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Lighting Styles and Moods in Unreal Engine

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Lighting Styles and Moods in Unreal Engine

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A Culminating Experience

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In partial fulfillment

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Master of Fine Arts in Digital Media

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by

Maggie Shelton

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Jacy Richardson, Chair _____

Chris Wilson   _____

Todd Emma   _____

ABSTRACT

Lighting Styles and Moods in Unreal Engine

by

Maggie Shelton

This writing covers the process of lighting stylized and realistic scenes in different moods in Unreal Engine. Lighting can be used to express a mood in an environment, which can aid storytelling in films and games. Lighting in Unreal consists of positioning directional lights, sky lights, spot lights, point lights, and rect lights, as well as various fog effects that help create the ambiance of the scene. This project utilizes free Epic Games Pack content to show the lighting process for different moods in several environments. The use of lights and colors are an important part of designing a game environment which conveys moods and allows for playability.

DEDICATION

For Beverly and David, A.K.A, Mom & Dad. I would not have had the ability to teach on the collegiate level without your guidance to get my master's degree.

For Justin Frazier. You always did whatever you could to help me achieve my degree. You set aside your life to make our life happen together. My love for you and our dog-son, Louie, is insurmountable.

For Angel, who encouraged me to do the most I could possibly do and funded this poor college student in exchange for cleaning services!

For all my buddies in the Digital Media M.F.A. I cannot wait to see what you all accomplish in your life!

For Megan Smith. My lunch buddy and best friend throughout this entire experience. It was an honor being your desk neighbor throughout the program. Thanks for sharing a brain cell with me the whole time!

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Thanks to Jacy Richardson, Chris Wilson, and Todd Emma for being on my committee. Your feedback is what got me to the level of artist I am. With your help, I grew a lot as an artist in the graduate program for East Tennessee State University.

TABLE OF CONTENTS

LIST OF FIGURES

Chapter 1. Introduction

Lighting has been an integral part in storytelling for many entertainment mediums such as games and can be useful to guide the player. Lighting artists can utilize the descriptive words from writers to guide them to create the correct visual concept for an environment. How the lighting artist utilizes lights and color can make or break the feel of an environment. Using color theory, along with light intensity and saturation, is the key to creating an interesting environment. How do light and color affect the moods of environments?

When choosing a color for an environment, it is important to understand the meaning behind each color. Cool toned lights, like blue, can feel technical, clean, cold, whereas warm toned lights, like yellow and orange, can feel warm and inviting. Colors like red can feel dangerous, and green can often give off the feeling of sickness or mystery. Often horror games are known to be filled with darkness with noticeable shadows. The absence of light is a big part in making something feel scary or creepy. Adding a descriptive color to the scene can intensify the fear factor, such as adding a creepy red light to a dark hallway. In more light-hearted games, one might notice bright, colorful, saturated lights that make a scene pop.

Not only does lighting help sell the mood of an environment, but it is also a very important tool used to help guide a player around an environment. If an environment is too dark, the player will have a hard time navigating around the environment, resulting in little to no playability. For example, if a game wants a player to go through a door, adding a light source near that area tells the player to head in that direction. Without the light, the player may not know to go through the door. People find light sources safe and inviting, so this instinct is present in humans when playing games.

Lighting for games can be tricky because of playability. The actions of the player will determine how the light is viewed. This differs to films where a scene has pre-baked lighting that will not change and is based on the camera position alone. When lighting for games, lighting must look good in all angles of the environment because the player will traverse the playable area. There cannot be a source of light that appears from nowhere, or you risk un-immersing the player. Often in films, if lighting needs to be adjusted, lighting can be faked and added into the scene to make that specific shot look good.

To emphasize lighting and to compound its effects, lighting artists use tools such as atmosphere and post processing. Fog is an important key in many scenes. It can be used to create a sense of depth in an environment, or as a creepy ground effect to sell the mood. In post processing, a lighting artist can introduce a LUT, which can transform the environment into a specific visual appearance. LUTs are used in both games and film to add stylization. There are several other settings such as vignette, that the artist can use to complete the desired look in an environment. Vignettes emphasize an area on screen or make the player feel closed in due to it making the shot fade into the background without a defined boarder.

