Color and games

The effect of colors in the video game multimodality

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This master thesis builds on my own research I did in the semester assignment at Digital Culture 303. *Color effect. A look at the color use in the Legend of Zelda*. I have used the assignment ideas and bibliographic as a starting point for this thesis. I have also taken several text parts from the assignment and used them in this thesis to build upon. There is some work taken directly from the assignment and used in this thesis. This will be mention and referred to when used. Henceforth referred to as "Andersson 2018".

Abstract:

In the world of video games, several different elements have an effect on the player. The primary motivation for this study was to see what role colors have in creating affection to the player, as well as exploring how colors create a mood to the player and to what degree colors play in this multimodality.

The goal was to identify the different aspects of mood and emotion in videogames, and how colors are used to create a potential mood and emotion to players, and the role of colors in the multimodality. The different aspects in focus are semiotics, affordance, HUD, tropes, UI, music, action, shape, and form. This is to see how these aspects of the multimodality works together with colors to create mood and affection.

The method used in this thesis is combining both academic theories and analysis of different mainstream games. The main theories about colors related to mood, emotion, and affection are by Richard Coyne and combined with Plass and Kaplan theories. To explore the different parts of the multimodality, Gibson's theories concerning affordance and Peirce's semiotics tools were used to see how they related to games. These theories are combined with an analysis of different games to highlight what role colors have when alone and how they influence different parts of the multimodality. A survey was conducted that put different videogames figures and shapes combined with colors to see the reaction of the survey takers. The result was that colors combined with a shape and a form could create a reaction and affection in different players. An interview with a game designer was also conducted to see how game designers are using colors to create the mood and understanding to the player. The result was that game developers are designing games with colors in mind and using color as a tool to help the player, but the meaning of color and mood is not a fixed element.

Combining the presented theories, survey, interview, and the analysis, an argument can be made. The argument is that when it comes to mood, affect, and emotion in videogames, colors

does not have a real effect on its own, but combined with something else in the multimodality it can. In games, the focus is the gameplay, characters, world, actions, and not necessarily the colors. Color is a helpful tool to tell the player about the game by indicating something or to help amplify the mood. Color use are essential to make the player understand the game, but it is not completely necessary. Colors in itself cannot create mood, but can help amplify an action, object, settings, the mood, or emotion in the multimodality.

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Chapter 1: Introduction

1.1. The motivation for this study

The motivation for this study is the lack of research on the role of color in games, specifically on the mood and emotional aspect. There exists much research on color itself and on video games itself but not combined. Although color in digital media has been discussed and researched, there is little specific literature on the use of color in video games in particular. Color might have been overlooked as non-essential in regard to mood and emotional aspects in Video games. This is puzzling since the large distribution on phones, computers, and game consoles make this genre one of the most significant phenomena in digital media.

My goals are to contribute to filling this gap. I did try so by using work already done in digital media studies in general and applies it to a selection of video games and the analyses of an interview I contacted myself for this study.

My motivation for this study is, therefore, to look at what role colors play in video games and in digital culture. The field is extensive, and there is extended research of color and color use combined with psychology, but there is little research that combine video games and how color is used. This thesis is an attempt to combine these theories to see how if color has an effect on the player.

1.1.2 The research question

In today's age and in digital media, colors affect the everyday person through digital screens and devices. Colors are perhaps best used to help create a mood for the user. Regarding colors and digital media, what role does it play in a user's life – specific, how does it affect people's moods and emotions in digital media? Plass and Kaplan argues that color affects users. This can be seen in their chapter 7 of *Emotions, technology, design and learning* (2016, 138-139). They notes that the use of bright and dark colors and other variants of colors combined with shapes have an emotional effect on how children learn and use certain functions.

In Richard Coyne book *Mood and Mobility,* he points out that "while there is as yet no firm evidence that color affects mood, there are strong cultural associations. Color provides a

powerful metaphor for mood" (Coyne 2016, 180). Coyne argues that color helps set the mood for the user by playing a certain role in digital media

Based on these two theories, one can argue that colors can affect digital media as it has shown to connect to emotional learning. One can ask next, what role does color play in video games? Video games are a form of digital media that has the most user inputs and arguably the most use of colors to set a mood and an advanced learning environment. When writing and using *affect* as a term, the meaning is that it affect the player feels of something. This can for example be a connection to the game.

My goal was to explore what role, the color plays in video games when it comes to mood, affection and emotion in regard to the players. In this study, I explored whether colors are a part of a bigger multimodality that includes shapes, forms and interaction. Coyne, Plass and Kaplan are writing about how color works together with other elements in media and objects. I continued this look with the focus on video games since video games are a combination of several key elements in the multimodality.

Coyne is focusing on how the user is "intoxicated by colors" in a digital setting and color is a metaphor for mood, but what happens when the user plays with color and objects in a game? Do the colors affect the player as it is, or does it need to be supported by other elements? One can also argue that the shape and interaction is boosted by color to gain a signify to the player. With this in mind, I present the following research question:

> How best can we define aspects of the role of colors, and what role does color play when related to mood , emotion, and affection in video games?

1.1.3 Method used to explore the research questions

The primary method of analysis was a look at video games and colors to see how it is relevant to mood and affection. I did a theoretical analysis of video games and combined them with academic theory to make a case for argument. In this kind of analysis, one must look at the essential parts in the domain of colors in video games. The essential parts can be semiotics, gameplay and layout. the analysis that will include games from the legend of *Zelda* series, *Pokémon, Limbo, overwatch,* and others. To explore the relevancy, I also used a survey and an interview to strengthen my argument.

The aim was to explore the different domains and gain an understanding of how games use colors and to what effect, as well as how color works together with other moods and elements in video games to create a multimodality.

1.1.4 Data that are being used

The data I did use can be summarized into 3 points

1. Video games: The games I listed are chosen as I am familiar with them and can-do research on them as I have them available. These games are from different genres and are made for different age groups. The games are presented trough illustrations and is used based on the illustration and description of the games.

2. Survey. The thesis is also including a simple survey with a focus on the perspective of gamers and non-gamers and their opinions on the combination of color and form in video games. The questionnaire will focus on the results of the survey itself.

3. An interview. The interview is presented through a transcript. The interview I conducted was with game designer Solveig Møster, where I asked questions related to how and why game developers choose colors, as well as what developers think about the value of color and the emotional aspect

1.1.5 Academic theory

The academic theory I used is from the book *Mood and Mobility* by Richard Coyne. For the thesis I did focus on chapter 7 "Intoxicated by color", as Coyne has a focus on how colors are being used in the design and how color influences the user. I am using his text and explore how it works in video games. This is because Coyne writes with a focus on digital color as whole. I wanted to see how colors are viewed in an interactive media and video games to see how color works there. As Coyne writes "color provides a powerful metaphor for mood" (Coyne 2016, 180)

1.1.5.1 Plass and Kaplan

I am also using Plass and Kaplan's theories noted in *Emotional Design in Digital Media for Learning*, focusing on chapter 7 "Emotions, Technology, Design and Learning" Plass and Kaplan explore the connection between shapes and forms and the how colors co-exist with other elements. Plass and Kaplan writes about the emotional connection to color and object and how color can be a factor in preference. Plass and Kaplan are writing about colors in learning and how it affects people in a teaching and learning setting. When translating this to video games there is the factor of *understanding.* When it comes to color, mood and the meaning of understanding it is both about what the color informs the player and what the color are making the player feel. In games color are there to help the player understand where to go and what to press, but at the same time setting a mood and creating an understanding of what the mood of the game is, is it scary and bleak or happy and colorful? Plass and Kaplan argues that color helps this to kind of *understanding*, and this is a key factor on how to people learn and play. My question here is how the affection and mood work when the player is working with object in games?

1.1.5.2 Semiotics tools

For the semiotics part, I used Peirce's fundamental theories as presented in the book *Photographic Theory: An Historical Anthology* by Andrew E. Hershberger. My goal of using semiotics is to see how color is using different semiotics traits to get a certain value and or meaning in a digital setting and what the color tells the player and if color tells the player something. In almost all of the theory I did use semiotics as the overtone and it is important to see how it are being used. I will also use what Jason Hawreliak calls *Semiotics modes* in the video game multimodality in his book *Multimodal Semiotics and rhetoric in Videogames.*

1.1.5.3 Affordance

To explore multimodalities and the semiotics tools I did also use Gibson's *affordance*. Both James and Eleanor Gibson write about how affordance is the perception we have in the world and how objects are viewed. My question combined with the theory presented by Coyne, Plass and Kaplan theories to see how color creates affordance in video games and how objects

and the player are working together to an experience. What role does the color have in games to create affordance and mood and what create this value?

1.1.5.4 Other academic theory

Through my thesis, I have used other books and theories such as Aubrey Anable's *Playing with Feelings: Video games and affect*, to explore other views regarding emotion in Video games and how color is mapped in different research. This thesis is using the e-book version of Anable book. The main focus on the book will be from the chapter "Playing with feelings", as Anable writes about rhythm of play and escaping the world with a relevancy of color design. I also used Gilbert, Fridlund and Lucchina mapping of color. I explored also Nijdam's different theories about color mapping and emotion.

The questionnaire I created has a focus on Plass and Kaplan's theory about form and color and how they are connected. In short, I am using Coyne, Plass, Peirce and Gibson as pillars for my research.

1.2 History of color production

Colors are a natural part of human life and culture. When mammals first evolved, the first critical elements they could comprehend where three colors "In short, color first arose to help determine who ate dinner and who ended up on the plate" (Finlay 2007, 389).

Later in human history, colors were viewed as a status symbol as they could be taken from natural resources and had different monetary value on the color. In the "Roman Empire, purple dye for cloth was extracted from shellfish collected from the Mediterranean at a great cost" (Coyne 2016, 158). One might argue that the reason the color purple is seen today as a more valuable color is the early use of limited materials, compared to red or blue. The color red also has an important cultural and historical factor this is affected by the countless wars through history. If we go back to the Roman Empire we see that the soldiers used red in their uniforms . The color red is also used in flags as it represents the union and sacrifice of the people. Color had a value by its use and meaning.

In today's digital world, one can produce any color on a screen and on digital devices. Coyne notes, "On a computer screen, all colors are equal" (Coyne 2016, 158). When talking about today's world of color, there are three forms of values.

1:The first value is the original monetized value, where it is based on how hard and expensive it was to produce and obtain. One example is the color purple. Purple was a difficult color to produce and therefore difficult and expensive to attain. Purple was a color that was associated with wealth and had a greater value than other color.

2:The second value is the optics and physical aspect, where the definition of value is linked to the relative darkness and lightness of the color. This aspect can also be seen in digital colors, where the value comes from RGB triplet or HEX triplet. The value comes from the combination of the triples and how much value each of the triplet color is used to create a main color. The values lie in the color value. For example, White has the HEX color value #FFFFFF while Red has #FF0000.

3:The third value is how color creates value when combined with other elements like object, actions and meaning, as well as how it is being used to create mood and emotion.

This thesis will mainly explore the third value and see how color can create mood an affection in the multimodality with the help of other objects.

The change of this value has great importance for this thesis, as colors have always been a part of culture and the original value has become less important. However, that does not mean that the color is valueless, but that it has changed in parallel with the digital world. One of the main motivations for this study was to see how colors are used in games, but it is important to understand that the value of color has changed to help create importance. A color's role in digital media is to interplay and interact with other elements to create a greater value.

1.3 Video game color evolution

An example of color has evolved in video games can be seen in the original *Legend of Zelda*, where the developer only had 8-bits hardware to use in designing colors and gameplay elements. Limitations like this are why old games might look strange, but they used colors to balance the limitation. Mark J. P. Wolf writes in his book *The Video Game Explosion: A History from PONG to PlayStation and Beyond* that "Early video game graphic, with their

points, lines, and block color, often on a black background, coincided with minimalist, abstract styles of art." (Wolf 2008 ,18) This design goes form old black and white game to color games like the *The Legend of Zelda.*

An example of this can be seen in the water in the *The Legend of Zelda*, as the default water design is blue with small white dots. If an enemy approaches the player in the water, they use colors to create an illusion of water movement. Other colors used are light brown to sand and green for the trees. The player recognizes the colors as they are familiar elements from real life. The colors are used to create shapes that are difficult to be realistic in an 8-bit format. Another example of a game that uses this limitation is in the original *Super Mario Bros* game, where the clouds and bushes have the same sprite form, but the color makes the player see the difference between them. Color association the player has helps with the understanding.

The change from 8-bit to unlimited colors have changed the player's view of value. There have been several steps in this evolution and color in games has changed. Looking at the evolution of technology, the color red is just as easy to obtain as gold and purple. Thanks to this evolution, game systems have the option of creating unlimited colors. One can specifically see this development if we look at the first hit video game Video game *Pong* (Wolf 2008, 36) that was created in black and white, compared to today's big studio games that are photorealistic using maybe thousands of color variations in one frame. In this development has there been several points that are important to have a knowledge about. This is to see how color have been used to tell the player something.

It can be summarizing it in 5 points.

1:Black and white

In the early world of video games there where only two colors. The original *Pong* was only black and white. Here the colors role was just to contrast, it was a black background and the player did control 2 white blocks. Atari was the first one to develop *Pong* and soon there where similar games. (Wolf 2008, 55-56)

2: 2 to 128 colors

When the technology got better, color technology could be implemented. The developer used this chance to create more content for earlier games like *Pong*. Many Pong clones also included color, pink and green or similar color. The selling point here was that the base game

was the same, but it was called Tennis, football or ice hockey.

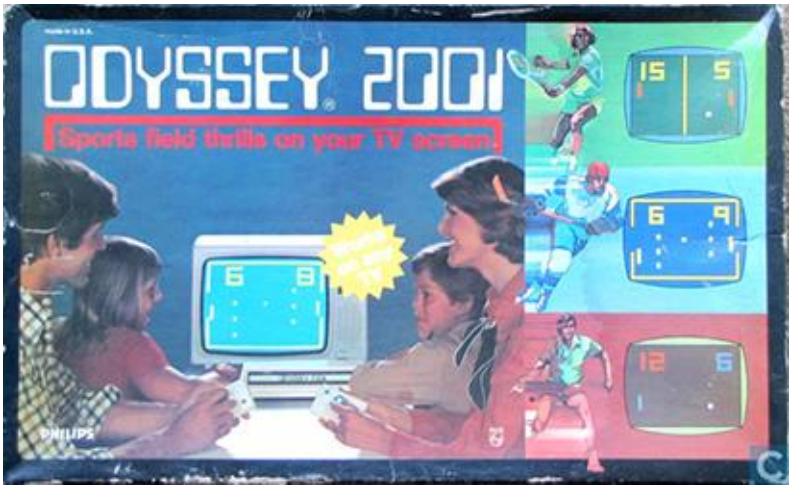

Illustration 1: The box art for the ODYSSEY 2001 (voxodyssey 2021)

The *Philips Odyssey 2001* released in Europe in 1977 and as one can see, it is still *Pong*, but it has different color and small adjustment in gameplay. As one can see on Illustration 1, The color changes the aspect of what the game they are playing, and one can use their imagination to see that, yes this is ice hockey and not tennis. This was one of the first changes in mood even though it was not a drastic change it led to more immersion.

The *Atari 2600* one of the big sellers in the gaming world. Atari 2600 had 128 bytes of RAM (Wolf 2008, 23). This made it one of the strongest consoles at that time. The game *Pitfall* is a nice example of how they use different color to create visabiluty and contrast based on what color and harddrive they had avilable.

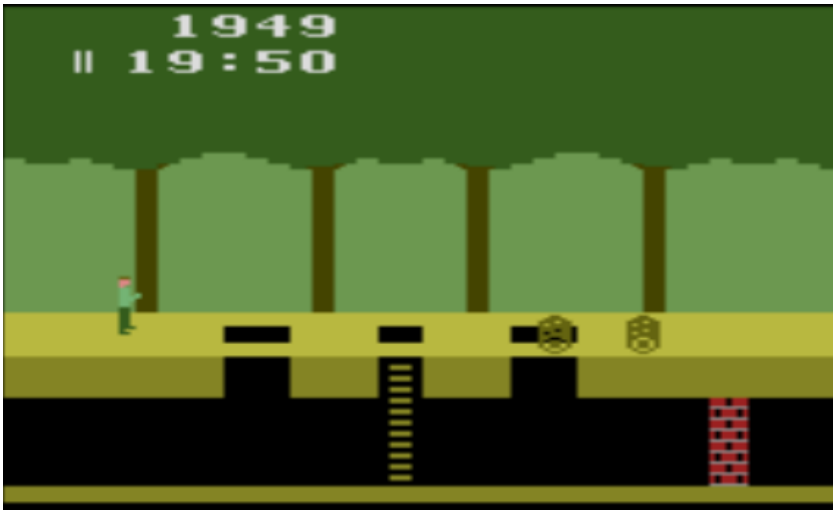

Illustration 2: example of the color use in Pitfall

3: 8-bit

One important thing to note is that 8-bit does not mean eight colors. Patrick Diskin explains how the color palette works on a Nintendo Entertainment System in the "Nintendo Entertainment System Documentation".

> The NES has a colour palette containing 52 colours although there is actually room for 64. However, not all of these can be displayed at a given time. The NES uses two palettes, each with 16 entries, the image palette ($3F00-$3F0F) and the sprite palette ($3F10-$3F1F). The image palette shows the colours currently available for background tiles. The sprite palette shows the colours currently available for sprites. These palettes do not store the actual colour values but rather the index of the colour in the system palette. (Diskin 2004, 18)

Figure 1: Showing all the color an NES could produce(Diskin 2004, 45)

When Nintendo developed the first *Legend of Zelda,* they had 52 colors to use in the game, but as seen in Figure 1, the colors are very similar and there are differences in light and dark. Games like the *Super Mario* on the *Nintendo Entertainment System* are using bright colors to make the characters different and visible. One example of this is the second playable character Luigi who is white, and green compared to Mario, who is red and brown. The playable character Mario is a good contrast with either blue and green or the white and black background of the game. This contrast also includes shapes and interactions, as they had to use precise forms and colors to make the shapes contrast with each other. This contrast is why Mario has a mustache, to give his face a more face-like shape. The main colors of the game are displayed in 16-color RGBI palettes (Red, Green, Blue, Intensity), as it could use 16 colors of the combined 52.

4 :16-bits and arcade

After NES, success the gaming marked was set to advance in both technology and in game quality, so the next step was 16-bits. Nintendo's follow up console was the SNES (super Nintendo entertainment system) . Based on Paweł Grabarczyk text about the console war . The SNES had a full list of 32,768 color there it could produce 256 simultaneous colors at once. SEGA was on of Nintendo's biggest competition in this 16-bit era and their console SEGA MEGADRIVE (SEGA GENESIS in the US), The machine could produce 512 colors. The Genesis had up to 61 colors on the screen.(Grabarczyk 2018)

This console war between SEGA and Nintendo resulted in that they pushed each other to make the most out of their hardware and make the most appealing game. Graphics in games and especially colors had a big change between 8-bit and 16-bit. Everything could now be changed and have a better effect. In illustration 3 and 4 we see the difference in both the background, character sprites, dialog and on the overall game, how much the upgrade did for the look of games. Color could have different shades that give more details and give the feeling of dept and volume.

Illustration 3: The jump between 8-bit and 16-bit in The legend of Zelda series. The Legend of Zelda

Illustration 4: The jump between 8-bit and 16-bit in The legend of Zelda series. The legend of Zelda: A link to the past

At this time arcade machines were a huge thing. People who did not afford consoles or did not have the opportunities could go to arcade machines around at mall or halls that had them and play games. In the beginning arcades games where games like *Pong* and *Breakout*, but thanks to the development in technology games did soon evolve to become better. Mark J.P. Wolf writes that

> An increasing number of arcade video games were being made in color, and color games outnumbered black and white games for the first time. One game of 1979, Namco's Galaxian, was the first game to have all of its color in true RGB Color. (Wolf 2008, 43)

This is important since the player wants to gain something while playing in the arcade. This was the reason that many arcades game was: *fighting game, beat em up* or *shoot em up*. This is because these genres make fast and spectacular action that the player enjoys and want more of. The use of a high score helps the player come back to the game. The colors role in the arcade was to draw people in to play the games. A game round cost money and the developers needed players to play their games. The colors needed to be appealing and the games needed to look and play cool. Therefore, a colorful action was a selling point in the arcade.

5: 64-bit and 3D polygons:

After the 16- bit console war, developers like SEGA and Nintendo wanted to create the next step in video game evolution, and that was 32 and 64 bit. SEGA had their 32-bit console SEGA Saturn and Nintendo followed up with the Nintendo 64.

The big change to N64, Sega Saturn and the PlayStation was the use of 3D graphic and polygons. Most game before this time was 2D games there the player was limited in action and movement. Now game developers could create full 3D world and 3D characters that could explore different places more freely. This technology jump allowed more power to the game developers

For our research in color the two biggest jump is how they used 3D polygon graphics with texture mapping. Using Leonard Herman writing chapter 26: "The later generation home video games systems" in Mark J.P Wolf book (2008, 162-165) We see how he is describing the upgrade to 64 bit and 3D impacted. This changed how figures and color worked and how changed the viewing on games. Even though the N64 and Sega Saturn used cartridges, the CD-ROM did become the new standard going forward and all consoles after having used it. When it comes to color, the lighting did get a big upgrade since one could now give somewhat normal lighting based on where the light source was on the 3D model, instead of needing to simulate the shading on the sprite. Lighting and shaders change how the figures and game model reacted to light and color and was easier to manipulate. (Herman 2008,162-165) Instead of having many different sprites that tried to emulate different lighting this could now be done in real time on game models thanks to the texture mapping and a in game lighting source. Also, going to 3D changes the whole gameplay and how people explore the environment. Colors in the UI and similar elements needed to change with the environment.

Illustration 5: showing 3D environments on the Nintendo 64, The legend of Zelda: Ocarina of time

Illustration 6: showing 3D environments on the Sega Saturn. Panzer Dragoon Saga

Illustration 7: showing 3D environments on the PlayStation. Resident Evil

These three illustrations show how these three consoles are using 3D graphics to create a feeling of dept, lighting on texture and overall mood. With the change to 3D the role of the color changed as well. The color is most likely a similar aspect to show the player the world, what different aspect of the world is, indicator to where to go and what button does what, but in a 3D world it is also important to make better contrast. One person can see that a pillar is a pillar without the color So, in this evolution lighting, depth and contrast was the biggest evolution to color use.

