Project Deliverable G - Prototype II and Customer Feedback

GNG1103

Group F1.1

March 13th, 2022

Introduction

In the previous deliverable, the project team developed the first prototype for this project with the objective of creating the storyline of the experience, as well as generating a basic environment in Unity that the user can move around and interact with objects in. The progress made and feedback received from this prototype was presented to the client, professor, panel members, and other students in the class during the third client meeting, where the project team had the opportunity to get more feedback that will inform our future design choices and improve our concept.

The focus of this deliverable is to develop the second prototype, document the test plan, gather and analyze user feedback, and update the target specifications, detailed design, and BOM based on these results. The main objectives of this second prototype are to create a detailed task list of the experience, develop the user interface (UI) for the entirety of the experience, and implement tasks in Unity. Once all the work on this prototype was completed, feedback was again received from potential clients and users and a test plan for the final prototype was developed to prepare for the next two weeks of project work.

Feedback Received from Client

On March 7th, the project team had a chance to present the progress made in the first prototype and feedback received from potential users to the client, Hanan Anis, the panel members, the professor, and the other students in the class. From this, the project team was able to receive more feedback on the progress made in the prototyping process.

The client was pleased with the amount of work that was completed in the first prototype and the direction of the project thus far. The only suggestion that she gave was that we focus on getting one of the experiences done (ADHD or anxiety) first, as it is better to do a few things well with depth in the storyline rather than implement lots of things but with less depth. The project team recognizes this as a concern given the short timeline of the project and is handling this by fully developing one experience (ADHD) first before adding the second experience (anxiety). This way, if timing becomes a major concern, at least one experience will be developed fully. Moreover, since we are reusing many of the assets, animations, and characters in both experiences, once one is fully developed, adding the second will not take as much time as many things will be able to be reused with little to no changes. Overall, the client meeting was very helpful in guiding the project team as we continue the prototyping portion of the project.

Prototype

The primary objectives of this prototype are to create a detailed task list of the experience, develop the user interface (UI), and implement tasks in Unity. Therefore, the critical components of this prototype can be split into 5 general areas: the unity prototype, sample diagrams for animations in Unity, the task list, the UI, and the content of the reflection questions, disclaimer, and additional resources.

Unity Prototype

The VR experience continues to be developed within Unity. For this prototype, several new features have been added. Environmental interactions and animations, such as the ability to open doors, have

been added to the experience's primary environments. Players can either push on the door, or press either of the hand controllers' primary button, and doors in the environment will open, expanding the virtual world.

Figure 1: Player Opening Door

Grab interaction capability has been added to all objects within the environments which realistically should be interactable. The primary game manager has also begun development, as has the UI manager, and the scene manager. These three features are responsible for controlling the flow of the experience and are well under way. The task assignment system that is the core of the experience is in a working state, with the capability to assign tasks, perform them, and register them as complete.

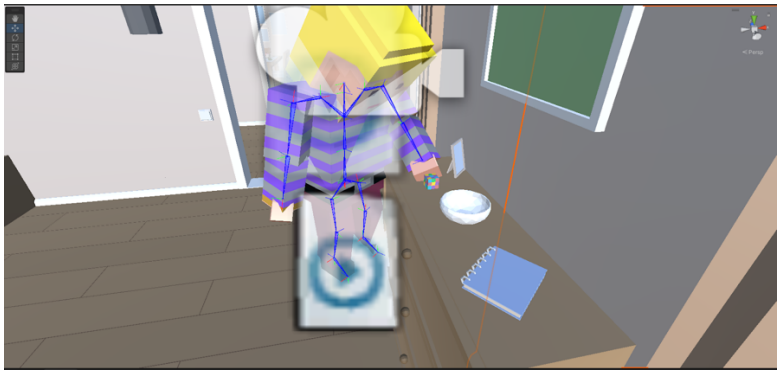


Figure 2: Player Tasked with Picking up Rubik's Cube

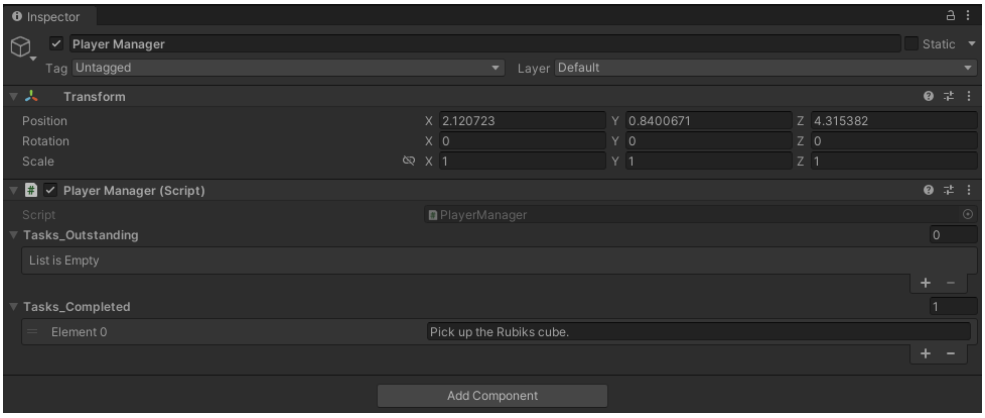
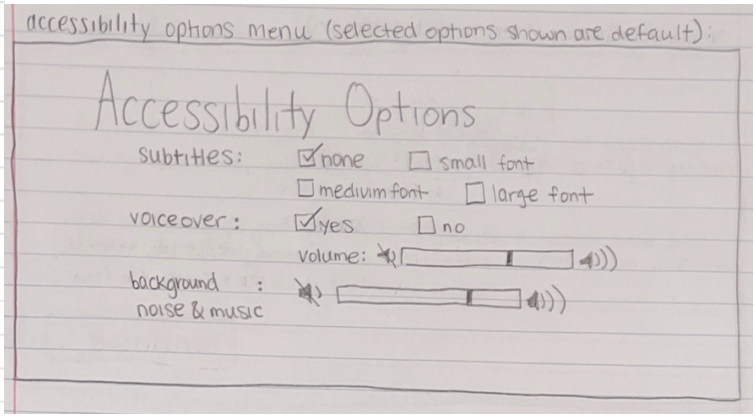