As a lighting artist, achieving well-lit environments that portray a specific mood is key. This thesis will research the vital effect lighting has on an environment and take into practice these principles. By utilizing free Epic Games environments, both indoor and outdoor, I will light several environments in different moods, and explain how light and color affect the moods of these environments.

Chapter 2. Research of Color and Light

How do light and color affect the moods of environments? There are several aspects to lighting for games, including the playability and mood of the environment. Light can be seen in everyday life, so it is important to get correct in video games. Studying how light and color interacts with humans will help lighting artists create the best lighting possible for these games. By changing hue, saturation, and intensities of light, lighting artists can achieve a multitude of lighting moods in games.

Lighting in Art

Lighting can be traced back to traditional artworks, as discussed in Niall O'Hare's (2021) article, *Painting Light, Drawing Space: William Black and the Incongruous Image of Architectural Space.* For humans, the effects of light and color are a subject of scientific inquiry, as discussed in research articles such as Geslin, Jegou, and Beaudoins (2016) *How Color Properties Can Be Used to Elicit Emotions in Video Games* and Knez and Niedenthal's (2008) *Lighting in Digital Game Worlds: Effects on Affect and Play Performance*. In addition, lighting also helps guide a player throughout the game experience, as discussed in Pluralsight's (2018) article, *Light Up Your World: How Lighting Makes All the Difference for Games*, Ronon Houze's (2019) article, *What is the Effect of the Lighting Design Process on Game Aesthetics and its Influence on the Gaming Experience*, and Ben Chandler's (2017) article, *A Look at Graphics: Using Lighting to Convey Mood*. Moreover, personal experiences with lighting in games are explored in Candid Games' video, *Color and Lighting in Video Games,* Naughty Dog's video, *Lighting at Naughty Dog,* Riptide's video, *How Lighting CHANGED My Game | Indie Devlog,* and Stylized Station's video, *How is Light used in Game Design?*

Human Instinct

In O'Hare's (2021) article, he dissects the makeup of William Blakes's Architectural Space painting. By looking at traditional art, lighting can begin to make more sense. O'Hare discusses the human instincts that correlate with light by stating, "Homo Sapiens have, through the evolution of sight, and embedded knowledge of light cues that they use to understand and make judgements about environments" (2021, pg. 1). Humans can typically tell whether a space is safe or not by its light. This relates to games because we can use the instinct humans have to give feelings of unease to the player. Adding dark areas or creepy colored lights can bring about those negative feelings when playing a game.

The use of light to evoke emotions in video games is a topic explored in Geslin, Jegou, and Beaudoin's (2016) article, *How Color Properties Can Be Used to Elicit Emotions in Video Games*. They argue that the way to keep a game interesting is by "exciting emotions and challenges" (2016, pg. 1). In their study, 85 participants were shown images of games that focused on "the general effects of hue, saturation, and lightness on the emotions of players" (Geslin et al., 2016 pg. 2). Participants answered back with the scale: Happy vs Unhappy, Excited vs Calm, and Controlled vs In Control. The results solidify that, "for the brightness of images, the greater the color Saturation is, the more positive the valence of these feelings is" (Geslin et al., 2016, pg. 7). Therefore, bright, colorful images create a since of joy, whereas desaturated images can induce fear or sadness. Lighting artists can use these results to their advantage to help sell the story the writer is trying to create. A scary game can utilize dark environments with dim lighting to achieve the spooky factor, or use bright, flashy colors to give a sense of awe to an environment.

Warm vs Cool Light

Knez and Niedenthal (2008) conducted a study to investigate how warm and cool lighting affects player performance in digital game worlds. The researchers predicted that "simulated warm (reddish) and cool (bluish) lighting in a digital game world would affect the player's feelings and game performance" (2008, pg. 2). It is known that warm colors can feel more relaxing and calmer, whereas cool colors can feel clean, cold, and put the player on edge. The study found that players completed the game faster when the warm lighting was added to the game compared to the cool lighting. The researchers suggest that the "color of light in a digital game world as in the real world [have an effect] on the psychological processes of affect and cognition" (Knez & Niedenthal, 2008, pg. 2). As a lighting artist, creating peaceful environments might look like a warm-toned place to fuel relaxation, where a scary or time-limited game could utilize cool tones to make the game play even more complicated and stress-inducing.