6: Modern console:

If we compare old games to new ones, there are now thousands and thousands of pixels in a single frame in games, instead of sprite reuse and color tricking. Developers today focus on light and photo-realism as technology has advanced. This technical change has created a shift in the value that colors once had. Coyne's comments on this "Colors is now easy to manipulate. Anyone with access to a computer and display screen can present and manage colors, and all colors equally;" (Coyne 2016, 158).

When compared to the newest console created by Nintendo, The Switch, colors have a new value and meaning, as games can have any type of color. This way, the color plays a smaller role as games does not need it to create practical illusions to entertain the player.

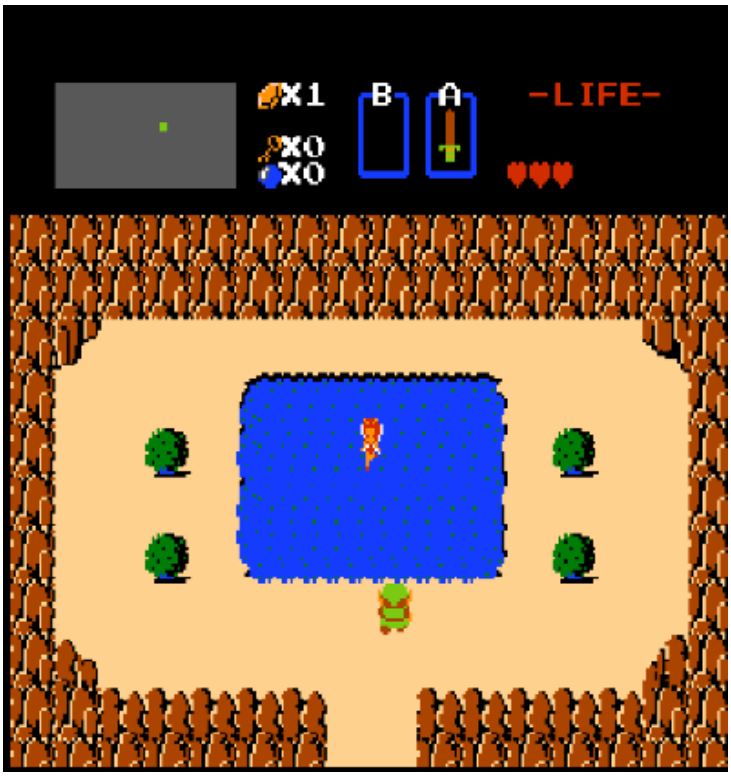

Illustration 8 : Water in The legend of Zelda (1986)

Illustration 9 : Water in Tomb Raider (2015)

An example of this is evolotuion can we see in Illustration 8 and 9, from the game *Legend of Zelda*(1986) and *The Rise of the Tomb Raider.(2015) In* both of the illustrations the player is facing water, and the games use different ways to illustrate it. In the first Illustration from *Legend of Zelda,* the developers use blue and contrasting colors to illustrate the water for the

player. In the second Illustration from *The Tomb Raider* game, they use a cinematic realistic method with waves, light and color. The value of the colors of the water is not the same from the different games, as the color is only playing a supporting role to help it make things clearer. In both games, the color plays a role in telling the player that it is water, but using vastly different methods. Color still has a meaning and a value, but as technology advances, the colors are now working together with other components to make things look better.

The value of color lies within its use with other elements and modes, as it lies in its use and it tells the player something about the in game reality. Even though it is possible to have every color one wants in a game, it is how the color is used that creates the value.

Technology has changed how color is being used compared to the old 8-bit days. The colors were used to contrast characters, and the gameplay and background used simple sprites. The color was used to represent a certain object from real life to make the player familiarized quickly with the game. An essential part one can take from this is that using bright colors and contrast is still a method that is used today, which I will be exploring later in the thesis.

Chapter 2: The role of the color

The focus of this chapter will be on how color is used in games and what role they can play, as it is important to look at the value of color when they work together with other elements and moods. To explore the value of the colors when they work together, the thesis is using different theories that will be explored through five main points: Affordance, Indicator, color semiotics in the UI, color as a trope, and color and connection to emotion.

When exploring these five point, I will touch upon what Jason Hawreliak calls *Semiotics modes* in his chapter "The videogame modes" *(*2019, 45-74) These includes, but are not limited to: User Interface , Text, Lore, speech, Images, moving images/animation, sound, sound effect, music and feedback. In the thesis as whole, I will be talking about these different modes in a certain way. Player feedback includes action, animation is a part of what I describe as gameplay and affordance and so forth. It is important to know that even though I do not mention all of these semiotic modes directly, they are all included somehow in analyses of the multimodality.

The reason for focus on these five points is to move along an analysis field to see how color can work on different aspects with a focus on human affection. This is because colors are telling something about the digital aspect, the personal view on color, biological limitations to humans to view color. These five different aspects are used to see how the player are exploring colors in a digital setting. To explore this, we are using these five points. All these five-point even though they are different they all have similarities. They have a connection to semiotics, and semiotics is the overall theme in all of these. The goal is to see what role color has in games and what it means. Semiotics is then the overall concept of how to see this. These five points are linked in how color is helping to indicate something and, therefore, a big part of semiotics.

1. The first point is affordance, created by James and Eleanor Gibson. In games, there exists a constant state of affordance, as the player views the world and knows what it has to offer when exploring it. This is linked to *diegetic design* , which is what the player perceives in the game world. Affordance in games is about transforming the game state and the game goal based on what the player has explored in the game. The game change objective and shape when the player progress through the game and the affordance transform while the player plays the game. The focus in the first point is

how games use affordance is using color to give the player perception of what to do and how to play the game.

2. The second point is *color index*. The thesis is drawing its focus from Peirce**'s** semiotics on how colors can be used as symbols, icons, and index. The focus is on how colors are being used to indicate something while playing the game.

3. The third point is color clarity in UI (User Interface). The focus is on how color is used to make the UI and HUD (Head Up Display) clearer and more readable. Colors in UI and mainly in the HUD are used to create a better readability experience for the player. The focus on this point was through the question of how semiotics and color create this view to the player and to what effect.

4. Color trope: The main focus on the fourth point is how games use colors that are often linked to real-life or a trope. A trope is used to help indicate what is happening by using familiar elements. The focus is on how colors have become a trope, with the use of color symbolism by Jill Morton.

5. The final point is how color can be **linked** to symbolism and emotion. This is to see how people are a reaction to different colors and objects.

To further explore the five points, it is important to understand the idea of the elements in combination with colors. When it comes to mood, emotion, and affection in this thesis, it is based on what Coyne describes in his book *Mood and Mobility*. The focus is on chapter one, where Coyne writes about how emotion, affection, and mood works in the digital world.

> By most account, emotion has an object, it's a way of talking about effect by invoking causality, I'm angry about losing my files, sad about the flood damage, happy about your promotion, or afraid of the savage dog. Sometimes, we even say that the object or circumstance causes the emotion. Mood, on the other hand, is described as an effect without an apparent object or cause […] sometimes, we use different words for mood and emotions. Happiness is a mood, whereas joy is an emotion felt at hearing some good news. The emotion might trigger the mood. (Coyne 2016, 32)

The mood description includes Plass and Kaplan's theory about mood and emotion. Plass and Kaplan is using Russel theory to define it:

> Russell defines mood as an ongoing and a free-floating core affect that is generally not attributed to an object. An emotional episode typically has a shorter duration but a higher psychological complexity, as it also involves perceived affective quality and attributed affect. The feelings that people recognize in themselves as fear, anger, frustration, compassion, and joy are all examples of emotional episodes" (Plass and Kaplan 2016, 133)

At the hand of Plass and Kaplan's discussion we see the different emotions and moods that can exist in video games, thanks to the connection of color and objects. Plass and Kaplan theories are used as a steppingstone for further discussions and arguments in this thesis. There is also other research included in the discussion, but Plass and Kaplan's theory of mood and emotions is being used as the main template.

To define mood and emotion, one can describe it as an object one can affect. The mood is not in itself an object, but the things that surround it are. Coyne notes that it is something that you feel something about; angry, happy, or sad. This type of object is linked to emotion, but as Plass and Kaplan notes about mood, this is a more ongoing and free-floating core affect that is not attributed to an object. In Kaplan and Plass's case, emotion and mood work together, but emotion triggers the mood. The emotion can be several different objects that people have an attachment to. For example, people angry at losing files, happy to see a person. These are different kinds of moods there. The mood is not the object itself but the result of emotions being triggered. One can say that when these emotions are triggered, they create a mood.

When translating these ideas to games, there are countless objects, world characters, and other elements that can have the same object emotion that works together to create a mood. The question that arises is: What kind of role color has in the part of creating objects of emotion?

The importance of this question is one of the key reasons to explore the different points regarding video games, as to see how different object are working together with color to create something for the player. This something can be emotion, as games are a big multimodality with different objects working together to create different moods for the player. A game cannot create emotion by itself but with the use of different objects and game mechanisms.

When defining color, the thesis is including inspiration and ideas from the e-book *A guide to color symbolism* by Jill Morton to aid the thesis in explaining color symbolism. Following is an overview and an abstract of what Morton notes about color symbolization.

> Red: Excitement, energy, passion, love, power, heat, aggression, danger,
> Yellow: signifies Cheer, Coward, philosophy, optimism, egoism, gold, Sign for caution.
> Dark Navy blue: Symbolizes Professional, Intelligent, respectable, secure, and Sophisticated.
> Blue: Passivity, tranquility, cold, calm/coolness, trust, truth,
> Purple: mystery, Imagination Cruelty
> Green: Nature, environment, healthy, youth, spring. Feeling ill.
> White: purity, Innocence, newness, refinement and snow (Jill Morton 1997, 21-79)

In this overview, Morton discusses what different colors can symbolize and which ones are most looked upon. Morton also describes that the colors can have a different meaning when it comes to hue and culture. An example is the difference between dark red and light red. The reason for I chose these colors is that they are most relevant to the thesis. White, for example, can be in some places represented as life and purity, but in other places, it represents death. In ancient Rome, white was the color of mourning and is viewed through history as a color of surrender. (Morton 1997, 38-39) When writing about video games, it is important to be careful to create absolute definitions to color symbolism, as the cultural context has something to say.

These colors symbolic combined with the five points can create an *understanding* . As Plass and Kaplan writes:

> Several studies on multimedia learning have implied that different aesthetic designs can induce emotions and that these emotions affect users' performance and cognitive processes (Harp & Mayer, 1997; Mayer & Moreno, 1998; North & Hargreaves, 1999; Szabo & Kanuka, 1998; Tractinsky, Katz, & Ikar, 2000; Wolfson & Case, 2000). Other researchers found that the design of various multimedia elements, such as the visual design, design layout, color, and sound in multimedia environments, resulted in positive user perceptions about learning (Tractinsky et al., 2000; Wolfson & Case, 2000). (Plass and Kaplan 2016, 138)

Color and design affect the player performance and cognitive process. In games this is the *learning* and *understanding* of what happening in the game. The focused is how these five points are creating the *understanding* to the player and what the role have for the affect and mood.

2.1 Affordance in video games

When writing about video games, it is important to explore the correlation between affordance and what role color plays when exploring the game world. To explore this, the thesis is using James and Eleanor Gibson's concept of affordance. James Gibson notes affordance as:

> The affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or ill. The verb to afford is found in the dictionary, but the noun affordance is not. I have made it up. I mean by it something that refers to both the environment and the animal in a way that no existing term does. It implies the complementarity of the animal and the environment, (JJ Gibson 1979, 127)

In short, Gibson notes that affordance is about what the environment affords humans and animals. An example given by Gibson is that if there is a horizontal flat surface, and it is about a knee height, it can be afforded to be sat on. The environment offers you a bench, and you can afford to sit on it. To explore how affordance works in video games, the thesis is using Jonas Linderoth's understanding of Gibson's theories in Linderoth text *Beyond the Digital Divide: An Ecological Approach to GamePlay.*

In video games, affordance can be a helpful tool in the question of "what do I do know ?" Comparing this to real life, affordance can be a part of the environment. For example, if you are walking through a forest or petting a cat, you have a general idea of what to do and what you can afford to do. This is based on the understanding of James Gibson's theory of affordance. It is important to note that Gibson did not write his theories with video games in mind, but they can be translated. Affordance can be used to describe the perception of the player and what the player sees, and what the player can do. When discussing affordance in the context of video games, it brings forward an interesting aspect of how the player is in "two worlds" at the same time: one at home in front of the gaming device and as the player in-

game. The two worlds need to work together to create a better game experience for the player. There are multiple ways to create affordance for the player. It can be through the use of controllers, mouse or sounds that is translated to the in-game world and action made by the player. This is a part of learning about affordance. Eleanor Gibson is writing

> Humans, at least, must learn to use affordances. Some affordances may be easily learned: others may require much exploration, practice, and time. (. . .) Further development of expertise may involve learning to realize affordances unavailable to non-experts. A three-inch-wide beam affords performing back flips for a gymnast, but the affordance is not realizable by others; rock climbers learn to use certain terrains for support that do not appear to others to provide a surface of support. (El Gibson and Pick 2000, 16–17)

Video game players now learn of affordance in two ways, first is the controller that they use in the real world, the second way is the affordance in the in-game world. A major part of affordance lies in the gameplay, as the game gives the player different objectives, actions, and places to explore. When it comes to semiotics tool in affordance, they are there to tell the player what happening based on the rules of the game. Jason Hawreliak writes in his book *Multimodal semiotics and rhetoric in videogames* that

> Games typically have
>
> - Rules which dictate what is and is not permitted;
> - Victory and fail conditions;
> - Unpredictable outcomes.
>
> In other words, players need to know what is required of them to win or lose a game, and the outcome of the game cannot be predetermined. (2019, 26)

The games are using small and big cues to tell the player where to go and when to go. This can also be combined with semiotic index and indicators. Affordance helps the player to complete the game, as most games have in-built mechanic meant to be completed or achieved at a certain point; examples can be beating enemies, complete puzzles, beat scores, etc. Linderoth notes about the subject:

> Some of the affordances that the player discovers during game-play will be acted upon. The player takes these performatory actions in order to achieve something in relation to the challenge that the game presents. Some actions will have a direct effect on winning or losing the game, achieving the personal goals that the player has set up. Shooting a puck or ball against a goal, attacking other players in multiplayer shooter games, jumping over some obstacle in a platform game, playing the highest card in a trick-taking card game, and so forth are all performatory actions taken directly against some goal. Many of the actions a player engages in during game-play have a transformative aspect, in that they can create new opportunities for other actions. (Linderoth 2013, 7)

The game creates a narrative for the player in what kind of actions he/she should take. Moreover, the affordance is transforming so the player can take new actions and experiencing a new perspective in the gameplay. Combining affordance and semiotics, one can make an argument that games use semiotics to tell what the player can afford, as to what objects can indicate, and what actions the player can afford. Regarding colors and affordance, one can argue that color is working together with and is a part of index and semiotics since affordance indicate something about the game world. Affordance are using colors to help the game tell what the player can do. Affordance is also perceptive of the player's actions and items in the world, and the color is an indicator of what is more important than other elements in the game. A common example of this, found in several games across different genres and platforms, is how the climbing mechanic works, as the game tells the player what is climbable. In a newer game such as the *Rise of the Tomb Raider*, there is white paint on the walls that are climbable, compared to the game *DOOM (2016)*, they use green light on the ledges to help the player see where to jump.

This is the role of the semiotics and affordance to present what the player needs to know about the game. The color is present to help the player with affordance and to tell them that it is the right direction to take in the game. An interesting thought from this color present in the game, is it only present for the player, or was it someone from the in-game universe who painted the color there?

2.1.1 The Non-Diegetic design

On the subject of gameplay, color, and affordance, let us cover the term n*on-diegetic*. In games, there can be different colored glow-effects on objects to indicate importance and value. This is linked to the use of icons, as the difference between diegetic and non-diegetic are explained by Ioanna Iacovides with et al: "Game interfaces consist of both diegetic (that can be viewed by the player-character, e.g. the game world) and non-diegetic components (that are only viewed by the player, e.g. the heads-up display)" (Iacovides, et al. 2015, 14)

The differences between the two terms are what the player experiences in the game world.

Illustration 10: Showing a normal view with the non- Diegetic gameplay elements in play

Illustration 11: Showing the difference without the Diegetic gameplay elements active

Provided above, there are two in-game screenshots from the game *Overwatch*. Illustration 10 shows non-diegetic elements, and illustration 11 shows the game with non-diegetic elements removed. The non-diegetic elements help the player control different aspects of the game. If you remove the elements, it makes the game more difficult to understand. Firstly, the HUD is removed when the non-diegetic elements are removed. The player has no control of their health, ammo, or ultimate counter. Secondly, there are certain elements in the game arena that are marked for the player that I removed. This way, the player has no information on their current objective to win the game. The third thing removed is the colors that indicate who is your team-players and whom the enemy is, thus making the game almost impossible to play. Non-diegetic elements shown through color can be crucial elements to help the player play the game, as seen in *Overwatch.* In other games, non-diegetic elements can be used to help the player get a better understanding of what to do next.

Illustration 12: How color is used in a non-diegetic way in World of warcraft

In the game series *World of Warcraft (*also known as WOW), the NPCs (Non-Playable characters) have some sort of symbol above their character to signify their importance. The color is present to signify to the player that they need to talk with this character to proceed in the game. If the color and symbol are not present, the game would be harder to play as there would be no clue to the player on what to do next. One can argue that removing the non-diegetic elements makes the game more realistic and challenging. On the other hand, is there a need for more realism in a game where you fight dragons and other fantasy creatures? The affordance is present, so the game is easier to play and experience for the player, as seen with the green light ledges in *DOOM*. It is important to guide the player and not let them get stuck, so the gameplay is more enjoyable. On the subject of color and non-diegetic elements and how they create the best possible game experience for the player, Linderoth notes about affordance: "these things exist in relation to one another in a layout, a structure of the environment. This layout is constantly changing as events occur and things and people move, change, disappear, etc." (2013, 3)

From the view of the player, it is important to see the structure of the game clearly to be able to play through it. One can help the player see this structure with the help of diegetic colors, as the player sits in real life watching different parts of the game have unique colors. These colors can be from a yellow text telling them to push X on the keyboard to open a specific door. Another color can be red from a bar representing the life of a boss that the player is fighting. The text that tells the player what button to press is a non-diegetic element, which is

an important aspect of affordance, as this text and figure is not part of the in-game world but is rather something that exists between the game world and real life for the player to experience. It is an overlay text that gives the player information and offers guidance, as games and technology have become more advanced by years. One can argue that this form of affordance is present in the game to make the gap smaller between the player and the game, as one of the best experiences is when you are fully immersed in the game world.

One can summarize by explaining that non-diegetic elements are a component that only the player can see and is not a part of the game world. In the context of color, the use of non-diegetic color elements is often used as markers in the game world to indicate certain importance. Enemies are often linked with a red non-diegetic color represented via either a health bar or a red outline around the character. A friendly NPC can have either a blue or green hue around them. Non-diegetic elements are important when talking about the player's understanding of the game world, as it indicates where to go and what to do.

2.1.2 Affordance in game mechanics

Already stated in the thesis, affordance is everything the player sees and experiences when playing a game. The experience can be through the HUD indicating health or a map indicating where the player should go next. In several games, one can see affordance used as a game mechanic. When game designers create games, affordance is not perhaps in mind but is a result of implementing things the player can do. When discussing game mechanic, it is in that sense in what the player can do. How the player controller the avatar and how the player behave in the game environment. Examples of a game mechanic is swinging a sword. Running, climbing walls, or killing enemies.

Using affordance as a game mechanic can be, for example, when solving a puzzle and when triggering the right elements, a sound can be heard, or when you are low on health in the game, a red hue is seen around the screen. In some games, like *Predator Hunting Grounds,* the player has different abilities based on the character the player is controlling. In other games, there can be a "detective mode" where the screen changes color or the game tells the player clues one should be attentive to. An example of using different viewing modes can be seen in the game *Astral chain* created by the game studio PlatinumGames. In the game, the player controls a police officer in a sci-fi environment, and the player has an ability called to use an IRIS-scanner that gives the player a new view of the environment. This way, the

perspective of the player changes dramatically with the use of affordance. The player needs to take an action based on the elements that appear in the new view of the game. Gibson and Pick note about the subject of the performative aspect of action:

> The exploratory aspect of actions is concerned with acquiring knowledge about the affordances of the specific situation. The performatory aspect of action is concerned with realizing affordances that have already been discovered. (2000, 21)

Illustration 13:Astral Chain with a normal view of the environment

Illustration 14: Astral Chain with the IRIS-scanner view of the environment

To indicate to the player that a new affordance is discovered, *Astral Chain* is using color as a tool to tell the player that the perception is changed, and now they might proceed onward in the game. As seen in Illustration 13, the player sees a red wall and a floating red orb, compared to Illustration 14, where the affordance is added with the IRIS scanner. The affordance can be seen as the HUD changes color outline and showing yellow lines to indicate importance between objects that had no outline before, thus indicating what the player should do next. The IRIS-scanner is a key part of completing the game and is an important game mechanic as it gives the player different affordances. Linderoth notes about the subject:

> Thus, in a sense, action always reveals information about affordances, but it is useful to make some distinctions. As Gibson […] points out, it is important to recognize that some actions are performed with the purpose of gathering information (2013, 6)

This is what *Astral chain* is about, gather information, change the affordance, and then complete the game objects. One thing worth taking talking about is how *Astral Chain* and all games is using color as tools. They are using color association to tell the player what the color means. The game tells the player what action and object the color is associated with. In *Astral Chain,* blue is the default color of the player, and red is the enemy. This gives the player association that blue is good and red is bad. This goes the same way in other games. This way of creating association gives players the affordance to know who the enemy is and how to play the game.

2.2 Color as an indicator

In this part we will take a deeper look at how semiotics is used to indicate something to the player. In the affordance part there where some mention about semiotics and index. Index and semiotics will be the key point in this part.

