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Deliverable H - User Feedback and Prototype 3

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## **Introduction**

In this deliverable, we will cover the analysis of the critical components, the results and analysis of our final prototype, how the feedback and comments of the client was used to improve our design, the updated design, the test plans for Prototype 3, and the plan updates for the entire project.

## **Analysis of Critical Components of Prototype 3**

For Prototype 3 the subsystems we focused on were the main menu and implementing our story, audio, and visuals into Unity, which are subsystems A, B, C, and D. The last prototypes confirmed that the storyline and the mechanics of the visuals were working, so all the subsystems now need to be integrated together to make our final simulation.

Subsystem B and C were easy to integrate because we already found a video and only a voiceover was needed. We had found several videos that matched some of the characteristics needed (like showing negative emotions and being short), and through a process of benchmarking, we chose a clip from a BBC YouTube video because it best met the specifications, which are covered below [1].



**Figure 1: Video Clip Chosen for Prototype 3 [1]**

The specifications for the video were the video quality, that the user could move in the video, the duration, it has the character show negative emotions, and that it matches our scenario. Using the benchmarking protocol from Lecture 6 where the weight is ranked from 1, the least important, to 5, the most important. Video quality was given a weight of 4 because the better quality the visuals of a video is, the more immersive it is, and this can impact how immersive our simulation is. From our design specifications, we have always had immersiveness as an important feature since it can increase the amount of empathy a user feels. The user being able to move within the video was given a weight of 3 because it can help to immerse the user, but too much movement can cause nausea, as covered in Prototype 2. The duration was given a weight of 2 because although a shorter video is ideal since we have a constraint of five minutes, the video can be edited to be shorter. Having the character in the video showing negative emotion was given a

weight of 5 because it relates to the goal of the project, which is to show the discrimination (negative feelings) directed towards minority groups.

The scoring system assigned can give a score between 1, the worst score, to 3, the highest score. The figures below are the qualitative and quantitative benchmarking of three videos that we found.

1. Video 1 is Inside Anxiety - A 360 Degree VR Video Drama by BBC Scotland [1]
2. Video 2 is Interview Simulation by ThisWayToCPA [2]
3. Video 3 is VIRTUAL MOCK JOB INTERVIEW VR - practice eye contact and answers - by Vince B [3]

Video specifications	Video 1	Video 2	Video 3
Video quality	HD (up to 2160s60)	360 p	HD (up to 1080 p)
User can move within it	360 degrees	No	No
Duration	The part we need is	8 minutes, 58 seconds	8 minutes, 54 seconds
Shows negative emotions	A lot but mostly somber	Neutral but his movements can be reinterpreted	Neutral
Matches scenario	Mostly if reinterpreted	Somewhat	Somewhat but poorly
Better			
Midrange			
Worse			

**Figure 2: Qualitative Technical Benchmarking of Videos**

Video specifications	Weight	Video 1	Video 2	Video 3	
Video quality	4	3	1	3	Better
User can move within it	3	3	1	1	Midrange
Duration	2	3	3	2	Worse
Shows negative emotions	5	2	2	1	
Matches scenario	2	2	2	1	
<b>Total Score</b>		<b>41</b>	<b>27</b>	<b>26</b>	

### **Figure 3: Quantitative Technical Benchmarking of Videos**

Video 1's quality could go up to HD, so it was given a score of 3 for its video quality and it was 360, which is why it was given a score of 3 for that specification as well. The clip we wanted from that video had the shortest duration, only around a minute, which is why it was given a score of 3. The character showed negative emotions like frustration and despondency, yet no overt aggression. However, those somber emotions can be reinterpreted as pity stemming from ableism, which is something that often happens to people who use wheelchairs [4]. For matching the scenario, it scored a 2 because it was not an interview, but the user could interpret it as one if we edited it and it was in a coffee shop.

Video 2's quality was the lowest, so it was given a score of 1 for its video quality. But it was not 360 or 180, so it was given a score of 1 for that specification. Video 2 was the longest, so it was given a score of 1. The character only presented neutral emotions, but the character's body language like looking at the phone or covering his mouth could be reinterpreted as ableism depending on how we edited it. It mostly matched the interview scenario, which is why it scored a 2.

