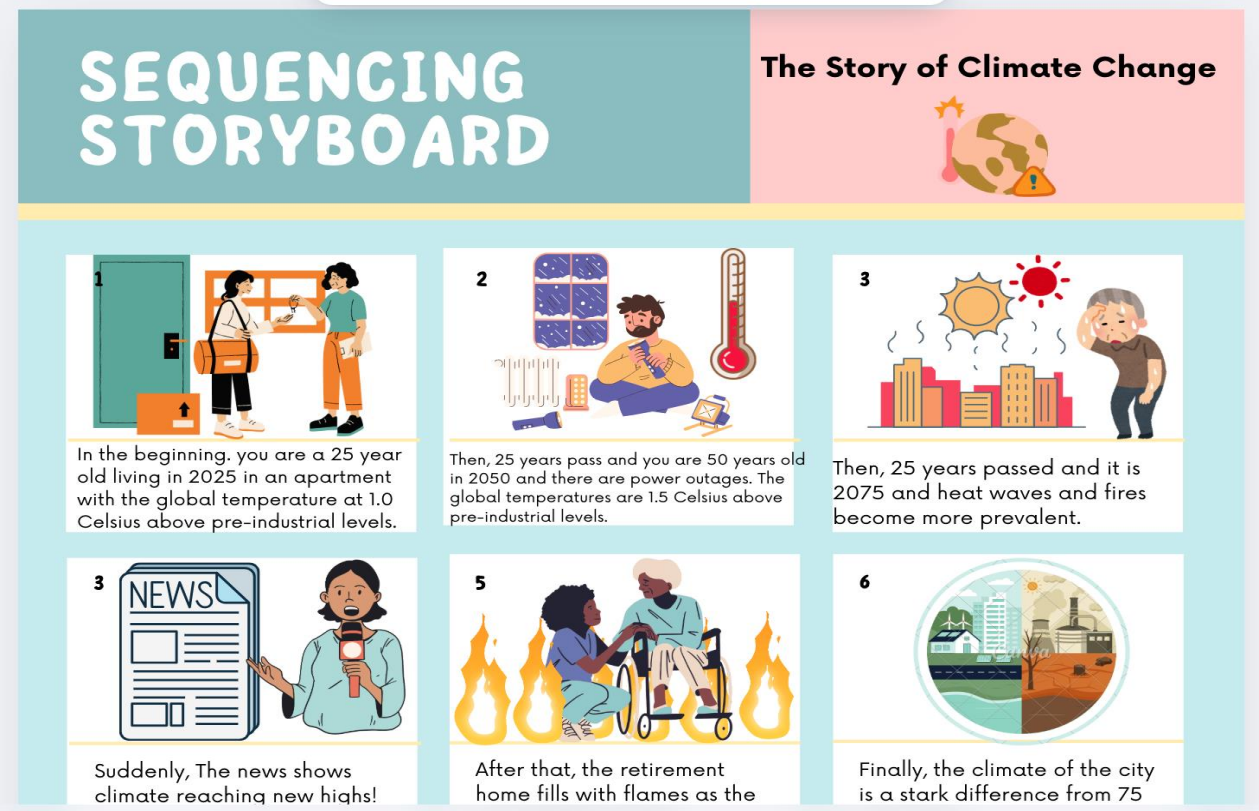
1. Introduction:

In this document, each member of our team designed a storyboard that shows each of our concepts for the simulation and added a description that outlines how the respective concept meets and incorporates the design criteria; at the end, an inclusive The storyboards are visualizations of our respective ideas and demonstrate how they will look to the viewer when put into the Unity engine. They include what climate change danger the user will experience as well as the objectives they will have to complete in the interactive experience. The descriptions first describe what the concept includes and then go through how it incorporates the 3-minute time limit into the pacing of the simulation and also how they use the sound effects and graphics of the experience in their respective concept. Lastly, the document concludes by choosing which concept we will move forward with and continue to work on.

