

DEEPER CONNECTIONS THROUGH INTERACTIVITY
IN THE VIRTUAL SPACE

by

Elizabeth Clare Wilk

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ABSTRACT

360 and virtual reality films are still developing an editing grammar. This editing grammar is dependent on how soon the consumers adopt immersive media, further proving 360/VR is a new genre of film. This new editing grammar will result in the gamification of 360/VR films. By converting consumers from passive viewers to active users, people will develop deeper understandings of the narrative subjects. This interactivity within a virtual space will additionally influence the framework of thought and how people imagine scenarios. *A Road Through the Wild* is a concept piece and educational 360/VR experience using interaction to direct viewers to actively participate with the experience. Hotspots are present in each location to guide users through the virtual space while allowing them to make choices to learn more about the area surrounding the Beartooth Highway. This piece shows there is more that can be done with 360/VR content to invite users to actively participate with the experience rather than passively watch. Furthermore, it shows how interactivity can be used as an editing technique within 360/VR by allowing users to decide when to cut a shot, what shot is next, where they look and when the film ends. The user becomes the editor.

CHAPTER ONE

INTRODUCTION

Explore new worlds. Experience adventure. Live a different life. All from the comfort of your own home or the local arcade. Yet, before these experiences were described as *virtual reality*, the content created was a disappointment. While seen as the future of technology and media, it never lived up to expectations. It was considered a fad that would be seen on par as 3D films. Rather than wearing cheap 3D glasses, viewers had to wear heavy goggles and only see an 8-bit empty world. Today, after many years and improvements in technology, filmmakers are experimenting with VR and 360 to place viewers into different environments for various purposes. The purposes range from producing entertainment to creating educational pieces. The ability for filmmakers to experiment with this new technology is in part due to the affordability of camera systems and rigs easily available for purchase. Similar to how early filmmakers created actualities of mundane life to see it in a new way, filmmakers are experimenting with virtual reality in the same way. With the ever-changing world of media, virtual reality and 360 films will create deeper experiences in viewers, overall shift the art of storytelling to become more game-like and potentially changed the way people think and imagine the world around them. In what follows, I will examine how 360/VR is a new format where rules are still being established and explore how the role of editing in 360/VR is different compared to editing in a traditional film. In traditional film, editing is how filmmakers move viewers through a story, by location and plot using different cuts and juxtaposing

images. This traditional editing not only tells viewers where the film takes place but also instills mood and emotion. In a 360/VR film, these traditional editing techniques do not work because viewers can quickly become disorientated in the space and miss vital information needed to understand the plot. Yet, minimal editing added with interaction in 360/VR directs users where to look and go within a virtual space can solve this problem. My argument is that interactivity, even simple interactions, can replace the need for editing in 360/VR storytelling. This gives the illusion of control to viewer, which is what VR promises. Finally, I will discuss my 360/VR film *A Road Through the Wild* as an example of this interactivity as editing.

Taking a Look Around

In addition to understanding the few key terms that are addressed below, the paper begins with the history of virtual reality leading into the challenges filmmakers and developers face creating 360/VR narratives. These challenges focus in the relationship between interactivity and editing. It is the relationship between interaction and editing that can create deeper appreciation and empathy in users centered around challenging topics. This relationship furthermore is leading to a new genre of film that is more game-like with cause and effect narratives. Finally, the end of the paper takes a look at examples of 360/VR films including my own experience, *A Road Through the Wild*, to see how interactivity, editing and this new way of thinking can come together.

Definitions and Key Terms

Before going in depth with the topic of 360/VR and its effect, it is critical to define key terms to better understand aspects of this paper. While the term *virtual reality* can be used as an umbrella term, there must be distinguished three separate forms that fall under virtual reality. Three forms discussed in the paper are: 1) *360 Video*, 2) *True Virtual Reality* and 3) a hybrid of 360 and True Virtual Reality.

360 Video, specifically the regarding the use of 360 video on mobile platforms with little to know interaction beyond looking around at a 360 photo or video. A more traditional definition from one of the leading VR websites describes “‘360’ technically refers to horizontal coverage of the panorama, but it’s become shorthand for a full spherical panorama.” Examples of where 360 Video is prevalent is Google Cardboard, YouTube360, and Facebook 360 where the viewer is simply viewing a spherical panoramic image or video.