Video 3's quality could also go up to HD, so it was given a score of 3 for its video quality. But it was not 360 or 180, so it was given a score of 1 for that specification. Video 3 was the second longest, so it was given a score of 2. The character only presented neutral emotions and was mostly still, so it was given a score of 1 because it would be hard to physically portray this character as overtly ableist. It mostly matched the interview scenario, but poorly because the background was not as professional looking, which is why it scored a 1.

As mentioned the previous deliverables, the storyline is based on the experience of Daniyah Manderson [4], so we wanted the user to experience the same outcome of rejection as her no matter what choices they made. This is because we believed that it was better to directly simulate a similar experience instead of creating alternate outcomes because we do not know how to properly depict these scenarios since we are not writers and we do not use wheelchairs. Our depictions may come off as inaccurate or ignorant and we also did not want to trivialize Manderson's experience. We wanted to show people that no matter what they did, the entire reason why they were rejected for the job was because of the interviewer's bias. Even if they were highly qualified or a perfect candidate, an interviewer's discrimination could easily prevent them from succeeding or earning a position because this experience is the entire point of our project.

### **Prototype 3 Test Plans, Results, and Analysis**

The table below includes what we needed to test Prototype 3 for. We did not have enough time to incorporate the "About the Project" and "How Can I Help?" buttons, so they were removed from the main menu, which was planned in case we would not meet the deadline. The character and scene descriptions were also implemented by directly putting them in the main menu instead of what was originally planned to save time. We also did not implement an exit button in the simulation but instead an exit mechanism, which just had the user just press the escape key on their keyboard, to save time as well.

**Table 1: Prototype 3 Test Plans**

Test ID	Test Objective	Prototype and Testing Description	Results and Their Usage	Estimated Test Duration
1	Testing if the simulation begins when the start button is chosen. Simulation only needs a start button and the video clip.	<p>Going into the simulation and seeing if it will run once the start button is chosen.</p> <p>We will see if the simulation starts. This is one test that will let us see if Subsystems B and D are properly integrated.</p>	<p>Seeing if simulation begins, and timing (in number of button presses) how long it takes to load.</p> <p>This is a test that can show us if there is something wrong with the code.</p>	<p>1 minute.</p> <p>Start: March 20th, 2022</p>
2	Testing if audio plays. The prototype does not have to be completely polished (ie. main menu and video needs to play but don't need to have subtitles).	<p>Playing through the entire simulation.</p> <p>This will show us if the audio is playing properly. This is one test that will let us see if Subsystems A, B, and C are properly integrated.</p>	<p>See if the audio is properly working (it plays in sync with the video).</p> <p>This is a test that can show us if we need to do another audio recording.</p>	<p>10 to 15 minutes.</p> <p>Start: March 20th, 2022</p>
3	Testing if the user can select options. The prototype does not have to be fully complete (ie. only the main	<p>Going into the simulation and navigating through the main menu.</p> <p>This will show us if the user can</p>	<p>See if the user can make a selection, and timing (in number of button presses) how long it takes to load. We can</p>	<p>10 to 15 minutes.</p> <p>Start: March 25th, 2022</p>

