Project Deliverable F - Prototype I and Customer Feedback

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Introduction

In the previous deliverable, the project team developed a detailed design drawing, project plan, prototyping test plan, bill of materials (BOM), and equipment list with the goal of creating a task completion experience that will educating users of the challenges faced by people with invisible disabilities, specifically ADHD and Anxiety. This solution was pitched to the client, professor, and TAs in the second client meeting, where the project team had the opportunity to get initial feedback to inform future design choices and improve our concept.

The focus of this deliverable is to develop the first prototype, document the test plan, gather and analyze user feedback, and update the target specifications, detailed design, and BOM based on these results. For this first prototype, the project team chose to focus on the story and structure of the experience, as well as create a basic environment in Unity that users can move around and interact with objects in. Once all the work on the first prototype has been completed, feedback was received from potential clients and users and a test plan for the second prototype will be developed to prepare for the next week of project work.

Feedback Received from Client

On February 18th, the project team had a chance to meet with the client, Hanan Anis, to present the chosen concept, the task completion invisible disabilities experience, a detailed design drawing, receive feedback, and ask further questions about the project. The client liked that we picked invisible disabilities that are common among the general population, and the concept we presented. She reminded us to not make assumptions about the experiences that people with ADHD and GAD experience and urged us to get feedback from both people who suffer from these invisible disabilities and people who do not to make sure that it is accurate and that users will emphasize with our virtual experience. As for deployability of the final product, the client stated that it is up to the project team to decide whether we want the product to be easily accessible through smartphones and "Google Cardboard-like" devices or more high-end VR headsets available at the University such as the HTC Vive and the Oculus Rift. At this time, we believe that programming with the latter type of headsets in mind will allow for a more interactive and immersive experience so that is what we are choosing to proceed with. Some other feedback received at the meeting was that the reflection elements should be "rightanswer resistant", meaning that the users should not just choose the "right" answers in reflection elements, which is something that is common in EDI training modules. The project team is trying to prevent this by making the reflection elements less black-and-white, and more up to the user at the end of the experience with guiding questions and statistics. Overall, the client meeting was very helpful in guiding the project team as we begin the prototyping element of the project.

Prototype

The objective of this prototype was to create the storyline of the experience, as well as create a basic environment in Unity that the user can move around and interact with objects in. Therefore, the critical

components of this prototype can be split into four areas: interactivity, reflection of the invisible disability, empathy, and generalization of the invisible disability.

Unity Prototype

The purpose of this technical prototype of the experience was to develop the framework upon which all future work will be built. This primarily included establishing the fundamentals of user interaction within the virtual environment, as well as setting up the VR hardware integration layers. The first environment of the experience was also created.



Figure 1: Screen Capture from the Introduction Scene

A "VR Rig" game object was developed. The VR Rig acts as the interaction layer between the position, movements, and inputs of the VR hardware (headset, controllers) and the virtual environment. It contains and controls the main camera of the experience through which users will see the world, as well as the left and right controllers through which the user will interact with the world. The position and orientation of the main camera has been bound to those of the VR headset, allowing the user to see the virtual world as if through their own eyes. The VR Rig also handles the inputs from the left and right controllers and facilitates interaction with in-game objects. Users can virtually grab, pick up, and throw objects by moving their hands close to objects and pressing the grab button on their controllers.



Figure 2: Headset and Controllers bound to Character Model

Character models have been bound to the movements of the headset and controllers with constraints on their skeletons that track the movements of the user's headset and controllers, to the head, arms, hands, and bodies of the character models. As a result, the player's character model will move with them, further adding to the level of immersivity of the experience. Currently, this feature is functional, but still requires some tweaking to make the movements of the character models more natural.



Figure 3: Headset and Controller Movements Animating Character Model Skeleton

Player locomotion has also been implemented. With VR, teleportation is favored over traditional continuous movement as the latter typically induces motion sickness in users. Given the accessibility and ease of use design criteria, the decision was made to use teleportation. Teleportation is achieved through ray-interactors, whereby the user simply points their hand to the location they would like to go and press a button to teleport. The ray is visible to the user to make the process easier, though only when the secondary button on the controller is pressed so that the rays do not get in the way when they are not needed.



Figure 4: Player Teleportation using Ray Casting

The Task Storyline

The project team has also created a more focused analytical prototype that focuses on the tasks that we will be implementing in the experience. This prototype has been made in the form of a diagram.