Figure 3: Player Object Tracking Tasks Assigned to it

Finally, UI elements, such as the players' Heads Up Display (HUD), and the character select menu are in their programming phase of development and should be graphical within the next day.

UI Design

To make the process of adding the user interface in Unity more efficient, the project team worked to develop sketches of what we plan for each module of the experience to look like. This includes the main menu, accessibility options, character selection, disclaimer, introduction, task list, reflection, resources, and end screens.



Figures 4 & 5: Sketches of the Planned UI for the Main Menu and Accessibility Options Screens

The experience will begin with the main menu screen, as shown in figure 4. If the user selects the accessibility options button, it will take them to the accessibility options screen, as shown in figure 5. The selected options drawn in the rough sketch will be the default options. This way, if users wish to have subtitles in a small, medium, or large sized font, or if they wish to change the volume of the voiceover or background noises, they can do so before starting the experience. Once the user presses begin, the character selection screen will be shown, as sketched in figure 6 below. Although we are only planning the ADHD experience at this time, in the future, this is where users will choose which character (and thus, invisible disability) they will experience. Once the user opts to enter the experience, a disclaimer will appear (discussed in the next section of this report).

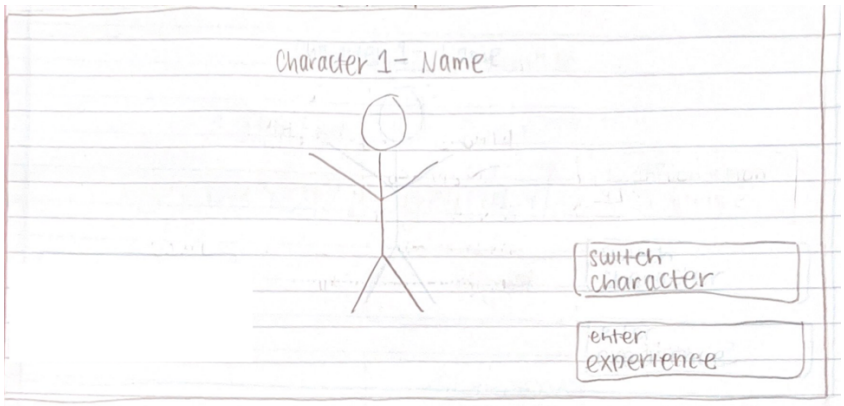


Figure 6: Sketch of the Planned UI for the Character Selection Screen

The user will then be informed of the objective of the introductory element of the experience (getting ready for the workday), and that it is completely optional and can be skipped by going to the front door.

