
Aphasia
Beach Cave


Controls
SteamVR
Ready
Beach Cave Island.exe
Spawn
Spawn
Dark Caves
Reload

Client Vision

- Proposed by the Aphasia House Communications Disorder Clinic at UCF
- Create a world for a patient with aphasia to overcome their disability
- Must be in virtual reality
- Can only use a maximum of one controller
- Must allow the therapist to interact with the scene that the patient is exploring

Project Plan

Patient:

- Immersed in VR experience
- Journey begins on a beach with a visible cave entrance
- Patient can navigate through cave and collect gems
- Once all gems are collected, treasure chest opens

Therapist:

- Controlling VR experience
- Selects initial difficulty
- Spawns animals in scene
- Adjusts lighting and sound

Suggested Art Style

- Bold and vibrant composition
- Depth and texture to easily discern the elements in the scene

Inspiration Image:

Reference:
https://awol.junkee.com/wp-content/uploads/2016/08/cave-e1472187313952.jpg
https://www.wired.com/2017/03/zelda-breath-of-the-wild-review/

Patient Actions

- Move themselves via teleporting along a cave path
- Collect gems found in the cave
- Open a treasure chest

Ref: https://images-na.ssl-images-amazon.com/images/I/71oPa3WRXXL._SX466_.jpg

- **Platform: HTC Vive**
- Patient will experience the scene inside the headset to:
  - View the landscape
  - Navigate through the cave
  - Collect gems

Movement

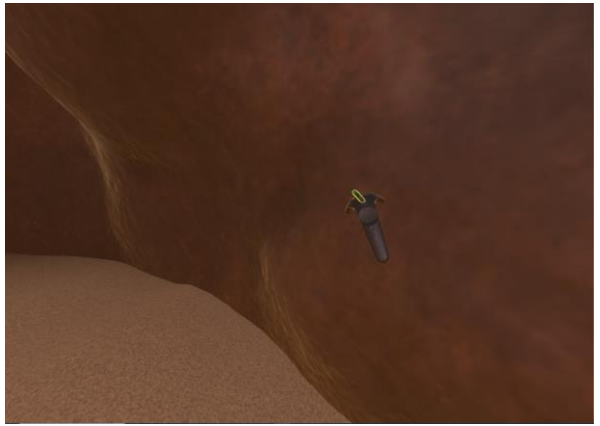
- Patient uses controller to teleport around by pressing and holding the front button
- Green light = can move
- Red light = cannot move
- Uses Unity collider components to detect movement options

Interactive Objects

- Patient uses the back button of the controller to pick up items
- User can rotate and throw picked up objects

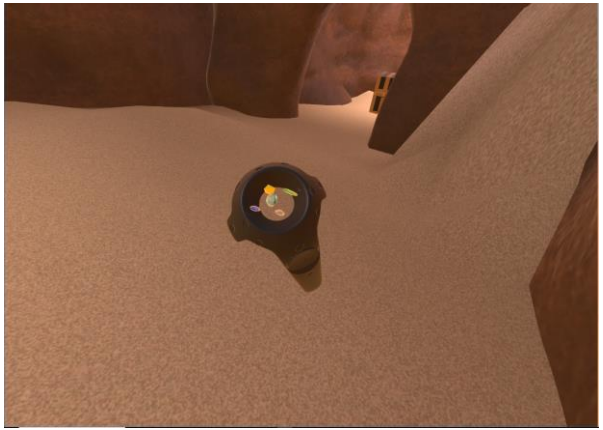
Minigame

- 5 gems are hidden throughout the cave
- Higher difficulty puts gems in hidden places
- Swipe at the gems to relocate them to controller and hear a collection sound



Collection of Gems

- Back treasure room opens
- Filled with interactable gems
- Completion victory noises

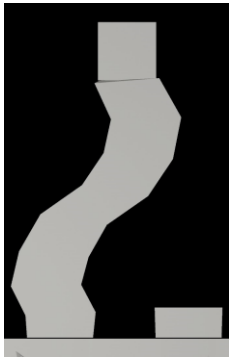


Therapist Actions

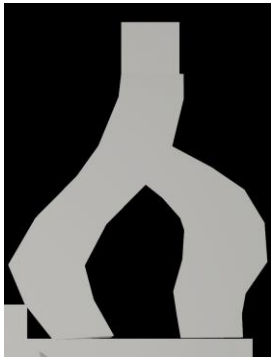
Actions set by the therapist is set using a tablet or monitor.