Looking in the mini- Disclimer risks that are driven displace if exercises	or if we have time to add aimer g # skabilty and how the base of base the second base
Getting u At home - Small task that they co Exclusion code Exclusion code The user goes to the front door o experience/ when they are com - Codel maybe have a confirm message	Issed to VR suid do around the house the' they used to complete main task like paking things up and once they are ready to get into the orrable with the VR space just in case they work to keep exploring
Main Experience Anxiety Main characteristics - Inner monologue: constant overthinking of the tasks at hand more specific	Main Experience ADHD Main characteristics - FILO tasks - Distractions: Inner monologue, Constant auditory and visual distractions
Speaking to supervisor Focus on social arxiety Overwhelming inner monologue with constant over thinking about what the supervisor is single.	Having to find a specific paper <u>Retrieval task</u> to represent not being able to find things have norm approving or deak dube thas that year with the with that needs to be completed (removes initial interaction with supervisor)
Procrastination of tasks Shorter tasks are given periodically as a way of procrastinating (perfections): as a way to keep busy and avoid the important more stressful task - Clean/organize desk	Reading a paper or resport Would have to try to concentrate on the report Contract divisions and dire tasks illuments time and and exist to be the State Would and of the Residual Have and the time which tasks when the enter point of the time are to find the the time have news to see the because of the distances and the time
 Sort through documents Create list of things that need to be done Inter monologie, ming yos Stalv The sur-would have to select task that the sejerizor mentioned (seasibly select from a long bull) to create the list 	Random task based on report Certain word from the paper starts another task This task would depend on the report tapic Gets coffee User would hear the sound of coffee machine
Pick what to put in the presentation Difficulty making decisions sorting through thermitian and the second second second second second trade decision and to include. Make make them reflexible decision even they have made there decision for the first the user rould not be also to make decisions and world just for the first the user rould not be also to make decisions and world just the testing.	Based on the distriction and and the added as a task would not into a constant and the minic conversation. Update a spreadsheet Task based of conversation with convolver at coffee the spread of the spread of the spread of the spread of the other spread of the spread of the spread of the spread of the other spread of the spread of the spread of the spread of the other spread of the spread
Placing things on the poster Hands on task — hands shaking He user would drep certain things ere to be able to place things easily and not be able to complete task. Possibly the controller vibrating	Find misplaced coffee cup User must find the coffee that they misplaced User would be thinky (new monologie) and want to drok and then remember the criftse. Cald have brighters caffee cal a coffee machine (or have the cup fully be at a different place) when distracted by coverier
Checks on car They hear a car horn and feel that they need to check they need to check on their car to make sure its locked or they just re lock their are cat they're samed bey forget to lock it. Use of nameled voice over to anglify the eventlenking spect.	Give Coworker as paper What the coworker asked user to do at the coffee machine (NDIRECTLY) The needed to send advorment to the coworker of it no computers we could have a later that they sere do give to them instead MARDOW MAR FROM MARK WOULD DIAMPEAR AT SOME FORM DURING THIS TAXE.
Asking coworker Asking opinions of other for reassurance and asking them to make decision the user wold as another coworker what they think and would ask them to make a decisions on that they durit need to make it themedit. Coworker would say they opinion	Task sitting down at desk GO BACK TO THE MAIN TASK OF READING AND TRYING TO FIND THE IMPORTANT INFORMATION
Go back to office and look at the poster Make changes her would examine the poster and change what the convolter said	Stand up User "gets fidgety" so has to move The user would simply how to stand up after having the sound and visuals be messed. Dissenant sounds
Second guessing placement of things on the board The user would be over thinking (represented is inner monologies) about the way it looks and would then redo the placement. It has to be perfect. Overthinking and chaining effect	Check on the mail They think of checking the mail after realising they need to stand up. This would then need to be the last place before they notice the time.
very pessivilistic and constantly thinking of everything (Dutterfly effect) "What if who is describ life if 2 What if it's so bad they fee me? What if i and find another job? Now will be able to pay for anything? Now will get food?"	Notices time Time distortion Looks at tops of soften the till Sign and not like 1 pm This would need to happen when the counsiderum his like 10 seconds. And realist the that they haven't completed the main task them tries to go back really quickly
Check in with supervises User has to show the supervise their work. Note the supervise their that has been det from emotioning a work if has has been det to the the the supervise in carding. The memory and the bad with if information and memory and the supervise with the second bad was a bad to supervise to support	Check in with supervisor Supervisor comes to check in Supervisor system that they shift are not denailably set that much shift are that and supervisor states that they shift are states from consider set that are also also also also also also also also
Refle	ection

Figure 5: Detailed design of tasks diagram

This diagram was created based on our original design, concepts, and design specifications. The beginning of the experience would include the selection of the character and would ideally allow the user to toggle accessibility options and would be followed by a disclaimer. Following that, the user would be able to get familiar with the VR space before going into the main experience.

The main experience for both Generalized anxiety disorder and ADHD would be relatively similar in terms of world and structure and would be around 5 minutes each as per our constraints. Both experiences would be in a work environment and the user would have to go through normal daily tasks, as indicated in the diagram but the tasks would be different and would happen a bit differently according to the symptoms of the respective disability. The biggest difference between the two disabilities, other than which tasks are being done, would be the use of inner monologue for the anxiety experience and the constant auditory and visual distractions throughout the entire experience.