2.2.1 The User Interface design

A fundamental part of video games is the UI (User Interface) and how the UI are designed and developed so the player will have an easier time playing the game. The UI design is connected to two things: icon/symbol and color. The design of a UI starts with different icons and symbols that represent something in the game universe. For example, in *Legends of*

Zelda, where they symbolize the player's health. In first-person shooters, there are weapon icons that correlate to the real-world counterpart. Another classic example of symbols in video games is arrows on maps that represent the correct direction the player should explore next. In the following section, the thesis is using the first-person shooter game called *Overwatch.* The game was released by Blizzard in 2016. The second game that is being covered is the game *Hearthstone.*

On the subject of UI and HUD, it is important to know the difference. A HUD (Head-Up-Display) is used to relay game information to the player and is designed in a way to give the player information about health, timers, in-game objectives, and goals. The HUD design varies between game, genre, and game studios. The HUD is a part of the UI, while UI is everything the player (User) can see when using the game.

The motivation for choosing these two games is that they are great examples of how different UI and HUD changes from game to game and genre, and they are familiar with the author. Before discussing the games, it is important to define a couple of definitions. Firstly, semiotics, and to discuss semiotics, the thesis is using Charles Sander Peirce's theory as mention in the book *Photographic Theory: An Historical Anthology* written by Andrew E. Hershberger. In chapter 3.5 "Logic as semiotics the theory of sign" by Peirce. The text from the book is a reprinted version of Peirce's text.

Based on Peirce writing, an icon is something that represents something that is known "such as a lead-pencil streak as representing a geometrical line." (Peirce c1990, 01) An *icon* is something that the user already has a certain knowledge of. Regarding symbols, Peirce is arguing that "A symbol is a sign which would lose the character which renders it a sign if there were no interpretant" (Peirce c1990, 101). A *symbol* is something one needs to know the knowledge behind it to get the understanding of it, like a red health bar or a glowing dot on the map. Last is *index*. As Peirce puts it, "An index is a sign which would, at once, lose the character which makes it a sign if its object were removed" (Peirce c1990, 101). This means that index is working as an indicator of something that has or will happen. For example, footsteps in the snow or smoke out of a pipe. Without the footsteps or the smoke, there is no indicator of the sign.

To dive deeper into Peirce's definitions, let us look at chapter 6.16, "Impressed by natures hand: photography and authorship" written by Douglas R. Nickel, published in the book *Photography and Authorship: An Historical Anthology*

> An index, finally, is a sign caused by its referent, what Peirce calls a "correspondence in fact" between object and sign. Resemblance is not required, only modification through connection or cause and effect. The smoke rising from rising from a chimney will indicate fire in the hearth below,[…]
>
> As Peirce explains, an icon represents through likeness, through recognizable shared qualities, as when a drawing or caricature resembles its subject. […]
>
> A symbol represents not through resemblance, but through habit, convention or consent. For example, in English the word 'dog' is a symbol that stands for a certain kind of four-legged mammal, while 'chien' stands for the same in French (Nickel 2009, 401)

To explain the quotes further, a symbol is something we need to know the context of and what it means. Compared to an icon, that is something that represents something that it looks like, and people know what it is based on familiar knowledge. The index is something that indicates something. The importance of knowing the difference is to get an overview of how they work together when translating it to a new media, such as video games. Considering the use of this kind of semiotics is that it is easier to gain an understanding of why certain things work the way they are. Using Peirce and Nickel's view on semiotics, one can gain an understanding of what the three parts of semiotics do, as well as the groundwork for this thesis's inspiration from the perspective of a video game. Moving on, it is important to look at how other games and modern interactive media uses semiotics and how semiotics translated to games.

2.2.2 Digital color semiotics

The motivation for using Peirce's semiotics to explain how games are using icons and symbols is that they are present to tell the player what is happening on the game screen. A case to be aware of when it comes to Peirce's explanation is that the theories are created in the

late 1800s, a time when the digital world was yet to be born. Even though the theories are old, one can abstract them to a certain degree to be translated into digital media.

Moreover, in games, there exists an own set of semiotics. An example of this can be found through the classic red hearts indicating life. They are classified as icons from a game perspective as they have become a common object to be found in games. Talking about color symbolism, we can explain colors in games with the use of color symbols and index. Color is used to tell the player more about the in-game world and is often linked to different rules that are present in the game. This includes tropes, the rules of the game, and color designs. In games, symbols and colors are often linked to tell the player useful hints and key aspects of the player's status. Hawreliak writes that

> UI text can also provide important information about a player's status (e.g. health or stamina), inventory, ammunition, etc., […] It is essential to know how much ammunition each weapon has since running out of the wrong ammunition at the wrong time can prove fatal. (2019, 48-49)

Red hearts indicating the player's health, or a yellow arrow telling the player where to go. The color that is used often correlates with its real-life counterpart and what is a part of the culture in the country where the game is created. Green can be both poison and health, as red can be blood or rage. This type of color symbolism is to help the player see the important things and makes objects stand out. "A symbol represents not through resemblance, but through habit" (Nickel 2009, 401). This use of color symbolism is linked to tropes and what the player expects from certain objects and colors, which will be looked upon at a later time in the thesis.

Icons are used to show the player how things work in the game. An example of this can be seen through different level designs. Games usually have different levels, and the color of icons tells them how they are different. For example, if the game has a level picker screen, Games use icons to tell them apart with the help of color. If the level icon is showing a blue sky and a green hill, this might indicate that it is a ground level. Compared if the level icon shows a blue sky and a white hill. This might indicate a snow level. The color is used to help the player gain an understanding of what to expect before starting a level. Another use of colors on icons is, for example, in team-based games. The color has no extra power but tells the player the teams apart. This can be seen in games like *Fire Emblem*, with the classic red vs blue team colors. This goes back to the association of color.

In the context of index, color is often used as a game mechanic to tell the player something is happening thanks to an action. If a player eats a green mushroom and the character turns green in the face and loses health, it can indicate two things. Firstly, the player has been poisoned and is losing health. Secondly, the player has made a bad decision and is now playing the price of his action. Just as Nickel (2009, 401) writes about how smoke is rising from a chimney is present to indicate a fire in a house, like color change and loss of health in a game is cause and effect. This indicates that something is happening and what the cause and effect are. In this example, there is a negative effect, compared to when a player is healed, and the green color fades. Another example of color change is, for example, when the character gets cold or hot, the screen turns blue or red depending on the temperature change. This can also be seen in shooter games, where a player gets hurt, and the screen turns either bloodier or redder depending on how close to death the player is.

This way of using the color index is to help the player gain a better understanding of the game. The game could have easily had text pop up and tell them, but when using colors, it creates a better in-game dynamic and helps the player stay immersed. Index is also useful to showing different enemies or allies or the rarity of an in-game item. The association this creates to the game helps the player. This can be seen in the game *World of Warcraft*, where red is connected to hostile, yellow to neutral, and green to friendly.

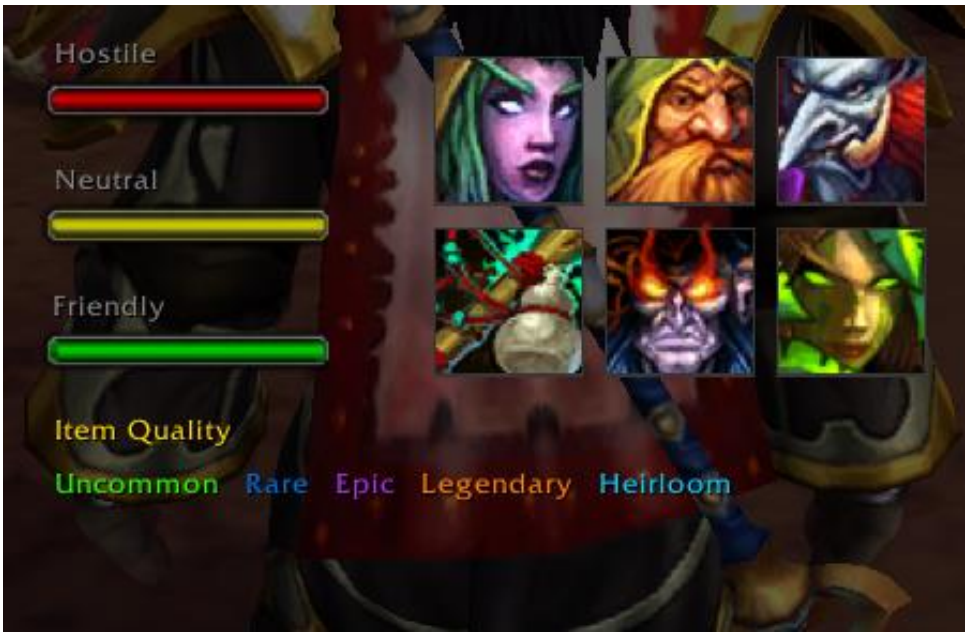

Illustration 15. How World of Warcraft is using color as indicators.

In the context of Peirce's theories of semiotics in regard to videogames one can see that it changes a bit from the original theories but can be used as a template to see how games are combining color with game elements.

2.3 Index in games

2.3.1 The HUD and color index in Overwatch

In the following section, the thesis is using screenshots from the game *Overwatch* to explain how semiotics can be used in games.

Illustration 16: Overwatch gameplay. It is showing the full UI and HUD of character: Soldier 76.

In illustration 16, one can see the HUD is mostly contained in the lower half of the screen. When looking at the bottom left corner, there is a character portrait icon and the player's health bar. The health bar is several boxes that increase and decrease when being dealt damage or being healed. This is relevant to what Hawreliak writes about the UI. It provides important information to the player about ammunition and health. (Hawreliak 2019, 48-49)

All of these elements create semiotic affordance to the player. The health bar can be argued to be a symbol, as you need to know the meaning behind it. One needs to understand what health is affected by, by learning to play the game. The same goes for the round symbol in the middle, which is the ultimate meter. The symbol is easy to see and is in the middle of the lower screen, thus indicating something important that needs to be viewed. This function is not unique to games but is not common in FPS (First Person Shooter). Its function is to show when the player can perform a special attack. On the right hand of the screen, there are several symbols that serve their purpose in informing the player of what kind of attacks the player can perform. The game has 31 different *heroes* – also known as playable characters, and all of them have special attacks and different ways of playing them. The hero in the screenshot is called Soldier 76, and the symbols on the right are functions that will give the hero more speed, health, and a special weapon ability. One can argue that they used contrast in the HUD design to make the symbols stand out from each other. For example, health is in squares. The ultimate meter is round. The gun is formed based on the character that is being used. The design needs to be simple, as the game is chaotic and is full of action.

If we move our focus to the top of the screen, there is a simple timer that is linked to the gameplay and the game mode. The other icons are linked to the game mode and the objective of the game. As mentioned earlier, the gameplay is chaotic, and that is why HUD is designed to be simple and not in the main view of the player. The game creators have created the best possible affordance to aid the player play the game. The affordance is split between the HUD and the gameplay itself, as the HUD cannot take too much space of the gameplay screen. The HUD gives the player all the information about the perceptive, while the player knows what to afford when taking action.

On the subject of HUD and color design, the same rules apply, as they are visible but not taking the same amount of attraction from the gameplay. The colors are used to highlight the essential parts of the HUD. For example, seen on the top screen symbol that represents gameplay objective, that is bright blue at first, as it is the team color. The same goes for the timer, as it has a yellow and orange color that contrasts with the rest of the HUD, thus making it easier to spot. The game also uses the classic red vs blue color scheme to indicate who is a team-mate and who is the enemy. Enemies have a red outline, and the team has no outline. The symbols that represent abilities are neither blue nor white, as it has a small contrast with the current color. The game has a lot of colorful elements and using white would have been

too much of a color change from the regular color palette. Other FPS games, like *Call of Duty*, uses darker color to symbolize weapons and abilities in the HUD. Since *Overwatch* have such a cartoon style, the darker color would perhaps have been too much of color contrast and would have been distracting to the player. It is also worth mentioning that when abilities recharge in the game, they are slowly filling up with a white color and have a flaming effect when it is full. This color index is to help the player see when they can re-use their ability.

The final object in the HUD is the ultimate meter. It is a circle form contrasted from the rest of the HUD elements and is the most visible object on the screen. The color is orange to create a contrast and is working to show the player that the meter is charging up. The ultimate meter will change slightly when it is full of a glowing effect, as well as a sound. The ultimate move is an essential part of the game and is different for each hero. It is a vital part that can change a loss to a win. The use of color, form, and numbers makes the use of this essential function clear to the player. All elements that have been mention are using color index.

Another object that is important to note is the status effect icons and the colors that are present while the game is on. The screen becomes purple when the player gets poisoned, and the screen has a flame with orange color when the player is on fire. This color change and effect indicate that something is happening, but it is not a part of the UI, but an effect that appears when the player's status changes. When the player is near death and low on health, the screen becomes increasingly red, as this tells the player to get help as soon as possible without looking at the health bar. The color index in *Overwatch* plays a crucial role in telling the player of their status without needing to look at the symbols. *Overwatch* has created their own color index with its own special indicators. For example, when a player is being healed or boosted, the screen gets a yellow flair with either a health cross or an upward-pointing arrow to indicate a boost. Yellow is not often associated with indicating health, but Blizzard has taken the color and combined it with familiar symbols and icons to create their own index that is not trope-based. It is also not a dominant color and is not taking too much of the attention from the game. One can also argue that yellow is more of a fit for the futuristic setting of the game.

Linderoth notes that

> Games with an emphasis on performatory challenges are described as: games that are designed so that knowing what actions to take is straightforward and obvious, but performing these actions is supposed to be challenging for the assumed player. Examples of games with an emphasis on performatory challenges would include most sports. In track and field events like pole vault, high jump, and hurdling, the challenge is not to know what to do; it is to do it better than all the other competitors (2013, 12)

Overwatch is built around the principle of performatory challenge, so you must be good or to "perform" to be able to play it. The question is then: why are color and semiotics so important? This can be explained by that both different icons and symbols work together with color to create an indication for something that is happening. The challenge and goal of the game are to win it either by killing the most enemy players or protecting a chosen objective. When the player is playing the game, the action of the player is transformed to the game state through either controller or a mouse and keyboard and thus making affordances available always. If you are victorious in a game round, the game state changes and making you switch sides with the enemy team. One can compare this to *Predator: Hunting Grounds,* where the human soldier team and the predators have two different affordances depending on which side, they play on in the given game round. The switch of sides during the game is because both teams get to experience the different abilities and change the objective of the game. The predator has a mask that gives the player heightened vision with an infrared view of the jungle game arena, as well as tools to help the player track down the enemy human soldier team. The human team has a mission and a goal, but their affordance changes when the predator shows up to hinder them. The human team needs to look for cues that are connected to sound and visual elements to get the overhand when fighting the predator. When comparing the two games, *Predator* relies heavily on affordance, and the performative challenges vary depending on what team you are on, compared to *Overwatch*, where this is not the case. One can also see differences in affordances in *Overwatch,* as the game has a lot of playable hero characters to choose from. An example of this can be the hacker hero *Sombra,* who has different affordances than the *sniper* character, who again has different affordances than the *healer* characters. The characters are all unique and play a key role in winning the game round, so if a round goes badly, one can try to change characters. This is like what Linderoth notes about this subject:

> Some of the affordances that the player discovers during game-play will be acted upon. The player takes these performatory actions in order to achieve something in relation to the challenge that the game presents. (2013, 7)

In some games, this is explained by in-game lore. For example, in the game *Predator: Hunting Grounds,* where the player who is in control of the predator can see a red outline of where he can climb, as he is wearing a predator mask, but without it, the red outline is gone. This kind of index and affordance is to aid the player to progress in the game. Indicators such as sound and colors are usually present in games to help the player gain the knowledge of what to do next and knowing when something has been achieved.

2.3.2 Color index of Hearthstone1

Moving on to the game *Hearthstone.* In this game you play a digital tabletop card game there you play against different players. For this thesis the game mode *Battleground* is used.

Illustration 17: A game of battleground in Hearthstone

[1] Parts of this chapter are taken from or inspired by Andersson 2018

Moving our focus to illustration 17, which is a screenshot from *Hearthstone.* In the game mode Battleground, the player is facing seven other players. The goal is to build a deck of seven-card that are in play and be the last man standing. This is achieved by leveling up the *tavern* and cards. A higher-level tavern, the better card you get. So, it's a game about planning and strategy to get the best card. Each player starts with 40 health points. When a player loses a round, the player that wins combines their tier with the surviving minion's tavern to get attack points and deal that total damage to the loser. So, if the player is tier four and has three surviving *minions* that is tier four, the total damage is 16. The game indicates taking or giving damage with minions attacking the other minions. When the player icon is attacking the other player, the icon is floating and attacking the other player icon. Furthermore, the total damage is shown in a colorful way.

Illustration 18: Using tropes, different color, and figures to tee the player who defeated and who is remaining.

If we start by looking at the left of the game screen we see the eight player icons and their respective hero. Here one can see the health, placement and who the player will face next. The players that have a red outline are the opposite players and the one with blue is you the player. The player icon that is red with two outlines and is slight to the right is the next opponent. The games are round based. There is a combat round, and a buy round. In the buy round the player gets the change to buy new minions, upgrade the tavern or use the hero power. In the attack round you are facing again one of the opponents and their minions.

When the different player is defeated their player, icons are getting a dark filter and a skull that are indicating that they are defeated. Here is the icon more important than the color, bur color help to amplify the understanding and index that the person is defeated. This is also the classic death trope. A withe skull symbolize death.

Moving to lower right one the game board we see coins. The yellow coins are used as a currency in the game. A new *minion* card cost three golds. In round one the player starts with three coins and gets one every turn until it reaches the max with ten. Used coins are in a darker color and there is a counter to the left of the coins. The player can use the coins on either *minion, refresh* the shop for new minions' card, upgrade the tavern or use the hero power.

In the middle right there is a timer that tells the player how much is left before the next fight. Ion the main board there are several key elements. The first is the big player icon in the lower middle. Here the player sees the hero the play as and how much heath that is left. Moving up here are the minion's card. When it comes to *minions, index* is a key part to understand how to play. Each card form and color indicate something. If we start with the health and attack. Each card has attack power and health. The attack power is to the left and health is to the right on the card. The number is the key indicator, but under the number is a yellow circle on attack and a red blood drop on the health. This is to indicate the difference between them. As shown on *Illustration 17* the different *minions* have different colors on these numbers. The green numbers indicate a boost/upgrade to the *minion's* power. If its white it indicates that it is a default card without any changes. If red (as seen on the players icon) it indicates damage taken. So green is positive and red is negative.

On the minions there is also different icons in the middle of the attack and health numbers. These icons are telling the player that this card does something special when played. A lightning bolt indicates that the card has a special power that activates when a certain condition is met, for example *when this minion is attacked give two health to the next minion.* Other icons can be a skull that indicates a *deathrattle* This is an ability that happens when the minions are killed. The last icon is a glass filled with green poison. This indicates that the *minion* gives poison damage. The reason why these icons are colored like this is because of the ability they grant the player. Coyne notes that (2016, 173) contrast has something to say in designing.

> Itten's first contrast was contrast in hue. Colors on opposite sides of the color wheel have maximum contrast" […]Second is the light-dark contrast,[…]third contrast was of cold against warm colors (Coyne 2016, 169-170)

When combining these contrast principles, a game item will always be visible to the player during the game time. An example of this is green health, as it has a bright color that are different from the normal color. The special ability colors and form also helps the player seeing the different in the card and the color contrast help with this understanding.

The shape of the minions is also an important factor in playing the game. Illustration 17 show several *minions.* The one in the middle has a different shape and color than the rest. This is because of two reasons; The first one is the shape. The shape is formed like a shield. This is because the card is a *taunt minion*. These *minions* are made to be a shield and must be attacked first in every round. So, the shape is an indicator for this. The gold color indicates that it is a *gold minion.* When the same *minion* is collected by the player three times it becomes a *gold minion*. The different from a regular *minion* is that a *golden minion* have double the abilities and attack power from a regular one. One can connect this to Peirce's connection to cause, and effect (Nickel, 401). As the gold color is indicating this upgrade, and the shape indicates that is a *taunt minion* .The understanding and trust originate from the connection Knowing the *minions* and their traits help the player understand what the abilities do, as well as the color. When the player knows the rules, form, and color, they can themselves understand what effect each *minion*.

> Being perceptually attuned to the game meant that the sound of appearing enemies was enough information to make me perceive the affordance of threat and take the performatory action of changing to the warrior. Defeating the enemies and picking up the vial they dropped transformed the game state and the available affordances. (Linderoth 2013, 10)

The same affordances Linderoth mentions about this fantasy action game can be found when fighting *minions* in *Hearthstone.* Firstly, the player sees the *minions* attacking. This gives the player an affordance of the round and how it is going. The *minions* then show what abilities it has when it is going to attack, for example, poison damage. The game tells the player that its available affordance and how to plan the next round. If the player is losing the round and gets

damage, the health numbers are going down, and there are colors and action present to indicate that they got hurt. When the opponent is defatted, the icons are smashed into pieces, thus changing its affordance again. Color helps with this transformation, as well as sounds, and actions.

Illustration 19: Showing how the game are using index to tell that the opponent is taking damage.

The total damage is shown as numbers and with special effect forms and shapes, combined with color. This color used combined with the shapes are an important tool to create both affordance and understanding of the game.

In the action sequence, the color aids the player in telling them what the game offers and how the affordances change. Affordance is based upon what the player sees and experiences and is linked to the different modes like color, music, and action to function. Color is combined with index to tell the player what is going on if he is hurt or if the hearts are being healed. There are flames and ice elements that are index about what happening in the game. The same is with the background music, as it also is an indication of something has changed and that the player needs to do something. The index is a major part of the affordance, as it tells the player what to do.

On the subject of the color index, we can compare *Hearthstone* to *Breath of the Wild* and to *Overwatch*. The index and affordance are similar. The screen changes color depending on the state of the player, but rather the character itself. When Link (Main character in *Breath of the*

Wild) gets cold, he is breathing white smoke and becomes an ice block if frozen. When in the hot areas, he is sweating and is more of an orange hue, and then literally on fire when it is too hot. The reason why the character itself indicates these changes instead of the HUD and screen might be because of the different game genres, as *Breath of the Wild* is an open-world adventure game. The game is also viewed with a 3d perspective, thus making it easier to show status change on the player rather than on the screen itself. Compared to Overwatch, where the player rarely sees their own character. There is also more active on the screen and more chaos. Therefore, the status effect must be shown differently and with the help of the player's whole screen. In *Hearthstone* the player has control of their card and have a certain affordance based on the index, but the affordance changes when facing different player and when different *minions* are chosen. Here are the indexes of the card more important than the player.