True Virtual Reality is where an entire environment can be constructed allowing players or users, to fully interact with the environment in addition to viewing a 360 spherical image. The environment might be completely constructed from the mind of an artist or using data collected using GIS (Geographic Information System) or photogrammetry. With the ability to allow users to interact with the environment and with objects in the environment, True Virtual Reality is focused more on gameplay and interactivity in addition to the visual aesthetics.

The last form is a *hybridization* between 360 film and virtual reality in which the virtual environment is not fully constructed to allow full interaction, but still allows

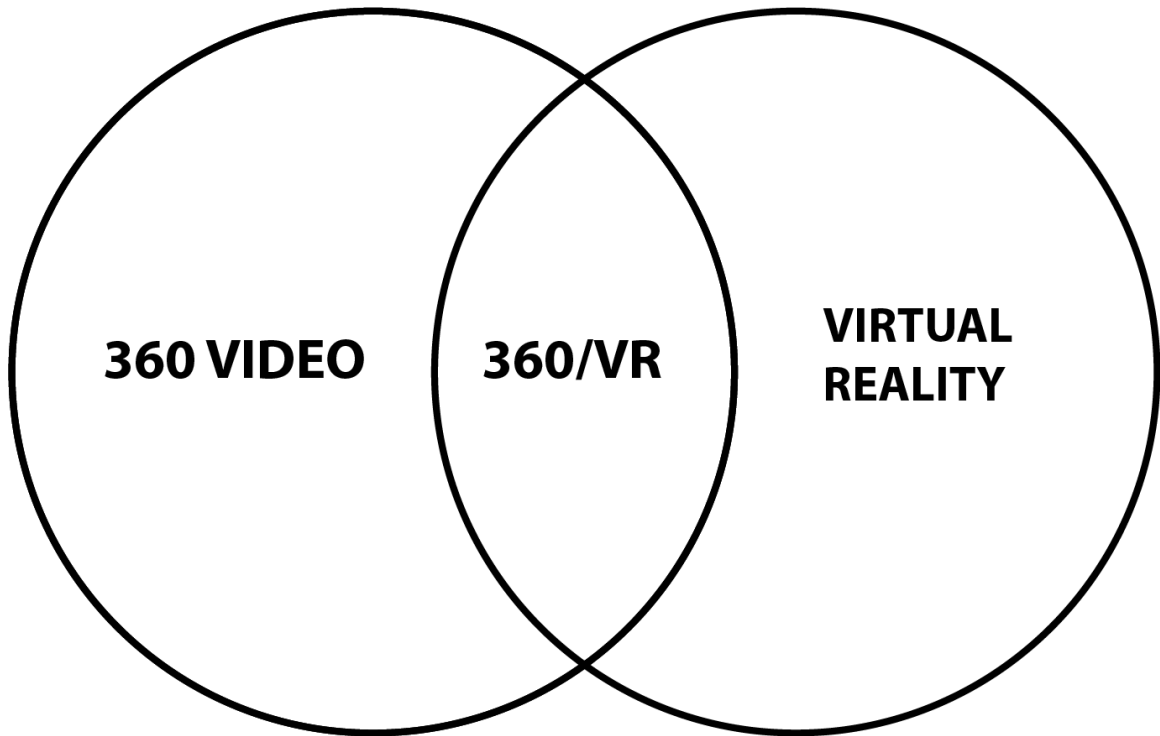


Figure 1: A visual description where 360 Video and True Virtual Reality meet to form a hybridization of 360/VR.

enough interaction beyond what is available in mere 360 video play. While we will only focus on these three forms of virtual reality and 360 video content, there are many different loose forms that can still fall under the umbrella of virtual reality. As the technology used to create and view this media becomes more sophisticated and as the medium is more accepted, these categorizations will change. Most likely the categories will develop to be more specific in their definitions and other categories will develop to encompass others. Currently, the recognized categories of immersive media include MR (Mixed Reality), AR (Augmented Reality), VR (Virtual Reality), 360 Video, and XR

(eXtended Reality). While the categories of MR, AR and XR are related to VR and 360 Video, they will not be discussed as this paper is specifically focused on VR and 360. In addition to defining the differences between 360 Video, True Virtual Reality, and mix of the two, other key terms must be explained. The term *user* refers to the audience and viewers of 360 Video and True Virtual Reality. It is important to refer to this audience as *user* rather than *viewer* because the word *viewer* hold the connotation of passive interaction while *user* carries the connotation of minimal active participation. The *viewer* views the action happening, while the *user* is creating the action.