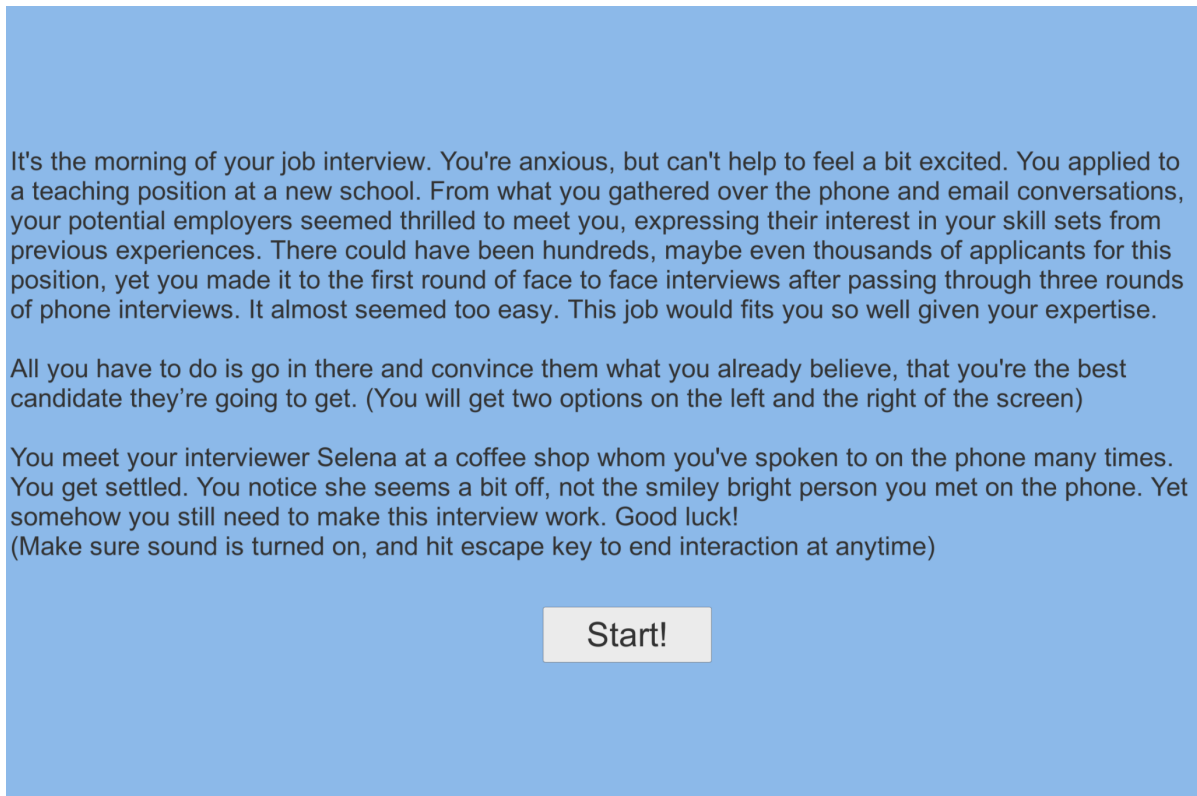


	<p>menu needs to be completed).</p>	<p>select options. This will test if Subsystem C and D is working.</p>	<p>also see how easy it is for user's to do this (ie. is this uncomfortable for people with limited hand motion).</p> <p>This is a test that can show us if there is something wrong with the code if the selection is not working.</p>	
4	<p>Testing to see if the user can exit out of the simulation at any time. The prototype does not have to be complete (ie. does not need to have subtitles).</p>	<p>Playing through the entire simulation.</p> <p>We will see if exiting at any time is possible. This will be the final test to see if Subsystems B, C, and D are properly integrated.</p>	<p>Seeing if exiting at any time is possible and timing (in number of button presses) how long it takes to load.</p> <p>This is a test that can show us if there is something wrong with the code.</p>	<p>10 to 15 minutes.</p> <p>Start: March 27th, 2022</p>
5	<p>Testing to see if subtitles work.</p>	<p>Going into the simulation and playing through only a couple of scenes.</p> <p>We will see if the correct subtitles for the dialogue shows up. This will test if Subsystem C</p>	<p>We will be timing (in seconds) how long it takes for the correct subtitles to load.</p> <p>This is a test that can show us if there is something wrong with the</p>	<p>5 to 10 minutes.</p> <p>Start: March 27th, 2022</p>