On the topic of the three forms of semiotics, one can conclude from this research that *index* has a bigger role in video games than one has anticipated. The icons and symbols are evidently important, but they are present to keep the player informed about the game status but are more present to help the role index plays. This can be seen through the *minion* symbols, as they change trough the game based on actions, and thus indicating something is happening. Whatever the player does in the game has a cause and an effect (Nickel 2009, p.401), but color form and actions are important to help the player understand what the effect is. The symbols tell the player that he has health, but the index indicates how much is left and whether the character is being healed or damaged.

2.4 Color Tropes

Another topic that is important to discuss is how color is used in literature and media tropes. This is to see the connection color can have across games, media and culture. The use of white can be a part of a trope. An example of this can be found when Gandalf the Gray from J.R.R Tolkien's *Lord of the Rings* trilogy sacrifices himself and returns as Gandalf the White with a white outfit and in a more powerful reborn body. The use of color within media and literature is often used to show a transformation like Gandalf's. The color white is associated with purity and power, White can also be trope for death, as seen on Illustration 18: The white skull is using the trope that death is symbolized with a white skull,

It is essential to note that the use of color does not need to have a deeper meaning than a trope. For example, in the football game *FIFA*, the grass is green because of the real-world counterpart, and represented an element from the real world.

There are many variations of tropes that are common in cartoons and video games, for example, when someone has eaten something poisonous or spoiled. The result of this is the person turning green and making sounds that's correlates to being sick. In games, this can be represented by a green cloud over the player or the character itself turn green in the face. Green has been used as a classic color trope to indicate sickness, as Jill Morton puts it "Green around the gill" (Morton 1997, 41), which is an old saying about feeling ill.

Color tropes can also be found in the game *Overwatch,* as when you are healed, the screen has a bright white and yellow flare around the player, as well as a symbol indicating healing. The yellow color might not be a familiar color trope, but put together with the healing symbol, this tells the player that the character is being healed. Nickel writes, " A symbol represents not through resemblance, but through habit" (R.Nickel 2009, 401). Even though objects and color can vary from game to game and other media, there exist similarities, which is why they can be called tropes. People have gained the knowledge and a habit of what kind of color represents and what certain objects can mean. If we focus on the color green, it can mean poisoning and bad health, but as in illustration 15 from *WOW,* green can mean friendly players. If we look at *Hearthstone,* green is connected to either the poison or the showing a positive upgrade on the *minion.* This tells us that colors can be used as a trope thanks to the association and not only symbolism. This creates meaning and understanding for the player. The color trope and real-world mimicking create a meaning to the player based on what the game tells them.

Another famous color trope is the association for the color red, as it is used when taking damage in games. In FPS games such as *Overwatch* and *Call of Duty*, the screen turns red when the player is hit by an enemy, but in an MMORPG (Massive multiplayer roleplay game) like *WOW,* the screen turns red when the character is close to death. *WOW* uses a few familiar color tropes written in the thesis so far. This can be seen in illustrations 20 and 21, where one can see the difference between the poison effect and the normal effect.

Illustration 20: Showing the player with a poison status effect

Illustration 21: The player with a normal status effect

One final comment about semiotics and tropes is how colors are mapped to emotions. Using Banu Manav result in his study *Color-Emotion Associations and Color Preferences: A Case Study for Residences*

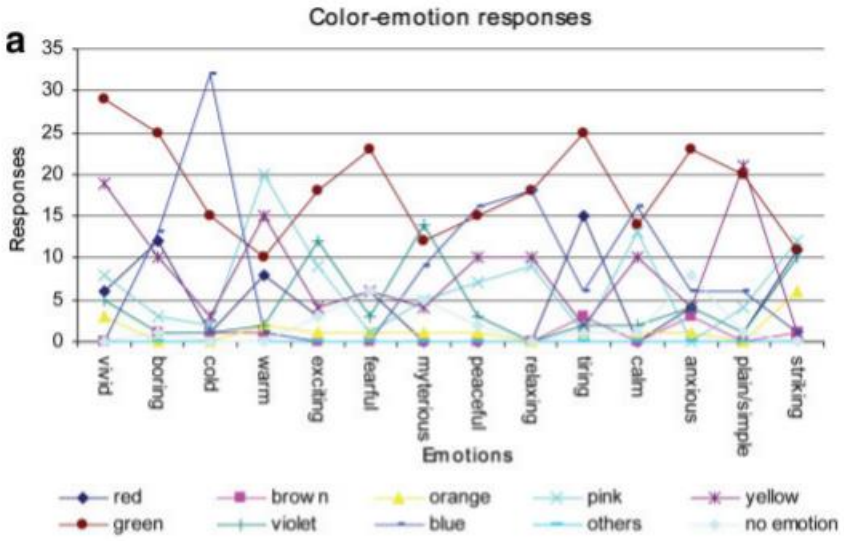

Figure 2: Color-emotion responses (Manav 2007, 147)

The color mapping presented in Figure 2 by Manav is we see that emotion like feeling cold is linked to blue, and feeling of warmth is red and pink. These can be translated to tropes. The same can cold blue. This can be tropes since blue often is used to show calmness in character as well showing that they are a cold person.

These color mapping Manav did lay forth can be argued for is somewhat linked to a certain emotion, but it can vary from person to person and nation to nation. The reason for mention this and specially Manav model is because this color mapping can be argued is both used in semiotics and as a trope. These results are somewhat linked to common traits, and the traits are linked to tropes. The reason for this is hard to say, but it most likely thanks to culture and what color people have associated with different emotions, thanks to tropes and semiotics. The big question here is if the color mapping is the reason for the color becoming a trope or it is the color trope that has become the reason for why people links certain color to ceratin emotion. Games like *Fire Emblem* are using color and icons to indicate what team the player is on and who is on the team. The newest *Fire Emblem* game is also using emotional color mapping as character traits for the main cast. When linked to semiotics, this can be because it is easier to link a person with a strong color difference, and the emotional color choice can make a stronger character story. *Fire Emblem: Three Houses* is using color tropes and emotional colors to tell a better story. The story would perhaps be the same without color, but combining character traits and tropes with already established color tropes can make the player understand more of the character.

2.5 Color connection to emotion

The main focus in this section is on the symbolism of colors and to see how the symbolic view of the color can be translated into the world of video games and why it is important to both the game and the player experience. The section is including a look at the player and why the player chooses a specific action in games, then explores the motion of what Coyne calls “mood” when it comes to color. Coyne writes, “do colors contribute to mood? If they do, then ubiquitous digital devices indeed provide rich media for the circulation of moods”. (Coyne 2016, 157) This question of whether colors contribute to moods in digital media is exciting, as the mood of the player is essential to the level of enjoyment when playing a game. The question is also what role color plays in helping to change the mood. One can argue that the role is perhaps linked to the player’s feelings, thus making color help the player feel more when playing the game. The main focus is on explaining how games are using color and to see what role it has in telling the player, then shifting the focus to how color can be used and how it is linked to the emotions when the player is playing a different game. To aid us in exploring the main focuses, the thesis is using Plass and Kaplan’s theories about emotional digital design and how color and shapes can help children with emotional learning (Plass 2016, 131), but how does it translate to video games?

2.5.1 Color as emotional traits

Continuing from the overview, we can now see how color is mapped to different emotions, and the mapping is referenced multiple times during this next section. In the article *Mapping emotion to color* by Niels A. Nijdam, the author does a more significant study on which emotions are connected to what color. His method is to compare several different color emotion theories and concludes it with:

> 1: What are the universal relationships between colors and emotion? This paper has shown a couple of model/theories about color-meaning they all have some overlap, but they also show

> a great deal of vague interpretation. This is because the color is situation, history, personal dependent.
>
> 2. How is the mapping done? The mapping is done by looking at models that already exist for other attributes; by combining the color-meaning research and the facial expression research. The advantages of this method are that it follows ideas that have been researched thoroughly. It also is an easy compact way to gain a fast result to work with. The downside of this approach is however the use of a radius which is not known for the emotions, a better solution would be defining the relations of the emotions towards each other.
>
> 3. How can it be extended? The biggest advantage would be an 3rd axis. More extensibility is however further research. (Nijdam 2005, 7)

For this thesis research, part 1 of the conclusion Nijdam writes is most important, as he concludes with:

> that color are theories about color meaning they all have some overlap, but they also show a great deal of vague interpretation. This is because the color is situation, history, personal dependent. (Nijdam 2005, 7)

Nijdam's investigations have several contradictory examples but have some common features, but for this section, it is relevant to look at what common connections they have. For example, colors and how they connect to other colors and emotions, and for the sake of this thesis, let us agree with his conclusions that the difference in connection to a color lies in the situation, history, and personal experiences of the viewer, yet colors have a common use. Orange is used to create awareness, pink to symbolize love, green is poison, and so on. These characteristics go back over western culture, and therefore one can argue that this is not linked to personal experience. Rather than personal experience, it can be linked to the connections made through history. On the subject of mapping emotion to color and color to emotion, Nijdam still has somewhat of general result of the mapping. Several theories include the classic red as rage and anger and blue as somewhat depressing. There are many links to emotion, and on the subject of Video games, the emotionally linked colors are becoming somewhat of a trope. To create a sad scene, one can add blue, or if you want to show rage, let's add red! When mapping emotion to color, Nijdam has several examples, as the color varies based on the person. This idea makes it difficult to say that color is connected to

emotion, especially in the world of video games. Exploring this connection was the main goal of this section. Asking questions such as: How is a color used to create emotion and mood? Is there a link, or is the choice of color random? It is clear that color is linked to different emotions, as Nijdam's text strengthens that. Nijdam uses a table of colors and their properties created by Willet, and the thesis it is using as a template when talking about color mapping in the next section.

Figure 3: color and emotion illustration by Shirley Willett as described by Nijdam.(Nijdam 2005, 4)

In several games, the main characters and plot have different color designs and to explore this further, one needs to look at several games of different genres to see if there is a common thread in design choices. In several cases, there will be similarities, but let us explore whether these similarities are connected to color design based on symbolic choices. The first game that is being explored is *Legend of Zelda* from 1986, with the main characters Link, Zelda, and Ganon. Link is courage, Zelda is connected to wisdom, and Ganon to power, as depicted in one of the main symbols in the game: The Triforce. The triforce consists of three triangles where each represents the main character. The main characters have their own color that is associated with them, shown when the characters speak, and names are mentioned in the game. In the game, Link is wearing green, and green can perhaps symbolize a form of courage in youth and life. Zelda wears blue, and blue can symbolize knowledge and her royal

background. Ganon wears red, and red can symbolizes power. This color choice can be as it is a clear contrast between the evil and the good in the game. Ganon is the evil in this game world, and his color is are contrasting the green and blue of Link and Zelda.

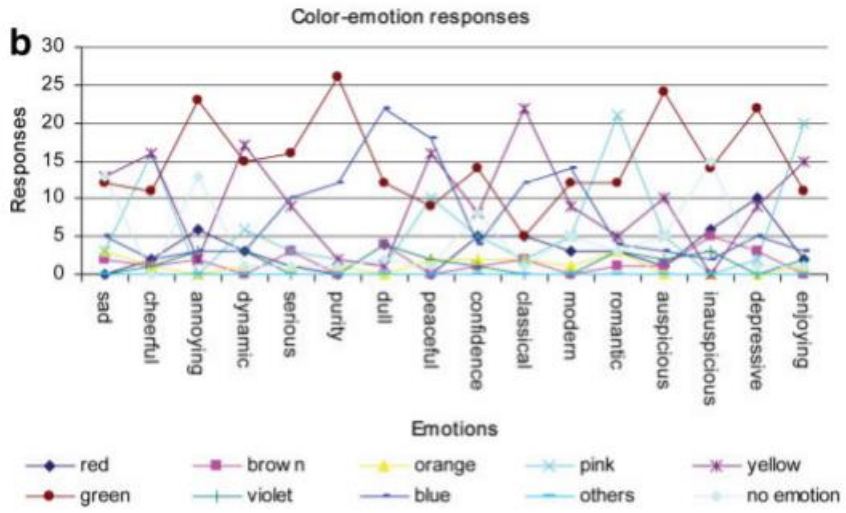

Figure 4: Color-emotion responses (Manav 2007, 147)

This can also be seen with Manav's research on the emotional response to color. Here we see that Green has the most response to the emotion of *purity* while blue is high on *peaceful*. The player will most likely have some association to color presented in the game and have an emotional connection to it, helps the player understanding the game and the mood of the game.

This use of color design contrast between the good and evil in Video games is linked to different symbolic and emotions. Coyne notes that “The theme of color illustrates and amplifies the human attraction to contrast, which in turn tells us something about mood.” (Coyne 2016, 166) Link, Zelda, and Ganon each have their own design. The color contrast helps the player see the difference between good and evil.

Using Nijdam's theories combined with *Legend of Zelda*, one can argue that the color choices of the three main characters lie in people’s assumption of color emotion. Red can be viewed and associated with power and war, blue is seen as intelligent or with wisdom, and green is a youthful color. The game is using emotional traits and color symbolism to tell the player something.

When combing color and emotion one needs to see what color people associate with the different types of emotion and feelings. In “The color of emotion: A metric for implicit color associations” by Gilbert, Fridlund, and Lucchina (2016, 206) they lay fort a research where they map color to what people feel. In this research, they asked a set of people to link color to emotion.

Figure 5: mapping of color (Gilbert, Fridlund, and Lucchina 2016, 206)

Here are 19 emotions that they have linked based on color and marketing on food research. We can translate this to video games. When designing games, one needs to know what colors are telling the player. Red is a color linked to anger and so on. Here we see that light green is a color that is linked to the feeling of being healthy, opposite to green, a color that can be linked to illness and poison. Based on Gilbert, et al, we can claim that color is to a degree linked to emotional traits, and one can assume that when facing these kinds of colors in

games, it can affect the player. Red is a color associated with anger, and darker colors like black and blue are sad colors.

Making the enemy red can help the emotional feeling and mood of the player, making a happy place green can make the player feel healthier and more relaxed. The key part here is that Gilbert, et al, research it is food products, like canned soda they are combining with color. So, its color combined with other elements that can make emotion to the player. Here one can make the argument that an object or shape, combined with a certain color makes an affection and an emotion to the viewer/player.

2.5.2 Color symbolism in *Fire emblem*

A newer game that is worth exploring is *Fire Emblem: Three Houses* from 2019, as the three houses in the game are linked to different colors. The three houses are Golden Deer, Blue Lions, and Black Eagle House. The house colors are yellow, blue, and red. This color choices can lie in the use of contrast, symbolic and real-life history. The three colors are all primary colors and are in contrast to each other. It also makes objects associated with each house easier to spot in the game. This color symbolic is also seen through the personalities of the main characters, Dimitri, as he is from the Blue Lion house and is showing the traits of knowledge, power, and seriousness, as well as having a calm and stable personality. Dimitri also has a dark side with traits such as depression and instability which can be associated with the colors blue and navy. Just like in Manav 's (2007,147) figure, blue is a calm color, but cold as well, blue fits Dimitris's character. Another character in the game, Edelgard, who is from the Black Eagle House, shows character traits associated with red: love, desire, strength, power, heat, aggression, danger, fire, violence, and passion. The last main character from the Golden deer, Claude, has personality traits associated with yellow, as he is a cheerful, optimistic, philosophical character and a little coward. These traits play a significant role in character development throughout the game. The use of the colors gives the player an idea of what to expect from the characters before getting to know them and the game lore. Coyne writes that:

> color could affect mood by virtue of the association and recollections it conjures up in the observer [---] Color would here appear among a range of emotional triggers and relates to people's memories, associations, and "conditioning (Coyne 2016, 160)

As seen in both *Legend of Zelda* and mostly in *Fire Emblem,* there could be another meaning behind the color use. In *Fire Emblem,* the color gives the player an association with the characters that help them, thus making them remember them and have a connection to the color they wear. If one is new to the game, you will perhaps choose the color one might like the most or have a better association to. One can argue that based on his color distribution, the two-character Edelgard and Dimitri, also fit in with color association since Edelgard still has the attributes of strength, power, heat, aggression they can all be linked to stress, and she is clearly showing the type of stress. Dimitri's blue is still symbolic of depression since, in the latter half of the game, he is shown dealing with a lot of inner demons. The character traits that are not only linked to what the color symbolizes but also the mood and emotion that can be associated with it make the character easier to find and make a connection to. Also, using Nidjam's text and the model by Willett, these color contrast also fit with personal traits and what emotion the character has. The color of the character is perhaps amplifying the emotion of the character. When describing a red warrior like Edelgard, red can be used to amplify those emotions she has in a story-wise perception. Linking colors with character traits can be a great way for the game designer to tell a story more clearly and thus creating affordance for the player. The color tells the player about the characters and helps the affordance in that way it gives the player a better view of the character's traits and how they difference themself from the other characters. Color makes the character more understandable.

Earlier in the thesis, I said I would bring examples of how history has affected the color and the emotions around them. One can look at the different families and kingdoms from the middle ages where they used symbols and color to tell each other apart, on and off the battlefield. This use of symbols and colors can be seen in *Fire Emblem* and other games. Clifford J. Rogers writes in the book “Soldiers’ Lives through History” that different sources tell the role of the commanders and how they used banners to know whom they were fighting and who were their allies. (Rogers 2007, 164) The use of banners can also be seen in the game *Fire Emblem* there the color of the banner helps the player see who their allies are.

2.5.3 Lighting and mood

In this section, the focus is on lighting and texture and how they affect the mood. Before that, let us use a rock as an example to define a couple of key elements. On 8-bit consoles, the rock

is most likely grey or brown, with a few pixels indicating that it is a rock. Compared to how it is on modern consoles, where the rock has many colors and can be viewed as similar as the real-life counterpart. A modern rock in newer games can have different main colors compared to the 8-bit games as it also reflects light and has a shadow generated. One can see through this example that the use of color has changed drastically in the last few decades, as in the old games, the color was important to tell the player what to do and where to go.

Lighting and color have much to say to a potential mood, and this is perhaps the reason why color and mood are connected. Coyne writes that “Color also provides a metaphor for mood. If the color is like mood, then perhaps there are lessons for the manipulation of mood from the manipulation of color.” (Coyne 2016, 161) As mentioned before, color can be linked to certain emotions and moods, and as Coyne writes, it can be a metaphor for mood. In video games, shader's and lighting have a lot to say as they can either help change the mood or create a certain mood. The use of color lighting is often used to identify locations easier, for example, if the area is safe or unsafe. A dark, blue, and purple lighting combined with monsters creates a mood. The color lighting also helps icon and index. For example, when there is a snow level, and there is a white hue in the game to represent cold and snowy.

If one can argue that color is a metaphor for mood, lighting is a certain part of the theory, as lighting, even though it varies from game to game, is a big part of the mood for the game. Lighting is the color telling the player about the place, dark, bright, red, or blue, lighting is the color shade of the environment.

The game also uses elements such as gameplay, music, and characters to create the same effect, but if combined with colors, it helps the player gain an understanding of what to expect from the game. We now have a certain understanding of what color's role is in video games, but one needs to explore further how the colors can tell the player something.

When it comes to games, the example that has been used now are based on different genres and art style, but it is still important to remember that there are differences between games.

A 2D platformer like Super Mario is different in both color style, tone, and mood than, for example, A 3D game like *Tomb Raider*. Furthermore,, comparing Nintendo’s *Super Mario* with another Nintendo 2D platforming game *Metroid: Fusion*, the color use is completely different and tells the player something else than in *Super Mario*. Even though it is the same

base developer, and both are 2D platform games, they are completely different both in tone and style. Color plays a big part here as well. Based on the research in this thesis, one can argue that yes, colors play a role in semiotics and affordance to tell the player what things do, how they do it, and how just to play the game, and there is perhaps a certain color that is more used than others. However, one must also remember that thanks to technology, color use has changed and, therefore, can have a different meaning. Colors do not mean the same for Mario as, for example, Lara Croft. Mario's red cap has a different meaning than Lara Crofts' red blood. Everything is not equal in games, and this is especially colors. This is the reason for the use of *Overwatch, Fire emblem,* and *Breath of the wild* as examples. They are a good example of how colors in UI, HUD character traits can be used to give more meaning to both the color and the game itself. The white paint in *Tomb Raider* or the green lights in *Doom* are examples of colors that have a different meaning and value than other colors in games because it helps the player gain an understanding of the game. Colors are used everywhere in the game, but it is in its use that it gets a value. This is in all genres and categories. Red in Mario has a different meaning than red in *Tomb Raider,* and this is thanks to the usage the color is linked to. Red, blue, and yellow in *Fire Emblem*: *Three houses* have one kind of usage as both stories, in-game battle, and to help the player tell them apart. The use of red, blue, and yellow in *Overwatch* is there to show the player that he is gaining a boost, healing, or taking damage. These are completely different use of the same color. The color has a different value to the player thanks to this, and this varies from game to game, genre to genre. However, the one thing that is common is that colors are being used to tell the player something, and this gives colors a value and meaning in games. So yes, there is a difference in how colors are used, what colors can mean, and how they are being shown to the player., but the common thing across genres and categories is that color is used to help the player get an understanding of the Gameworld.

2.6 Journey

One part that is not touched upon yet is the psychological part of semiotics, and what the role of color are when it comes to the psychological aspect. We have seen that there is a connection between color, elements, and the reaction to players. To helps us explore lets us use Emma Dickmark's case study in her *Degree Project in Game Design* about how colors are used in the game *Journey*.

Dickmark goal was to find out color affects the player on an emotional level, and this is be studying *Journey* and how the game changes color when exploring the game.

The result of the mapping of color

Colour	Emotions	Scene
Pink	Optimism, Harmony, Happiness	Cloth-creature
Lime-green	Soothing, relaxation, Admiration	Cloth-creature
Purple	Trouble, Uncertain, Boredom, Loss	Cloth-creature
Red	Negative: Danger, dear, horror, shock Positive: Love, Happiness, Excitement	Negative: Tunnels, Winter Positive: Heaven, Surfing
Yellow	Excitement, Joy, Trust	Surfing, Temple, Heaven
Orange	Interest, excitement, joy	Surfing
Blue	Negative: Loneliness, Cold, Loss, Remorse Positive: Calm	Negative: Tunnel, Winter Positive: Heaven
Green/blue	Awe, Fear, Immersion, Dillusion	Tunnels

Figure 6: The result of Dickmark research (2015, 15)

Dickmark is explain how color are creating a reaction to the player when exploring the game. Just like semiotics are used as index or to symbolize something about the gameplay, here color is used as a semiotics tool for the psychological part. She explains that color is used to change the elements to the story to reflect the emotion of the player and that this color changes impacts the story.