Since there is an expectation of interaction, particularly now with the term *user* identified, *interactivity* must also be explained. Kate Nash describes “Like documentary, interactivity is a concept that seems intuitively comprehensible but which, on closer inspection, points to a myriad of competing definitions and concepts” (50). Users are no longer passive observers to a story and are invited to make choices in order to move the plot along. By actively participating, users become a community member creating a production (Nash 50). While Nash goes on to propose key dimensions to define interactivity, this paper will only focus on how users interact with the virtual space (51). Similar to video games with storytelling, 360 videos and VR films are primarily concerned with the focus of attention (Bizzochi & Woodley 551). While describing video games, Bizzochi and Woodley’s observation can be applied the same way to 360 videos and VR films:

In gamest that are based on the design of interactive experience, the act of choice is the focus of attention. The interactor participates knowingly in explicit acts of choice throughout the experience. The goal of the video game is to successfully exercise choice and win the game. (551)

When users are aware they are in a 360 or VR film, the user expects the environment to behave in a certain way. They participate by knowing they have the choice of where to look depending on how the film is edited. For a user with some familiarity with the world of VR, there are clues presented by each platform that can signal the degree of interactivity the user can expect. Technical criteria such as image resolution and refresh rate affect the expectation of a user. Whether or not it is a smartphone or an Oculus are also clues users will keep in mind determining the level of interaction available. Users may also have a new experience each time, even if they participated with the film before because they can choose where to focus their attention. This interactivity changes how users engage with stories and film, a point that will be addressed later in the paper.

CHAPTER TWO

A BRIEF HISTORY OF VR: THE QUEST FOR THE VIRTUAL EXPERIENCE

While Jaron Lanier is credited for coining the term *virtual reality* in the 1980s (*State of VR*), it was Morton Heilig who submitted the first patents for a virtual reality apparatus in the early 1960s (Rheingold 46). Rather than the stereotypical computer scientist often pictured working in VR, according to Rheingold “[Heilig] had been a cinematographer, photographer, inventor of projection and camera apparatus – a Hollywood, California visionary...” (51-52).

“The *Sensorama* is where an alternate probability world could have branched off, a scenario in which the entertainment industry, not the computer industry, succeeded in cracking the reality barrier with pre-digital technology” states Rheingold (50). One can imagine if money was not an issue, filmmakers might have led VR in the early days (Rheingold 46). Patented in 1962, the *Sensorama* was an arcade-like VR experience where the user “experiences” a motorcycle ride through various landscapes eventually ending with the user in a sports car with a young woman driving off into the sunset. While the technology for the *Sensorama* is now considered primitive in comparison where VR/360 is today, it accomplished including other senses into its “virtual experience” with touch (fans for wind), and smell. The inclusion of these senses is nonexistent with most commercial VR apparati today. A few art installations and commercial enterprises such as The VOID are a few exceptions experimenting with the

senses in VR. In contrast, the HTC Vive, Oculus and others only provide sight, sound and limited “touching” with handles to pick up virtual objects.



Figure 2: What viewers see in The VOID experience with the ability to touch objects that appear in a virtual environment from: “The VOID Orb.” *The VOID Press*, The VOID. Web.



Figure 3: The actual physical space The VOID is set in with users interacting with the virtual environment from: “The VOID Fans Touching Gertrude.” *The VOID Press*, The VOID. Web.

Despite Heilig's interest and efforts with VR as the next step from film, the money needed to continue his work never materialized for various reasons out of his control (Rheingold 50). When Heilig's patents expired in the 1970s, others picked up where he left off. Rather than other filmmakers continuing his work, computer scientists