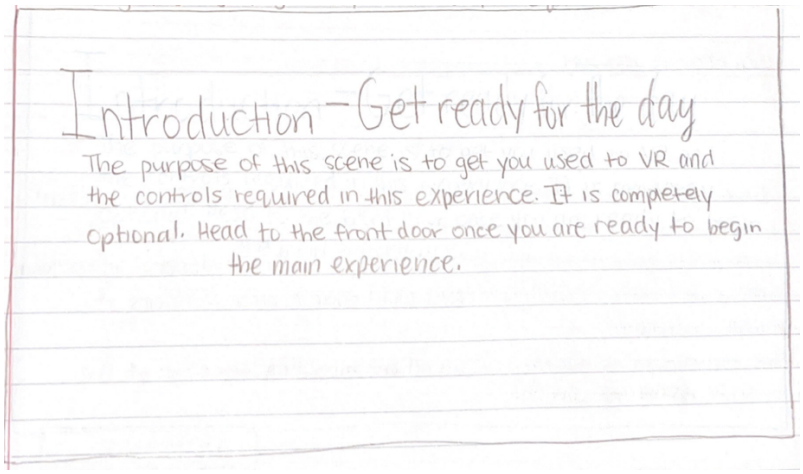
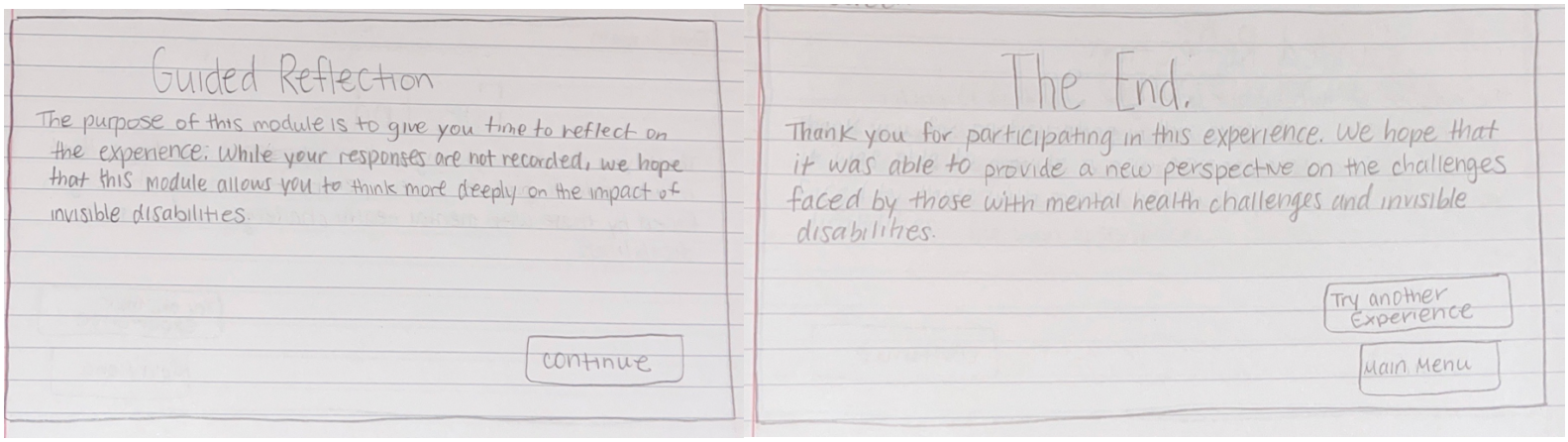


Figure 7: Sketch of the Planned Message Before the Introductory Scene Begins

Once the main experience is over, the reflection element of the experience begins. The user will be informed of this with a message like the one for the introductory scene, shown in figure 7, and then a series of guided reflection questions will appear. Examples of the guided reflection questions are provided in the following section of the report. Then, the end screen will be shown, allowing for users to easily exit the experience, go to the main menu, or play through a different experience by returning to the character selection screen.



Figures 8 & 9: Sketches of the Planned UI for the Guided Reflection and End Screens

Reflection Questions, Disclaimer, and Additional Resources

Since it was emphasized by the client in the first client meeting, one of our main design concepts is to give the user the opportunity to reflect at the end of the experience. Therefore, in this prototype a list of potential reflection questions was created. The sample reflection questions that were generated are as follows:

- "Which of the following invisibilities do you think you were experiencing?" Options: Anxiety, depression, ADHD, OCD. Once the user answers, the text that appears will say "You were following the life of someone with ADHD"

- “You took _ minutes and _ seconds to complete the experience. During this time, you completed _ tasks. How different do you think your experience would have been without the constant distractions?”
- “Were you able to focus on reading the report?”
- “Did some tasks just feel like distractions in themselves?”
- “Did it really feel like the whole day had gone by or did the time passing sneak up on you?”
- “How did it feel when you had to check in with the supervisor?”
- “How could you be more supportive of those who have ADHD?”

Moreover, the disclaimer and additional resource messages were created. The disclaimer message will be shown after “begin” is pressed on the main menu, and the additional resources message will be shown after the guided reflection questions. The resources will include University of Ottawa resources, mental health crisis lines, and ADHD-specific resources.

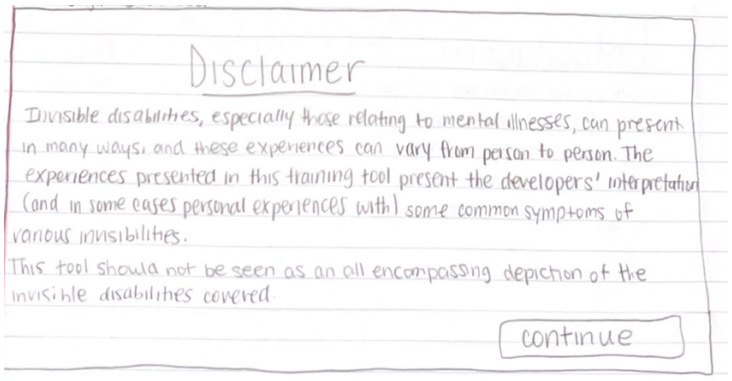


Figure 10: Sketch of the Planned UI for the Disclaimer Module

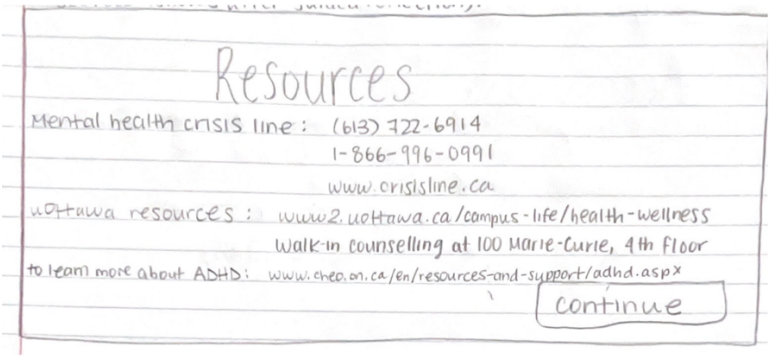


Figure 11: Sketch of the Planned UI for the Resources Module

Detailed Task List

The following diagram is an updated and revised version of our original storyline diagram which was created based on the original design concepts and design specifications. This diagram focused purely on the tasks for the ADHD experience since that is what we decided to focus on for the rest of our project. The main framework and organization of the rest of our experience have not changed other than the added details indicated above so they are excluded from this diagram.