> By not using these changes, the game would show entirely different kind of emotion and the emotional journey through the game would not be as intense. With help of the drastic changes in value, hue, saturation and temperature the developers have been able to portrait different emotions to each scene. It affects the storyline by making the player able to pass through emotions and understanding its surroundings using only what is visually near there. By putting the colours from the prophecy and the progression of the game together creates a link between the two. (Dickmark, 2015, 15-16)

The storyline changes thanks to the color change and the color are creating different emotion to player. The semiotics tools are now used to create a psychological reaction to the player. The color index helps the player understand the emotion and the story combined with the colors indicates something emotional for the player. This can for example be seen in the tunnel seen. As seen on figure 6, Dickmark are writing that this is impacting the player negative thanks to how the color is working to indicate sadness and negativity to the player. Dickmark is not mention affordance in her text, but here we can clearly see that color index create an emotional affordance to the player. Color, story and gameplayer are indication either positively or negative emotion and this is an emotional affordance for the player.

The main key to emotional semiotics lies in the *prophecy and the progression* part of the game. The player is exploring a story that goes from bright color and exploration to colder color and tunnels. Dickmark is reflecting:

> My reflection on players colour perception that, after the player has gone through the warm and loving part of the game, she firstly journeys through the darkness and blue environment but also the entire game fades in hue and saturation throughout its progression. The strong colours, including blue, fade out to a grey- almost lifeless tone. This continues until death. (2015, 17)

The game is a psychological semiotic journey through different emotion and the journey of the soul. The different parts of the game as Dickmark is explain (see figure 6) have different color, emotional tone and meaning. The player is experiencing a whole specter of emotions in this journey. The colors role here is to help with this journey and understanding of both emotions and the journey itself. This is perhaps the reason for why the game is called *Journey*. The game is a journey through the different emotion.

> Creatures of the wall paintings focus on the light and life of their surroundings, discovering the cloth creatures and their power. Later, as the game proceeds, at the end of the surfing scene, blue is added to the list representing destruction, hatred and death. It is added to, what seems to be the machines of war, and puts a cold and uneasy atmosphere around this part of the story. (2015, 14)

As Dickmark is explaining the game is adding different color to help the emotional aspects of the game story. Here we see that color can be used as a tool to create emotion to the player and work on a psychological level. This is by using semiotics to help tell the story and

meaning of game. The color creates an affordance of the situation and story and affects the player. Here the color is a key tool to help tell the story and create understanding of the emotion the game wants to tell.

The reason for that this important is that we are seeing here based on Dickmark text that emotion is a key element when it comes to color. As told by Dickmark, the story of *Journey* is told to be emotional and the game is using colors to help with this understanding and creating emotion. Here are the semiotics tools used to amplifying the emotions rather than the gameplay. They work on the same elements, but in Journey the focus is to create an emotional connection to the player.

2.7 Chapter summary

To summarize chapter 2 on how semiotics is used in video games, and why it matters with the use of five main points:

1. Affordance: In games, there is a constant state of affordance, as players view the world and know what it offers and how to explore it. Affordance is linked to non-diegetic elements. This creates a better game environment for the player. Affordance changes in the game based on the goal and objectives. The goal can be a puzzle or killing a special character, and the game gives cues on what to do. This affordance can be the color white on a wall to indicates it is climbable or a music change to indicate that an enemy is nearby. Color is connected to affordance to help and boost each other, so the player has a better game experience.

2. Color as an indicator : Color is used to help the player gain a better understanding of what is going on in the game, and this is through connection or cause and effect. This can be either showing what level type it is, how many red hearts are left, or what kind of buff or debuff is present on the player. This is important since it helps the player see and understand the whole game.

3. Color semiotics in UI, and how it is used to make the UI and HUD clearer and more readable: Color in UI and mainly in the HUD is often used to create a better understanding to the player. Combined symbols, icon, index, and HUD creates a better

understanding for the player what is going on in the game, either with the help of a health bar or using color on the screen to indicate something. Color design in the UI is crucial as it is everything the player can see and makes choices depending on that. This is also true for semiotic when it comes to color and emotion. Semiotics and color help with the emotional mood of the game.

4. Color as a trope: Colors are often used as they are linked to real-life or to a trope. An example of this can be seen through different colors. White is a clean and good color, compared to the evil red. Purple is often used as a trope to indicate wealth or poison, as seen in *Overwatch.* Using red for enemies is related to how red is connected to war, as well as the famous red vs blue trope.

5. Color linked to emotion: Color can be used to make a player understand a character better and gain a pre-knowledge. Color contrast that is known to be linked to different emotion types can be used as traits to characters to make it easier for the player to get knowledge. The well most example here is to use contrasting colors to the heroes and the bad guys and as well use a color that is linked to different emotion that fits the character. Based on colors' connection to emotion, these colors can be used as character traits that link color and traits. Color can be used to tell emotions in the story or as a semiotic tool to create emotion to the player in the story or gameplay.
   Color helps the player understand the emotion and mood of the game. Colors tell the player something, and the player gets an understanding of this.

Semiotics and color use are essential for the game and the player. The main goal of this thesis is to see how colors create a mood and how it works emotionally on the player. On the subject of mood, semiotics, and UI help the player gain an understanding of what the game is and what the player sees. The UI is using forms and shapes combined with colors. It can help to immerse the player into the game. This can be seen in the game *Overwatch* with its futuristic sci-fi UI, as it is set in the future, as well as using a lot of blue. As discussed earlier, the color choice is also used not to take all of the attention of the player, as well as to help create the immersion. This effect can also be found in *Legend of Zelda: Breath of the Wild*, as it is a

fantasy game, and the UI and colors indicate so. A misplaced HUD can ruin the game experience for the player, as it does not fit with the game setting or mood. A good UI and HUD are important as they are an essential part of the gameplay and to create immersion for the player. Semiotic colors are also essential in telling the player what is happening in the game. Without non-diegetic colors, the player would be frustrated and quit the game, as the character is being poisoned, and the player does not know it without the color indicating that. This type of color combined with semiotics can also help the player getting an emotional attempt at the game, as the player gets more panicked when the screen turns another color when something new is happening. To summarize, color semiotics matter as it helps the player gain a better understanding of the game, and color lighting helps the player get immersed in the game's mood. Going back to this quote by Coyne that I already have used on page 48 :

color could affect mood by virtue of the association and recollections is conjures up in the observer [---] Color would here appear among a range of emotional triggers and relates to people's memories, associations and "conditioning" (Coyne 2016, 160)

Here we see that color is important since it tell the player about the game and give the player associations and emotional triggers when playing the game. These elements are affordance, semiotics, and tropes. All of these elements bring either new or old associations to the player, and the player knows more about how to play the game and comes into a certain mood when playing. Color combined with the other elements helps the player with this.

To summarize, the color helps content like shapes and gameplay be more natural for the player to immerse them into and to help them gain an understanding of what is happening

Using index with color, one can argue that they are present in the game to tell and teach the player to play the game. We have discussed visual design and layout, but they might be present to create a mood in the environment. Color's role is to amplify the players feeling of mood, index, and the immersion of the game, as the game use color to tell the player something and to create a positive perception of the game.

Chapter 3: Mood and affection

Now that we have seen how color can create an *understanding* with the use of semiotics, affordance and how it is used to indicate something, the focus now will be on the other side of *understanding.* Here we will focus on more Plass and Kaplan's theories about emotional learning in chapter 7, "Motional Design in Digital Media for Learning" in the book *Motions, Technology, Design, and Learning* by Sharon Y. Tettegah. (Plass and Kaplan 2016,131-157) This chapter will focus on Plass and Kaplan and combined them with color elements to see what role color potentially has to creating mood and the understanding of mood.

Plass and Kaplan are using form, shapes, and color to see how children react to different elements and to see how they reacts to emotional learning. In short, they argue that children are more favorable to bright colors and more unfavorable to dark colors and that round shapes are more favorably received than hard and sharp shapes. What one can take from this is that shape has more to say than color. This can be seen from their research there they found out that a round shape with light warm colors received the same feedback as a round form with light cold colors. (Plass and Kaplan 2016, 131-157).

What is relevant to this thesis is a more in-depth look at how the color reinforces its association with the shape. The shape is perhaps an essential part, but how big is the role of the color, and what does this say for video games shapes? Based on what we have found already, one can agree that form is the most important thing, but the thesis is also exploring if different colors can affect the shape. For example, a red blood sword is more threatening than a sword with blue water on it, both are threatening, but red can reinforce the emotions.

3.1 Different color affection[2]

In regard to mood and if color and mood , Coyne writes (Coyne 2016, 180) that we can link certain moods or emotions cultural and social associations to different colors, there is still an association with color throughout history. With this knowledge one can argue that that associate to colors are not trough emotion, but thanks to the pre knowledge and *understanding* of what the color means based on former experience.

[2] Parts of this chapter are taken from or inspired by Andersson 2018

The problem is that there is no firm evidence that the link between moods, emotion and colors exists. Let us explore this further with. In *A Study of Colour Emotion and Colour Preference. Part I: Colour Emotions for Single Colours* by Li-Chen Ou, Et Al. The authors are doing a study on how people react to different colors.

> Colours play an important role for customers in making decisions on what they like and dislike. They evoke various emotional feelings such as excitement, energy, and calmness. These feelings, evoked by either colours or colour combinations, are called colour emotions (Ou, Et Al 2004, 232)

This strengthen the argument that the color can affect emotion. Ou and Et Al continues their research and the result of one of the tests is support the argument that the use of color can influence people,.

> 1. Like–dislike: Chinese observers tended to prefer colours that were clean, fresh, or modern, whereas this tendency did not occur for British observers.
>
> 2. Tense–relaxed: British observers tended to associate tense with active colours, whereas Chinese observers associated tense with the colours that were hard, heavy, masculine, or dirty (Ou, Et Al 2004, 239)

The article *Seeing Life through Positive-Tinted Glasses: Color–Meaning Associations* by Sandrine Gil and Ludovic Le Bigot is a research test, there the reaction to color and the face was tested. They conclude with.

> even if happy faces prompted more emotion responses, this effect was modulated by color. More precisely, multiple comparisons tests revealed that green and white involved significantly more emotion responses for happy faces compared to sad faces (all ps,.001), whereas it was not the case for gray (p = .60). (Gil and Le Bigot 2014, 4)

The authors examined whether a green background, as opposed to a controlled background, would bring about an increase in emotional responses to congruent emotional faces (i.e., happy faces). (Gil and Le Bigot 2014, 4)

When looking at these two projects, we can make an argument that color can help with the emotion and mood, but the shape has more to say. Color has a role in the multimodality when creating the mood. Color has an affect on the mood, but not alone.

These color associations found by Gil and le Bigot are similar what Plass and Kaplan mentions in their text. The similarities are that colors, and shape are connected, but the shape is more important. Green and lighter colors had a better effect on a smiling, positive face, but grey did not affect the sad face. The shape and color combination are an example of how color can help the emotion of a shape be stronger but is also an example where the shape is the same thanks to a dull color.

> In addition, this follow-up research revealed that round face-like shapes induced positive emotions both alone and in conjunction with warm colors. Interestingly, we found that warm colors alone did not affect learners' emotions. Comprehension was facilitated by warm colors, by round face-like shapes, and by combinations of both design features. Transfer, on the other hand, was facilitated by round face-like shapes when used with neutral colors. (Plass and Kaplan 2016, 139)

One can argue that color has less to say than originally thought, as shapes have a more significant impact. In the world of gaming, this may be a reason why different color is used at different times. A lot of this use lies in the semiotic use, affordance, and perhaps not in the emotional aspect. The color, emotion, and mood lie in the use and association the game gives the player. The game tells the player what the color means, and the player reacts based on that. Like Ou, et al , research says, people have different views on the color association. The emotion comes from the relations and association, and in games, colors is combined with semiotics, affordance, and elements to tell the player this.

3.2 Color and the player[3]

Based on symbolic and semiotic argument we have laid forth, one can make a claim that the player can be affected by color, but the affection lies in several key aspects. This is what the color tells the player when playing the game and what relation the color has to the player.

[3] Parts of this chapter are taken from or inspired by Andersson 2018

This is a part of the affordance the player receives from color combined with other elements. Color us used to create attention and notice, Yellow is a color that create attentions and is a contrast to other game elements. When the player sees a contrasting color, or a color combined with a shape. They have experience from game world and the real world, so they have a certain knowledge on how to react. The question then is, are these actions based on emotion? When playing *Overwatch,* the player reacts to what the UI is telling them. If the screen is red and the health bar is low to zero they need they need to react. The same in *Legend of Zelda.* If the player sees a purple object they can take action based on the knowledge the color give. As I wrote in Andersson 2018 (p. 12f) Marcus Gabriel's book, *I am not a brain* an action is:

> someone is doing something in order to achieve something. In sociology and philosophy, this is called an action. An action is thus always an activity that is oriented toward goals and is accompanied by motives. Actions have a meaning that one must understand in order to know which (Gabriel 2015, 50)

The actions come from the knowledge about past experiences, and in both games, color tells the player what to do. Color is a tool that helps the player with taking action. The player is doing something based on an experience he already knows. If the player is taking a hit and the color flashes white and red, the player now knows that he must either heal or change strategy. Colors cannot affect the player's action but combined with another element, it can, as actions and emotions are linked together. These feelings can vary based on how the player play, all from being happy to being sad and colors helps with that. Finally, finding the mystery path that was hidden with a different shade of brown can make the player feeling short of relief. Moving around with only red enemies that are not a treat to suddenly meeting a golden enemy can evoke a sense of panic and despair. Making the map go from the only grey to an actual map can be a joyous experience. Finally, restore the purple haze back to normal brings accomplishment. Thanks to emotions like these, the player takes action and, knowing that red enemies are no threat, the player does not react to them, but suddenly meeting an enemy that is shown to be a threat thanks to a different color makes the player take action. One can make relations to the *Seeing Life through Positive-Tinted Glasses* "(Gil and Le Bigot 2014, 4), as the authors saw an effect on different color with the use of a face, but the color itself was not the cause, the color with relation to something else can affect the emotion of a person.

Another way to create mood with the use of color is to combine them with certain elements, for example, towns, weather, season, and people. Games like *Animal crossing* is creating mood based on weather and seasons and are based on the real-life mood that people can have to season and weather. A white snowy town creates a mood, and hot lava with orange lighting or a scary haunted mansion with the grey color are two different moods. Using color lighting to create a certain mood is essential to the overall game because if the overall lighting of the game conflicts with the other elements of the game, then mood can be mixed, and the player is more confused about the aspect from the game.

3.2.1 Taking actions

It is not the color itself that sets the mood for the player, but the color can boost the emotion. Thus, one can argue that Plass and Kaplan's theories also can affect actions and interactions. Plass and Kaplan write that color can help the shape to be received more positively, and based on earlier research, one can say that the same goes for interactions and actions in games. Red can be an alarming color that tells the player its need to act against. The form and action of that enemy are the most important since the player is not completely sure it is an enemy before it attacks, but the color amplifies an indication of an enemy. The player interaction is also boosted by color, for example, with the non-digenite color that is telling the player where to go and what to pick up. The game could most likely be playable and enjoyed without the non-diegetic color use, but the color is helping the player's action. This association with color helps the player. The game gives the player affordance in color and tells the player what color means and what is best for the next action.

This non-diegetic element can be everything from an enemy health bar that is turning red and almost depleted or finally finding the rare gold weapon after hours of grinding. Mainly colors are there to tell the player what is, but the color can also become a symbol of the player's struggle and relief when the experience is over. This color use goes back to what we already have mentioned in semiotics tropes, affordance, and emotions, and in how color can help the player being boosted with emotion. Going back to Nidjam's text and the model by Willett (Nidjam 2009, 4) we can see different colors that are linked to different emotions, and using these colors combined with index tells the player what is happening when they take action. The white game over screen can indicates that the player was killed by ice, a red NPC can indicate an enemy. This is because these actions, screens, and NPC are perhaps using

emotional color as a trope to help the player see what is going on and amplified the action. The action has the most to say, as an enemy is an enemy either way, and a sword strike is a sword strike, but using color amplifies the action and helps the player get in a mood of either success or failure.

In the game review by reviewer Espen Jansen for the website Gamer.no of the game *Astral Chain*, he lay forth how actions are essential for that game and how color combined with action, animation, and design is used.

> An important reason for this is the game's impeccable design. This not only makes it easy to distinguish the lively and creative enemies from the surroundings but, at the same time, gives incredibly clear signals when the bad guys are about to attack - if you know what to look for. Flashes of light, acoustic signals, and extensive animations all help to indicate what is about to happen just before it happens, and then it is only up to one's own skills if one manages to respond in time. (Jansen 2019. Translated from Norwegian)

Color combined with gameplay and animation helps to create both unique gameplay and mood that the player a being set in. Here it is the combination of a different part of the game that helps tells the player something and helps the player understand the game and are in control. The game gives the player the tools, and now if the player fails, it is his fault. Color helps the player understand the action he is taking and what actions the game are taking against him.

When combing color to action, what color people associate with emotion and feelings. In "The color of emotion: A metric for implicit color associations" by Gilbert, Fridlund, and Lucchina. (2016, 206) (See *Figure 5* on page 52 in this document) Here we once again see the mapping they did on color and emotion regarding action and the player taking them.

Red is an angry color, and light blue is a color of calmness and relaxation. At the same time, yellow is a color that is often associated with alerting. Yellow is a color that is often contrasting the other elements on the screen, like the parts of *Overwatch* HUD is yellow/orange to be in contrast to the game. Color is here to help the player take action, and when the player sees something that is yellow or red, he is alerted by its color. Here there are different colors that all makes the player understand the action he is taking, either if its action based on alert or action-based calmness around him. Colors help telling the player this.

Knowing when to take action is a big part of the player's affordance. As already noted, that color is helping people taking action, and this is one way they are doing it. As Gibson writes, "Actions have consequences that turn up new information about the environment[---]All actions have this property[---] (JJ. Gibson,1991, 601)
Colors combined with animation, sound cues, action, and objects give the player a certain affordance of what to do in a setting. Color helps the player get a perception of the action and can take action. If the player is underwater and blue bubbles appear on the HUD, it tells the player something, and if the player turns red in the volcano level, it tells the player something. The same goes for the overall color choice in the game world. Color can help the player understand if he is in danger, in a relaxed state, or in an anxious state.

3.3 Color as gameplay

On the subject of colors in games, there are also games that are using color as crucial gameplay elements in their games, as this is commonly used to indicate something relevant to the primary function of the game. Games like *Guitar hero* were popularized with their full-color buttons that are needed to be pressed at the right time with the song notes. A key example of this is the game *The Hunt showdown.* This game has a very gritty color setting with dirt color and an overall grey tone, and the goal of the game is to collect clues to find and fight a boss. To locate these clues the player needs to use the *dark sight ability* and then the clues are shown in a bright blue color, and if there is an enemy on the clue, it is glowing red. These colors are essential to the gameplay, and if the game were in black and white, the game would be more difficult. In the game *Splatoon*, the main goal of the main mode is to fill most of the map with a particular color, and you win if you have more color than the opposite team. In these games, colors are essential gameplay mechanics, but are they important for the mood itself? For this, one can argue for both yes and no. First, in *Hunt*, the sound design is far more important than the color to create the mood, but when the player is using dark sight and sees the clues, it creates a kind of mood there and then and especially if the clue is red an there can be a whole enemy team you need to fight. In *Splatoon*, the game is colorful, and this color helps create the mood for the whole game, and since the game is built upon a game mechanic that creates more color, this has a lot to say for the mood. So, here is a case where a gameplay mechanic combined with color helps create a mood. The color in itself does not create the

mood, but since the main game mechanics are using color to create the mood and tell the player what is happening, color is a valuable tool to create the mood.

3.4 Chapter summary

> The multimedia environment induces affective responses, which we describe as "core affect." This core affect is experienced as the learner perceives auditory and visual information from the environment. Some of the experienced emotions may be attributed to specific sources, but they may also persist unattributed, as mood. This attribution is impacted by the information learners select from what is presented, but also impacts that selection process (Plass and Kaplan 2016, 151)

Taking this quote into account, what we already have discussed, it fits well with the theory of emotion and color. As mentioned, some parts of emotion, like being killed by a specific thing, seeing a particular type of enemy or taking a certain action, can bring forth a mood. This visual information from the environment gives the player a mood and is impacting how the player plays the game. The game uses both mechanics, objects, shapes, and colors to create a multimedia environment that the player can explore. The role of color is to help create the mood that the developers will use the player to experience. As Plass and Kaplan writes: "the experienced emotions may be attributed to specific sources" (Plass and Kaplan 2016, 151) The source is the game itself and what it makes the player do, with uses of different elements, color, and association. It is up to the game developers to create a good use of multimodality and color to make the player get in a mood.

To make a short summary of the chapter one can make the argument that when it comes to action, mood and emotion color are a tool in the multimodality. Color help to create the mood. An action combined with color helps the understanding and mood. Color combined with game elements and music brings forth a mood. The game uses game mechanics, objects, shapes, and colors to create a multimedia environment that the player can explore. This creates a mood, and the color is a big part of that.

Chapter 4: Colors in the multimodality

In chapters 2 and 3, the focus was to see how colors are being used in games as tools and how colors are being used combined with another element. In this chapter, the focus will be on different modes and elements. This look will also include color, but it will focus more on other elements in games, like music and using the lack of color as a gameplay element. This chapter will also take a look at what role color has to immersion and the art of failing in video games.

This chapter is built upon the *understanding* of Plass and Kaplan that we did see in chapter 2 (Plass and Kaplan 2016, 138) The understanding can mean two different things. In chapter 2, we did discuss how semiotics, affordance combined with color helped the player understand where to go and what to do in the game. This is thanks to color combined with elements. In this chapter, we will look at how color creates *Understanding* as a mood and how color is a part of a bigger multimodality that helps the player understand the game.