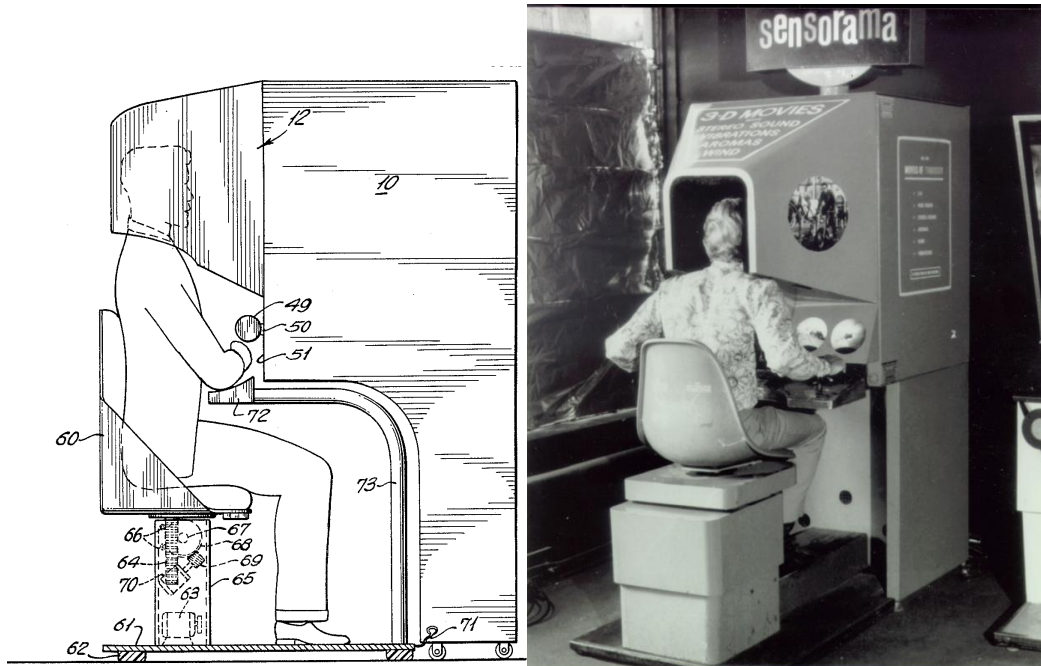


Figure 4: Sensorama patent figure from: Heilig, Morton. "Sensorama Simulator." US 3050870, United States Patent and Trademark Office, 10 Jan. 1961. ; Figure 5: Sensorama in use from: Heilig, Morton. Mortonheilig.com/InventorVR.html. Web.

and others in Silicon Valley continued efforts with creating virtual reality. Rheingold addresses this stating "Ultimately, VR is neither strictly the child of computer science nor a form of entertainment, but something that necessarily partakes of both technical legacies..." (67). From the 1960s up to the 2000s, it was computer science that continued the majority of work in virtual reality systems. However, while the interest from the computer science filed in VR was based in primarily recreating the senses virtually and

using the technology for navigating through a computer system network, and not necessarily for entertainment purposes.

Computer science allowed for the creation of headsets, proto-virtual environments and eventually the popularization of the *virtual reality*. When Jaron Lanier of the Visual Programming Lab (VPL) coined *virtual reality*, the computer science of VR turned a corner and headed back toward the entertainment aspect of VR due to the growth of video gaming. VR was viewed as the pinnacle of gaming. The turn back towards entertainment seems a natural step for VR to grow. Creating a virtual space with the inclusion of the senses does not make up the entire experience. After all, “At the heart of VR is an *experience* – the experience of being in a virtual world or a remote location...” are not only limited to sight, smell and touch (Rheingold 46). There needs to be a story behind experiencing the senses.

Interest in virtual reality as entertainment was resuscitated partly due to the promotion of 3-D films such as James Cameron’s *Avatar*. While 3-D home apparati did not live up to the hype, there were massive improvements in the quality of game graphics for video games and their consoles. While 3-D films faded, they opened the imagination of what cinema can do next to create captivating films. Technology is catching up to the dream of virtual reality sold back in the 1980s. New, inexpensive 360 cameras that use wide-angle lenses, plus photogrammetry-based software for image stitching has led to a renaissance of 360/VR content. Using these tools, filmmakers without computer coding skills are able to create immersive content.

With a new way to tell stories visually, 360/VR is experiencing the same challenges and evolution as early cinema, in regard to structure and editing. Many early 360/VR films focused on mundane activities reminiscent of the *actualities* from the early 20th-century. However, since those films, filmmakers are now working to create framework and narrative structures to fit the 360/VR capabilities and environment. This is most prevalent in the editing of 360/VR films. It is important to discuss the evolution of editing in 360/VR films and its challenges because the most important aspect to create a virtual experience is based on how well a piece is edited.