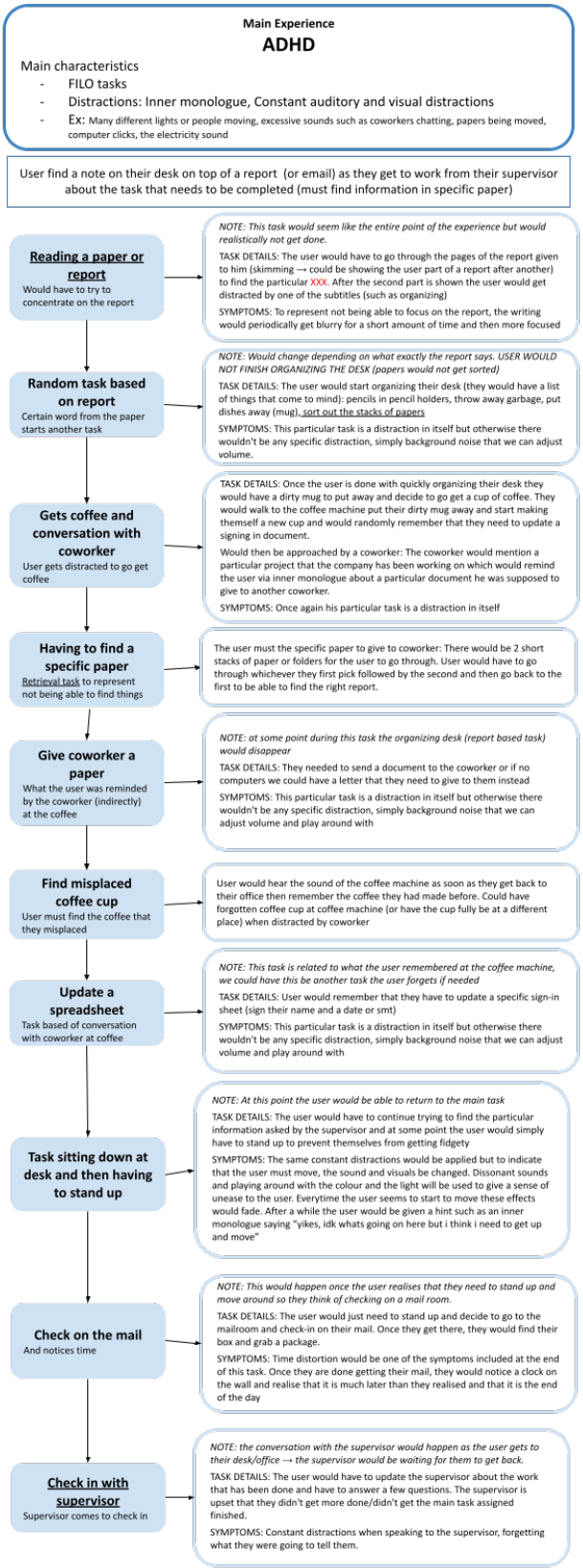


Figure 12: Detailed Task Diagram

Sample Diagrams for Animations in Unity

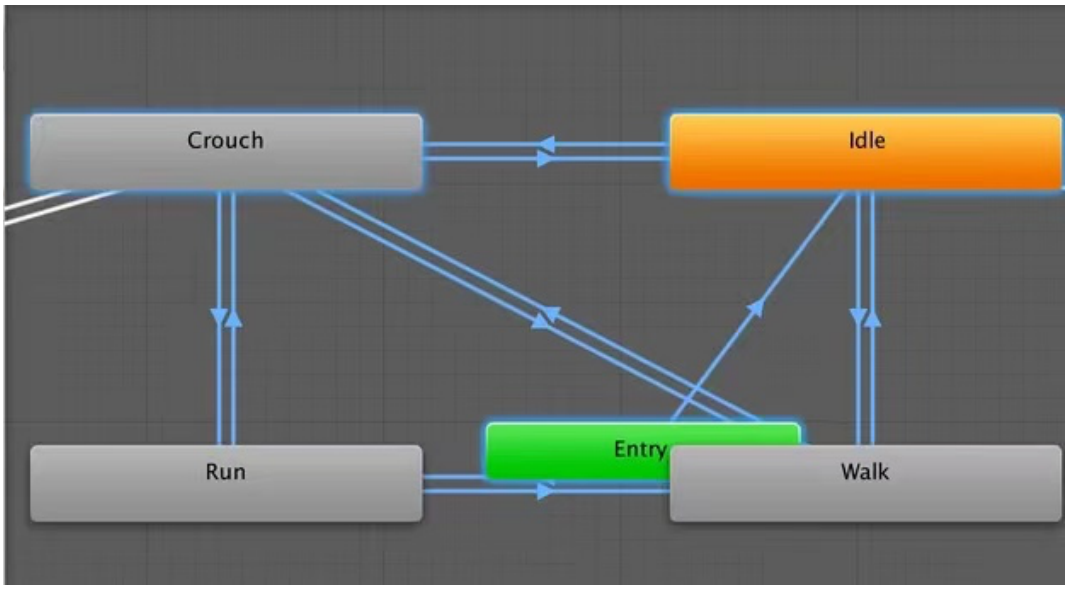


Diagram 1: Manual Animator Controller

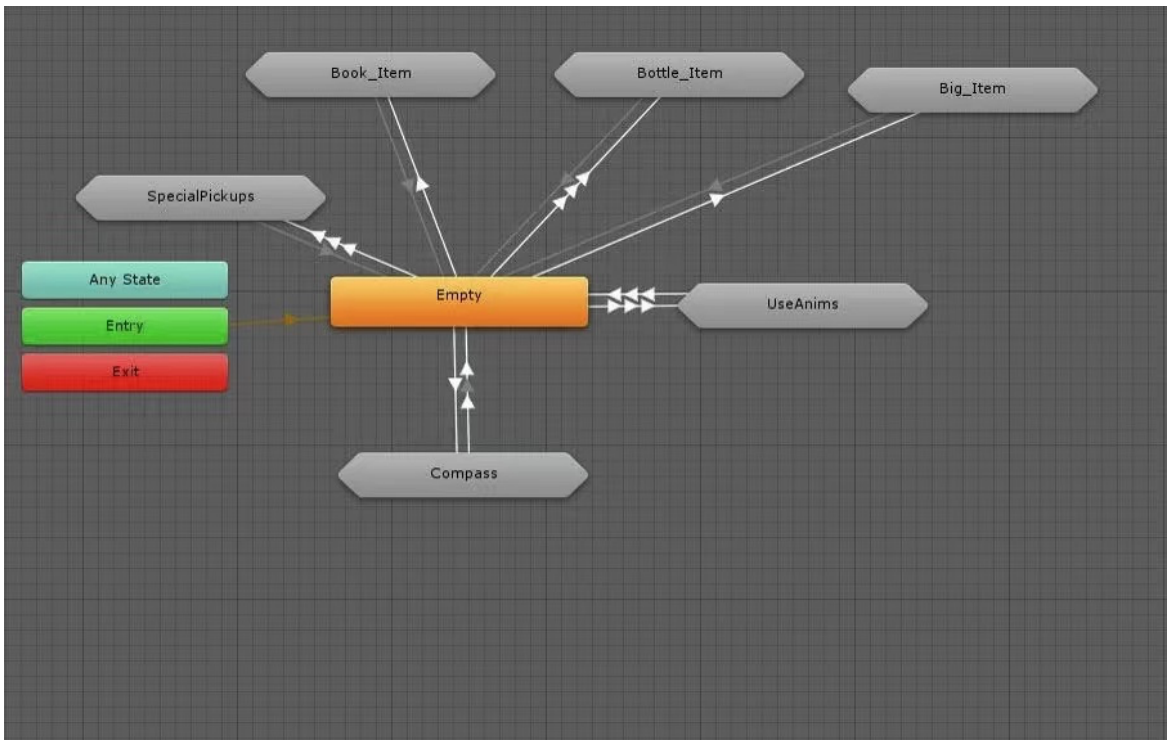


Diagram 2: Neat and Tidy Animator

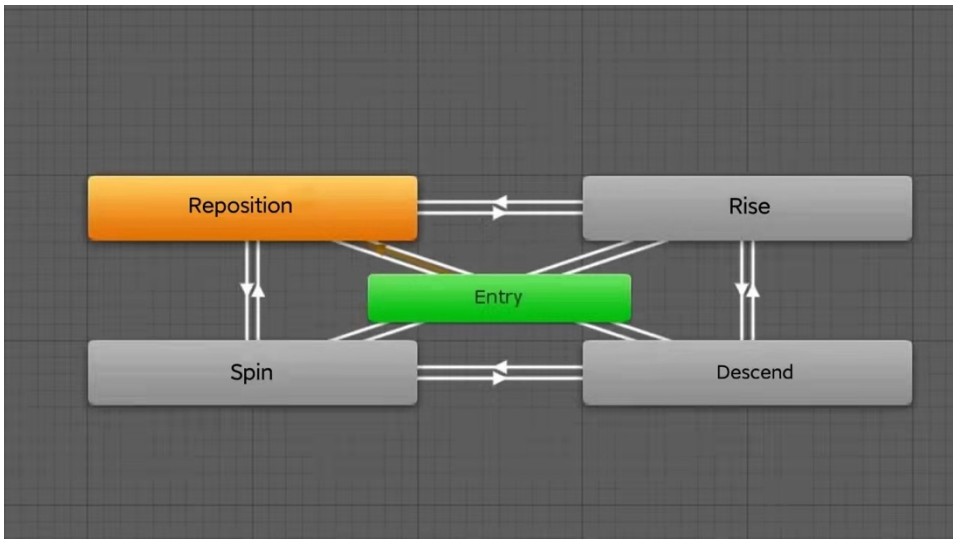


Diagram 3: Animation for Dirty Cup

User Feedback

Since the amount of feedback required for this prototype is more limited than for the first prototype, a survey for potential users and clients was not conducted. The plan is for another survey to be done for the third and final prototype since the script and the unity elements of the experience will be more complete.