Once the user has completed the tasks or ran out of time, stats would be shown about what the user has done during the experience which might make them realize certain things that they otherwise wouldn't have. Finally, there would be a guided reflection for our user based on the feedback we have received, as well as the chance to guess the invisible disability portrayed in the experience the user has just completed.

User Feedback

Feedback and comments on our ideas and prototype was received by potential users and clients. To do this, the project team reached out to those with ADHD and Anxiety and those without. This allowed us to gain an insight into the degree that the storyline of our proposed experience would elicit empathy from those who do not have ADHD or anxiety, and whether our proposed experience portrays ADHD and anxiety accurately and is depicted in a way that represents the proper symptoms of the invisible disabilities. Moreover, additional questions were asked regarding the proposed art style, introduction to VR, and reflection elements of the experience to gauge their potential effectiveness. To make the process of collecting feedback as efficient as possible, a feedback form was created for the potential users to fill out. From this, we were able to gather information both concrete numerical data and long answer comments from each potential user.

Potential users were asked to give feedback on whether the introduction sequence would be helpful in getting used to a VR environment. Most of the feedback was positive, with most people saying that it was a good way for users to become fully immersed in the experience as it is simple and in a controlled environment. The only concern was that users may feel tired of the introduction sequence if the entire experience lasts too long; however, since the goal of the main experience is to be approximately 5 minutes and the introduction sequence is completely optional, the project team does not believe this will be a problem going forward.

Those with ADHD agreed that the experience presented is representative of the challenges they face on a regular basis and stated that there was nothing that seems insensitive, inaccurate, or offensive about our portrayal of ADHD. Those without ADHD commented that they believe it would leave users with a better comprehension and new perspective of ADHD and how it can affect the daily lives of those who have it. As shown in the figure below, the most impactful elements of the ADHD experience seem to be the emulation of symptoms with audio/visuals and constant distractions. We also received feedback

that fidgeting task(s) would further emulate the experiences of those with ADHD. This will help us focus on these particular elements as we develop the ADHD experience in Unity.

-0 (0%) Tasks being first in, last out 1 (20%) Inner monologue Constant distractions 4 (80%) Emulation of ADHD symptoms 5 (100%) with audio/visuals 1 (20%) Time forgetfulness Some tasks being forgotten by 3 (60%) the user 0 1 2 3 4 5

What elements of the ADHD VR experience seem most impactful?

5 responses

Figure 6: Feedback on the different elements of the proposed ADHD experience

As shown in the figure below, the most impactful element of the anxiety experience seems to be the inner monologue. The project team will use this information to make this our primary focus when developing the script of the anxiety experience. The consensus from the feedback received on this experience was that our concept will be an effective, interactive, and educational way of showing a new perspective on anxiety and help people gain empathy through experience.



What elements of the anxiety VR experience seem most impactful?

Figure 7: Feedback on the different elements of the proposed anxiety experience

Those with anxiety agreed that the experience presented is representative of the challenges they face on a regular basis and that our proposed product seems like it will provide meaningful perspectives on challenges that are not talked enough about. However, they also stated that in their experience, the overthinking does not create such a large butterfly effect. For instance, the example we gave was "What if my boss doesn't like it? What if it's so bad they fire me? What if I can't find another job? How will I be able to pay for anything? How will I get food?", and the potential user stated that simply "What if my boss doesn't like it" would be enough for them to get stuck thinking about.

All responses agreed that the tasks presented in both the ADHD and anxiety experiences made them feel more empathetic to the struggles faced by individuals with those invisible disabilities. When asked if there was anything that the project team could do to make the VR environment more engaging, potential users stated that more "game-like" and realistic tasks would help in making the experience more user-friendly. Moreover, all responses agreed that the experience would be more engaging and effective than a traditional EDI training model, with one user commenting that people will have a more emotional reaction rather than just reading what ADHD is, indicating to the project team that the proposed final product would be useful in the EDI training sector. The only concern was that using a VR headset such as the HTC Vive would make the experience less accessible to members of the university as not everyone owns one of these headsets.

When asked if the chosen art style would allow for an immersive VR experience, most users commented that it strikes a good balance between being realistic and simple and that the chosen assets will help put the participants in a mundane context, which will help foster empathy as users see how ADHD and Anxiety can affect real people.