360 editing is currently attempting to edit 360/VR content similar to traditional film for the screen. While filmmakers new to the medium might think traditional editing techniques transfer easily to a 360 space it becomes a challenge. They must adjust their editing to match the apparatus by changing the timing of cuts and put in prompts to show users where to look. The latter is more in part to keep the narrative structure on track and to further conform the film to social media platforms. Yet both take away from the 360/VR narrative experience if not executed properly. Other filmmakers are aware of this issue, as Cameron Bailey of the Toronto International Film Festival said in a 2016 interview about virtual reality “Now I think the next step is narrative, and a lot of artists are playing around with narrative, trying to figure out how to guide the viewer through a story when they can look and sometimes move in any direction” (“Virtual Reality: Future of Filmmaking or Cinema’s Latest Gimmick?”). This statement touches on the same challenge of how to edit 360/VR films in an engaging way that fits the narrative without taking users out of the experience. If the editing is executed poorly, the filmmaker takes

away from the narrative preventing the user to look where they want. By preventing the user from looking around in the 360 space, the filmmaker negates the use of the 360 space. Additionally, just as traditional cinema, the editing must be executed in a way that adds to the narrative without making the puppet strings noticeable.

The purpose of 360/VR is to put the viewer in a *constructed* environment allowing them to look around and *experience* it as though they are in that environment. The act of editing itself seems to run counter to the spirit of the VR experience. Editing is an act of established temporal control by the filmmaker to direct attention, create tension and ultimately drive the narrative. Yet, editing seems to be one of the main challenges that filmmakers are struggling to resolve when editing 360/VR films. Filmmakers use prompts to get around this challenge. However, these prompts can take away from the experience, either by forcing users to look in one direction or by distracting users. The use of quick cuts from one scene to another is also counterintuitive from a 360/VR experience by not allowing users to fully look around their environment to establish their location in a virtual setting. Additionally, quick, fast-paced cuts are jarring to the user and can function to remind him or her that they are in a 360 experience. This can also cause motion sickness in the user.

One potential way to solve the issue of directing the focus of the viewer is through the use of sound. Sound cues can help direct the attention of viewers. Sound editing is used similarly to direct a viewer's attention in traditional 2-dimensional films. Yet, traditional editing still relies on shot type, length, angle and action to tell viewers where to look. 360/VR presents the opportunity for creators to direct a user's attention

with sound that can be placed spatially within a scene. Ambisonic sound used with a 360 image allows a filmmaker to achieve directing attentions to one area of the 360 space. Ambisonic spatial sound also allows filmmakers to create more in-depth sound mixing of scenes and locations.

The need for a new editing grammar mirrors the early days of cinema. In the 1890s, there was not an established logic to guide users from one story location to another. Similarly, today's VR experiences struggle with transitioning from one location to another without completely taking the user out of the experience. How to jump from actualities to complex narratives that utilize pacing, cuts, angles and more.

The struggles have even led some, both programmers and filmmakers, to abandon 360/VR as a film medium altogether. However, there are just as many people looking into and creating new content for 360/VR platforms replacing those abandoning the medium. Additionally, companies are heavily investing in creating systems catering 360/VR experiences. This is particularly seen with companies such as Facebook purchasing Oculus Rift, Google's investment in creating a 360-video playback platform on YouTube, National Geographic creating 360 content, and founding of companies such as Here Be Dragons who create and curate content.

Facebook is pushing 360/VR through its own social media platform and continuing to develop Oculus Rift, even releasing standalone head mounted display (HMD) systems, such as the Oculus Go. Additionally, Facebook, released software to edit ambisonic audio for 360 creators to utilize and encourage creators to upload content to Facebook and Oculus. Google is also working to compete in this market by allowing

creators to upload 360 content to YouTube, releasing the Google Pixel smartphone that is to be used with Google's Daydream (HMD) as a step up from the more popularly known Google Cardboard. Google is also actively researching how to use 360/VR in terms of creating and sharing narratives as is seen from their ethnographic study entitled *Storyliving: An Ethnographic Study of How Audiences Experience VR and What that Means for Journalists*. Even Amazon recently joined in with Amazon Sumerian. It is described on their website, as "...a managed service that lets you create and run 3D, Augmented Reality (AR) and Virtual Reality (VR) applications" without requiring the knowledge of coding or development experience ("Amazon Sumerian - FAQs").