Feedback was gathered from potential users on the effectiveness of the disclaimer, reflection, and resource modules of the experience. The feedback was positive, signaling to the project team that these elements of the experience will be effective and are ready to be implemented in Unity.

Justification of Prototype

During our first analytical prototype we created a baseline for all the tasks that would be included as well as ideas for the storyline and had a very general idea of how our introduction and conclusion would go. After receiving feedback on our first prototype, we changed the order of certain tasks and created more detailed tasks and distractions for our ADHD experience so that they can properly be implemented in unity during our last prototype. To give us a more specific idea of how and what we would include in our introduction and conclusion sections, UI sketches were also created during this prototype. For the next prototype, we will be able to focus a lot more on the unity parts of our project because we've completed most of the analytical framework.

We were also able to develop the framework and the first environment of the experience as a first physical prototype and have added the possibility for the user to interact with many objects in our first environment. We have also been working on the ability to give tasks to the user and have developed the base code for the tasks that the user will complete during the experience. The experience can also now detect once a certain task has been completed, which will make adding the rest of the tasks much easier.

Overall, during this prototype, we have improved and added details to our storyline as well as the beginning and end of our experience and significantly improved and added components to our physical unity prototype.

Prototype 2 Test Plan and Results

After tests were performed and potential user and client feedback was received, the test plan for this prototype from the last deliverable was modified to reflect the true objectives and results of this prototype.

Table 1: Test Plan for Prototype 2

Test ID	***Test Objective (Why)***	***Description of Prototype used and of Basic Test Method (What)***	***Description of Results to be Recorded and how these results will be used (How)***	***Estimated Test duration and planned start date (When)***	***Test Results***
1	**Reflection:** One of our main design concepts is to give the user the opportunity to reflect at the end of the experience. This was also emphasized by the client. This guided reflection will be an important part of eliciting empathy in the experience.	A list of guided reflection questions will be created.	Feedback was gathered from potential users and clients on the proposed guiding reflection questions and their effectiveness.	This task was done independently of the Unity tasks. It required the creation of reflection questions and gathering feedback from potential users and clients. It was started on March 7th.	A list of guided reflection questions for ADHD was created and the user feedback was positive.
2	**Object Interactivity:** The purpose of this test would be to see if the user can do different things and interact with objects.	Low fidelity physical and focused prototype required to test the basic function of the environment	We will record the different objects that were able to be interacted with and how they affected the following actions. We will make use of the ending statistics page to help us track the decision and to see how they affect the rest of the experience.	This test requires some of the elements to be added to the base VR environment. This test will need to be completed earlier on in the process as it is required to create the rest of the experience. It was started on March 7th.	In the introductory scene of the experience, the user can interact with different objects such as doors, books, and plates.
3	**Task implementation**: Another main concept of our product is that the user can interact with objects to complete tasks. The	Low fidelity physical and focused prototype required to test the basic function	The extent to which the user can interact with objects to complete tasks in the world will be recorded.	This task was started at the beginning of the week since the user could already move around the world in VR in the first prototype.	The game manager successfully assigns tasks to the player on Unity.

	tasks would then affect the results in the statistics at the end of the experience.	of the environment.			
4	**Completion of the Introductory Scene:** Since many people are not familiar with VR controls, we wanted to include an introductory element of our experience where the user can test using objects and moving around.	Low fidelity physical and focused prototype required to test the basic function of the environment.	The extent to which the user can complete the introductory scene will be recorded.	This task will be completed after task implementation and object interactivity.	Although it is not complete, most interactions in the introductory scene have been implemented.
5	**Empathy - Inner monologue:** How does it make the user (without the disability) feel? Do those feelings match the feelings of people with ADHD and anxiety? Does it generate empathy from the user? One of the main client's needs was to generate empathy from the user in this training tool, to accomplish this, we need to assure that the user feels the same way people with the disability do.	Focused analytical prototype to follow the storyline and tasks that the user would face.	We will gather feedback from potential users with and without ADHD and Anxiety to gauge the accuracy of the script to real experiences of the invisible disabilities and the level of empathy elicitation.	This will be done independently from the VR environment and involves creating a script and gathering feedback from potential users and clients.	After the first client meeting, the project team was advised to focus on only one invisible disability. Since we chose to focus more on ADHD, the inner monologue was not completed for this prototype since it was more important for the anxiety experience. Instead, we will work on the script of the experience for the next prototype.
6	**Disclaimer & Resources messages:** It is important for us to ensure that users know that our experience may not cover all aspects and symptoms of the invisible disabilities and that there are additional resources they can access if needed.	A focused analytical prototype in the form of a paragraph at the beginning and end of each experience.	Feedback was gathered from potential users and clients to gauge the effectiveness of our disclaimer messages and the resources provided after the experience.	This was be done independently from the VR environment and involves creating the disclaimer messages and gathering feedback from potential users and clients. It was started on March 7th.	Disclaimer and resource messages were created, and the feedback from potential users and clients was positive.