The following action would be a parameter set prior to the patient entering the experience:

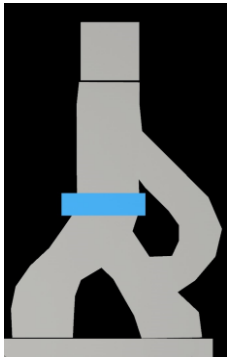
- Select the difficulty of the cave path (easy, intermediate, and hard)



Easy



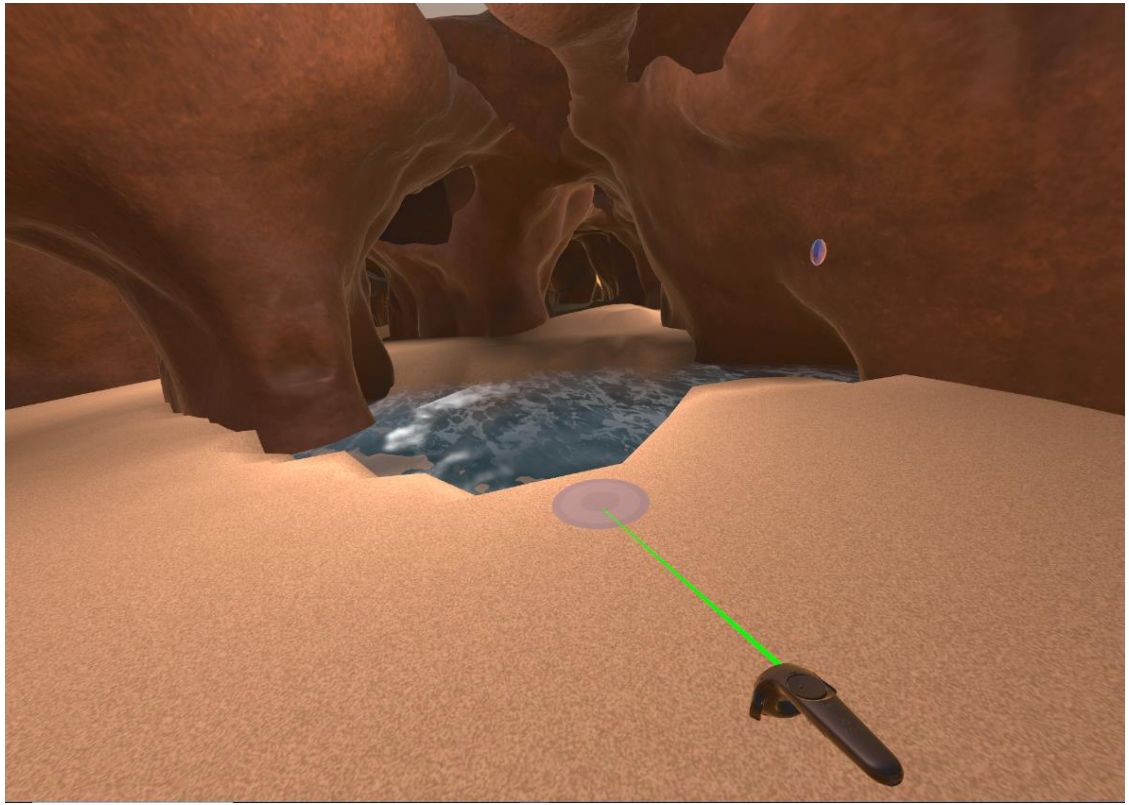
Intermediate



Hard

Example

- Hard setting requires the patient to aim the reticle over the river to cross and collect the gem
- Gems are more challenging to find



Therapist Actions, cont.