Games vs Film Lighting

Lighting for games involves a distinct process compared to lighting for films and images, as games must look good from all angles. According to Pluralsight's article, *Light Up Your World: How Lighting Makes All the Difference for Games*, "the lighting can often change based on the character's action" (2017, para. 1). The way the light hits objects at different places throughout the environment is an important thing to note when lighting. Pluralsight says, "In a movie, or anything pre-rendered, those challenges aren't really present" (2017, para. 1). Lighting in films is often adjusted to look good from one camera position, which means lighting can be faked in certain spots to make the shot look better. In games, a random light might look good from one angle, but not make any sense in another.

To take lighting further, we can use it as a guide for players in-game. Because humans have the instinct to gravitate toward light, we can use it to tell a player which direction to go. In the article, *What is the effect of the lighting design process on game aesthetics and its influence on the gaming experience?* Houze states that "directing a player's focus to important elements in a game by balancing saturation, brightness, and hue of objects in a level" is key to playability (2019, pg. 1). A lighting artist can "strategically [place lights] in the player's central vision to guide him" (Houze, 2019, pg. 1). If a player is in a dark environment, a bright light above a door could let the player know that is the direction they need to go in. Houze agrees that "using lighting to invoke fear puts the player under constant stress" (2019, In-Game Lighting Design section, para. 1). We can use desaturated, dark scenes to help achieve the feeling of fear.

Not only does a lighting artist have to pay attention to light, but also darkness or the absence of light. Especially in horror games, darkness is an important part of the fear factor that is evoked. In the article *A Look at Graphics: Using Lighting to Convey Mood,* Chandler explains that "darkness feels mysterious and dangerous to us, just as ample light feels welcoming and safe" (2017, para. 4). Relating back to O'Hare's article, this is the instinctual response from humans. Even mixing in colors, these dark environments can bring across other emotions. Chandler states that "green highlights – give a poisoned feeling" (2017, pg. 1). Other colors like red can give off a negative, hot feeling. Blue can be cold and clean. Stylized Station also comments on the effect colors can have on environments and human reaction in their YouTube video, *How is Light used in Game Design.* The speaker says, "red light can increase alertness and blue light promotes a relaxed ambiance" (Stylized Station, 2021, 04:15). A lot of lighting directly correlates with color theory.

How Light Adds to Games

   After knowing the technicalities of lighting, adding them to a game can make or break the look of it. The YouTube video *Color and Lighting in Video Games,* by Candid Games lists plenty of good and bad examples of lighting and how it changed a game. The speaker states that "lighting needs to feel stable and easy on the eyes" (Candid Games, 2019, 01:25). Often games have harsh lighting that blinds the eye and can make it uncomfortable to play. A lighting artist must balance aesthetics and playability when designing the lighting for a level. By adding too much light, it can make the game "lack sense of contrast" (Candid Games, 2019, 02:40). A good game has a nice blend of dark to light which can enhance the silhouettes of shapes and objects in the game. Not only can you blow out the lighting, but you can also under-light an environment, making it way too dark. While several horror games utilize dark environments, they are craftily made to still be playable. Candid Games says, "the last thing I want to deal with is pitch blackness. It creates less tension and more irritation" (2019, 03:07). If a player cannot see where to go by some light indication, the playability fails. Using a flashlight as a way for the player to get around in a completely dark game can be an alternative to making a very dark environment. Using windows to allow natural moonlight to come in can also help those moments when it can be too dark.

   Another game developer, known as Riptide on YouTube, explains the importance of adding lighting to their own game. In the video *How Lighting CHANGED My Game | Indie Devlog*, the author said that when he added lighting to his game "the color palette popped out more, and the player feels more like the center of the game" (Riptide, 2022, 0:27). The author took his game, that is based in a cave, and added lighting to an otherwise flat looking

environment. By adding a light to the player's torch and having the light falloff into darkness, it added depth to the environment and brought more focus to the player within it.