2. Concept Ideas Per Group Member:

Number	Need	Design Criteria
1	A length of time for a virtuality reality simulation of 3 minutes.	Time is measured in minutes for the simulation.
2	Types of copyrighted music and ensuring sound effects are not restricted.	Non-copyrighted sound effects and music.
3	Graphics that stimulate interaction in the simulation.	A simulation that has activities or tasks for the user to interact.

Hannah:



The concept relates to climate change mainly to the rising of the global temperatures and how it this relates to the everyday life of a person in the span of 75 years. The simulation follows a person who must complete tasks in three different parts of a greater story that is over the course of 75 years but each part from the 3 is within 25 years. The story begins in 2025 with a 25-year-old who must complete three tasks, the first is checking the weather by looking out the window and on the tv, second, make breakfast and 3 turn on the ac. The user will see that it is hot outside and there will be elements that help the user see or that are displayed such as the year, date (a calendar) and the temperature (a thermometer). The tasks will also be timed to help keep the pace of the story by allowing the user to explore but not require the tasks to be done. Once the timer is done for the first scene, the next scene will be a kitchen in a house. The user will see a calendar on the fridge, and it will say the date and year and there will also be a text showing the date and year and global temperature with a thermometer. Again, the user will have tasks much like the first one but will see the impacts of climate change by seeing food shortages of certain things needed to make breakfast, the rising cost of using an ac, blackouts and draughts and forest fires on the news. They will also feel more fatigued and hotter and move slower around the house. Lastly, the user will have the final scene which will include the sound of medical staff and fires outside

their hospital room. The year is 2075 and forest fires are now rampant and heat waves as well. The user will see on the news the new global temperatures and food shortages. Sad music will play as the user looks at photos of the last 75 years and how it impacted their life.

Taha:

This integration of VR technology into awareness about climate change focuses on the increasing danger of wildfires worldwide. Through an immersive virtual reality simulation, one will witness how rising global temperatures, endless droughts, and human activities create the perfect conditions for disastrous fire outbreaks. The storyboard will show a series of events, from a serene environment to a small fire turning into a wildfire in no time, threatening homes, forests, and lives in its way. As the fire spreads, users have to make decisions on fighting the fire, evacuating, or strategizing escape routes similar to real-life crises. Interactive firefighting and evacuation scenarios let the user understand what kind of challenges the firefighters and the community go through, seeing what fire damage has done to an ecosystem over a long period. The experience will also point to the role that climate change plays in intensifying these wildfires and encourage users to take action through prevention, policy solutions, and reforestation. This is a project that blends education and immersive storytelling, inspiring action in climate resilience and wildfire prevention.

Lucas:

My concept for the simulation is having the user escape a house that has been caught in the path of a deadly forest fire. However, the user was caught off guard by the disaster, so they must follow the markers and search their house for important items that can not be lost to the fire before they

exit, collecting them as they go. After obtaining all required items, the user is directed to the house's exit where they are then instructed to arrive at an evacuation spot; and the simulation ends after a brief conversation with a firefighter where he explains that the reason the user was unprepared for the fire was because global warming had caused unprecedented levels of drought and heat in the area, and nobody could accurately predict how fast the wildfire would spread. To pace the simulation and make sure the user completes it within the three-minute limit, my plan is to overlay a two-minute time limit for collecting all special items and leaving the house. If the user fails to leave within the allotted time limit, they will be automatically teleported to the checkpoint outside the house to continue the experience. To assist the user in exiting the house within the time limit, markers will be placed to guide them through the house as well as show which items need to be collected. For sound effects in the simulation, firstly, there will be no music to enhance the realism of the experience. In the same vein, sounds of fire crackling and burning wood will be played while the user is inside the house, along with distant sounds of fire truck sirens, barking dogs, and people yelling to give the simulation a lived-in feel. Lastly, the simulation's graphics will be realistic enough to make the user feel the urgency of the situation and empathy for victims of similar events, but not so realistic that it will frighten them. This balance will be achieved through using real landscapes and accurately modeling the house they must escape from, while using obviously artificial fire graphics.

