GNG1103 - Deliverable C: Design Criteria and Target Specifications

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1. Translating Needs to Design Criteria

Table 1. Needs and Criteria

#	Need	Design Criteria
1	The simulation immerses and engages the user in the effects of climate change.	Graphical fidelity, Modes of interactivity, Follows a storyline
2	The simulation educates and informs the user with well-evidenced facts and without overdramatization.	Accurate scientific data, Verifying information, Explicitly display data
3	The survey quickly measures how the user's perceptions have changed.	Survey question count, Question format, Modes of gathering user feedback
4	The simulation complies with ethical, moral, and legal standards.	Compliance with legal and ethical guidelines
5	The simulation is inclusive to all users in accessibility and bilinguality.	Font sizes, Visual contrast, Control scheme, Supported languages
6	User sensibilities are anticipated, avoiding offensive depictions and providing explicit warning for sensitive content.	Content warning, Ethical storytelling, Depiction of real-world settings
7	The simulation focuses on one aspect of climate change to keep within the available project scope.	Number of climate effects implemented
8	The UX design is tailored to best engage the critical audience.	Font sizes, Visual contrast, Visual style, Control scheme, UI layout

2. Technical Benchmarking

Table 2.1. Technical Benchmark Parameters of Similar Existing Products

Products (→) Specifications (↓)	FoCL Climate Visualization [1]	Climate Connected: Outbreak [2]	Oblivion [3]	This is Climate Change [4]	Qikiqtaruk: Arctic at Risk [5]
XR Form	AR/PC	VR/PC	VR	VR/PC	VR/PC
Duration	1-2 minutes	30-60 minutes	20 minutes	40 minutes	1-30 minutes
Character Usage	None	Non-human	None	None	None
User Feedback Methods	MC Survey	Observation of User + Interview	Live User Narration + Interview	None	None
Interactivity*	None	Narrative progression, Minigames	Narrative progression, Photography	None	Movement
Graphical Fidelity	Medium	Low-poly	Low-poly	Real life videos	Realistic

*Interactivity is defined as the user's ability to advance or affect the state of the simulation or an element thereof.

Table 2.2. Grading Relative Scores of Competitors and Weighting Specifications

Products (→) Specifications (↓)	Importance	FoCL Climate Visualization	Climate Connected: Outbreak	Oblivion	This is Climate Change	Qikiqtaruk: Arctic at Risk
Duration	2	3	1	1	1	2
User Feedback Methods	3	3	2	2	1	1
Interactivity	5	1	3	3	1	2
Graphical Fidelity	2	2	1	1	3	3
Accessibility	3	2	1	2	2	2
Total	-	30	28	31	22	29

3. Target Specifications

Table 3. Engineering Design Specifications

#	Design Specifications	Relation	Value	Units	Verification Method
	Functional Requirements				
1	User affects the simulation	=	yes	N/A	Analysis and testing
2	Accurate scientific data	=	yes	N/A	Research and analysis
3	Follows a storyline	=	yes	N/A	Analysis and testing
4	Supported languages	>=	2	English and French	Analysis
	Constraints				
1	Survey question count	=	3	N/A	Analysis
2	Measurable feedback	=	yes	N/A	Analysis
3	Simulation duration	=	1 to 3	Minutes	Test
4	Number of climate effects implemented	=	1	N/A	Analysis
5	Compliance with law and ethical guidelines	=	yes	N/A	Research and analysis
6	Cost	<	50	$	Estimate and final check
	Non-Functional Requirements				
1	Visual contrast	=	yes	N/A	Test
2	Visual style	=	yes	N/A	Test
3	UI layout	=	yes	N/A	Test
4	Control scheme	=	yes	N/A	Test
5	Font Size	=	12-24	pt	Analysis
6	Usage of realistic human characters	=	no	N/A	Analysis
7	Graphical fidelity	>	720-1200	pixels	Analysis

4. References

1. D. Bruce. “VR Climate Change Experiences”. Available at: https://makerepo.com/project_proposals/501.vr-climate-change-experiences
2. D. Fernández Galeote, N-Z. Legaki, and J. Hamari. “Climate Connected: An Immersive VR and PC Game for Climate Change Engagement”, CHI PLAY Companion ‘23, 6 October 2023. Available at https://dl.acm.org/doi/10.1145/3573382.3616053
3. S. Jang. “In Visible Climate Change: Exploring Immersive Data Visualization to Promote Climate Change Awareness in a VR Game”, CHI PLAY Companion ‘22, 7 November 2022, Available at https://dl.acm.org/doi/10.1145/3505270.3558335
4. D. Dennis, and E. Strauss "This is Climate Change" Available at https://docubase.mit.edu/project/this-is-climate-change/
5. *Discover arctic climate change impacts through virtual reality*. Discover Arctic Climate Change Impacts Through Virtual Reality. (n.d.). https://www.arcticxr.com/#main