Lastly, lighting artists from Naughty Dog comment on the importance of good lighting on Naughty Dog's YouTube channel in the video, *Lighting at Naughty Dog.* Lighting artist Mark Shoaf of Naughty Dog states that "it is important to get [lighting] right because most people know what looks right, and it's our job to make sure it does" (2015, 0:20). It is very easy to make the lighting look incorrect, which can take the player out of the experience. The author of *How is Light used in Game Design* agrees with the lighting artists at Naughty Dog. The speaker states that "[a lighting artist's] work is completely critical to a game and when it is done well it goes unnoticed as it is threading every other element to build a believable environment" (Stylized Station, 2021, 04:41). In the YouTube video *Color and Lighting in Video Games* by Candid Games, he agrees by saying "[you] can't appreciate the details put into other aspects like colors, textures, and models" (2019, 02:36). When the lighting is done well, the scene becomes one and is complete. If lighting is done poorly, it can ruin everything else. Stylized Station states that "poor lighting will almost always catch our eye and dissipate the illusion" (2021, 04:51). As Riptide mentions in his video, *How Lighting CHANGED My Game | Indie Devlog,* "There is not a single place within [a] game that looks better without the lighting" (2022, 04:23).

Immersion

When examining the information presented in these articles and videos, it becomes clear that there is factual data demonstrating the different effects that light and color have on humans. We can take this knowledge that hue, saturation, and intensity has on humans and apply that to

video games. There are several genres of games that utilize this research that are available to play, today.

Games like *Super Mario Bros* and the Lego franchise are noticeably brighter with many colors which bring about joy and excitement. These games feature high levels of color contrast and saturation, which create a sense of excitement and energy. In the Lego franchise, you can see characters like The Joker being displayed with an almost neon green color. The green color gives off a corrupt sensation, and the saturation of the color lets you know this stylized game is going to be fun and lighthearted. Similarly, the Batman character is often depicted with a bright blue glow behind him in many Lego Batman game covers. Blue is known to be a heroic color, and again, the saturation helps the style of the game come across. If the game is wanting to come across as exciting, then using these techniques will achieve that goal.

Games like *Outlast* and *Amnesia* are fear inducing because of the use of darkness and shadows that play at our instinctual fears. A lot of horror games tend to be very dark with limited light sources. *Outlast* uses this fear tactic by only allowing you to see through the camera's night vision. This makes the player cling to its only source of visual guidance, increasing the anxiety the player has. *Amnesia: Rebirth* uses matches to light for a few seconds and the occasional torch or candle lit somewhere in the environment to make the environment not too dark and help lead the player to the correct destination. For example, in the game, the player has a fork in the cave. A light is placed farther down on the side that the player should go down first. Because humans gravitate to light, the player will most likely choose the direction the light is in in the cave. These games also use atmospherics to add to the fear. Adding fog to a dark environment can make it even creepier for the player.

We can use these concepts together in adventure games by making exciting gameplay brighter and inviting, then changing the tone of the game when the storyline changes to sad sections. You can see this in games like Uncharted 4 where the outdoor environments are lit beautifully. They have fog in certain places, and have a warm, sunny feel to them. In the serious and more intimate scenes within this game, the lighting develops a nice contrast with the shadows. A lot of the relaxing parkour scenes within the game are in beautiful outdoor environments. Then they change to desaturated and become darker scenes where the character is being chased or in trouble.

In conclusion, by altering the lighting for each scene, we can help immerse the player into the game and story. The best way to light a scene is by using the right colors and intensity of light to tell the story. By using lighting and atmospherics, a lighting artist can achieve the feeling and mood described by the author.

Chapter 3. Projects

For this research, I will be using Unreal Engine to create these projects. Unreal Engine offers free environment packs on the marketplace, which I have used as my environments. The main packs I used for the four environments are *Assetville Town*, *Infinity Blade: Grass Lands, Stylized Eastern Village,* and *City Subway Train Modular.* Additional packs I used for set dressing is *Edith Finch: Cannery and Low, Edith Finch: Edie Room, Advanced Village Pack, Hand Painted Environment, Deluxe Tropical Environment, Stylized Egypt,* and *Stylized Fantasy Provencal.*

Stylized Environment Lighting

For my first environment lighting, the stylized pack from Unreal Marketplace called Assetville was used as my environment base to light. This pack is free to use and comes with several assets and a demo world layout that resembles a town. For this lighting piece, I set dressed the empty barn within the town. My idea was to have a car bursting through the barn with bright, saturated colors to match the stylized assets and theme I was going for.

