

LOSING LIGHT

Game Design Document

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Losing Light Executive Summary

Overview

Losing Light is a virtual reality experience built for PC that emulates the experiences of visually impaired people as inspired by blind guide dog user, activist, and YouTuber Molly Burke. Burke is an advocate for increased accessibility and often talks about how you cannot really know what it is like to be blind unless you are blind. Through the Oculus Rift Virtual Reality Headset, sighted players can gain a better understanding of the challenges that visually impaired individuals face by entering an environment that simulates being legally blind.

SCOPE

Guide Dog Users must master specific orientation and mobility skills before being teamed with a guide dog which is reflected through the game's story progression. Players are introduced to life with low vision through a cut scene that starts with the player waking up in their bedroom with full vision before gently decreasing their vision to emulate Retinitis Pigmentosa. The player is asked to complete two chapters inside a house environment where they learn to use a cane and practice orienting themselves within the environment. Once the user progresses through those chapters, the player will watch a cut scene where they are paired with a guide dog. Players will complete a tutorial level about working with a guide dog before being challenged with crossing a street safely, navigating a mall environment with stairs, elevators, and escalators, and moving through a crowded party.

ACTION

Each chapter of Losing Light is thoughtfully designed to immerse sighted individuals into an environment they would otherwise never encounter. Players will experience a mild visual impairment so perception of everyday experiences like navigating a household, crossing a street, and traversing a crowded room can be thoughtfully challenged. Players will be forced to rely on auditory instructions and sound cues to progress through the game because visually impaired individuals are not able to rely on written instructions or purely visual interfaces. By the end of the game, players will have a better appreciation for their vision and an increased awareness of how guide dogs change lives for people who are legally blind.

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Explanation of Chapters

BACKGROUND

According to the World Health Organization (WHO) at least 2.2 billion people experience visual impairment or blindness globally.¹ Of those 2.2 billion cases, approximately one billion people have an impairment that could have been prevented, or has yet to be addressed, partially due to a lack of healthcare in certain regions.² The American Foundation for the Blind in the United States estimates 26.9 million Americans (10%) live with blindness or low vision.³ Many legally blind individuals have limited vision or experience different forms of vision loss. For example, Retinitis Pigmentosa generally leaves only some light and shadow perception so individuals may only see very dark, or very bright, objects.⁴

Despite the prevalence of visual impairment in the global population, very few people truly understand what living with blindness or low vision is like. Creating this game can serve as a tool for activists who continue to push for increased accessibility and universal design practices. Activists like Molly Burke note that universal design practices such as using sloping curbs at street intersections are helpful for people in wheelchairs, people who use walkers, and parents trying to push a stroller.⁵ In other words, everyone can benefit through the creation of accessible spaces. This game will highlight the importance of accessibility and universal design practices by forcing sighted players to navigate with reduced vision and gain understanding about how challenging it is to live in a world that is not designed for equal access. After completing *Losing Light*, players will be empowered through education and personal insight to advocate for increased accessibility, the need for universal design, and the importance of respecting service dog etiquette.

¹ “Vision Impairment and Blindness.” *World Health Organization*, World Health Organization, 8 Oct. 2019, www.who.int/news-room/fact-sheets/detail/blindness-and-visual-impairment.

² “Vision Impairment and Blindness.” *World Health Organization*, World Health Organization, 8 Oct. 2019, www.who.int/news-room/fact-sheets/detail/blindness-and-visual-impairment.

³ “Statistical Snapshots from the American Foundation for the Blind.” *Statistical Snapshots from the American Foundation for the Blind | American Foundation for the Blind*, www.afb.org/research-and-initiatives/statistics.

⁴ “Retinitis Pigmentosa.” *Foundation Fighting Blindness*, www.fightingblindness.org/diseases/retinitis-pigmentosa.

⁵ “Making the World Accessible Helps EVERYONE! (Molly Burke Public Speaking).” Performance by Molly Burke, *Making the World Accessible Helps EVERYONE! (Molly Burke Public Speaking)*, YouTube, 14 Nov. 2017, www.youtube.com/watch?v=3kIfwE4vJrI&list=PL_Xm8PicNxr0PeFjdxoW3o6grBYFrt_tH&index=3.