Finally, potential users were surveyed on the potential effectiveness of including user statistics and guiding reflection questions at the end of the experience. It was noted that there should be reliable sources and emergency helpline information provided at both the beginning and the end of the experience, and that we should empathize that everyone has different experiences with ADHD and anxiety and that some symptoms were not included in our experience. The potential client surveyed stated that they would appreciate it if users were also able to reflect with multiple choice questions so clients can collect and review this data so they can develop action plans. It was also emphasized that

This user feedback was greatly appreciated by the project team and will help us modify elements of our project to improve its quality in future prototypes. Additional charts and unedited comments from the feedback forms are provided in the appendices of this report.

Prototype 1 Test Plan and Results

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

Test ID	Test Objective (Why)	Description of Prototype used and of Basic Test Method	Description of Results to be Recorded and bow these	Estimated Test duration and planned start date	Test Results
	10	restiviethou	now these	uute	
		(What)		(When)	

Table 1: Test Plan for Prototype 1

			results will be		
			used (How)		
1	Interactivity Can the User move around the world and interact with objects? This test is to make sure that the basic function of our VR (Virtual Reality) code works. If the user cannot move around the world and interact with different objects, there is no way for them to complete activities and gain the knowledge and education that is the point of the entire project.	Low fidelity physical and focused prototype required for basic environment testing	The extent to which the user can move around the world smoothly and interact with things in the world was recorded.	This test can start as soon as the base environment has been created and should not take more than 10 minutes to complete. It was done as the environment was created and objects could be picked up by the user. Date of Completion: March 6 2022	All desired features have been implemented successfully in Unity.
2	Reflection of the invisible disability: Is the invisible disability depicted in a way that represents the proper symptoms of the invisible disability? If our experience does not accurately represent the symptoms of the invisible disability, we will not be able to educate or generate empathy from other about what it is like to live with the invisible disabilities.	Focused analytical prototype to follow the storyline and tasks that the user would face.	We would ask people with the invisible disabilities (ADHD and anxiety) if they feel that the suggested task accurately reflect how it feels to have the respective invisible disability.	This can be done independently from the VR environment and will rely solely on our task list. The time it would take to complete this test would rely on the amount of people we are able to talk to about their experiences with the disabilities. Feedback was collected over a few days. Date of Completion: March 5 2022	People with anxiety and ADHD were surveyed and they felt like the experience accurately reflected their experiences.
3	Empathy	Focused analytical	With help from the task list/	This was done independently	A diagram was