4.1 Games with no color

Until this point, the text has gone into dept about how games and developers might use color based on symbolic, semiotics, gameplay, and UI and how it can help the player's mood and understanding of the game, But what happens when one takes the color out from the game? For this part, let us focus on two games, *Limbo* and *Madworld. Limbo* is a game from independent studio Playdead and was released in July 2010 and was quickly popular and know, based on the graphical and color style. The game is in black and white with a gray fog-like color surrounding the player and background. The game is using lighting to make it brighter or darker.

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Illustration 22. The game Limbo uses the lack of color to create a mood

In this game, the player is in control of a small boy who is exploring *Limbo.* Thanks to the little plot of the game, the player does not know a lot, and the only thing the player focusing on is to get out and avoid danger. The game presents a mood that makes the player feel that they are in the unknown, and it is unclear what the purpose of the game is. Thanks to the level design and the use of black-grey-white color use the player feels a sense of dread and the feeling of the unknowing. The theme of the game, thanks to the color use, is depressing, and since you are playing as a boy trying to escape death, the mood of the game is set. A big part of this is, of course, the color design. If the game did play the same way, but with a colorful color palette, the theme and mood would possibly change. The story would be the same, but the feeling of dread would minimize, and the player would perhaps experience a different kind of mood. Thanks to colors used in the genre, people are perhaps linking different moods to different genres. 2D platforms are often associated with bright and colorful designs with games like *Super Mario* and *Rayman Legends,* and if *Limbo* had the same type of colors, people would perhaps start to play the game in the same mood as *Super Mario.* Therefore, it is important to use color to help the player better understand the theme and mood of the game. Depressive black and white color help with that. Coyne is using Itten, “an unformal gray, lifeless surface can be awakened to mysterious activity by extremely modulation of shading” (Itten 1970, 37). *Limbo* makes a dull grey into a great atmosphere and is using the dark-light contrast to make the atmosphere to set the player in a certain mood.

The other game to cover is PlatinumGames *Madworld*. There *Limbo* did use light and dark contrast to set an almost depressive tone on the game, *Madworld* is using color in the other

direction. Just like *Limbo*, the game is mostly black and white but is also using red as an essential color. The game is a “beat em up” there (a genre where the player is against a whole lot of enemies and needs to beat them to advance in the game) all the characters and backgrounds are black and white, but when the player is beating or gruesomely killing the NPC they will bleed gallons of red blood. So instead of using the color to set a depressive mood, *Madworld* is using the lack of color to make things even more brutal and set a different mood. Since the only “real” color is blood red and the more brutal the player is, the redder the screen gets. This use of color set up the mood that is perhaps lighter-hearted and fun.

Illustration 23: The game Madworld that is using limited colors to create a certain mood

The game's color palette is in the start bland with white and black buildings that lack shading, and they almost go tighter in a blur. The only color is the yellow life bare in the HUD. When the player starts hacking and slashing, then the world is filled up with color. The mood is lighthearted here, thanks to the over-the-top art style and use of color. The art style has taken inspiration from the German Expressionism moment. This can be seen in the character and world design.

This game is not serious and is telling the player that it is not serious. The art style, color choice, music, and sound design helps to create this lighthearted mood and understanding.

The use of red makes the player focus on the gameplay, and without red, the player would still kill the NPC, but with the use of red, it becomes more apparent that this is the point of the game. There is also big cartoony text the pops up that are in bright orange that also tells the player that he is doing it right. This font and color are reminiscent of old comic and comics shows and helps set a certain mood for this game

These are two completely different ways to set a mood by using minimal color. One is to set an atmosphere that is depressive and unknowing, and the second uses the lack of color to make the player focus on a specific color. When it comes to mood, the color is helping the player getting into a certain mood that the game wants them to have and helps the game deliver the story they want to tell.

4.2 Art of failing [4]

Color and the emotion that comes with the art of failing are to a degree connected. Aubrey Anable mentions in her book *Playing with feelings* that

> Video games are not distractions from the frustration and failure of our everyday lives; rather, they are intimately linked to how we feel failure-not just how we feel *about* failure, but how we actually experience the feelings associated with failing. (Anable 2018, 131)

Anable telling that real life of failing can be translated to the feelings of the game. In games, the color is not alone a reason to react emotionally but can be used as a tool to higher achieve the feeling of failure. In the *original Zelda* when the player gets hurt, he blinks red and white to show that he has taken damage. Red and white are two colors that draw attention, and it is easy to see when the player has taken damage. The colors help the player see when he is failing. This is shown well with the game over screen. When Link dies, the screen will first be crimson red and then turn black and with the words GAME OVER on the screen.

This color use will help the player know that he has failed and enchant the feeling of failure. In *Breath of the Wild*, depending on how you die, the game over screen will change. The screen will turn black with the words GAME OVER, but depending on how the player died, the color will change. If it is a fire or a "normal" death, the text will be red, if it is related to water or snow, the text is in light blue, and if it is related to lightning, the text will be yellow. This color is to show the player the reason why he failed and perhaps enchant the feeling of failure with the "yes I know that the lightning killed me!! What can I do not to be hit by lightning the next time?". In both games, there is a color reaction when the player gets hurt, there is a color reaction when the enemies attack, and in *Breath of the Wil*d there is a colorful reaction to when the player gets environmental damage. So, color tells the player that if you continue, you will fail and give the player the feeling of failure. This can also help the player

[4] Parts of this chapter are taken from or inspired by Andersson 2018

to take new actions to avoid failure. The colors tell the player that the feeling of failure is near so that the player can avoid it. Just like color and symbolism, color by itself can give the player a sense of failing but combined with other means like a text or an action there the player taking damage, color can enchant the feeling of failure.

As mentioned earlier, shapes have a lot to say about how color is being viewed. Plass and Kaplan notices that

> Our research with college students provided evidence that the use of round shapes and warm colors in the visual design of learning environments is able to induce positive emotions in learners that in turn facilitate comprehension and transfer of learning scientific materials (Plass and Kaplan 2016, 138)

Shapes and action combined with color tells the player the importance of what is happening. As Plass and Kaplan are writing, round shapes and bright colors have a positive effect on the students learning and one can say the same about the color use in games. Games are using color and shapes to make the player feel differently. Form this, one can say that the shape can be influenced by the color to get a greater meaning.

4.3 Relation to the game world.[5]

Can color affect emotion when it comes to relations to the world that the player is exploring? Let us go back to the three main characters Link, Zelda, and Ganon. They are bound to each color, and these colors can make the player feel more about them. Ganon is the big bad guy and that his color red can make him get a more empowering. Zelda is blue, and that is because of her royal blood and that she has knowledge and wisdom, so the player knows that she can help them in the quest. Link is green, and just like green, Link is a neutral character. This choice is perhaps because he is the avatar for the player in this world. He is the link between worlds. He is bland because he is the player's feelings and being a natural color like green can help the player feel connected to the game.

The emotion the player can have when exploring these two games is perhaps countless since all the different players react in different ways, but color can help to achieve those emotions. Going back to "A Study of Colour Emotion and Colour Preference." The article says that Colors play an important role for customers in making decisions on what they like and dislike.

[5] Parts of this chapter are taken from or inspired by Andersson 2018

They evoke various emotional feelings, such as excitement, energy, and calmness. “These feelings, evoked by either colours or colour combinations, are called colour emotions” (Ou. Et al. 2004, 232)

This tells us that colors are important because they give the player various emotions such as excitement, energy, and calmness. This what the color in the world of Zelda is doing. In *Breath of the Wild,* the player may see something exciting and colorful that he may want to explore. This means he has a feeling of curiosity about what that thing is. The color also has some other affection. One can like one part of the game better because one may like the calm of the white snow or like the blue of water town: Zora’s domain. People already have some attachment to color and the emotion, so they seek after the color. There are countless colorful places in both games and some places have color themes. Places like Death Mountain, Zora’s domain, and Rito village have all different colors that can appeal to the player. Some might find the green forest of Rito village relaxing, but the orange lava of death mountain stressful because they know that red can hurt them, but the green is calm. Going back to what Plass and Kaplan writes about emotional learning and how they use shape and color to see how children react to different shapes and elements (2016, 138-139). In short, they argue, that children are more positive to light colors and more unfavorable to dark colors and that round shapes are more favorably received than a hard, sharp shape. What is important here is that they argue that shape has more to say than color. This is since a round shape with bright warm colors received the same feedback as a round form with bright cold colors. The shape is perhaps the most important, but how big is the difference between them? One can agree that form is the more important thing but let us take a look at how different colors can affect the shape. For example, a red-blooded sword is more threatening than a sword with blue water on it, both are threatening, but red can reinforce the emotions. This is how games create a relation to the world. They are using color and shapes to give the player a view and understanding of how the world works, both character-wise and gameplay-wise.

4.4 Music and mood

As noticed, there has been a focus on color in regard to shapes, form, and in-game mechanics/ objects in this text, but one thing that has not been touch that much is what role sound and color have combined in games. When creating a mood, sounds and music can have a big and can even have a bigger role than color. Countless games are using sound they create different

atmospheres for the player to explore. This kind of music can be everything from medieval music in a fantasy game to panic music when the murderer is right behind you. As a tool, music can change and create moods on the spots and are an important tool to create a mood. Examples of this are again games like *Breath of the wild*. In this game, you, as the player, are exploring a somewhat peaceful, full open world with calm music and colors. This is enchanting the feeling of exploring. On the opposite end is when the player encounters the Guardian enemy, Then the music is turning into a frenzy with loud piano and alarming sounds. This is to tell the player to run and to change to mood from peaceful to chaotic and panicky. On the opposite end of this is the *Resident Evil* series, with the focus on the *Remake* and *Resident Evil Zero*. In these games, the player is escaping from zombies and other undead creations. The music is always playing a combination of scary low tense music and more intense music through the game, and the sounds effect are created to keep the player tense and in the unknown on what is next. The only exception of this is when the player is in a safe room. The music in a save room is a calm piano tune that helps the player understand that this room is safe, and it is safe to take a break and check inventory and health. The music still has an ambient undertone to remember that the player is not safe but can relax for now. This kind of calm music all creates a different kind of mood that is different from the rest of the game. In *Resident evil* and *Resident Evil Zero* music is an indicator of what is happening. This mood is also a part of the affordance the game is giving the player. The game tells the player that he can relax or not. Music helps the affordance to the player, and this helps create a mood.

In chapter 10 in the book *The Emotional Power of Music: Multidisciplinary perspectives on musical arousal, expression, and social control* authors Klaus Scherer and Eduardo Coutinho write about how music can be used to create mood and emotions.

> the emotions experienced by listeners can be triggered by, and are a collective function of, many parameters, including the mood and psychological state of the listener, memories and other previous listening experiences, environmental and other situational aspects, individual preferences and attitudes, cultural conventions, among others (p Scherer & Zentner 2001).(Scherer and Coutinho 2013, 121)

Regarding games, on can make a case that this work in a similar way. The game mechanics sets the player in certain situations, and the music can help create the mood based on what the player experiences. The music can help the trigger the emotions experienced to the player. This can be all from fighting an epic dragon, to a puzzle game. A great example of this is the

horror game *Resident Evil 4*. This game is atmosphere driven, and the game sets up an atmosphere that has both panic and quiet parts. This atmosphere is most common when the player faces off against enemies. When the player just goes around and is exploring the world, there is little to non-background music, only the sounds of the player's footsteps and sound of the nature. This helps create the atmosphere that it is quiet and perhaps safe, but at the same time, the player can hear anything include the heavy breathing of enemies and scary monsters. So, it can create a sense of paranoia and alertness. On the other side is when the player is in combat with enemies and monsters. The music is soundly turn up to 10 and is playing a loud ambient track that tells the player, when you hear this song, you know you are in danger. The combat music is created to make a clear difference between exploring and combat, so long the music is playing, there is still enemies around you, but when the enemies are gone, the music stops. This musical affordance that's tells the player what to expect helps create the emotion and mood for the player. It creates panic and amplifies the action, and at the same time, when the music stops, the player knows that he is safe and can relax.

Another example of creating a mood is the game *DOOM (2016)* In this game, heavy metal music is used to set a player in a certain mood. This game is also using color to help create that mood, but here the music is the main focus. In *Doom*, when the player is battling the hordes of hell, the music is a pump-up metal soundtrack that feeds the player energy and the gameplay works together to give the player the feeling of mayhem and invincibility. The main point is that the player feels like a "bad ass" and the gameplay and soundtrack do that. This combination creates emotion to the player. The game is about fast action and high intensity, and the music help to set that mood. The color's role here is to amplify the gameplay and give the player hints to when making certain attacks and where ammo and health are. In this game, music and gameplay create the mood, and color helps that feeling. Color is also used to indicate the setting and who the bad guys are.

Music can help create mood and emotion in games. Music helps the player being a part of the world or as a tool to tell or set the player in a certain situation. In games similar to *Mario kart* music is background music, but the songs are designed to fit the map and to go with the setting of the map. In this way, music can also have a semiotics meaning by using index and icon to tell the player what, where, and how they are playing the game. This is also linked to musical tropes. In games, there is some type of music that is linked to certain places and actions. In RPG games like *Bravely Default* and *Twilight Princess*, have a somewhat similar

design even though they are completely different games. The similarities lie in the tropes. All three games have a “winter world” there the background music is slow, relaxing, and “wintery”. The same goes for the game “overworld” and “forest area” there is more upbeat music that sets up the adventure.

Location background music can also help the feeling of inclusion. The game *Far Cry 5* is set in fictional Hope County, Montana, America, and is a parody on the political climate. To make things even clearer, the game is using country music to help set this mood. Video game music takes from the real world and other game tropes to help the player understand more of the game they play. These tropes can trigger the player's knowledge about something they have experienced before in games or real-life, too, then make a connection to what the players know. As Scherer and Coutinho are pointing out “We have acknowledged that music can evoke many different affective states, including preferences and moods” (Scherer and Coutinho 2013, 139) Music in video games can help set the mood in the player.

Also, relevant to preferences, the music can help create a connection to games. The music can be so memorable that people have a connection to a place just for the music and want to explore this part of the game the most or get nostalgic when listening to a tune from a game. Music is a big factor to creating mood and emotion to the player and is a big part of the game design. The well-known video game music composer Koji Kondo said in an interview in 2009 that he would play the game, feel the game, the rhythm of the game, and the feeling of the game when engage by the player, and after that make the music that fits the game and setting. (2009)

Nostalgia also plays a big part in creating a mood. The interesting part is this mood is not something that is created when the player plays the game for the first time, but rather later on when the player has an emotional connection in the game and emotion. For example, music, when played to a certain place, can bring some nostalgia to the player, and this creates a mood when the player is listening to it. This mood can even be there when the player is not playing the game. For example, listening to the soundtrack without playing the game.

Sound effect also play a big role in game design. The sound is there to help indicate something as well. Here is the index and telling the player about the gameplay important. The sound effects are mostly there to either indicate or tell the player what is happening. If you hear a gunshot, it indicates someone is shooting, are you hearing screaming someone need help. The sound effect can also amplify actions the player is making. If the glowing red sword

is making a more impact-full sound than the regular sword, then this can amplify the action and tell the player that this is different from the regular attack. Alternatively, if you hear a jingle when completing a puzzle or objective, you know that you completed it. An example of using sound effects is the horror/action game *The Hunt: Showdown*. This game is about the player who is a hired bounty hunter that need to kill a bounty boss in a zombie-infested Louisiana. The twist is that the game is also PVP (player versus player), and several teams are after the same bounty and will most likely try to kill other hunters when seen. The way this game work when it comes to sound and music, is that is little to no music. The focus is on sound effect and thanks to Crytek's 3D sounds engine, these sounds are almost real-life mimicking. So, the player can hear almost everything that is happening close, the mood is set here instead of creating action and unpleasant mood like *Resident Evil 4,* the game creates the mood without the music and only sounds.

When it comes to sound effects in the multimodality Hawreliak er noting that:

> Most obvious are the sound effect that occur during combat. Gunshots, explosion, death cries, and animal roars all create an auditory environment that communicates there is a lot going on, and that the player's action have significant effects (2019 ,110)

Since everything in *Hunt* can kill you, the player needs always be on the alert, and the sound effect of both flying crows and hive monsters can make one more and more paranoid. So, this is a case where the lack of music and focus on sound effects can create its own mood. The players will need to work together and use the sounds effects for all that its worth. All sounds from gunshot to walking on glass can alert other hunters and tell them where you are. The sound effect indicates where you or the other player are. The sounds also work as different index in the game. Different monster has different sounds, so the player will know what kind of creature it is without seeing it. Also, when in combat with other hunters when hitting an enemy, the hit makes a special sound that tells you that you have hit. Also, when a player dies, he makes a special dying cry that indicates that he is dead. The semiotic index is giving the player affordance with these sounds.

Let us go back to Gilbert, Fridlund and Lucchina text about color and emotion. (2016, 206)

Figure 7: Gilbert, Fridlund and Lucchina mapping of color. Focus on "happy "colors. (2016, 206)

Here, color is linked to other modes and elements in a multimodality. Color helps create something more. For example, using light-blue relaxing color, with relaxing music and not showing elements like enemies or taskbar the player know he can relax. The same goes for the opposite. If you want to make an angry mood, combine red color, with angry music and elements that tells the player that the situation is angry. Music and color play into this and help each other to create the multimodality. The music helps indicate something even if it is where you are, what world you are in, or if enemies are attacking you. Music is an important tool to enchant the gaming experience and the game world. Music combined with the game mechanic, game world, and colors are needed to understanding the game Overall, on can claim that music plays a bigger role than color, but both color and music play a similar role, and the role is to amplifying and helps the gameplay to create moods. Without music and color, the game would still play the same, but would most likely be more boring. Music is being used to help the moods of both actions, places, and overall experience of the game. Both music and sound effects are a more central part of index and to indicate something in the game world.

4.5 Rhythm of playing

When talking about mood and mobility on important aspect of that is how on experiences the game and how the game make the player play. Before in this chapter the discussion has been on how other modes like music are amplified by color, but how is the player experiencing the game and can the player be a part of this multimodality?

In chapter 7 of the e-book *Playing with Feelings,* Aubrey Anable writes about the rhythm, tone, and timing of casual games. She writes that simple mobile games like *Candy Crush* and *Dinner Dash* are designed to create a break and transition in our digital lives. The digital

landscape is designed to have a rhythm there; we go from different tabs on the web and programs and apps, and therefore we are drawn to games that have a certain rhythm and design. One question that comes up here is how colors are used to lure the players into playing the game. She writes about *Candy Crush* and mentions colorful candies and how it can appeal, but nothing more than what it regards of color. So, let us take at how colors can be a tool and how it's used in regards of rhythm and tone.

Using the same examples as Anable are using "candy crush" One of the reasons for why candies were chosen was because of their shape.

> Candies felt like something that everybody would have a positively feeling about. And I wanted something that could have shine and glossiness without being something unattainable (Sebastian Knutsson 2013) (Anable 2018, 86)

Sebastian Knutsson says that candies were chosen because of their design, their shapes, and the color are something that everybody knows and has mostly a positive view. The game itself is grid based, and the goal of the game is to match the candy shapes and color with another to make them disappear. The reason for its success is due to mainly three parts. Anable writes that one reason is that of casual games:

> Casual games have become one of the most important global business and game design models in the industry, precisely because they reach players beyond the usual video game demographic of men between the ages of eighteen and thirty-five. Many of these players are women who do not play any other games and would never identify as gamers (Anable 2018, 96)

People that are not usually playing games are now playing casual games like *candy crush* because they are simple to pick up and easy to play. Anable continues to write in this chapter that this rhythm between work/ real-life and a simple break with casual games makes them more appealing. This is one of the reasons why they are popular. The second reason is similar, and that is because they are freemium games. Freemium games are free to play and simple to download and start playing. If you want, you can play the game almost anytime and anywhere for free. So, people can easily take a "break" from the real world for 5 minutes and play. The third reason why it is popular is its gameplay. The gameplay of games like *candy*

crush is easy to understand and, at the same time, gives the player a visual reward when doing something great.

4.6 Accessibility and playability

The *candy crush* gameplay and other popular casual games like *Angry birds* and *plant vs zombies* are made easy to access. You can play the whole game using only your hand and fingers. When it comes to shape and color, this plays a particular role in luring the player in. As mention earlier, *Candy crush* did choose candy, because candy is appealing to people and easily recognizable. The candy shape and color symbolize to the player what they need to do, and colorful illustrations and items are telling the player how they play and if they did succeed or not. Here the visual reward is essentially to hook the player to play more. You get the candies popping and a bright orange sweet when you are clearing different candy rows. If you get four in a row, you get a "striped candy" that is worth more. This is an example of how color is being used to mark something important. The shape is the same, but the color is telling the player that this is something special. When playing, the player can also do something that is called sugar crush. This is a colorful reward that pops the candy in a meaningful manner. This color pop is a visual reward for the player to keep playing more. The game uses color and shapes to give people this feeling of success and reward so the players will keep playing the game. And another reward in the form of the board itself. When the player starts playing the game, there are colors and different shapes everywhere, and it is the player's mission to make order in it. Anable writes that this brings a new challenge to the player. "A field of disorder is presented to the player, the player creates tempered order, and a new mess is presented for ordering." (Anable 2018, 87-88)

This disorder is essential to what she calls the "rhythm of play and work". The player takes a break from the real world to make a virtual board go from chaos to order. This helps the casual player to take a break from the world and enjoying the game. The game's grid is important for that, and with the help of shapes and color, the players set on to match up the color and shapes to make order. In this sense, color helps the feeling of escaping and making order.

Combine this with Plass and Kaplan theories. They are stating that:

> We have found evidence that a number of different design elements in interactive learning environments, such as games for learning, can impact the situational interest experienced by the learner. Among them are the game mechanics, the social mode of play, and the use of badges" (Plass and Kaplan 2016, 141)

Mobile games can impact the situational interest experienced when playing the game. Mobile games are using different elements to gain attention. Anable is claiming that people are using small mobile games as a break from the real world. Furthermore, these are the same as Plass and Kaplan describe. It is mechanics, the social aspect, and rewards as badges and similar items. It is about the impact the player feels when playing the game. Even though it is not traditional learning, the player gets in a mood that is impacted by the game, color, and mechanics. Anable claims that people are mobile games as small breaks and games are using shape, form and color to make this clear to the player. The games are teaching the player how to play and what to expect from the game and the mood. The game is still telling the player what to do and how to achieve this. Even though it is just a short five-minute break, the player still has a learning and an understanding of the game.