Marie-Gabriella:

This concept follows the user who will be set to be a firefighter. The character is not set to be any specific gender to not exclude anyone but will be referred to as “firefighter” to keep the simulation general to anyone experiencing it. The experience will have a very short introductory scene to clarify the storyline. The user will then be brought to the start of the simulation which is set in a burning home. The user will have to clear the house for anyone remaining and will find a cat to save. The experience will include a map of the house to make the experience more time-efficient, to meet the 3-minute time limit. During the house scene, the sound effects will be faint, but loud enough for the users to understand the environment they are in. The sound effects will have siren sounds, the sound of wind and fire spreading and burning. There will also be faint sounds of a heartbeat, to incite alertness in the user. Furthermore, to reduce the possibility of going over the time limit, the house will be of a smaller size.When all the rooms are cleared and the user has finished their tasks, they will be asked to evacuate the house as quickly as possible. The last scene will have a narrator (who will be set to be the chief of the fire department), who will explain why fires are so extreme and widespread. This concept’s purpose is to bring to light the fact that “70 per cent of more than 400 extreme weather events, analyzed by researchers, were found to have been made more likely or more severe as a result of global heating” (p.32) according to Bill McGuire’s book *Hothouse Earth*.

3. Conclusions and Recommendations:

After the Analysis of these four concepts, we have concluded that the third design is the concept most fit to meet the client’s needs. The storyline is set in an environment that everyone can find themselves in and thus would make it easier for the user to immerse themselves in the experience. To continue, the third design has many different ways of keeping the simulation under 3 minutes. The timer is an effective way for the user to gauge how much time they have. Also, using markers to guide the users eliminates any possible confusion the user may have on where to go. The design emphasizes that the goal is to incite emotions without crossing the line into sensationalism. The concept does this well by not adding background music, but adding sound effects that are realistic to the storyline. The first design was not chosen because it had too many scenes, which we think would prevent the user from having a full and in-depth experience. To continue, the last design was not chosen because we understood that making the character a firefighter would diminish the impact it could have, since not everyone can relate to being a firefighter. In the future, we would like to improve this concept by adding more elements that would contribute to meeting the design criteria. Some examples would be to add different features from the other concepts that would be helpful to add in the chosen design.

References

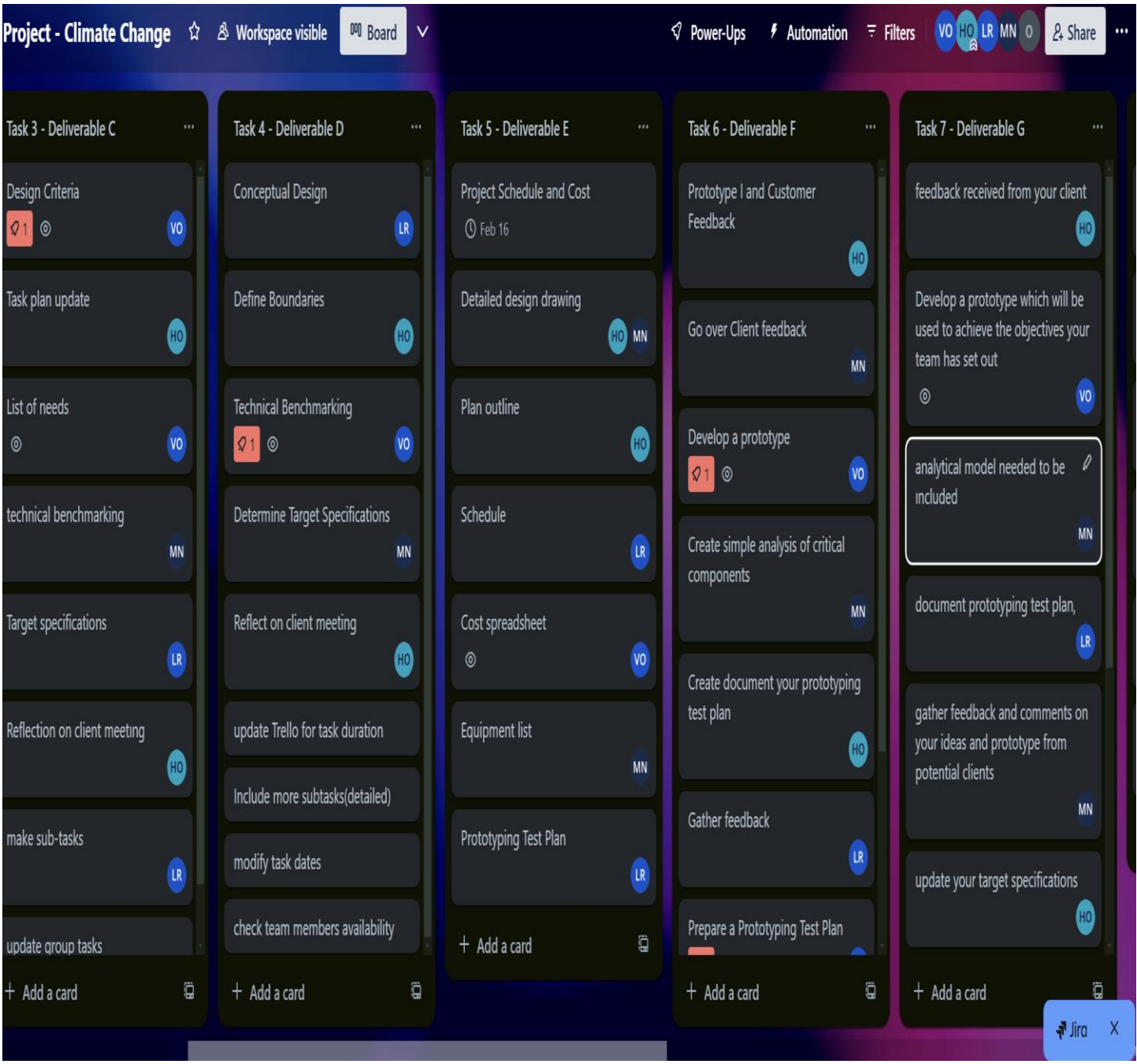
Global temperature. (2023). The Global Climate 2011-2020: A Decade of Accelerating Climate Change, 8–11. https://doi.org/10.18356/9789263113382c004