		is properly working.	code.	
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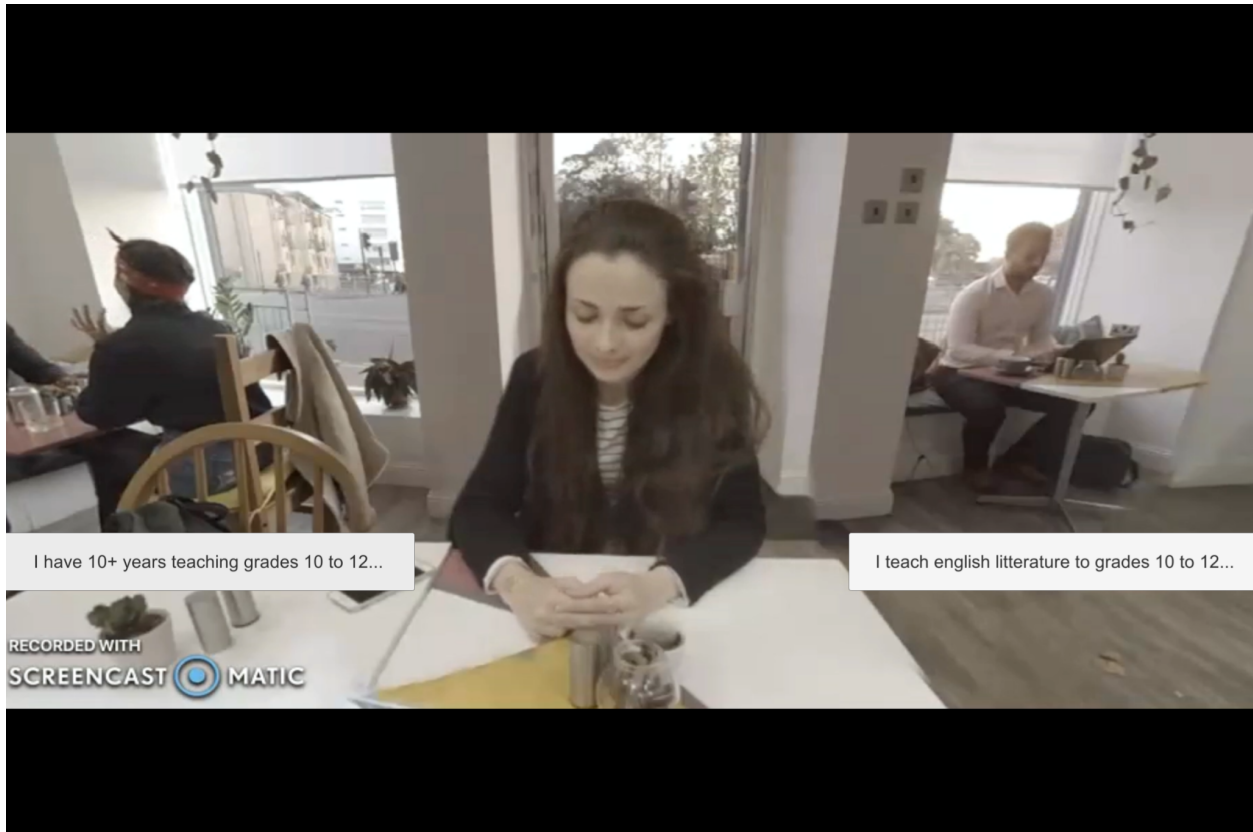
For Prototype 3, we selected a 360 degree VR video from YouTube [1], which portrayed an interview in a coffee shop, as this was the main scene for our narrative. We then created a script, which incorporated Daniyah Manderson’s experience [5] and an article interviewing people who use wheelchairs [4], for the audio and put our recording over the video.

The following images are from Prototype 3.



**Figure 4: Main Menu**

The image above is the main menu. It is the first thing the user will see when they open the simulation. It includes the description of the scenario and character, the explanation of how to leave the simulation at any time, and the start button.



**Figure 5: Inside the Simulation**

This is a screenshot from the simulation. The user will be able to pick between two options to respond to the interviewer.

The results for the tests from Table 1 are in the table below. As all of the tests in Table 1 are about the technical aspects of the simulation, Table 3 will concern the other qualities of our simulation through user feedback.

**Table 2: Test Results for Prototype 3**

Test ID	Results
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1	Yes. Starts immediately after one press of the start button.
2	Yes. Also the background noise edited in does not distract from the dub.
3	Yes. Takes one to two presses of the option.
4	Yes. It only takes one press of the escape key to exit the experience and 3-5 presses to close the simulation entirely.
5	Yes. Shows up immediately, and not off-time.