In this way, the main point of the game is to make the colorful blocks disappear and make the disordered color shapes to mix and disappear. It is the colors job in this game first to be appealing and draw the player in, and then let them use the color to create order on the gaming grid. When it comes to the feeling of escape and the "rhythm of play and work," color has a more significant role in games like *candy crush* more than other games. In other casual games, color is perhaps not as important, but to casual games, they are often designed to be played on mobile phones. Mobile phones have smaller screens than the central Video game platform, and therefore it is vital to make the shapes and form in the game stand out. Therefor using precise forms and colors helps the player understand the game. In casual games like candy crush with clear shapes and colors, colors play a central part in the gameplay and how the player experiences the game.

Regard to color and shape, and the feeling and mood of escaping the real world, the Color, and shape of the game itself is important but is also the smaller things.

> When we play games on our mobile phones, we seem to momentarily leave the realm of self-measurement and management of productive labor in order to play with and among heightened and fantastical version of these categories. In Candy Crush saga the phone's conventional

> symbols of connectivity—network status, battery power, and time are replaced with colorful gauges measuring the players score, remaining moves, and boosters. (Anable 2018, 92-93)

The choice the change the different phone icons is most likely to draw more attention to the game and create an even bigger "free" zone for the player. There is no clock to remind you about the time and so on. This helps create the mood of escaping and make the player focus on the game. If you want to see other notification and the clock, you need to make it visible yourself on the phone, and even incoming calls get minimized so that the colorful game can be in focus.

4.7 Question about rhythm

So, the question is, why does this matter and what difference make color use to people? Mobile games are made for rapid play sessions, and the color is there to draw people in. Color works as both a selling point and as a reward. So, color is important to create a mood. *Candy crush* has by Mars 2020 over 500 million downloads worldwide and had made a big impact on the mobile games market. Other successes like *Angry birds* have over 100 million, and this is not including the countless spinoffs and sequels that the games have. (Data were taken directly from the Android Play Store) The games have made an impact on the phone world and the casual gaming scene. The games are mostly free and are an easy download on the device you already have. It gives the player something to do for 5 minutes. Either it is for taking a break from writing a master thesis or taking the bus home from work. It gives the player something to focus on besides the real world. To do this, it uses shapes, forms, colors, and gameplay that is appealing to the masses. The gameplay has nothing to do with candies, and the shapes could be any shape, cars or pizza, the gameplay would still be the same. Here is the color and form appeal This helps the player understand the game mechanics easier, and that helps create the feeling of "escaping" the real world. This is also somewhat true for *Angry birds*. The gameplay would still be the same if the birds and pigs where other objects but creating colorful birds that fight against only green pigs make the game easier for the casual player and create the mood. Color helps create a mood that makes people forget about the real world for just 5 minutes. The mood is not about some big epic adventure, but the whole game is built around short fun there. The mood is to contrast the mood of the real world. This mood is a small escape.

4.8 Colorblindness

This partis to take a deeper look at how color changes to people. I want to take a look at how colorblindness is affecting the mood and semiotics tools of the videogame multimodality.

In regard to colorblindness in Herman Tulleken and Jonathan Bailey write that :

> Color blindness affects about one in 12 men and one in 200 women. The most common type of color blindness is Red-Green color blindness, which results in a difficulty in discriminating red and green hue. (Tulleken and Bailey 2015)

Illustration 24: The different color a colorblind person can see compared to a normal color vision (Tulleken and Bailey 2015)

Illustration 24 is shows how Red-Green color blindness are affecting how one views color. When it comes to the history of video games and colorblindness, the majority of games have not support colorblind players. Earlier in the text, I have argued that the reason for a specific color lies either in symbolic or/and contrast, but what is happening when the contrast and the color disappear? First, games that are using color as a marking tool or using a particular object or icon with color become much harder to play

Name	Issue	Functional blindness	% afflicted	
			M	W
Anomalous trichromatic				
Tritanomaly	Malfunctioning blue cone	Blue-Yellow	0.0002 %	
Deuteranomaly	Malfunctioning green cone	Red-Green	4.63 %	0.36 %
Protanomaly	Malfunctioning red cone	Red-Green	1.08 %	0.03 %
Dichromatic				
Tritanopia	Missing blue cone	Blue-Yellow	0.0002 %	
Deuteranopia	Missing green cone	Red-Green	1.27 %	0.01 %
Protanopia	Missing red cone	Red-Green	1.01 %	0.02 %
Monochromatic	Missing two or more cones	Fully color blind	0.00003 %	

Figure 8: Table 1. Breakdown of naturally occurring color deficiency types for men (M) and women (W) (Kevin Berisso 2018, 94)

Using this figured that is presented by Kevin Berisso (2018 ,94) We can see what color are having issues and what the functional blindness are. Using Protanomaly as an example. Going back to *Overwatch*, the game uses blue and red to make a clear border between each team, and with Red-Green color blindness, the player is perhaps able to see the different teams, but what with the UI and HUD?

The ultimate meter suddenly has the same color as the background, and the health meter is not as visible. In other First-person shooter games, there is usually a min map there the player and his team are marked with blue or green arrows and the enemy are small red arrows. With color blindness, it can become slightly difficult to play the game. Color in this scene stops meaning the same, and all the symbolic and contrast changes meaning. Coyne writes that "people easily relate the language of color to that mood"(2016, 80), but what is the mood of color if there are several other colors that looks the same and the user can see the difference? One can argue that the mood can change thanks to this, but it is also important to remember that in this case that other modes and elements, like shapes and sound plays a more significant part of creating the mood of the player. Thankfully in many modern games there are different form of colorblindness tools that can help any player have the same experience. *Overwatch* has three colorblindness modes that can help if the player is suffering from deuteranopia, protanopia or tritanopia, and the player can make small customization to the UI color if necessary. This helps the player to experience the game like normal players. If the mood is completely the same is hard to say but using tools like these helps players enjoy the game more.

Illustration 25: The different between the Tritanopia and default color set

Illustration 26. The different between the Tritanopia and default color set

If we see the on illustration 25 and 26 we see the different between the Tritanopia and default color set. If you have a normal eyesight the tritanopia colors have a completely different meaning, mood and is looking of similar to other key color in the HUD. The important thing to remember here it that players who that have tritanopia perhaps sees the default colors in a same way. A bounce of similar colors that are coming together in a mud of colors. When using colors in games as a tool in both UI and in gameplay it is important to think about on how other people are viewing the same colors and if the color meaning changes or become difficult to read when combined. Even though *Overwatch* is using bright color in the design some players cannot see those colors and the colors lose their meaning. Therefore, it is important to have a colorblindness adaption to create a game where everyone sees what they are supposed to see and enjoy. Game developer Henry Hoffman said in the article “The

Whose View of Hue?: Disability adaptability for color blindness in the digital game Hue" written by Theo Plothe that when designing for colorblindness patterns and symbols are important.

> […]I actually experimented very early on with using patterns, which are a much simpler aesthetic, having sort of a pattern overlay over each different color and being able to match those patterns. But then as the aesthetic developed and we got these intricate details, overlaying patterns became too much visual noise, and even people who weren't colorblind struggled to play the game. So, I was like, okay, that's not going to work. So, I ended up devising sort of this symbol-based system, my own symbol-based system, which ended up getting a substantial amount of press, which I'm very happy about." (Plothe. 2018)

So, in this case the color becomes not important and something is replacing the role of the color. Color becomes valueless and non-relevant. This is of course made so that all players will have similar enjoyment of the game without being confused. The visual is important and color can be replaced by patter and symbols. Color are the main focus in most cases, but it is important to know that is can be replaced by something else if necessary. Hoffman continues: "There's been players that have got no vision impairment whatsoever who turn on colorblind mode just because they prefer it, because it's another form of visual reinforcement" (Plothe. 2018)

From this, one can argue that color is helpful in telling the player about affordance and meaning of the game, but it isn't necessary and can be replaced. This is important with the colorblind in mind since the most import is the experience of playing the game. Color is one of the main forms of visual reinforcement, but as seen, it is not necessary for the game experience. It can be replaced, by other modes and elements like symbols and pattern. Colors are there to help, but in cases like colorblindness, it can be replaced.

4.9 Summary chapter 4

In this part, the focus was on different kind of modes and elements, and to see what role they could have. This was with a focus on what mood they bring and how color has something to

say. When making mood and relation to the world, one can make the argument that color is vital to mood and affection but is not the central part. Other modes and elements, like music and shapes, form, and objects, play a more prominent role. In games that use the lack of color to create a mood, shapes objects, and music play a bigger role, and music can set a mood. Color amplifies the mood and understanding of what the game developer wants to tell. In a game, a setting with objects and music tells the player more than color, but the color helps the understanding and to create a mood. The sense of play and rhythm has also something to say, the way the player plays a game has something to say when the player are experiences the game itself, even if it just for five minutes or several hours. This all helps create a mood for the player.

Chapter 5: Survey and an interview

This chapter will take a different approach than the rest of the thesis since it will now focus on a survey based on Pokémon and an interview with the game designer Solveig Møster. This is to get a new and different view on how color and other modes and elements work in games and how they can be used to create mood and emotions.

5.1(Compound survey) The cute pocket monsters:

5.1.1 The motivation and purpose

In the game's series *Pokémon* by Nintendo, the player can explore beautiful worlds that are full of colorful creatures that the player can catch and interact with. When it comes to the color of the Pokémon, one can ask if the color has a purpose or not. Furthermore, what role the color plays for the player. The motivation for this survey was to see how the relation of shapes and form work in practice.

This survey gave new information to refer to in relation to the thesis, I did conduct this survey with a certain purpose, to receive new answers and information. This is to create an argument based on the information it gave combined with already found information based on earlier work in this thesis.

5.1.2 The aim

The aim of the survey was to gather a result that gives a result that we can use to form an argument. Earlier in this text we have taken a look at how color works with other parts of the multimodality. On key focus has been the connection with color with shapes and form. The aim is to see if this academic analysis is connected to real life reaction by people regarding shape, form and color. This is to see if there is a connection with color symbolic, a link between color, shape, and a possible affection in regard to the color and form. This test is to try to see if color can have an affection on the player and if color can be used to help the player understand the game.

5.1.3 Method used

To investigate this, 10 participants were asked ten questions about color, form, and look. The purpose of this study was to see what color is linked to the design of the Pokémon and what people think connect the color and form of the Pokémon..

The 10 participants were chosen based on their gaming knowledge. Five of them said they have played little to no video games before and where unfamiliar with Pokémon. The other five play games on a regular basis, and only, two of them have played Pokémon before this survey. The 10 participants were shown six different Pokémon. The first three Pokémon's are the starter Pokémon from the newest game's *Sword* and *Shield*, and the three others were chosen from a different game and different Pokémon generation. These different choices were made to focus mainly on two things; what are the color telling the player, and how are color and form combined appealing to the player?

In regards of Pokémon, every Pokémon is either one or two *type.* This *type* can be fire, water electric or dragon. One part of this research is to see if there is a connected between the *type* and characteristic of the Pokémon.

Illustration 27: The different type and Pokémon that were used

The participants were asked 10 different questions. The 10 different questions were:

1: Based on what you see, what *type* is the different Pokémon?

2: Why did you answer this?

3:Wich one do you prefer?

4: why did you choose this Pokémon?

5: which one is the cutest?

6: which one is the ugliest?

7:Why are they ugly and cute?

8: What is more important? The form or the color?

9: If the color was opposite (red is blue, green is red, and blue is green), would you still think they are the cutest/ugliest?

10: Choose one Pokémon, and what is your first thought?

5.2 Summary of the survey

Based on the answers, the result was somewhat surprising but also a little predictable.

5.2.1 Question 1

The first question was about which *type* is linked to each Pokémon. On the first three Pokémon, all the participants answer the right *type*. On the other three Pokémon's there was the varied answer. Some had also right on the fifth Pokémon, the electric Raikou. But all were wrong on the last two Pokémon's.

5.2.2 Question 2

When asked the second question: why this was the case, 9 out of 10 said it was mainly because of the color, the water *type* is all blue, and so on. Some of them also said that thanks to the design and form. For example, the water *type* had something that resembles fins, and the grass *type* had a leaf on its head.

The last three Pokémon were somewhat different. The fairy Pokémon Gardevoir was believed to be a grass *type* by the majority of the participant. The reason for this was mainly that it has a "plant" form and has green in its color design. The fifth Pokémon, the electric Raikou, was believed by all participants to be electric or lightning. This is thanks to the design and color combination. The lightning design and yellow color combine to make it clear. The last Pokémon Haxorus was the trickiest one. Perhaps thanks to the easier color and form combination of the other Pokémon's, the participant was thrown off by this design. The majority said, ground, and said this was because of its brown-like color and its armored design. In Haxorus's case, the color had more to say of what *type* people thought it was not the form.

5.2.3 Question Three

When it comes to the third question, there they were told to choose the preferred Pokémon, something interesting happened. Of the 10 participants, all of them except one did chose either Scorbunny or Sobble. The last one was Gardevoir.

5.2.4 Question 4

Continuing to question four, they were asked why they did choose this Pokémon, there were similar answers. For those who picked Sobble, this was because they thought it looks cute and wanted to hug it. Sobble has a scared but cute look on him. There were also 3 of the 4 who did choose him who said their favorite color was blue, and that helped them picked him. When asked why they picked Scorbunny, the answer was similar. Scorbunny is a cute rabbit that looks energetic and fun. Color did have little to say here, but the knowledge that it was a fire rabbit help for at least one of the participants. The last participant who picked Gardevoir did it mainly because of the design. The participant liked the feminine design of the Pokémon and thought it looked cool, thanks to the dress design.

5.2.5 Question Five

When asked which one was the cutest, the two winners were to non-surprise Scorbunny and Sobble. 4 participants thought Sobble was cutest, and 6 participants thought Scorbunny where cutest. When asked about the reason. The common answer was because of their form. Scorbunny is a cute rabbit, and Sobble is a cute and afraid salamander with big eyes. Also interesting is when asked about the color of Sobble, one participant said that the blue color helps Sobble to look calmer and, therefore, more likable than the others.

5.2.6 Question 6

When asked about the ugliest one, three Pokémon' were chosen. Haxorus had 3 , Grookey had 2, and Raikou had 5. The reason why they thought the grass *type* Grookey was ugly was that they did not like monkeys and that they tough its monkey/grass form was ugly. Also, the color combination that makes it look likes it has an orange bird's beak was not a big hit. So here it is mainly the form, but the color amplifies them to dislike the Pokémon. Haxorus, was disliked because of its form. They said that the design was not bad in itself, but that it had rough edges and, based on all the other Pokémon, Haxorus, was the least cute since it had an edgy and aggressive design. The blood-red color on the mouth blade also did not help with the cute factor. So here it is mainly the form that makes it look "not cute"

The last one is Raikou. The main reason for people thinking he was not cute is because of its form and color combination. The participants believed there it was too much going on in the design, and the use of color amplified that feeling.

5.2.7 Question 7

When answering why a Pokémon is either cute or ugly. They argue that different Pokémon's are supposed to look threatening and some to look cute. Here it is, both color and form, that makes either makes it ugly or cute. Some of the participants didn't like the monkey design, and some of them liked it. The form and personal preference have something to say.

5.2.8 Question 8

Perhaps the most important question was the one about what is more important: color or form. The interesting here is that there are mainly two answers based on if you are playing the game or not. The non-gamer side of the survey had different answers and opinions, but the mainline was that the form was the most important. One said that the form is the most important to see if it is cute or bad. If Sobble were green instead of blue, it still would look the same. One other said that the form is more important than color, but the color is helping the form.

Looking at the answers by the gamers, they also agreed that the form is the most important since one can still have an understanding to the form without color. Two of them said that even though the form is the most important, colors play a crucial role in gameplay. If they were playing and did meet a new Pokémon that they did not know what *type* it was, they would use color as a tool to see what *type* it is. So, the take from this is that form is the most important, but color can help.

5.2.9 Question 9

For question nine, all participants thought that if their favorite and least favorite did change color, the effect would be the same. Mainly because of the form. If the rabbit were cute before, changing color would not make it less appealing. The answers for question 10 were similar to other answers since the participants did the answer in a similar way to what they already had described in earlier questions and therefore had the same answers. The rabbit is still cute.

5.3 Information this gave us

So, after this round with the question, one can ask why these numbers and opinions matter. To answer this, we need to look back at what Plass, and Kaplan wrote about shape and color. They mention that shape and form can have a connection to preference, and softer shapes are more positively viewed. (Plass and Kaplan 2016, 138) When looking at these theories in regard to the video game world and game characters like Pokémon, we can make an argument that there is a connection between color and shape to different preferences and affection. When people were asked which *type* the Pokémon was, people answered correctly on the first three *types*, and the reason for this was because they look at the color and believed blue equals water and so on. There were surprisingly few that said that the form of the Pokémon had something to do with the *type* even though there were clear plant and amphibian traits on some of them. It is interesting to see how this kind of mentality continued to the three next Pokémon as well. When it comes to the Pokémon Gardevoir, almost all of the participants said that it was a grass Pokémon. The reason? Because it was green and had a flower-like form. Even a player who has played a lot of Pokémon said that it was part grass *type* based on the color even though this Pokémon had never been a grass *type*. The dragon-*type* Haxorus, it was interesting to see that almost nobody said that it was a dragon even though it has a dragon and lizard-like shape. The most common was that he was a rock/ground *type* because of the color and that he had "rock" armor. The electric dog, Raikou, all correctly said that this Pokémon was electric *type* based on the combination of the yellow color and the form design.

So, what does this tell us? Based on these results, one can make the argument that people already have a mindset as to which color is linked to which *type*. This is most likely because of the real-world rules and traits. The grass is green, and so on. When players see an utterly blue Pokémon, it is easy to make the connection that this is a water *type* because of the color association. This may be a reason why the designers have colored the Pokémon this way, so it is more accessible to the player to know the different *types*. With the water Pokémon Sobble, this is almost self-explanatory. People see a blue Pokémon with a form that resembles a real-life salamander and, based on that, is learning that this is a water *type* Pokémon and can continue the game based on this. In Pokémon, this is not always the case, as seen with Gardevoir. This Pokémon is green and has a flower-like design but is not a grass *type*. The reason for Gardevoir inclusion in this research was to see if people made the same connection

with color and form as with the three other Pokémon. The result shows that they combined the color and form to assume that Gardevoir was a grass *type*. This shows us that color and form have something to say about how people react to the design. This can be argued with Haxorus. Even though Haxorus has a dragon-like form, most of the participants thought that this was a rock Pokémon based on the color. Its brown color was more important than the form itself to assume of *type*. One of the percipients argued that its designs were "vulcanoid" and therefore made it a rock *type*. What we can take from this is that people are using the color that they know from real-life, combined with a form that may resemble a real-life form to make assumptions about the *type* of Pokémon and is playing the game based on this.

Based on the participant's answers, it looks like the form is the most important, but the color is the first impression to placing the *type*. Color has a role. Even though all Pokémon's have different color and this color are not always the same as *type*, there is a more significant presence of the Pokémon's that are linked to the color of *type*. There are a lot of red/ orange fire *types*, and there are a lot of green grass *type*s, and so on. This design can help the player have a better understanding of the game, especially if the player is entirely new to the franchise.

Regarding the link between color and form and a possible affection thanks to color and form, we can see a connection with the different forms of the Pokémon. The smaller, more baby-like, was better liked than the rest. The reason for this, as said by some of the participants, is mainly because of the form and somewhat the color. So, the questions are: Why are Sobble and Scorbunny cute? Why are Haxorus and Raikou not cute? This assumption can be liked to what Plass and Kaplan write:

> In fact, research has shown that children associate brighter colors with more positive emotions, and darker colors with more negative emotions (Boyatzis & Varghese, 1994). Several studies on multimedia learning have implied that different aesthetic designs can induce emotions and that these emotions affect users' performance and cognitive processes (2016, 138)

First off the colors may have something to say. As they write, color can have an emotional effect on people. Scorbunny and Sobble have different colors, where Scorbunny is colorful and bright with white and red colors. Sobble, on the other hand, is blue but with a bright light blue primary color. So even though Sobble is a colder color than Scorbunny, but thanks to its lighter tone, it is still appealing and can have a positive emotional reaction.

Figure 9: Gilbert, Fridlund and Lucchina mapping of color. (2016, 206)

Supporting this is also Gilbert, Fridlund, and Lucchina's research. (2016, 206) Here can one see that lighter color is overall more positively used, and the darker color is used to exhibit more negative emotions. Healthy and relaxed equals light green and light blue, while sad and tired is darken and bluer. Sobble and Scorbunny have a different color, and these colors have some association with the player, but the shape has more to say. The color helps the shape, no doubt, and it helps the player. Sobble light blue design is helping his appeal, but at the same time shows him a little sad, and people have a symbolic affection for that.

When it comes to the other two “ugly” Pokémon’s Haxorus and Raikou, the participants were clear that the shapes were the main factor, especially with Raikou. Even though Raikou has a bright color pallet, the participants disliked his design. In Haxorus case , its design was “not cute” but not ugly. Haxorus is designed with this color and shape to look threatening, and thanks to the color, especially the red on its mouth blades, helps with this look. Haxorus color design is made threatening with purpose.

Sobble and Scorbunny have a cute form, but why is it cute? Plass and Kaplan writes about the baby-face bias:

> Another established effect is the baby-face bias, which describes how people or things with round features and large eyes are perceived as baby-like (Lorenz & Generale, 1950). Unlike shapes featuring sharp edges, these round features induce a positive effect in the learner by evoking baby-like personality attributes—innocence, honesty, and helplessness. Anthropomorphism research, which studies the attribution of uniquely human characteristics and qualities to nonhuman beings, inanimate objects, or natural or other phenomena, has reported similar effects (Plass and Kaplan 2016, 138)

Sobble and Scorbunny have these baby face traits. Especially Sobble has a round head with big round eyes that makes him innocent and helpless. These shapes, combined with his color, makes him look even more helpless. Scorbunny design is still round with round eyes and a round head. However, instead of helplessness, it is the opposite there, he looks ready to take on the world, looks young and energic. So even though they have the same trait, these traits are in different ways. Color can have something to say here. Blue is a calm and perhaps sad color, while red is a more energic color. The index of the color tells the player something different about the characters. The color helps the shapes have an emotional effect on the player, as one of the participants said. “I picked Sobble because he looks sad and needs help” And asked why he said, “it is his form, but also he is blue, and I connect blue with sadness.”