Country brief: Canada - the limits of livability - the emerging threat of smoke impacts on health from forest fires and climate change. (n.d.-a). Climate Change and Law Collection. https://doi.org/10.1163/9789004322714_cclc_2021-0021-133

McGuire, B. (2022). *Hothouse Earth : an inhabitant's guide*. Icon Books.

Trello Management

Task	Team member	Notes
Introduction	Lucas	Overview of the simulation story idea
Abstract	Hannah	Summary of project purpose and objectives
Story board& Concept Paragraph	Everyone	Each member creates their own simulation story idea
Design Criteria Explanation	Everyone	Time, Sound Effects, and Graphics considerations for their idea
Conclusion& Idea Selection	Marie-Gabriella	Explanation of the final chosen concept and reasoning
Final compilation & Editing	Group Effort	Review for consistency and clarity
Task table & Trello Screenshot	Taha	Summary of who did what, with proof from Trello


Project - Climate Change
Workspace visible
Board
Power-Ups
Automation
Filters
Share
Task 3 - Deliverable C
Design Criteria
Task plan update
List of needs
technical benchmarking
Target specifications
Reflection on client meeting
make sub-tasks
update group tasks
Add a card
Task 4 - Deliverable D
Conceptual Design
Define Boundaries
Technical Benchmarking
Determine Target Specifications
Reflect on client meeting
update Trello for task duration
Include more subtasks(detailed)
modify task dates
check team members availability
Add a card
Task 5 - Deliverable E
Project Schedule and Cost
Feb 16
Detailed design drawing
Plan outline
Schedule
Cost spreadsheet
Equipment list
Prototyping Test Plan
Add a card
Task 6 - Deliverable F
Prototype I and Customer Feedback
Go over Client feedback
Develop a prototype
Create simple analysis of critical components
Create document your prototyping test plan
Gather feedback
Prepare a Prototyping Test Plan
Add a card
Task 7 - Deliverable G
feedback received from your client
Develop a prototype which will be used to achieve the objectives your team has set out
analytical model needed to be included
document prototyping test plan,
gather feedback and comments on your ideas and prototype from potential clients
update your target specifications
Add a card
Jira