The video we had created was then sent out to family and friends to receive feedback about their emotions being felt while watching the video, if it was disorientating, if they felt immersed, and if they found the scenario realistic, etc. Our survey results are summarized in the table below.

**Table 3: Results from Prototype 3 survey**

<b>Main emotions felt during the experience</b>	<b>How strongly on average these emotions were felt</b>	<b>How immersed users felt during the experience</b>	<b>Was the audio and subtitles clear and easy to understand?</b>	<b>Suggestions for improvement</b>
→ Anger → Frustration → Sadness → Empathy	On a scale of 1 (very weak) to 10 (very strong):  Average: 7.9	On a scale of 1 (not immersed) to 10 (very immersed)  Average: 6.75	100% said yes for the subtitles  85.7% said yes for the audio	→ allow users response to affect the outcome of the story → Increase time the subtitles are shown on screen → have audio for when the user chooses their text dialogue

From our survey we concluded that our audio was easy to understand, our subtitles were clear to read and users felt emotions which we wanted to portray with our story. What we need to improve is the immersivity of the experience. The results we got for this category increased from our last prototype because we included our video, therefore the immersivity will continue to

improve once the user uses the VR headset and completely immerses themselves within the scene. A suggestion that we could implement is having audio when the user selects their response during the experience to allow the conversation to be more realistic. We also need to allow the user more time to select their response and keep the subtitles on screen for longer as some users said it went by too quickly to read. We will not allow users' responses to affect the outcome of our story as we want to depict to the users that no matter what they say or do, the interviewer's ideas about them will not change and that this is the reality of being discriminated against.

### Updated Design

The only thing that has changed for the design specifications is that having multiple perspectives is no longer a requirement. From the second client meeting, Professor Hanan said that it was okay if we only had one perspective because otherwise it would be too much work and we might not finish the project at all.

**Table 4: Design Specification for Functional, and Non-functional Requirements of the Solution**

Rank	Design Specification	Relation	Value	Units	Verification
<b>Functional</b>					
5	Tells a story (user experience)	=	yes	N/A	analysis
5	Conveys a message (user experience)	=	yes	N/A	test
4	Has to use virtual reality (technical)	=	yes	N/A	analysis
<b>Nonfunctional</b>					

5	Non-disorienting (user experience)	=	yes	N/A	test
4	Intuitive to navigate (user interface)	=	yes	N/A	test
4	Bug free and reliable (technical)	=	yes	N/A	test
2	Short duration (duration)	=	yes	min	test
2	Different topics covered	>	1	N/A	analysis
<b>Constraints</b>					
1	Cost	<	50	\$	analysis
4	Provided in English (technical)	=	yes	N/A	test
	Age	>	18	years	analysis

The Bill of Materials has also not changed from the last deliverable.

**Table 5: Bill of Materials**

<b>Item</b>	<b>Description</b>	<b>Unit</b>	<b>Quantity</b>	<b>Singular Item Cost (\$)</b>	<b>Total Cost (\$)</b>	<b>Link</b>
Unity text assets	Text assets like textMeshPro	unit	1	0 (free)	0 (free)	<a href="#">Link</a>
180 stereoscopic footage of scenario	Can be obtained by finding existing recordings	videos	3-4	0 (free)	0 (free)	YouTube videos will have different links
SteamVR plugin	A plugin to make Unity work with VR	unit	1	Free if we can borrow one	Free if we can borrow one	<a href="#">Link</a>

## Conclusion

After creating Prototype 3 and testing it, the user feedback indicates the conceptual functional requirements (like overall user review of the simulation, how empathetic it made the user, etc.) are meeting the criteria. We may decide to add some of the suggestions that the users gave to Prototype 3 before Design Day depending on if our Design Day presentation is finished early.

## Wrike Link

<https://www.wrike.com/workspace.htm?acc=4975842&wr=20#path=folder&id=829269946&vid=65913036>

## References

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