	How does it make the	prototype to	storyline an	from the VR	completed
	user (without the	follow the	image of what	environment by	that outlined
	disability) feel. Do	storyline and	our experience	creating a	the
	those feelings match	tasks that the	would feel like	diagram.	experience.
	the feelings of people	user would face.	to possible	Similarly, to the	User
	with ADHD and		users (people	task above, this	feedback
	anxiety. Does it		without the	test required a	was
	generate empathy		disability who	few days of	gathered
	from the user?		are trying to	talking to people	based on this
	One of the main		learn about it)	and asking for	diagram and
	client's needs was to		was depicted.	their feedback,	it was found
	generate empathy			and comments	that the
	from the user in this			about the	experience
	training tool, to			experience.	seems very
	accomplish this, we				effective at
	need to assure that			Date of	eliciting
	the user feels the			Completion:	empathy.
	same way people			March 5 2022	
	with the disability do.				
4	Generalization of the	Focused	Research was	Testing will be	A task list
4	Generalization of the invisible disability.	Focused analytical test	Research was done on the	Testing will be done as we	A task list was
4	Generalization of the invisible disability. Does the experience	Focused analytical test about the	Research was done on the different	Testing will be done as we create the task	A task list was generated
4	Generalization of the invisible disability. Does the experience cover all distinct	Focused analytical test about the different	Research was done on the different symptoms of	Testing will be done as we create the task list and as soon	A task list was generated and feedback
4	Generalization of the invisible disability. Does the experience cover all distinct aspects of ADHD and	Focused analytical test about the different symptoms	Research was done on the different symptoms of anxiety and	Testing will be done as we create the task list and as soon as it is	A task list was generated and feedback from those
4	Generalization of the invisible disability. Does the experience cover all distinct aspects of ADHD and anxiety?	Focused analytical test about the different symptoms reflected in the	Research was done on the different symptoms of anxiety and ADHD. We	Testing will be done as we create the task list and as soon as it is completed	A task list was generated and feedback from those with ADHD
4	Generalization of the invisible disability. Does the experience cover all distinct aspects of ADHD and anxiety? We want to make	Focused analytical test about the different symptoms reflected in the tasks that will be	Research was done on the different symptoms of anxiety and ADHD. We asked other	Testing will be done as we create the task list and as soon as it is completed before we begin	A task list was generated and feedback from those with ADHD and anxiety
4	Generalization of the invisible disability. Does the experience cover all distinct aspects of ADHD and anxiety? We want to make sure, as per the	Focused analytical test about the different symptoms reflected in the tasks that will be incorporated in	Research was done on the different symptoms of anxiety and ADHD. We asked other people who	Testing will be done as we create the task list and as soon as it is completed before we begin coding tasks into	A task list was generated and feedback from those with ADHD and anxiety was received
4	Generalization of the invisible disability. Does the experience cover all distinct aspects of ADHD and anxiety? We want to make sure, as per the client's feedback,	Focused analytical test about the different symptoms reflected in the tasks that will be incorporated in our experience	Research was done on the different symptoms of anxiety and ADHD. We asked other people who have anxiety	Testing will be done as we create the task list and as soon as it is completed before we begin coding tasks into the VR space.	A task list was generated and feedback from those with ADHD and anxiety was received to ensure
4	Generalization of the invisible disability. Does the experience cover all distinct aspects of ADHD and anxiety? We want to make sure, as per the client's feedback, that our experience	Focused analytical test about the different symptoms reflected in the tasks that will be incorporated in our experience	Research was done on the different symptoms of anxiety and ADHD. We asked other people who have anxiety and ADHD what	Testing will be done as we create the task list and as soon as it is completed before we begin coding tasks into the VR space. This test might	A task list was generated and feedback from those with ADHD and anxiety was received to ensure that we
4	Generalization of the invisible disability. Does the experience cover all distinct aspects of ADHD and anxiety? We want to make sure, as per the client's feedback, that our experience covers all aspects and	Focused analytical test about the different symptoms reflected in the tasks that will be incorporated in our experience	Research was done on the different symptoms of anxiety and ADHD. We asked other people who have anxiety and ADHD what they think the	Testing will be done as we create the task list and as soon as it is completed before we begin coding tasks into the VR space. This test might take a couple of	A task list was generated and feedback from those with ADHD and anxiety was received to ensure that we accurately
4	Generalization of the invisible disability. Does the experience cover all distinct aspects of ADHD and anxiety? We want to make sure, as per the client's feedback, that our experience covers all aspects and symptoms of the	Focused analytical test about the different symptoms reflected in the tasks that will be incorporated in our experience	Research was done on the different symptoms of anxiety and ADHD. We asked other people who have anxiety and ADHD what they think the most prevalent	Testing will be done as we create the task list and as soon as it is completed before we begin coding tasks into the VR space. This test might take a couple of days to	A task list was generated and feedback from those with ADHD and anxiety was received to ensure that we accurately cover as
4	Generalization of the invisible disability. Does the experience cover all distinct aspects of ADHD and anxiety? We want to make sure, as per the client's feedback, that our experience covers all aspects and symptoms of the invisible disabilities to	Focused analytical test about the different symptoms reflected in the tasks that will be incorporated in our experience	Research was done on the different symptoms of anxiety and ADHD. We asked other people who have anxiety and ADHD what they think the most prevalent symptoms are	Testing will be done as we create the task list and as soon as it is completed before we begin coding tasks into the VR space. This test might take a couple of days to complete.	A task list was generated and feedback from those with ADHD and anxiety was received to ensure that we accurately cover as many
4	Generalization of the invisible disability. Does the experience cover all distinct aspects of ADHD and anxiety? We want to make sure, as per the client's feedback, that our experience covers all aspects and symptoms of the invisible disabilities to effectively educate	Focused analytical test about the different symptoms reflected in the tasks that will be incorporated in our experience	Research was done on the different symptoms of anxiety and ADHD. We asked other people who have anxiety and ADHD what they think the most prevalent symptoms are that others	Testing will be done as we create the task list and as soon as it is completed before we begin coding tasks into the VR space. This test might take a couple of days to complete.	A task list was generated and feedback from those with ADHD and anxiety was received to ensure that we accurately cover as many aspects of
4	Generalization of the invisible disability. Does the experience cover all distinct aspects of ADHD and anxiety? We want to make sure, as per the client's feedback, that our experience covers all aspects and symptoms of the invisible disabilities to effectively educate users.	Focused analytical test about the different symptoms reflected in the tasks that will be incorporated in our experience	Research was done on the different symptoms of anxiety and ADHD. We asked other people who have anxiety and ADHD what they think the most prevalent symptoms are that others should learn	Testing will be done as we create the task list and as soon as it is completed before we begin coding tasks into the VR space. This test might take a couple of days to complete. Date of	A task list was generated and feedback from those with ADHD and anxiety was received to ensure that we accurately cover as many aspects of the invisible
4	Generalization of the invisible disability. Does the experience cover all distinct aspects of ADHD and anxiety? We want to make sure, as per the client's feedback, that our experience covers all aspects and symptoms of the invisible disabilities to effectively educate users.	Focused analytical test about the different symptoms reflected in the tasks that will be incorporated in our experience	Research was done on the different symptoms of anxiety and ADHD. We asked other people who have anxiety and ADHD what they think the most prevalent symptoms are that others should learn about or	Testing will be done as we create the task list and as soon as it is completed before we begin coding tasks into the VR space. This test might take a couple of days to complete. Date of Completion:	A task list was generated and feedback from those with ADHD and anxiety was received to ensure that we accurately cover as many aspects of the invisible disabilities as
4	Generalization of the invisible disability. Does the experience cover all distinct aspects of ADHD and anxiety? We want to make sure, as per the client's feedback, that our experience covers all aspects and symptoms of the invisible disabilities to effectively educate users.	Focused analytical test about the different symptoms reflected in the tasks that will be incorporated in our experience	Research was done on the different symptoms of anxiety and ADHD. We asked other people who have anxiety and ADHD what they think the most prevalent symptoms are that others should learn about or experience with	Testing will be done as we create the task list and as soon as it is completed before we begin coding tasks into the VR space. This test might take a couple of days to complete. Date of Completion: March 5 2022	A task list was generated and feedback from those with ADHD and anxiety was received to ensure that we accurately cover as many aspects of the invisible disabilities as possible.
4	Generalization of the invisible disability. Does the experience cover all distinct aspects of ADHD and anxiety? We want to make sure, as per the client's feedback, that our experience covers all aspects and symptoms of the invisible disabilities to effectively educate users.	Focused analytical test about the different symptoms reflected in the tasks that will be incorporated in our experience	Research was done on the different symptoms of anxiety and ADHD. We asked other people who have anxiety and ADHD what they think the most prevalent symptoms are that others should learn about or experience with this training	Testing will be done as we create the task list and as soon as it is completed before we begin coding tasks into the VR space. This test might take a couple of days to complete. Date of Completion: March 5 2022	A task list was generated and feedback from those with ADHD and anxiety was received to ensure that we accurately cover as many aspects of the invisible disabilities as possible.