This pack has several resemblances to Lego games and movies, so I took inspiration from Lego Batman as reference for the color and mood for this piece. When looking at images of the Lego Batman Movie, there are several bright, saturated colors used in each shot of the film. Several of the shots are at night, so I made a nighttime scene with colors resembling the ones in Lego Batman to achieve a nice contrast that would allow the colors to stand out.

With Lego Batman being a stylized world, lighting is key to help sell the excitement and adventure of this world. If the colors were desaturated, it would not give off the right mood the Lego Batman Movie has. To make the viewer feel excitement and joy, I utilized the information in Geslin et. al's article that stated, "the greater the color saturation is, the more positive the

valence of feelings is," so I implemented the vibrant colors to mirror the film (2016, pg. 7). The Assetville pack characters and props resemble the look of Lego characters and props. Legos look shiny and plastic, so when lighting this environment, I made sure to keep this detail.

The first step in creating this environment was to find the camera angle I wanted and start placing the characters in the scene to roughly develop the staging of the scene.

Figure 3.1.

Basic Layout of the Barn Shot

By adding in characters that resembled car maintenance men, this tied in the theme of cars and a workshop barn. The red sports car stands out as the intruding vehicle because of its bright red color. The fact that it was a sports car gives the viewer a sense of excitement and chaos within the scene. To increase the sense of action, I implemented a composition based on gathered references of cars flying in the air.

After adding in the characters and the car, I needed to make the barn more interesting by set dressing it with the free assets that came with the pack. By adding in several signs to populate the walls of the barn, this added to the whimsy and fun of the scene, allowing for several colors of light to reflect on the plastic materials. I used my personal knowledge of decorated barns to give the barn an old look. This meant lots of clutter and stereotypical objects you would find in an old barn in the south. To make the environment seem old, I added tools, guns, ivy, and random trash. By adding some cardboard on the ground of the barn, it helped to break up the empty space. By not having dirt or spill spots, this added to the plastic Lego look, which balanced realism with Lego realism.

Figure 3.2.

Set Dressing the Barn

When the set dressing and overall composition was completed for the scene, it was time to make the scene more interesting by amplifying the lighting and adding atmospherics. I added point lights to the neon signs, spotlights to the car's headlights, and spotlights outside the barn door to illuminate the entrance. According to Unreal Engine's documentation on lighting, a point light "works much like a real-world light bulb, emitting light in all directions. Point lights are simplified down emitting light equally in all directions from just a single point in space" ("Point Lights," n.d.). A spot light "emits light from a single point in a cone shape" ("Spot Lights," n.d.).

My next idea was to add blue-tinted environmental fog to the ground to add depth and life to the scene. The blue tint contrasted with the yellow headlight color because it is opposite of yellow on the color wheel. This made it to where the left half of the image was cool toned, and the right half warmed toned. I added in some floating dust particles to add another moving element to the scene to give it more depth and life.

Figure 3.3.

Adding Blue Atmospheric Fog

There were some dark places within the scene that needed some more ambient light, so I added in a few point lights behind the camera to illuminate the dark foreground.

Figure 3.4.

Adding Ambient Lighting

Now that the foreground of the image was brighter, I defocused the foreground so the eye would be forced to look at the midground of the image, which consisted of the car and character on the left.

The light color in Figure 3.4 was a bit too desaturated for the look I was going for. Looking at images of the Lego Batman movie, I knew I needed to make my light colors more vibrant. The difference can be seen in Figure 3.5. where the light color has been updated.

Figure 3.5.

Increasing Saturation

The saturation gives off an exciting and fun mood like the scenes from Lego Batman.

Animating the Scene

Now that the scene's set up is completed, I added some slight animations to the characters and cars, along with a camera animation. With the scene animated, it helps immerse the viewer into the scene compared to a still image. I wanted this shot to look like the action was happening in slow motion.

I animated the shot by using the Sequencer Editor in Unreal Engine. The Sequencer Editor "gives users the ability to create in-game cinematics with a specialized multi-track editor" ("Sequencer Editor," n.d.). After animating the characters, cars, and pulsing lights, the finished result of this lighting look can be seen at the link below in Figure 3.6.

Figure 3.6.