LIST OF CHARACTERS

- “The Player”, Visually Impaired Person (Player 1)
- “Casper”, Yellow Labrador Retriever, Guide Dog (Optional Player 2)
- “Jenny”, 25-year-old female, Guide Dog Trainer, Non-Player Character (NPC)
- “Greg”, 33-year-old male, Senior Guide Dog Trainer, Non-Player Character (NPC)
- “Mother”, off-screen voice that encourages the player to progress through the game (VO)
- Orientation/Mobility Voice Over, Part 2 Mini-Game (VO)



Figure 1: Casper the Guide Dog in his Harness

CHAPTER PROGRESSION SYSTEM

Part 1: Opening Cut Scene

The game begins with a black screen and the sound of soft breathing- the player is stirred from sleep by the sound of an alarm clock beeping. The field of view blinks open and shut like eyelids as the player wakes up and shifts from lying in bed to sitting up in bed. The player can view a modest bedroom environment for approximately 2 seconds before the vision decrease effect starts. The room will be immaculately organized, any items on top of tables should look like they were placed with grid-like precision. After the 2 second period, the player’s vision will gently deteriorate to emulate the experience of a visually impaired individual. To prevent simulation sickness, this effect will be honed to allow the player to perceive light and shapes, but not crisp outlines or text. The cut scene ends with the player swinging their legs out of bed and grabbing a tall white cane with a red tip.



Figure 2: Blind Person Using a Cane to Navigate

Part 2: Learning to Use a Cane

Coming out of the cut scene, the player’s character stands up and motion control is passed to the player. The player clearly hears the voice of their mother calling downstairs that breakfast will be ready soon which prompts the player to walk to their bedroom closet (highlighted to appear brighter than other objects in the environment to attract the player) and pick out an outfit. There will be several options for the player to choose from, but each choice will appear in the same blurred style of the environment. After selecting an outfit, the player will be asked to navigate around the room to locate additional items such as a cell phone, wallet, sunglasses, and backpack before heading downstairs. The necessity of using a cane to navigate will be enforced through movement mechanics, such as mirroring the movement of

the cane with their mouse, that will allow the player to walk faster when they choose to use the cane compared to not utilizing the cane.

Part 3: Orientation and Mobility

The player is transported to a living room adjacent to the kitchen where the mother's voice off-screen tells the player that food will need one more minute. The voice will then prompt the player to test their orientation and mobility skills in preparation for meeting their guide dog. The player will be instructed to pull out the cell phone, unlock it, and start an auditory mini game. The player will be seated on a sofa where they can pan across the entire environment. To progress the game the player will be asked to correctly identify a series of objects in the room. Once the player has identified each object, they will be asked to play a second round that requires players to remember which side of the screen items were on. This will represent the increased need for visually impaired people to rely on memory instead of sight to locate objects. After completing the game, the player will be alerted that breakfast is ready by the mother and will walk to the kitchen to progress the chapter.

Part 4: Guide Dog Team Cut Scene

The scene opens with the player riding in the backseat of a car, passenger side, with their cane seated in-between the player's legs. Eventually, the car pulls up to a curb at front of the guide dog training facility. The player will hear the car door on their right open followed by dialogue from Jenny, a guide dog trainer, who will notify the player of the location of the curb in proximity of the car and ask the player if they want any assistance navigating to the front door. The player will then walk with Jenny through the sliding front doors of the facility to a hallway that strongly resembles a wing of hotel rooms. Jenny instructs the player to enter one of the rooms in the hallway telling the player that this room is where they will stay while they are working towards their guide dog certification. Jenny then describes how the room is arranged. Jenny assists the player into a chair that is angled slightly off center from the door so the player can see the room including the door. There is a knock and Jenny tells the player that she is going to answer the door because the player's guide dog has arrived. The scene fades to black as the sound of a door opening is heard.