Test Plan for Prototype 2

Based on the results from the first prototype, a test plan for the second prototype was generated.

Table 2: Test Plan for Prototype 2

Test Test Objective ID (Why)	Description of	Description of Results	Estimated Test
	Prototype used and	to be Recorded and	duration and
	(vvny)	of Basic Test Method	

		(What)	how these results will	(When)
			be used (How)	
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.	We will gather feedback from potential users and clients on the proposed guiding reflection questions and their effectiveness.	This task can be done independently of the Unity tasks. It will require the creation of reflection questions and gathering feedback from potential users and clients. Planned Start Date: March 7
2	Interactivity - Choices: One of the concepts for our main design is having the user make decisions to complete tasks. 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 choices that were able to be made 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. We would also need to have at least one simple task added in our VR space that we can test and see the results for. This test will need to be completed earlier on in the process as it is required to create the rest of the experience. Planned start date: After task implementation
3	Interactivity - Task implementation: Another main concept of our product is that the user can interact with objects to	Low fidelity physical and focused prototype required to test the basic function of the environment.	We will record the extent to which the user can interact with objects to complete tasks in the world.	This task can be started as soon as possible since the user can already move around the world in VP
	complete tasks. The tasks would then affect the results in			Planned start date: March 7

	the statistics at the			
	end of the experience.			
	Empathy - Inner	A focused analytical	We will gather	
	monologue:	prototype in the form	feedback from	
	How does it make the	of a script.	potential users with	
	user (without the		and without ADHD	
	disability) feel? Do		and Anxiety to gauge	This will be done
	those feelings match		the accuracy of the	indonondontly
	the feelings of people		script to real	from the VP
	with ADHD and		experiences of the	onvironment and
	anxiety? Does it		invisible disabilities	involves creating a
	generate empathy		and the level of	script and
4	from the user?		empathy elicitation.	gathering feedback
	One of the main			from notential
	client's needs was to			users and clients
	generate empathy			users and chemes.
	from the user in this			Planned start date:
	training tool, to			March 7
	accomplish this, we			iviar cit 7
	need to assure that			
	the user feels the			
	same way people with			
	the disability do.			
	Disclaimer messages:	A focused analytical	We will gather	This will be done
	It is important for us	prototype in the form	feedback from	independently
	to ensure that users	of a paragraph at the	potential users and	from the VR
	know that our	beginning and end of	clients to gauge the	environment and
	experience may not	each experience.	effectiveness of our	involves creating
_	cover all aspects and		disclaimer messages.	the disclaimer
5	symptoms of the			messages and
	invisible disabilities			gathering feedback
	and that there are			from potential
	additional resources			users and clients.
	they can access if			Diannad start data:
	needed.			Planned Start date:
				iviarch 7

Conclusion

The objective of this prototype was to develop a clear outline of the experience structure and have a basic VR environment created with the assets purchased in the Unity store. The first prototype was created by developing the storyline of the experience and by using Unity to implement user motion and object interactivity. Tests were performed to assess the interactivity in Unity, the reflection of the invisible disabilities, empathy elicitation from users, and generalization of the invisible disabilities, and feedback from potential users and clients was gathered. The project team was able to use this feedback

to develop our next prototype test plan, update our target specifications and BOM, and improve the overall quality of our product.