Final Stylized Lighting Look

[(243) Lighting in Unreal Engine 4.27 - YouTube](https://www.youtube.com)

Mysterious Castle Environment Lighting

For this environment, my goal was to achieve a dark and mysterious feeling to the castle ruins. The free Epic Games content I used for this scene is the Infinity Blade: Grass Lands pack. The scene has a setup of Elven Ruins, which I modified by taking out some of the mountains to bring out the silhouette of the castle.

To make this environment feel mysterious, I made the time-of-day night. By choosing a green colored fog, this added depth and mystery to the scene. Often in Disney films there is a trope that "uses lime green to let you know the villain onscreen" which also symbolizes "evil magic" (Lewis et al., 2022). You can also see green in several Scooby-Doo episodes in which they use to give off the feeling of mystery.

The fountain statue stuck out to me as something I could use to catch the eye in the scene, so bringing in a bright green light to illuminate the statue made it stand out from the darker background.

Figure 3.7.

Statue Lighting and Atmospheric Fog

By raising the atmospheric fog to encompass the whole image decreased the ability to see, which added to the mysterious vibe. Not being able to see clearly gives the viewer a sense of what is to come if they explore. Next, I adjusted the color of the green that was illuminating the statue to have more of a yellow tint, since a lime green color has been used before to symbolize evil magic. By adding more green lights to the braziers in the background, this separated the castle from the rocky cliffs in the background.

Figure 3.8.

Darker with a Yellow Tint

Now that I had a better base of lighting, I needed to add some variation to make the image more interesting and balanced. Fire flickers which constantly change its brightness, so the first thing I did was add a variation to the brightness for each of the braziers. Adjusting the colors of each brazier light to either a yellow-green or blue-green adds more visual variation as well. This color change helped separate the statue lighting from the brazier lighting, so they would not compete for attention. Each variation I made added more depth while balancing the mystery.

I adjusted the color of the fog to be a green tint to match the overall color choice. By adding a magenta color for the ambient light, this complimented the green fog. Too much green could start to feel annoying to the viewer, so this added a nice pop of color.

Figure 3.9.

Color and Light Variation

Now that I had completed my lighting, I needed to add some fog effects to give the scene movement. I created a ground fog effect in Unreal Engine and placed the effect near the bottom of the castle ruins. This gave a more mysterious feeling, but also a feeling of unease because the fog partially blocks the view of the water, making it seem deeper and dangerous. I colored the moving fog green to match the atmospheric fog in the background.

Figure 3.10.

Adding Fog Effects

With the scene complete, I created several level sequences to add in camera animations, rendered the sequences out using the Render Movie Queue plugin in Unreal Engine, and edited the sequences together in Adobe Premiere, where I added background music to add to the immersion of the video.

Figure 3.11.

Final Look

[(243) Mysterious Castle Ruins Lighting - Unreal Engine - YouTube](https://www.youtube.com)

Lighting A Peaceful Environment

For this environment, the Stylized Eastern Village pack from the Epic Games Marketplace was used. Instead of a nighttime scene like the previous environments, using dusk colors evoked the emotion of peace and relaxation. I researched colors of light, and found that in East Asian artwork, "red and gold together convey both happiness and prosperity" (Olesen, 2022, para. 13). By decreasing the saturation of a color to its pastel form, these colors can bring feelings of peace and relaxation.

To make this environment look like it is dusk, I got rid of the original day time lighting by changing the color of the sky and horizon to pastel blue and pink with purple clouds. Then I added lights to each of the lanterns, as well as a reddish-pink, hazy fog.

Figure 3.12.

Changing the Sky

Figure 3.13.

Adding Lights to Lanterns and Lowering Sun Brightness

The lantern material originally did not look illuminated, so I had to come up with a way

to brighten the texture of the lantern, otherwise it would look wrong if I placed a light inside.

Below, in Figure 3.14., is a before and after photo of the changes I made to make the lantern appear illuminated.

Figure 3.14.

Changing Lantern Material

To make this change, I investigated the material properties of the lantern. I added an emissive glow to the lantern by copying the setup for the Base Color into the Emissive Color. I changed the blend mode to Soft Light, which granted me the result I was looking for.

Figure 3.15.