Illustration 28: The difference between baby design and edgy design

On the opposite side of Sobble and Scorbunny, we have Haxorus who is featuring sharp edges in its design. As mentioned before, this is most likely done with purpose. Not to make him look evil, but to make him look cool and threatening. A rounder shape can have a more positive effect, but in games, there is also the need to have the opposite. For this Haxorus's design does a good job of looking threatening to the player. Its design is a big contrast to Sobble’s round design. Furthermore, once again, the color design helps Haxorus look threatening, with darker colors and colors that are linked to blood and death. Haxorus design

is not meant to be cute and positive but to look like a treat to the player and the player opponent.

5.4 Summary from the research

If we combined the survey results with Plass and Kaplan's theory about different shapes/forms and colors. We can argue that the result of the survey is: The forms are more important to which Pokémon is the most attractive.

This lies with the shapes of the Pokémon, and we can make a case that thanks to the baby-face bias. Pokémon that have a rounder form is more attractive to the player. The participants were more likely to pick the round, baby-faced Pokémon than one that had sharper edges. So, when it comes to this, the form had the most to say, and this design is the most important, but color

When creating understanding of the Pokémon *type* to the player, the color had the most to say. The participants did mostly go after color when deciding what *type*, the Pokémon was and picked the wrong answer because they did only look at the color and not the design. This can be linked to what people already know about colors and what they believe is linked to each color. Here the understanding lies within the index of the player and what the player believes the color is indicating.

So, regarding emotions, moods, and attraction to Pokémon the shapes of the character are the most critical part. Shapes are the crucial part, but colors can help the player feel something. Sobble was picked because he was blue. This can help the player be set in a mood since they are playing a game with a character that they have some attraction to.

In regard to *gameplay* (The player are playing the game based on its rules and mechanics), color has a more prominent role. Based on the Pokémon color, one can have specific knowledge of what *type* it is and understand the game. If the player believes a Pokémon *type* is something based on the color, they can go from there either way this affect the gameplay. What the player feels is right affects the gameplay, and color has something to say about that.

So, one can make 4 points from this survey

1: A round shape is viewed as cuter than a pointed shape. This point helps us understand how some people think about shape and form and that this is possibly more important than color.

2: Bright and happy color is also more popular, as shown, bright and robust color is more popular than others. In the test, the three Pokémon that had clear and bright colors were the most popular.

3: Color can help with different associations and helps the player: The color pallet helps the player first to link color with different abilities, like water to blue and fire to red. This color design can help the player gain a better understanding of the game they are playing, and even though there is some color that does not work together as well, the player gains some information just by the color.

4: When combining shape and color, the shape has the most to say, but the color helps. Color can help the shape grow and become something more to the player. Shapes have the most to say, but when combining with color, the shape can perhaps change the meaning to the player. If the water Pokémon with its fish-like design suddenly were red, the player would maybe think that it was another *type* than water. The shape is most important, but the color helps the shape. The color is an index that can help the players *understanding* of the game.

5.5 The mind of a game designer

Now that we have looked at both different theory and what players and non-players think about color and shape. This part is of the thesis is an interview with Solveig Møster. Møster is a Game artist that has three years of education from Inland Norway University of Applied Sciences and now works as a freelancer in Stockholm, Sweden. Before this, she also has worked as a game designer and leading artist at the small indie studio *TripleRam Games* and has worked as a 3D artist & UI/UX Designer at *Misc Games AS*.

The main point here is to get a professional view on the theories that are discussed in this text to see a game designer thought about color and the way color is used. This is a written summary of what we did discus. The interview was conducted during an online meeting on the app Discord as a video interview. The form of the interview was a Q&A (question and answer). Møster's answer is presented in italics.

This is a structured prepared interview. The structure are following these four points

1. Convention, 2. Readability, 3. Mood, 4. Trend. The question varies, but the structure is based on how colors are used in the game industry. The four points is the red threat that goes through the interview.

5.6 Discussion about color

The first question is about the color's role in-game and game models. What role does color have when working with a shape and form? For this question, she answered that the color helps the form come through and is important to the model since the color helps the model clearness.

> Møster: *Color is important. It reflects and define the material. Plastic has a different reflection than metal. It is important to use color to make the material look right. There are a lot of different materials that need to look right, and colors help with that. Color is helping to make the game material looks like real-life material. The animated movie Toy Story is an excellent example of lifelike plastic that is using colors to mimic real plastic. Furthermore, there are games like Five Night at Freddy's that are taking this to the next level and are using it to create horror bunnies and are making horror games with these esthetics. When looking at the models themselves, one can argue that color helps the model shine and being more defined. It can help the player have a better understanding of the game and what the game models do. It helps set the emotional tone of the game and helps tell the story of the models. A house is just a house, but colors can make it to a hospital or a police station, which is a house that has an entirely different story and purpose.*

The second question was about the use of older color theories about color symbolic and how if there is a connection there:

> Møster: *Color is perhaps not used on purpose, but people are making choices based on what they already know. Of course, there can be some studios and designers who go into detail about it, but with my experience, I'm using colors but are reusing them based on my knowledge of design and what I believe fits the game narrative better. The narrative is the main reason for the color chose.*

5.7 The Role of lighting

The next question was about lighting and color that forms the game. The focus was on how she are views color and lighting when designing her works.

> Møster: *With models and forms in a 3D-environment, there are certain processes. The process is in three different parts that all are important. The first is concept art that has form and tone. In this part, color is there to help the mood. Concept art can be different from the final result, but this part creates the mood. This concept art is to give the developers a clue about how the create the models, art, and the game.*
>
> *The second part is modeling. In this part, the developer takes the concept art and turns it into a game object and form. In the case with mood and emotions, this part is not that critical since mood is created in the concept art, and before, the color and lighting enhance the mood. Of course, the models itself can help create a mood, but the concept art already creates the mood.*
>
> *The last part is the lighting. This part is essential since lighting will affect all colors and models in the game. If you put neon lighting, the whole illustrations change color and mood. Lighting is essential to set a mood in the game. In games, there is already a set color on different objects, but the lighting creates the mood. A blue character's color changes if there is green or red lighting, and this helps create a mood for the player.*

Møster says that lighting has much to say when it comes to mood. An example is from the animation movie.

> Møster*: Here is an example where the model is already telling a story (Illustration 29), but the new red color creates a completely different setting, and the laughter is evil. The model already tells the viewer something, but the color helps the user understand the mood.*

Illustration 29: An example on how colors can change the mood. (Dan O'Brian 2019)

The differently colored lighting is creating different moods in different scenes. The main colors on the objects are the same, but the lighting colors change. The mood in scenes in both games and movies, this mood is important to both the concept art and the model. The concept art combines both form and color to set the mood, and lighting is fulfilling the mood combined with the model.

> *Møster: about the mood, the lighting is the most important part. The models can tell the story, but the lighting and color is setting the mood.*

5.8 Question about Symbolic

When it comes to the question about different colors symbolic, Møster says that they are always thinking about it.

> Møster: *As you point out, green can be poison and so on, but it is not the main thinking point when designing. There is an undertone that is always there but is not always the main point when using color.*

A game from Møsters own creation is *Yearn: Tyrants conquest*. In this game, there are the four main clans that go to war. The design of the clans and clan leaders is contrast to each other: yellow, blue, green, and red.

> Møster: *This form of color contrast is an old and common use in game design. Board games like Ludo also use this color contrast on the main bricks. This use of color is an easy way to tell the player the different characters and see the difference between them.*

In *Yearn* the characters colors are also linked to the design or origins of the characters. The sea bird is blue, the evil plant monster is green, the evil demon jester is red, and the desert shaman is orange/yellow desert color.

> *Møster: this color choice was not random. The color was chosen thanks to the contrast and to tell the characters more apart. It was perhaps not the symbolic meanings of the color, but people link different colors to different things. Like green to nature.*
>
> *Color is essential to game design, like red vs. blue-concept and definite elements in games. Old 8-bit games used color to help them define form and readability. Color has grown. Pixel art was limited but did set some rules. Furthermore, now that games have evolved, there is still the same color use. The color is essential to the design.*

5.9 Different kind of mood

About the question: How do you think color is telling a mood in games? About setting a mood, Møster thinks that games can create a mood for the player, and color is defining, and people linking so much color with the real world. She did also say it is connected to trends.

> Møster: *People react differently both to moonrise and sunrise, and this translates to the gaming world. Color can help the player understand morals in the game, using a color like red as a passion or evil. Yellow is a warm color. A color filter can help to set a mood. Horror games like Outlast have a green filter that can be linked to illness that helps setting the player into a mood.*
>
> *For example, in the late 80ies and 90ies when Nintendo and Sega competed in the console war, Sega's mascot was chosen to be blue just to be a contrast to Nintendo's red Mario. Different trends have also been a factor in color. In the mid, Sega mascot was chosen to be blue just to be a contrast to Nintendo's red Mario. Different trends have also been a factor in color. In the mid-2010s, there was a boom in horror*

walking simulator there most games were either green-grey, blue-grey or just grey. This was to enchant the horror aspect of the game, and since the most popular games had these colors, it was natural for others to follow.

In 2006-08 there were a lot of brown colors to make games look realistic and gritty. Even today, the reality has not changed, but games have become more colorful and varied. This is most likely because, in 2008, there was a trend and popularity for more "realistic" games. Game series like Call of Duty and Fallout set their game in a brown world that is dark and gritty, even fantasy games like the legends of Zelda: Twilight Princess had a more realistic art style and where browner than other games in the series.

In today's game world, there are no rules to color design. There are realistic games, and there are super abstracts games. Games like Overwatch has a friendly and optimistic design that includes all people and culture. This type of colorful pallet and varied design is including diversity. Overwatch is great at this with its optimistic design.

About the question about color relations, Møster says that

Møster*: it is important to use color to relate to games. Games can use other colors but need to define themselves in the game. Today color symbolic is used to have an association. Like, red is action, and green is a color that can show sick people. It is important to create a contrast to tell a story. One can use color to make the story part or character design stronger without telling the player.*

Color associations are interesting. There is no one way to define a color. Like in Japan, the game character Rayman needed a redesign since its purple color was associated with death and therefore needed a change. In the West, there is a similar use color, and in the association, there is a similar way. There are similarities, but not all is the same.

When asked about the connection between other part in the multimodality, like action, gameplay, and shapes, Møster answers that:

Møster: A great example of this is the two games: The legend of Zelda Wind Waker and The legend of Zelda: Twilight Princess. These games in the same series and have similar game mechanics, but thanks to both color design and form design, the feelings are entirely different. The mood is entirely different.

Illustration 30 ; the difference between color can be to a mood. Wind Waker

Illustration 31; the difference between color can be to a mood. Twilight Princess

The games are similar, but the models, lighting, and colors change the mood entirely and tell a different story to the player.

> *On Mobile games like candy crush, games are using objects and color to draw the player in. This to make the user spend money. The player gets feeding happy color boost, and this is to draw people in. However, mobile games are not all that bad. Other games can be uses on the phone and are more story-based.*

So, to end this interview, Møster thinks that colors are helping to define form, mood, and association to the gaming world. They add to the readability and understanding of the game. Color is creating a mood that helps the player understand the game and lift it for the player. Colors tell the player about the game, character, setting, and mood and are essential for the player to gain an understanding of the game. Some games do not use color as much, but that is because these games are using the lack of color as a tool.

5.10 Key points from the interview

From this, one can make the argument that there are four parts to choosing a color in Video games.

1.Is the common factor in the video game industry. This is what has already been done and is common. For example, Red can fire and evil, green can be nature, life, and poison. This is what the player already expects and now for playing games. This usage of color also includes mimicking the real world. Many games are using colors that are common in the real world and translate it into the game world. Other games are using this in the opposite direction and are using abstract colors to create a different mood than the real world.

2. Conor can help the players with the readability and helps the player understand the game. Color can help the player to understand what is essential, the way forward, and the different effects of the gameplay. Color helps the player to gain a better understanding of what to do.

3. To either tell a story or set a mood. Color is important to set the mood of the game. This mood does also include the lighting of the game. Ambient lighting can help create a whole new atmosphere than the original setting. A green-grey atmosphere sets a different mood than if is red or blue. This color use is essential to different genres of games. This use of color is linked to tropes and what is commonly used in games.

4.To follow a trend and the marked what is popular and trendy in Video games. In today's gaming market, this is perhaps not as important, but it was in the past. Color trends of games

changes and even tough it is not as common today with several colorful games there is still a common use. Fantasy games have a certain color use and the same goes for realistic First-person shooter.

5.11 Value

At the start of this thesis, we discussed the value of color and how that has changed through time and because of technology. Going back to this, after taking a look at games and different theories and color uses, are these claims still the same. Looking at how colors create value to create understanding and emotion to the player. As mention (Coyne 2016, 158) Coyne writes that color is valueless in a digital setting since one can create any color without thinking about the cost, and all colors are equal. Going on from there, Plass and Kaplan writes about shapes and colors combination and what role the shape has, and how the shape has more to say about the reception of an object than the color. Color still has something to say, but the form and the shape have the bigger part. This is also strengthened by the Pokémon research. The form is the important factor, and color boosts the experience. The same goes for Pierce's semiotics. In chapter 2, we discussed how games are using symbols, icons, and index in games and what role the colors have to this color use, color are used to help the player understand more of the game, and a color index helps the player understand what is happening. So here, color is a tool to amplify the gamer experience. Colors are also there to help create a mood. Color combine with forms, music, and gameplay creates a mood for the player. So here, the color is also a helping tool.

So, the question is, what the value of the color is? It is just as easy to get brown as purple and yellow. In games and possibility in a digital setting, color by itself is all equal and does not have a meaning in itself.. Red has no more value than blue or purple. After going through and using different theories, one can make the stamen that in a classic view of value, color is valueless, but if one is looking at value in a digital setting of creating mood, emotion, and as a tool, color is far from valueless. In digital games, the value of a color in regard to emotion and mood lies within its use and combination with other objects and elements. An object can be amplified by color. An action can tell the player more when using color. A color helps set the mood and tells the player what to expect. Color can also get a new symbolic meaning when combined with other elements, an example of this is the *Super Mario Brothers*: Mario and Luigi. The primary colors are red and green. When the color is combined with these

characters, the color then starts symbolizing the character, red is now a color for Mario, and green is a color for Luigi. The same goes for games that have the classic red vs blue setup. The blue symbolizes a friend and the red an enemy. The value of combining can changes the meaning of a color thanks to this combination.

In a digital world, one can argue that the color is valueless by itself .The value comes from the color combined with an object, action, or atmosphere. Colors tell the player more about the game, how game developers are using colors to make a better story, gameplay, and UI colors combined with other modes create a value for the color. These modes and elements can be music, shapes, object, or actions and can work together to create something bigger. This is how games create a mood. They are combining all the modes and elements tighter, and perhaps color is the glue. All other modalities are working together, but the color helps them by amplifies them. This can be a dark color on a threatening-looking shape or showing a bleeding effect on an enemy. In a digital setting as video game the value in regard to emotion and mood comes from working together with other objects, action or something similar. Colors are far from valueless. The value comes from color being used and combined with something else to create a combined value and meaning.

6: Conclusion

When we started on this thesis, the main quest was to see how color in video games is being used to create emotion and mood in games and for the player. To answer this question, we dived into how color works with other modes to create multimodality. This was to see what role colors play when combined with other elements that make a video game. Early in the text, we did describe what we would use as templates for mood and emotion based on Coyne's work. To see how color can be used to create emotion and mood for the player. After exploring several types of modes, like semiotics, tropes, music, art, form, and shapes, we can make an argument that colors doesn't in itself creates mood and emotion but is instead a tool and a helping hand to create these emotions and mood. The argument here lies in several parts of this research. First was the change of color value. The digital value of color has changed with time, and thanks to new technology, the value is used differently. Before modern technology, the color was valued based on how costly it was to get a specific color, but in a digital world, it is simple to get all colors. This does not mean color is valueless. In games, the value of a color can be seen to creating mood and how it works as a tool. In this thesis, we have seen how color can be used to create atmosphere, mood, indicate something, and used to help the player understand the game. Colors help create affordance and tell the player what they can do. The color is far from valueless. The color is easy to produce, but in digital media, the value has been transferred to the usage of it. Color is there to tell something, and the value lies in how the colors tell that. The value of the color has changed from having its own importance to help create importance. This value change has gradually developed between digital culture and old culture. Colors' role is now linked to how color interacts with other applications and objects to create value.

Color can be used to describe characters and traits. The traits are not necessarily linked to a color, and if the game were black and white, the character would still act the same way. Here the color helps the player have a better understanding of the character. It is not necessary, but colors can work as an indicator of character traits and help people see the difference between characters. When it comes to creating and describing a mood, color plays a more significant role but is still not necessary. In the past, when games were limited to 8 and 16- bit, color did have a more significant role in creating mood and being used as a tool to help the player

understand the game, for example, using it in the HUD and change the color of the player if hurt, etc. Game developers needed to use intense colors to contrast, and this can be the reason they created a certain mood in the games. Also, regarding color, it's most commonly uses as a tool to help the player understand the game. Taking basic in Peirce's semiotics, we can see that colors are used as semiotics tool that helps the player understand the game. The most common here is the use of index, color combined with other gameplay elements. Color helps tell the player when the game indicated something. The color usage is linked to cause and effect. The color indicates what is happening and what causes it to the player. This indication can include everything from the player becoming green from poison, the screen gets red from getting hurt, or the ultimate meter is full and flashing. This use of color helps the player gaining an understanding of the game. Colors design in games, HUD and UI, are designed to make the player have the best possible understanding for the game, and even though it is through the use of non-diegetic or use of UI, the role of the color is to make things clearer. Color semiotics like this helps create affordance and perception to the player. The color helps the player to see how the game world is built and what to do to play the game. The mood in color use comes from the association the game gives the player to the color. If this is based on the former association the player has or new ones give to the player can vary. Red is red, but red combined with a box can tell the player something more thanks to the association.

Video games would most likely be playable without the use of color, but the color makes it clearer and gives more personality to the game. As Solveig Møster said in the interview, "Color can help the player to understand what is important, the way forward, and different effects of the gameplay." Color helps the player to gain a better understanding of what to do. In this case, we can argue that a color is a tool that helps other tools in games. Color is there to make things clear. It amplifies other gameplay elements. The color helps it become something more. Color helps games become better and easier to read. Color works with other modes and elements, like shapes, form, and music to create something special for the player. One can argue that music, object, and actions are more important, and they are, but the color helps to make them stronger and clear

This connection can be seen when combining form and shapes. When testing this out with a survey and combing in this with Plass and Kaplan theories, this makes the argument that shapes, and object has more to say to emotion and mood. Cuter objects with bright clear color have arguable a positive effect on players as seen when asked about Pokémon preference.

Cuter Pokémon with a clear color were favorable, and the reason was that people think they were cute. Here the shape is the most important thing, but as the survey showed an argument for, color helps to gain an understanding of the shape and object. The understanding of the object helps the player get in a certain mood. If it's a happy green flower, it's creating an understanding for the player that this is a happy mood and so forth. Once again, here, the color is not the critical element but rather a tool that amplifies the shape and object.

When coming to creating a mood for the player, color has a part in the play. As mentioned before, this lies in the cooperation between color and other modes and objects. The combination of color and action, object, music, and location create the mood. A scary form combined with dark colors with particular lighting and ambient music creates a mood for the player, the same does bright color and happy music. The color in itself cannot create mood, but color combined with other elements can create it. Colors can help amplify that mood. This can be, for example, creating a white snow town with jolly music or creating a hellscape with red lighting, heavy metal music, and scary demons. The jolly music and metal music would still be there, and the town and demons would also be there to create a mood, but the color help amplified the mood. If you inverted the music and play metal music in a snow town, the music would change the mood more than if the color was changed. This is because the music tells the player more about the setting than the color. The same goes for action, color tells the play about what is happening, what actions got the player killed, or which action did what. This can work without color, but the color is once again amplifying the feeling of mood and emotion. This is also true with the rhythm of play. If the game is designed to be an escape from reality, shapes, form, and color are essential since they need to be appealing to the player. The object of the game must also be easy to understand. All these elements create a mood of escaping reality and gives the player just a little break from the real world. The player needs to clear small objects and can do so in a short time. The role of color here is combined with the other gameplay elements to create a feeling of escaping.

My goal was to explore what role the color plays in video games when it comes to mood, affection, and emotion in regard to the players.

The answer based on this research is that color in itself does not create a mood or emotion but is instead a tool that can amplify the mood, affection, and emotion. Color is not necessary to create a mood and affection, but it helps to create a mood, emotion, and affection to the player. Thanks to the color association created in the game, color amplifies emotion,

affection, and mood for the player since it helps tells the player about the setting, mechanics, locations, objects, and characters. This, combined with music and shapes, creates the mood and helps the player being placed in that mood. Color helps the multimodality to shine and create a more definite form of mood. The value of the color lies within the mood it helps create. The value of the color helps the player being set in a mood. In a digital world, the value of the color is one of a supporting roles that is important for the whole mood.

Further work building on this thesis can be more testing of the argument . The main argument from this thesis is that color is an amplifier of other elements multimodality. To strengthen this argument, one needs to look at data gathered from people playing different games and see if they react in different ways based on color. Colors help create emotion, mood, affection, and understanding of the games, but the thesis argument is mainly from a theoretical analysis of video games. A bigger survey and research on player reaction can be helpful to strengthen this argument.

One can also take a look at specific genres of games. The thesis did have a broad variety of games to see the similarities and differences in the color use. It may be helpful for further research to look at a specific genre to get a better understanding.

Since color was the main focus of this thesis, it can also be useful to take a deeper dive into multimodality to take a better look at different elements and their importance. Video games are using a lot of icons, symbols, and index, and take a deeper dive into the semiotics and affordance as a whole would be interesting. Color is a big part of the multimodality, but it would be useful to take a better look at the other elements to gain an even better understanding of how it all works together.

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