The following actions allow modifications while the patient is in the experience:

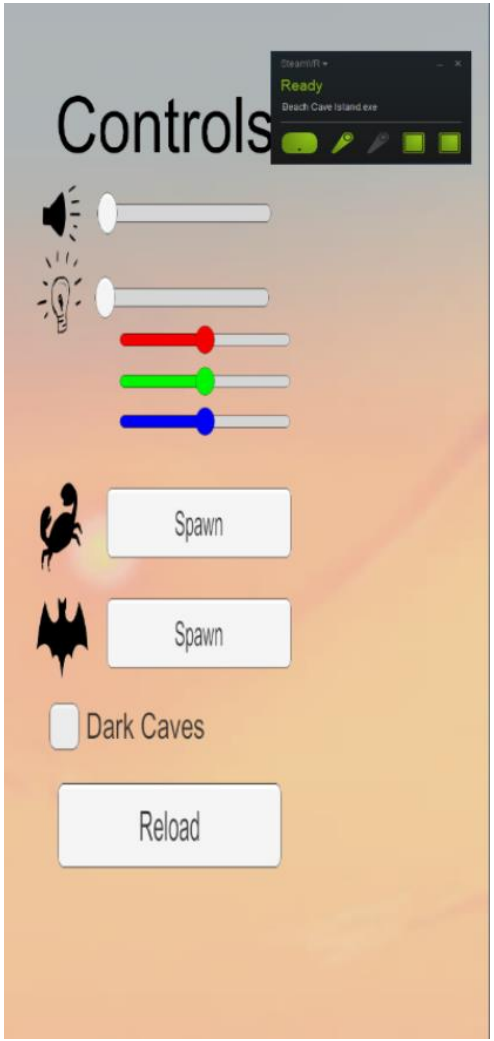
- Select the number of crabs and bats the patient can see and hear
- Adjust the lighting of the cave
- Adjust the volume within the experience
    - There are ambient water sounds, as well as sounds emanating from the crabs and bats

Animated Animals

- Spawned by the therapist by clicking on the spawn button near each animal
- Can choose between crab and bat

Lighting Selection

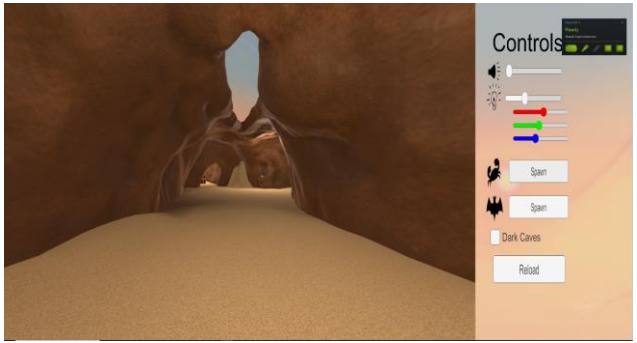
- Objects have shadows the move based on their location from the main light source
- Therapist has 1 slider for light intensity and 3 sliders to change the color of the light
- Special lighting effects can be added into the caves to make the caves appear darker by toggling on “Dark Caves”

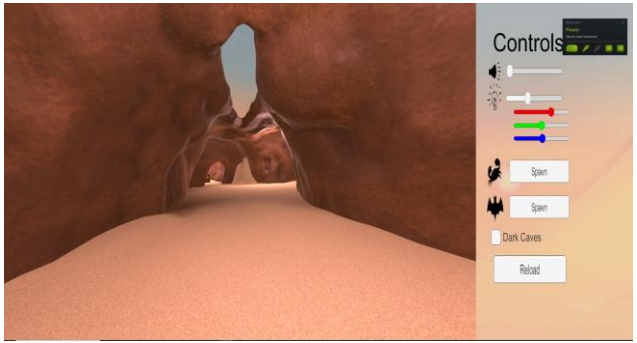


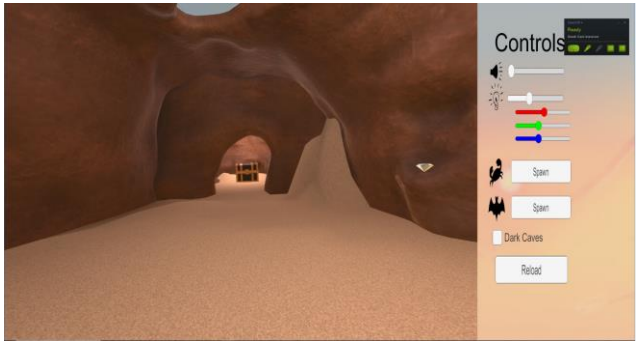
Lighting Design

- Unity lighting is used to provide a directional light that is real-time and baked
- Static objects such as the cave walls and palm trees are baked to increase performance
- Light probes are used to create baked lighting on moving interactable objects to provide faster performance
- Lights inside the cave are dynamic and change based on the therapist’s selection
- Dark mode uses post processing effects such as ambient occlusion and bloom