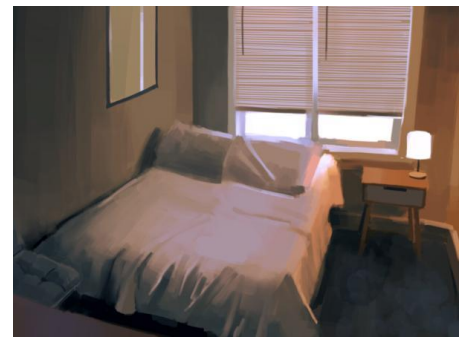


Figure 3: Dorm Room at the Guide Dog Training Facility

Part 5: Guide Dog Training

The scene fades up revealing Jenny walking a yellow lab, Casper, into the room. Jenny introduces Casper to the player, hands the player his leash, describes what Casper looks like, and shares a few character anecdotes about him. Casper sits in front of the player and they can move the mouse to pet him. The player will be guided through an interactive tutorial by Jenny that teaches the player to successfully put on Casper's guide harness. The player will be guided out of the room and down a hallway to a conference room with ethereal qualities.



Figure 4: Casper Sitting

Inside this area will be an obstacle course containing simple rectangular barricades that will teach the player to walk with Casper. Once the player can navigate a slalom-style obstacle confidently, the course will update to freestanding doorways that the player will direct Casper to find. The third mini game will instruct players to listen for traffic sound cues to determine if it is safe to cross the street or not. The environment will contain traffic cones for Casper to target in place of street poles. If the player attempts to cross before it is safe, the game will alternate between Jenny gently reminding the player not to endanger themselves and "obedient disobedience" from Casper who will not obey the command to walk forward. The final part of the tutorial will teach the player how to navigate stairs with Casper before declaring the player has passed guide dog orientation and is ready to work through situations outside the training facility.

Part 6: Crossing the Street

The player and Casper are transported to a downtown area where moderate traffic passes by. Players should feel like they are placed in a slightly nostalgic version of a shopping district that is lined with locally owned storefronts, trees, parking meters, and small planters. There is a universal quality to the street setting that will allow the player to feel confident navigating the space despite visual impairment. The player will be asked to cross through different intersections with varying levels of traffic. For each intersection, the player will tell Casper to find the intersection's curb and crosswalk pushbutton. After pressing the walk button, the player will primarily rely on traffic sound cues, like the tutorial level, to indicate it is safe to cross. Some intersections will feature a talking cross walk that will repeat "Walk", a countdown sequence, or "Wait" to assist player decisions. To create a variety of challenges one intersection with this feature traffic sounds will



Figure 5: A Street Intersection with a Wide Crosswalk

continue for a short period after “Walk” and another will include other people talking over the “Walk” command which will reward close listening.

Part 7: Navigating the Mall

Jenny begins the level by praising the player for working well with Casper and stating that the player is ready to take on a more complex environment. She describes a local indoor mall that the trio currently stand inside. Jenny challenges the player to locate a pet store that is located on the second floor. The player is given the option for Jenny to repeat instructions for climbing stairs before setting off to buy a bandana for Casper. In addition to the increased environmental complexity inherent with a two-story building, there will be additional obstacles like benches and groups of people. To prevent the player from becoming lost in the mall, Jenny will offer instructions and gentle redirection.



Figure 6: Escalator in the Mall

Up to this point the player and Casper have been sheltered from distractions and interruptions from members of the public who wish to pet service animals despite common knowledge that working animals should not be pet or distracted in any way. In this chapter, that reality will change. The player will have to stop and address people who want to pet Casper or offer him food. Interruptions will be tuned so they are frequent, but not so frequent that the player quits, and are counteracted by dialogue from Jenny that explains the frustration service dog handlers experience when people distract service dogs. Jenny will also encourage the player to continue progressing forward. Eventually the player will reach the pet store and receive a bandana that Casper can immediately equip.