This heavy investment and interest from major tech companies indicates virtual reality is here to stay and continue to develop as a new genre of film and entertainment. This is further emphasized with the exponential growth of film festivals actively seeking 360/VR content. 360/VR films staying is only possible because of the interest from filmmakers, media makers and technology developers that are making virtual reality come into full fruition. As the technology improves the image quality of cameras and displays, the only major hurdle remaining is the adoption of HMDs by consumers. This is heavily tied into the cost of a decent HMD unit and an additional computer. But, it is only a matter of time until this last hurdle is defeated as Oculus and HTC Vive are releasing powerful standalone units that do not require expensive, cumbersome computers to run off.

CHAPTER THREE

LOOKING INTO THE ABYSS: CREATING DEEPER EXPERIENCES IN VIEWERS

Virtual reality was first imagined in the 1960s, coined in the 1980s and now is entering the mainstream in the 2010s. How did the interest remain after all those years as the pursuit of the technology grew and waned repeatedly? Perhaps, it is because creators recognized the potential of 360/VR in creating deeper, more meaningful experiences when viewing media.

What was the initial draw and interest in 360/VR? Compared to watching a story unfold through a 2-dimensional mirror, 360/VR allows users to develop deeper experiences because they are not only watching the story. They are in it. Users are left to reflect on the actions of the actors they may watch while in the story. Depending on the interactivity of the experience, users may also reflect on their actions influencing the outcome of the story, albeit, at a safe distance. As Doyle quotes the poet Bachelard in an article by Char Davies “In this private virtual space, by: ‘leaving the space of one’s usual sensibilities, one enters into communication with a space that is psychically innovating...for we do not change place, we change our nature” (qtd. in Davies xv). While a user’s actions or presence may not directly change location since they are physically in one place, the nature of who they are may change in the virtual space. Similar to how video game players may change their identity within a game from the one

they are known as in the physical world. The virtual space is a liminal environment in which people can behave in ways not tied to their real identity.

360/VR films create more meaningful connections with users because they are surrounded by the action. Users can be put into the shoes of a character to see a new perspective. Rubidge states “That one cannot consciously ‘feel’ the activity of these systems does not mean that these modes of consciousness do not have a role to play in our understanding of the more subtle aspects of our being” (122). While the user may not ‘feel’ the physical senses in a traditional 360/VR experience, their conscious minds are left to ‘feel.’ Additionally, interviewees from a Google funded ethnographic study about the experiences of audiences talk about this embodiment of “...a digital entity, and experiencing what it knows. Viewers experience the story as though they lived it. This is consistent with an understanding of VR as storyliving” (Maschio 9). Users are left to process without the physical aspect hindering them. Inhabiting a digital avatar is also noted as creating a number of effects in the audience such as a sense of agency, vulnerability and a cognitive dissonance (Maschio 10). It leaves users to “...stare into the Abyss, and the Abyss stares back...” How users react or interact with the 360/VR space can reveal the unconsciousness or connect to a deeper understanding within the viewer. Particularly, since each user’s experience in a virtual space is a private experience similar to how each individual’s perspective in life in their own private understanding of life. This private experience is further emphasized by the fact that the user is actively taking part in the narrative alone rather than passively watching while sitting in an audience surrounded in the community setting of theater.

The deeper understanding users can experience is dependent on the design of the experience. Bizzocchi and Woodbury address this stating “Interactive design has various sets of design parameters...when designed appropriately, these interactive environments can lead to a feeling of agency, to interactor immersion, and transformative experiences” (553). By designing the experience well enough, users can leave with a new understanding of the subject on an emotional level. This can be achieved by providing enough choices or interactive elements, or simply developing a well-crafted narrative that immerses the user. These experiences developed can be used for a variety of purposes. Either to simply put the user in the places of a character as part of a narrative or to evoke empathy within the user to a cause.

Using 360/VR is a popular method to promote human rights campaigns and conservation efforts because of the ability to place users in the roles of those affected by crimes, pollution and so on by simply allowing users to ‘transport’ across the world where these issues are happening. Additionally, the use of 360 video for such efforts is popular because there is very little that can be done to manipulate the image shot. Rather than only seeing what activists might want users to see, a user can now look around the entire area of where events are taking place. This can provide transparency to organizations who use this technology for broader outreach. Using 360/VR allows decision makers to privately experience and come to conclusions without direct influences of filmmakers as to where they should pay attention.