7	**Detailed Task List:** Since the project team is now focusing on the ADHD experience, it is important to have a detailed task list with all the planned symptoms and distractions, so we know if it is accurately to ADHD and what to implement in the Unity beforehand.	A focused analytical prototype in the form of a diagram.	Once created, this detailed task list will be used to create the script of the experience.	This task was done independently of the Unity tasks. It required the creation of a diagram, research on the symptoms of ADHD, and taking inspiration from the storyline created in the last prototype. It was started right after the client meeting on March 7th.	The diagram was created, and the script based on it will be written for the next prototype.

User Feedback

Since the amount of feedback required for this prototype is more limited than for the first prototype, a survey for potential users and clients was not conducted. The plan is for another survey to be done for the third and final prototype since the script and the unity elements of the experience will be more complete.

Feedback was gathered from potential users on the effectiveness of the disclaimer, reflection, and resource modules of the experience. The feedback was positive, signaling to the project team that these elements of the experience will be effective and are ready to be implemented in Unity.

Test Plan for Prototype 3

Based on the results and user feedback from the second prototype, a test plan for the third prototype was generated.

Table 2: Test Plan for Prototype 3

Test ID	Test Objective (Why?)	Description of Prototype used and of Basic Test Method (What?)	Description of Results to be Recorded and how these results will be used (How?)	Estimated Test Duration and Planned Start Date (When?)
1	**Measure the level of performance and empathy elicitation:** To gauge the success of our prototype, the user's subjective and objective feelings and behavior states will be recorded. To ensure the product is effective in eliciting	A high-fidelity prototype will be created and tested with potential users and clients.	We will find potential users to test the entirety of our VR experience and provide feedback via a questionnaire like the one sent out for the first prototype.	This test will be conducted after the main experience, all the UI, and the voiceovers are implemented in Unity. It will be the last thing needed to be done for this prototype. Estimated start date: March 20th

	empathy in users, we will need to select appropriate measurement indicators and optimize products in each measurement.			
2	**Completion of the Main Experience:** This is the most important piece of the prototype. It will focus on putting the user in the shoes of someone who has ADHD.	A high-fidelity prototype will be created and tested with potential users and clients.	We will find potential users to test this module of the VR experience and provide feedback via a questionnaire like the one sent out for the first prototype.	After the introductory scene is complete, work will begin on the main experience. Estimated start date: March 15th
3	**Addition of all User Interfaces:** All the user interfaces outlined and sketched in prototype 2 will be implemented in Unity. This will give users access to modules such as accessibility options, guided reflection questions, and additional resources if they need.	A high-fidelity prototype will be created and tested with potential users and clients.	We will find potential users to test the effectiveness and ease-of-use of the UI and provide feedback via a questionnaire like the one sent out for the first prototype.	This test will be conducted at the same time as test ID 1, but the addition of all UI can be implemented as soon as possible (it does not require the main experience to be implemented). Estimated start date: March 14th
4	**Empathy - Inner monologue:** How does it make the user (without the disability) feel? Do those feelings match the feelings of people with ADHD? Does it generate empathy from the user? One of the main client's needs was to generate empathy from the user in this training tool, to accomplish this, we need to assure that the user feels the same way people with the disability do.	A focused analytical prototype to follow the storyline and tasks that the user would face will be created.	We will gather feedback from potential users with and without ADHD to gauge the accuracy of the script to real experiences of the invisible disabilities and the level of empathy elicitation.	This will be done independently from the VR environment and involves creating a script and gathering feedback from potential users and clients. Estimated Start Date: March 14th
5	**Voice Recording:** For the experience to feel as realistic and immersive as possible, voiced lines for all characters will be provided.	Focused analytical prototype that will involve voicing the inner monologue of the user, and the dialogue from the user, coworkers(s), and boss in the main experience.	We will gather feedback from potential users and clients to gauge the effectiveness of the voice acting and the level of empathy elicitation.	This will be done independently from the VR environment and voicing the lines created in the script (test ID 4) and gathering feedback from potential users and clients.

				Estimated Start Date: March 18th
6	**Functional Failures:** Functional failures contain testing all functions of the experience and verifying specific functions in extreme cases. This will help us improve the overall performance of the system and ensure that users do not experience any software glitches during use.	Some special conditions will be tested in Unity to test the operating conditions of the system and ensure that glitches or error messages do not appear for potential users or clients during use.	These results will be recorded by the project team exhaustively testing the product in Unity to see if any errors occur that can be fixed before the project is shown on design day.	This will be done after all planned features have been implemented in Unity. Planned start date: March 21st

Conclusion

The objective of this prototype was to create a detailed task list of the experience, develop the user interface (UI) for the entirety of the experience, and implement tasks for the introduction scene in Unity. The second prototype was created by implementing object interactivity, tasks, and completing the introductory scene of the experience in Unity, creating a diagram showing all the tasks in the main experience and how they work to show ADHD, and having a clear layout of the UI planned. Tests were performed to check for interactivity in Unity, and feedback from potential users and clients was gathered on the guided reflection questions, disclaimer, and resource modules. The project team was able to use this feedback to develop our next prototype test plan and improve the overall quality of our product.