Part 8 Interactive Epilogue: Certification Celebration

The final part of the game will open with a voicemail from Jenny congratulating the player and Casper for passing the Guide Dog Certification. Players are invited to a party to celebrate the hard work of puppy raisers, trainers, family, and the newly certified teams. The player and Casper arrive at the party but realize that the venue is very crowded. Casper will struggle to find a path between groups of people who are focused on their conversations and people who accidentally bump into Casper. Just when things seem futile, a gentle voice offers to take the player's arm and lead them to a quieter area where the player and Casper can sit without worrying about being bumped into. Greg guides the player to a quieter spot and brings the player refreshments. He strikes up a conversation with the player praising them for progressing through each chapter of the game. Greg asks the player to think about their experience by providing insight from the Blind community about working with a guide dog long term and the importance respecting service dog etiquette.

The conversation will encourage players to think about teaching others about what they have learned before someone announces that a group photo is about to happen. Greg guides the player to the backdrop and helps the player sit on a bench with Casper sitting directly in front of the player. An exaggerated camera flash is heard and the screen pops to a framed 4x6 photo of guide dogs, handlers, and other party goers. The player character is seated in the middle of the picture which slowly comes into focus as the hero shot is revealed, vision is restored, and the game ends.

Core Gameplay Experience

USER INTERFACE

Audio

For the visually impaired player's user interface there will be few visual elements. Because of their limited vision players will need to heavily rely on audio cues, dialogue, and the ambient soundscape. The game objectives and instructions will be given to the player through audio clips that can be repeated from a bound key. This is meant to further the experience of not being able to use vision to understand the world around you. While the soundscape will be slightly different for the guide dog character, the second player will also rely on verbal instructions from NPC's and the visually impaired player to successfully guide their handler through each level.

Visuals

The visuals for the visually impaired player would experience visuals similar to individuals with Retinitis Pigmentosa (RP). As in the case of a person with RP tends to only have the remaining vision of light and shadow. This means that they can see outlines if there is a lot of contrast. People with RP can also see things that reflect light like sequins.

The visuals for the guide dog would be done in a way that it helps compensate for the fact that there is a human playing that of a dog. The dog player will experience the color range that a dog would, and they would also have blurred vision around things that can be read like signs. To show that the guide dog is not focusing there will be more blurred.



Figure 7: Example of Limited Vision Because of Retinitis Pigmentosa

GENERAL MECHANICS

One of the things that makes Losing Light special is the usage of both the Oculus Rift headset and a keyboard for movement. In Losing Light the controls to walk are WASD or the arrow keys. Usually in PC games the player would use a mouse to help control the camera rotation. However, in Losing Light the player will be equipped with a virtual reality headset so movement will be controlled by the player physically turning their head in the direction that they want to look at. To prevent the player from losing touch with their keyboard, the game will be designed for the player to remain seated at their computer with important visuals limited to a field of view that is conducive to player's limited range of motion. The development team proposes using Unity VR or an equivalent engine to build this experience.

GAME CONTROLS

Losing Light is a PC game that utilizes an oculus rift headset to immerse players into the game environment in addition to a keyboard and mouse for movement. To navigate through a level, players would use the keyboard to walk forward or execute commands while using the oculus rift to look around the environment. Each playable character will have unique heads up display that ties into their character specific abilities. For example, the guide dog will obtain special power-ups that make a target object glow a bright yellow color while the rest of the world darkens which will help the player understand what the visually impaired player is asking the guide dog player to find. The purpose of the power up is to assist players and give them the option to decrease the difficulty of a task or receive a hint if they become stuck. This power-up will be available to use three times in each level to help the guide dog player through situations like finding a doorway, identifying a crosswalk button, or locating a seating area.

Universal Player Controls

Mouse/Cursor Movement
Headset Tracked Camera Rotation.