A couple of examples created within the last five years for the purpose of stirring empathy are the TOMS VR giving campaign and Kathryn Bigelow’s *The Protectors*:

Walk in the Ranger's Shoes. Both experiences are intended to fill and answer a different niche. TOMS VR is a humanitarian piece promoting the company's mission of donating shoes to children and adults in developing countries. While *The Protectors* is a conservation piece focusing on the dangers that park rangers face every day in order to protect elephants within the national park's boundaries. On the website for *The Protectors* the experience is described as a:

...documentary short shot in Virtual Reality that chronicles a day in the life of rangers in Garamba National Park, managed by African Parks, in the Democratic Republic of Congo. These rangers are often the last line of defense in a race against extinction at the hands of poachers slaughtering elephants for their ivory tusks. The rangers face constant danger and even death, at the service of these sentient, noble creatures. Rangers are truly the unsung heroes in this race against time. (*The Protectors*)

The purpose of this experience is to take users who are far removed from the conflict and directly place them in the middle of the action. Kathryn Bigelow and her associate who worked on the experience achieved the purpose of shocking and creating the feeling users were right with the rangers throughout the film. Once user states as a testimonial on their site that "It's a horrifying image as I describe it – but when viewed as a 360-degree video in a VR headset, it's even more so. And the three-dimensional sound makes you feel as if you're actually there" (*The Protectors*). Conversely, looking at the more positive TOMS experience based on allowing customers to go on a giving trip to Peru virtually, one user stated that they experience "...makes you feel more connected" (Graham).

Despite self-reports by users after viewing an experience, people question how effective they are. User empathy and comprehension have measured in a number of studies. One study focused on how well users are able to retain information from

educational 360/VR experiences. The concern of the study was "...while virtual environments are both immersive and engaging, they are also novel" (Rupp 2108). While 360/VR is a prime medium to educate with, the technology is so new and novel that users possibly will not focus on the information provided in the experiences. Other concerns are that the experiences will make people motion sick or turn off users from 360/VR if the experience is "sub-optimal" (Rupp 2108). Despite these concerns, Rupp et. al's findings were somewhat mixed as he writes "Overall, our findings were mixed. No significant difference were found for simulation sickness, positive or negative affect, or information recalled" (2111). While users with higher expectations of VR recalled more information while using a smartphone versus a higher quality HMD, the same users with high expectancy recalled slightly less information after using a more advanced system from Oculus' Development Kit 2 (DK2) (Rupp 2112). This makes 360/VR potentially seem like a less dependable source for spreading information if users are distracted by the experience itself. However, it should be noted that 360/VR is still a developing technology slowly reaching the masses. As stated earlier, while it seems that 360/VR is beyond the *Train Entering the Station* point when compared to early filmmaking, it is only slightly beyond it. The majority of people heard of 360/VR, but many still have not experienced it firsthand. This can be seen on Facebook 360 videos. The social media giant who bought Oculus in 2014 is actively pushing 360 experiences to increase awareness among potential users. Comments on NASA's Hubble Space Telescope's Anniversary Tour of the Control Room included users stating they can only see feet, or that the filmmakers did not know what they were doing. Others tried to explain that the

video was in 360. Comments such as those show lack of awareness of what 360-video is and how it works.