Dynamically Changing Lighting Examples

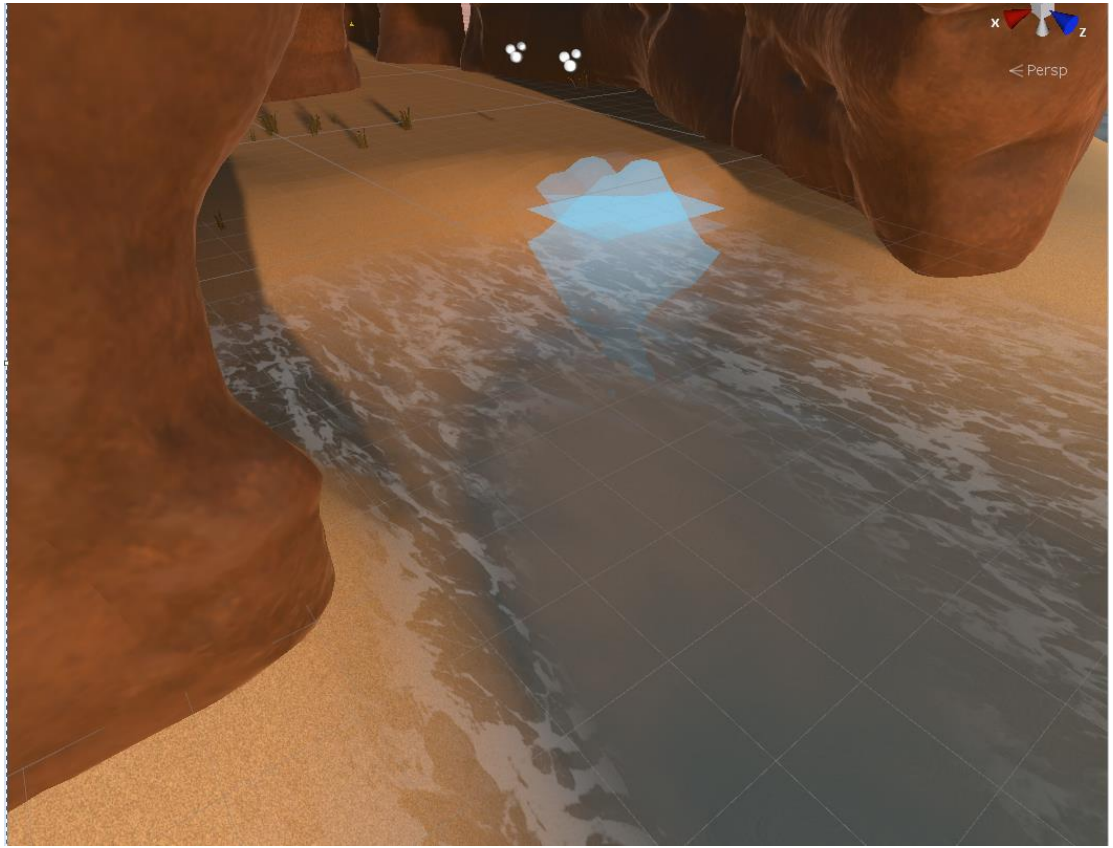






Terrain

- Created using Unity’s built-in terrain sculpting tool and colliders
- Water created using Unity 3D water



Sound

- Patient hears sound of crashing waves that originate from the ocean
- Animals have distinct sounds emitting from their model
- Collection sounds and completion sounds notifies the player when an action is happening

Challenges

- Two Screens
- Virtual reality development
- Multiple difficulties
- Managing an inventory
- Leaving the map boundaries

Reception

- Well-received by the client and will continue to work with E2i Creative Studio for more projects involving aphasia
- Demoed at ITSEC 2018, the worlds largest simulations & training event
- Showcased the possibility of using modeling and simulation for medical purposes