Appendices

Appendix A - Updated Target Specifications

Design Specification Relation Ideal Va		Ideal Value	Acceptable Value	Units	Verification Method
	(=, < or >)				
		Functional Requir	ements	•	1
Level of Interactivity = Sig		Significant amount of	Fair amount of meaningful	N/A	Analysis
	ļ	meaningful user interaction	user interaction		
Relatability to	=	Experience meaningfully	Experience meaningfully	N/A	Analysis
marginalized groups		addresses challenges	addresses challenges faced		
		universally faced by all	by one marginalized group		
	ļ	marginalized groups			
Effectiveness of fostering	<	User leaves the experience	User leaves the experience	N/A	Analysis
diversity and inclusion		with a thorough	with a respect for the		
		understanding and respect for	challenges faced by		
		the challenges experienced by	marginalized groups		
		marginalized groups and can			
		empathize with their struggles			
Effectiveness of empathy	<	Users leave the experience	Users leave the experience	N/A	Analysis
elicitation		able to identify many of the	able to identify several of		
		challenges faced by	the challenges faced by		
		marginalized groups, meet	marginalized groups and		
		those challenges with	meet those challenges with		
		empathy, and are committed	empathy		
		to positive change			
Change in POV	<	Yes	Yes	N/A	Test
Conveyance of otherness	>	User feels that they are	User recognizes they are	N/A	Analysis
		different, feels marginalized	different and experiences		
		as a result, and experiences	minor challenges due to		
		significant challenges due to	their otherness		
		their otherness			
Opportunities for	=	Experience is designed with	User is prompted to reflect	N/A	Analysis
reflection		thoughtful reflection in mind,	at the end of the experience		
		and user is prompted to			
		reflect multiple times within			
		the experience			
Level of immersion	=	User feels completely	User feels immersed in the	N/A	Test
		immersed in the virtual world	virtual world, and takes to		
		and their new identity	their newly assigned		
			identity; user is keenly		
			aware of the limitations of		
			their virtual world		
Ease of use	<	Experience controls are	Experience controls are	N/A	Test
		intuitive, and users require no	unintuitive, but users only		
		facilitator training to	require minimal training		

		complete the experience. Within a few seconds the user is acclimated to the unfamiliar	from the facilitator to complete the experience. Users are acclimated to the		
		environment and its controls.	unfamiliar environment in		
		Nausea is not induced in	less than 5 minutes. Nausea		
		users.	is induced in those new to		
			VR.		
Level of user	>	Experience captures the	Experience captures the	N/A	Estimate, check
engagement		attention and focus of the	attention of the user, but		
		users and never loses it	user's attention and focus		
			wanders occasionally.		
Accessibility >		100% Accessible	Accessible to most	N/A	Test
		Constraint	S	•	
Cost	=	<mark>No more than \$50</mark>	<mark>\$70-\$80</mark>	\$CAD	Estimate, check
Incorporation of VR	=	Yes	Yes	N/A	Final check
		Non-Functional Req	uirements		
Ease of deployment	>	Users can easily access the	Most users can easily access	N/A	Test
		device	the device		

 Table 3: Updated Target Specifications (Changes from Deliverable C are highlighted)

Appendix B - Updated BOM

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

 Table 4: Updated Bill of Materials (Changes from Deliverable E are highlighted)

Appendix C - Task Plan and Wrike Snapshot

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

Main Task	Details and subtask	Assignee
Feedback from the client	Following the client meeting on Monday, the feedback will be taken into consideration to improve our following prototype and will be recorded in our next deliverable	Honor
Physical prototype	Since the basics of movement have already been figured out in unity, we will add the basic tasks outlined in our storyboard (figure 5) during this prototype.	Anthony
Analytical prototype	The plan is to finalize all the details for the task and come up with the animations that will need to be added to Unity. We will also develop the inner monologue for the Anxiety experience and more detailed distractions for the ADHD experience. We will also develop the ending reflection based on the feedback of potential users and clients that we received during this deliverable and come up with a more detailed introduction and disclaimer.	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.	Honor
Feedback and comments	We will gather feedback the same way we did for the first prototype as it seemed to be quite effective in getting comments. Every team member will reach out to at least one person for feedback through google forms. The feedback and comments will then be combined and analyzed by the person assigned to find the most relevant and common comments.	Honor
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
Future test plan	We will create a prototype test plan for our last prototype based on what we need to have completed by that time and we will include all the tests that need to be done to show how the prototype fits our design specifications.	Yuteng
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.	Nicole

Table 5: Task plan for Deliverable G

Wrike Snapshot link:

https://www.wrike.com/frontend/ganttchart/index.html?snapshotId=xXndzIfVeCH2z6Jmncdqdk8hgXtBde1s%7CIE2DSNZVHA2DELSTGIYA

Appendix D - Feedback Form Data

This experience would be more effective than a traditional EDI training module. 6 responses



Is there anything that seems insensitive, inaccurate, or offensive about our portrayal of anxiety? 2 responses

No, those are great points and I am deeply resonance.