Appendices

Appendix A - Target Specifications (No update since Deliverable F)

Table 3: Target Specifications

Design Specification	Relation (=, < or >)	Ideal Value	Acceptable Value	Units	Verification Method
Functional Requirements					
Level of Interactivity	=	Significant amount of meaningful user interaction	Fair amount of meaningful user interaction	N/A	Analysis
Relatability to marginalized groups	=	Experience meaningfully addresses challenges universally faced by all marginalized groups	Experience meaningfully addresses challenges faced by one marginalized group	N/A	Analysis
Effectiveness of fostering diversity and inclusion	<	User leaves the experience with a thorough understanding and respect for the challenges experienced by	User leaves the experience with a respect for the challenges faced by marginalized groups	N/A	Analysis

		marginalized groups and can empathize with their struggles			
Effectiveness of empathy elicitation	<	Users leave the experience able to identify many of the challenges faced by marginalized groups, meet those challenges with empathy, and are committed to positive change	Users leave the experience able to identify several of the challenges faced by marginalized groups and meet those challenges with empathy	N/A	Analysis
Change in POV	<	Yes	Yes	N/A	Test
Conveyance of otherness	>	User feels that they are different, feels marginalized as a result, and experiences significant challenges due to their otherness	User recognizes they are different and experiences minor challenges due to their otherness	N/A	Analysis
Opportunities for reflection	=	Experience is designed with thoughtful reflection in mind, and user is prompted to reflect multiple times within the experience	User is prompted to reflect at the end of the experience	N/A	Analysis
Level of immersion	=	User feels completely immersed in the virtual world and their new identity	User feels immersed in the virtual world, and takes to their newly assigned identity; user is keenly aware of the limitations of their virtual world	N/A	Test
Ease of use	<	Experience controls are intuitive, and users require no facilitator training to complete the experience. Within a few seconds the user is acclimated to the unfamiliar environment and its controls. Nausea is not induced in users.	Experience controls are unintuitive, but users only require minimal training from the facilitator to complete the experience. Users are acclimated to the unfamiliar environment in less than 5 minutes. Nausea is induced in those new to VR.	N/A	Test
Level of user engagement	>	Experience captures the attention and focus of the users and never loses it	Experience captures the attention of the user, but user's attention and focus wanders occasionally.	N/A	Estimate, check
Accessibility	>	100% Accessible	Accessible to most	N/A	Test
Constraints					
Cost	=	No more than $50	$70-$80	$CAD	Estimate, check
Incorporation of VR	=	Yes	Yes	N/A	Final check
Non-Functional Requirements					
Ease of deployment	**>**	Users can easily access the device	Most users can easily access the device	N/A	Test

Appendix B - BOM (No update since Deliverable F)

Table 4: Bill of Materials

Name	Description	Cost	Link
Low Poly Cartoon House Interiors	Low poly house-themed asset pack including a demo house scene	$9.99	https://assetstore.unity.com/packages/3d/props/interior/low-poly-cartoon-house-interiors-167425
POLYGON Office	Low poly office-themed asset pack including character models, objects, and office demo scene	$39.99	https://assetstore.unity.com/packages/3d/props/interior/polygon-office-low-poly-3d-art-by-synty-159492
Universal Sound Effects	2305 general purpose sound effects and ambient environment noises	$7.00	https://assetstore.unity.com/packages/audio/sound-fx/universal-sound-effects-206856
		Total Cost	$56.98

Appendix C - Task Plan and Wrike Snapshot

The base task plan for the third prototype deliverable is going to be like the first two prototypes because of the nature of the deliverable. The following is a written breakdown of for the first the plan for our next deliverable (Prototype III). The task plans for the other deliverables have also been updated on Wrike as the following snapshot demonstrates:

Table 5: Task plan for Deliverable H

Main Task	Details and subtask	Main Assignee
Physical prototype	During this last prototype we will be attempting to add all the tasks outlined in our storyboard diagram into our VR experience in Unity.	Anthony
Analytical prototype	Now that almost all the analytical parts of our prototype are completed, the only part that is left that is separate from the physical implementations of the tasks in unity is recording things such as the script and what will be said by the different characters in the experience as well as the different distraction sounds.	Nicole
Test plan	Based on the prototype test plan outlined in this prototype, we will conduct the test and document the analysis and the results of each test we complete.	Yuteng
Feedback and comments	We will gather feedback in a similar way that we did for the first prototype as it seemed to be quite effective in getting comments. However, in addition to that, we will be trying to get people to really	Honor

	try out the VR experience that we have created. We will then use the feedback to improve our prototype.	
Updated important documents	We will keep updating important documents such as the target specifications, detailed design, and Bill of materials throughout our experience as needed. Any changes made will be included in the appendices of the deliverables.	Yuteng
Presentation	Given that our presentation is on March 21st, we will also be working towards creating the presentation PowerPoint as well as figuring out what exactly needs to be added into our presentation and what the best way of presenting it will be.	Nicole
Justification of prototype	We will make sure to include a justification and reasoning of this prototype. We will include the results of our previous prototypes and how this prototype continues to develop our solution.	Honor

Wrike Snapshot link:

https://www.wrike.com/frontend/ganttchart/index.html?snapshotId=a3rJbmDYUFkSjXPAt8Uizt9obbEnL3Ux%7CIE2DSNZVHA2DELSTGIYA