Blend Nodes

After fixing the lantern material, I added some effects into the scene to add visual interest

for my camera animations. I added in falling leaves and mist from another free pack from Epic

Games Marketplace called Advanced Village Pack. Lastly, I adjusted the Post Process Material

that was within the Stylized Eastern Village Pack to get the right falloff of the atmosphere. I used

the Exponential Height Fog to add a red-tinted fog to the entire environment, but the mountains

lacked atmosphere. This Post Process Material fakes the fog that makes the mountains look

farther away by adding the fog look to them. I went into the material and changed the color to a

blush-pink to match the overall color of the scene. Next, I adjusted the Scene Depth Fog and

Power Depth Fog to get the right distance the fog started at and how translucent it was.

Figure 3.16.

Post Process Material Edits

The Scene Depth Fog node adjusts the distance that the fog starts at from the camera. If you increase the value of the number, the fog will start farther away. The Power Depth Fog acted as a node that adjusted the fall off of the fog.

My last lighting adjustment was within the Post Process settings. Here, I adjusted the saturation of the image to bring out more of the pink and red-tint. The saturation added to the stylized feeling. I added a small amount of vignette to frame the camera to center in the focus to the statue. To me, a faded boarder felt more relaxing than a harsh border.

After completing the lighting, the player can walk around and view the lighting from all angles inside the village, making this lighting set up great for games because it looks good at all angles.

Figure 3.17.

Final Look

Lighting A Sense of Fear and Unease

For the last lighting scene, I chose to light a subway car that would give off the feeling of fear and unease for the viewer. The pack's content is available for free on the Epic Games Marketplace and comes with a pre-lit scene of a subway car. I deleted all the existing lighting, as I am only utilizing the pack's model of the subway car to start the lighting from scratch.

As I reviewed the research of the effect color and light has on human feelings, I made sure to make lighting choices that resulted in the viewer feeling uncomfortable and distressed. In Geslin's et al. study, the researchers state that "if the video game environments are less saturated, the negative valence and the feeling of fear are higher" (2016, pg. 7). Therefore, colors that seem dull or drained of their color would decrease the feeling of joy in the viewer. The researchers mention the luminosity density as another important factor saying, "lower brightness induces a sense of fear" (Geslin et al., 2016, pg. 7). The darker the environment, the more scared a viewer can become because of our decreased sense of sight. This is a characteristic instinct of humans

36

that makes us feel in danger because when lacking one of the five senses, we have a lesser ability to defend ourselves.

With this knowledge in mind, making the subway lighting minimal and dark would make it feel scarier. I stared out with a faint yellow light that illuminated the seats and faded into the darkness as seen in Figure 3.18. I added atmospheric fog with a tint of blue to contrast with the yellow light, since they are opposite on the color wheel.

Figure 3.18.

Faint Yellow Light

There needed to be something of interest in the darkness of this scene to sustain the viewer's interest. I decided that a dark figure blocking another light, as seen in Figure 6.2, might help tell the spooky story I was trying to create.

Figure 3.19.

Adding Dark Figure

While this did add more interest to the shot, I felt that I could do something more with the

lighting instead of adding a dark figure. To make the lighting scary without the addition of an

object, I removed the figure and instead, went with a red light to draw in the viewer to the back

of the subway car.

Figure 3.20.

Red Light

Now the lighting was starting to create the uncomfortable effect I was trying to achieve; however, the yellow light started to not make sense within the shot. It was competing with the red light on what was most important within the shot. By removing the yellow light, it allowed the red light to be a guide for the eye.

Figure 3.21.

Removing the Yellow Light

After settling on my choices for lighting, I added a few camera movements to the scene to help immerse the viewer even more. I made a camera animation of the shot in Figure 3.21., and then added a second camera angle facing directly towards the back door of the subway car.

Overall, the lighting was a bit too dark in some areas, so I added a bit more ambient light to the scene. I animated the red light to flicker on and off to add suspense and help the viewer know where to look. The viewer should feel a sense of danger coming from the red light, and, within a game, if the player was required to enter the area with the flickering red light, it should make the player anxious and scared to go in.

While the scene had atmospheric fog in it, I added some thicker ground fog to the scene. This helped add more movement to the scene, since the fog floated around the ground.