The only inaccuracy I can find is that from my personal experiences, the overthinking does not create such a large butterfly effect. What's scary is that I get anxious about and stuck up on the smallest of things that don't make a huge difference in the big picture.

"What if my boss doesn't like it? What if it's so bad they fire me? What if i can't find another job? How will I be able to pay for anything? How will i get food?" - This is your example.

"What if my boss doesn't like it?" - This would be enough to make me anxious.

Is there anything that you would like to see in the anxiety experience that is not already included? 2 responses

High pressure in life? Like bad relation between family

Nope, thanks for making this! From what I've read it seems like a great interactive and educational tool that can provide meaningful perspectives on something that is not talked enough about.

Any comments on the anxiety experience? This could include things you thought worked, didn't work, or could be altered.

3 responses

Procrastination and excessive thinking are the main culprits of anxiety, and the inner monologue or psychological struggle should be highlighted

The anxiety experience may affect the situation of experiencers' psychology

Again what worked was that you included a variety of accurate feelings and doubts that someone with anxiety would experience. My only critique is that I don't think the hands shaking example was very effective without context (why were they nervous about placing things on a poster?) I think a better example from personal experiences could be nervous sweating (hands, arms, head etc.) This could even be included at the end of the overthinking example as those anxious thoughts could definitely make someone nervously sweat. I think that the inner monologue should not just include the overthinking of what the supervisor is saying but also constant insecurities about how they aren't good enough and should not have agreed to do the presentation.

Do you believe that this experience would give you a new perspective on anxiety?

6 responses

I think it makes me realize how bad anxiety can be and it highlights the differences with normal stress which can be really informative for people who don't have it.

As a potential client I feel this would be very useful for my users to develop a new perspective on what people with anxiety face on a day to day basis and how they react

I am deeply affected by anxiety, I believed it will helps a lot

I believe

Yes, I think this is an effective way of showing a new perspective on anxiety because it is both interactive and educational. Definitely helps people gain empathy through understanding!

Yeah

Any comments on the ADHD experience? This could include things you thought worked, didn't work, or could be altered.

4 responses

In this experience, I deeply felt the pain of ADHD and better understood the unknown side of patients

I think you did a good job on creating many tasks/examples of the various ADHD symptoms and the challenges that those symptoms produce. Something that could be added is a fidgeting task after the user sits down at their desk and starts reading. As they read and try to comprehend the information they could start shaking or tapping their foot against the floor. As a student, this is something that I see my friends with ADHD doing a lot when they are unable to stand up in the middle of class and start moving around.

Focus on setting off the patient's high stress through others' isolation or failure

If a common person uses VR to do the ADHD experience, he or she doesn't feel a real feeling from a person with ADHD actually.

Do you believe that this experience would give you a new perspective on ADHD?

6 responses

Yeah

Yes, I think this idea would provide an educational experience that shows a more personal perspective on what it is like to have ADHD. Since it is interactive and I'm assuming in the first person, people will have a more emotional reaction compared to just reading about what ADHD is.

For sure, cause I never meet the problem like adhd before

I think it would provide me with a better comprehension of what ADHD is and how it can affect the day-to-day lives of people who have it.

I believe

As a potential client I feel this would be very useful for my users to develop a new perspective on ADHD and how it could affect their work

Guiding reflection opportunities at the end of the experience would feel meaningful.

6 responses



Any comments on the reflection element of the experiences in general?

5 responses

I think the reflection element is essential. It should be mostly in multiple choice form so that the feedback is actually usable. As a client, I would like to be able to collect that so I can develop action plans to help my users develop a good empathetic reaction. It would also be useful to include as part of the reflections, some questions or suggestions about what actions / reactions would be most helpful to the people experiencing the ADHD or anxiety. This would help further educate, not only on identifying the existence of an invisible disability, but how to provide support -- or how not to make things worse.

Feedback questions and giving correct opinions, can make the experimenter have profound reflection

I think that the reflection element is important, and experiencer should get a right reflection.

It is definitely important that you emphasize that everyone has different experiences and that some experiences of ADHD and anxiety were not included in this simulation. Provide reliable sources that the user can seek if they would like more information and definitely provide emergency help lines for anyone in distress.

Understand the problem more deeply