W/↑	Walk Forward
A/←	Walk Left
S/↓	Walk Backwards
D/→	Walk Right
E/Enter	Interaction with an object
Q/	Quest Key (Replay Audio)

Player One Specific Controls (Visually Impaired Player)

Sweep Mouse to Walk with Cane

1/	Guide Dog Command- Forward
2/	Guide Dog Command- Stop
3/	Guide Dog Command- Sit
4/	Guide Dog Command- Stay on Task
Shift/ + 1/	Find Door
Shift/ + 2/	Find Stairs/Escalator
Shift/ + 3/	Find Seat
Shift/ + 4/	Find Crosswalk Light

Player Two Specific Controls (Guide Dog)

Right Mouse Click to activate Hint

1/	Increase Speed to Match Player
2/	Decrease Speed to Match Player
3/	Focus Sight (10 second duration)
4/	Focus Hearing (10 second duration)



Figure 8: Two Versions of a Crosswalk Button

PLAYER ACTIONS

For each action below the visually impaired player would press shift/ and a number key in order to give the guide dog instructions. The instructions will be given as a short audible command and a one-word command on screen. For example, if the visually impaired player wanted their guide dog to find the nearest door both players would hear “find nearest door” and see the word “Door” onscreen. This recreates the dynamic between the guide dog handler and the guide dog by demonstrating how the guide dog relies on commands from their handler for both to move forward together. Additionally, this mechanic will enforce the importance of good communication and the trust that is necessary to complete tasks.

Find Door:

This command is used when the visually impaired player gives the command to find any door. The guide dog will hear the auditory command and become tasked with leading their handler to the nearest doorway. In some cases, guide dogs can learn to guide to specific places, but this command will generally function like the guide dog is trying to identify objects in a new environment. The visually impaired player will then have to reach out with their hand using their computer mouse to find and open the door. To simulate moving through the door the visually impaired player will need to click and drag their mouse forward or backwards to emulate pushing or pulling a door open. As in real life the player will have to guess which direction the door opens which could lead to potential embarrassment if the player guesses wrong.

Find Stairs/Escalator:

When the visually impaired player gives the stairs command, the guide dog will receive the instructions to find a set of stairs, an escalator, or an elevator. To find stairs the guide dog will lead their handler to one side of the staircase where the handler can use their right hand to hold on to the railing. The guide dog will also step onto the first stair to indicate they have found a staircase. For escalators, the dog will lead the user to the handrail again, but the user must figure out which direction the escalator is going and then decide whether to take that escalator or to find a different escalator. In the case of an elevator, the guide dog will lead the user to the up and down buttons where the handler will need to press the appropriate button.

Find Seat:

When given the command to find a place for the visually impaired player to sit the guide dog will be tasked with finding the nearest chair, bench, or other form of seating. It is up to the visually impaired player to figure out what kind of seating it is and if there is a person in the chair already. Once the visually impaired player established the orientation of the seat and if there is a person in the seat, then they can choose whether to sit down or repeat the command.

Find Crosswalk Light:

To successfully complete the crosswalk command, the guide dog has two jobs. The first job is to stop the visually impaired player from prematurely entering the roadway by stopping on the edge of the sidewalk at the intersection. The next task for the guide dog is to direct their handler to where the crosswalk button should be, but that does not necessarily mean that there will be one available. The visually impaired player will have to locate and press the walk button. The visually impaired player will listen for signals that they think it is safe to cross, such as low traffic sounds or verbal cues from the crosswalk signal, before commanding the guide dog to begin crossing the intersection. If the visually impaired player or the guide dog thinks that it is unsafe to cross either player can refuse to move which will stop both players from moving forward.

Arm Guiding:

In chapters where the visually impaired player is being escorted by their arm, the second player will be the human escorting them. This transition allows players to gain experience and better understanding about how visually impaired people prefer sighted individuals to offer them arm guiding. The human guide will guide from the left if the visually impaired person is not accompanied by a guide dog or from the right if they are with a guide dog. Sighted guides will offer their inner elbow to the visually impaired player and move forward together.

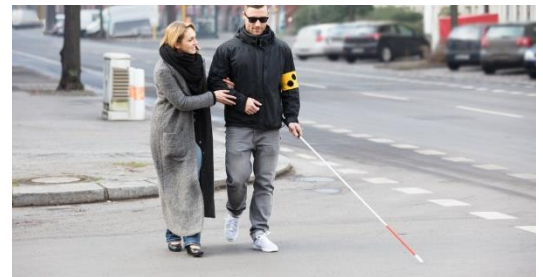


Figure 9: Blind Person with a Cane being Guided by a Sighted Companion