The scene felt like the subway car was not actually moving, so to achieve that feeling of movement, I added yellow lights outside the subway car. The yellow lights quickly trailed down the sides of the subway car and contrasted with the blue fog in the interior. To attain this look, I

simply added a yellow-colored spotlight to each side of the subway car. I set two keyframes on the two spotlights. One keyframe was set at the front of the subway car and the other at the back. I adjusted the spacing between the keyframes to get the desired speed of the train that the moving lights were mimicking. After finding a good speed, I duplicated the keyframes to repeat, making sure that they were not perfectly timed one after the other to create more variation.

Since the lights were flickering throughout the scene, I went even further with the fear factor the scene was giving off. At the end, I turned off the lights, so the viewer was left with complete darkness. My goal was to peak the fear in the viewer at the last second.

For the camera animation of the three-quarter shot, I added a simple camera push. The head-on shot was where I felt I could get more creative with my camera animation. I had seen several uneasy feeling shots utilizing a "zolly" camera movement. A zolly is a dolly zoom, which is an "in-camera effect where you dolly towards or away from a subject while zooming in the opposite direction" (Lannom, 2023, Definition section, para. 1). This camera movement added greatly to the scene because a zolly "creates a sense of unease in the viewer, simulates a spatial warp, and can either shrink or extend distances based on the choice of direction" (Lannom, 2023, Definition section, para. 1). Other examples of a zolly being used can be found in Alfred Hitchcock's film *Vertigo*, where the zolly camera effect imitates the effects of vertigo.

After the camera animation was completed, I rendered out the animation in Unreal Engine, and edited the sequence in Adobe Premiere. Inside Premiere, I added in sound effects for the flickering lights, subway car sounds, and an eerie background music track to complete the scene. The results of the subway car lighting can be seen in Figure 3.22.

Figure 3.22.

Final Subway Car Lighting

[(243) Scary Subway Lighting - Unreal Engine - YouTube](#)

Chapter 4. Conclusion

After lighting these four different environments, light and color directly affect the mood of an environment. An environment can feel completely different if the intensity, saturation, and color of light is changed. As a lighting artist, it is up to the artist to take the artistic vision of the director and bring it to life within these environments by adding in lighting and atmospherics.

In the castle ruins scene, an important step I learned when lighting this expansive outdoor environment is that varying the multiple lights is very important to make the scene visually interesting. Each light would not be the same level of brightness in real life, so varying the lights gives the scene more personality.

The saturation of light depends on the style of lighting the artist is going for. Typically, stylized environments have more saturated colors and brighter lights, while the realistic environments have more muted tones to the colors. With a stylized environment, a lighting artist can push the boundaries of lighting, but in a realistic environment, the lighting must match what we see daily, or it can easily look wrong.

Another key element to good lighting is working with atmospherics. In all the projects I created, I used some type of effect to create better depth for my scenes. In the car scene, I used the Exponential Height Fog to create the blue fog, but also added in a moving fog effect for movement. The same moving effect was used in the castle scene and the subway scene. In the eastern village scene, I used a post process effect to mimic what atmosphere would look like, since I was already using the Exponential Height Fog to give the scene a red tint.

Lastly, the biggest point of lighting is choosing the right colors to give off the right mood for the environment. When I use bright, saturated colors in the car scene, it gives off a fun and exciting feeling to the viewer. In the castle scene, the misty fog and green lights bring the viewer

a scene of mystery, making them want to explore this dark castle ruins. In the eastern village scene, the saturated red tint in the scene with beautiful gold lighting allows the viewer to feel calm and peaceful. In the subway scene, the lack of lighting and harsh flashes of the scary, red light gives the viewer a sense of unease and danger.

All these aspects are what are needed to create a well-lit environment. Then, adding variation to the lights helps make it look more natural. Adding interior lights to buildings can bring more interest to the scene as well. Finally, adding fog or other atmospherics complete the scene and give it depth. To summarize, color, intensity, and saturation of light are what creates the mood of an environment.

Future Research

By learning about how light and color can affect the mood of an environment, more research can be conducted about similar topics. More moods can be explored by applying this research to any environment. This research can be used in different methods such as lighting for mobile games or utilizing other programs like Unity to light environments for games. Not only is real time lighting used for games, but real time lighting in Unreal Engine is becoming a popular tool to use in films. All these methods utilize the same principles when lighting.

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