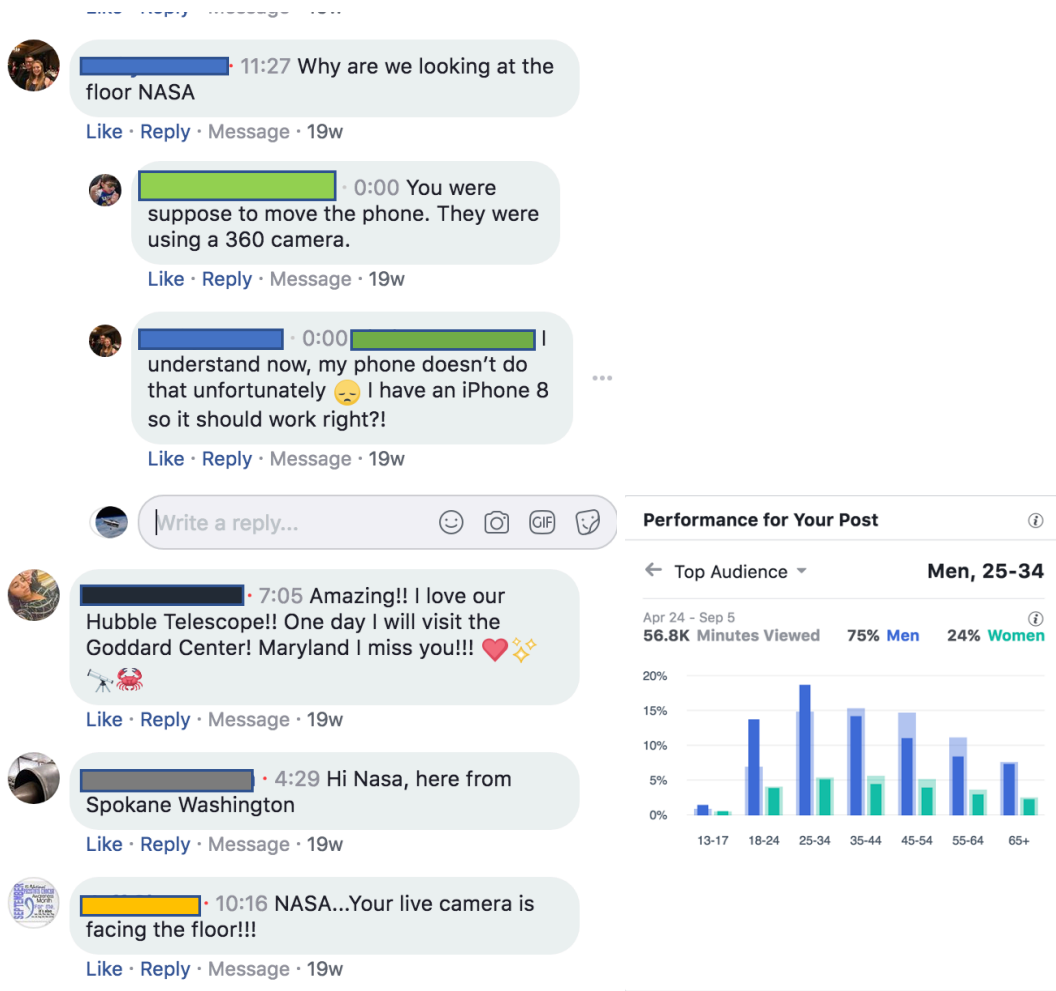


Figure 6: Comments from the Hubble Anniversary 360 Live event indicate many Facebook users are not aware of 360 or how it works from: Hubble Anniversary 360 Live Facebook Comments Section. *Facebook*. 24 April 2018.

<https://www.facebook.com/NASAHubble/videos/206760709925210/>. 30 May 2018.

; Figure 7: Facebook's insight on the age range and gender of those who viewed the Hubble Anniversary 360 Live Event. Men are the overall majority of viewers. This can be skewed due to interests. But it should be noted the majority of users who viewed the event are aged 35+. Image from: NASA Hubble Audience Analytics on Hubble Anniversary 360 Live. *Facebook*. 30 May 2018.

One explanation for users on Facebook who did not know who 360 video works, is that they are part of the fastest growing demographic on the social media platform of

individuals 35+ years old. It is possible that a number of these individuals are late adopters to technology and use the platform primarily to keep in touch with family members rather than as a media viewing application. This is also seen on other platforms such as YouTube where the majority of users are between 18-35 years old. Similar 360 videos posted by Hubble Space Telescope on YouTube in 2018 only had one comment in regard to camera view. Because the majority of YouTube users are between the ages of 18-35 years old, the 360 Hubble Space Telescope videos were recognized as 360 without any confusion as to how the videos work. The grammar and expectations of the videos are already accepted as the norm for 360/VR videos among this demographic.

Despite these mixed results, however, Rupp and his colleagues agree that a well-conceived and executed 360/VR experience can indeed “...lead to increased engagement and greater amount of knowledge learned in the virtual space being transferred outside of the simulation” (Rupp 9). An example of this is noted by Rupp in a study where participants become more pro-environmental after taking part in a virtual experience where they learned the impacts of cutting down trees after “virtually” chopping down trees (2108).

As 360/VR continues to develop and become more accessible to the masses, the medium is a prime candidate for instilling knowledge and understanding for a variety of subjects. While this continues to develop, what is certain is that the effectiveness of 360/VR will be largely dependent on how well the storytelling is executed.

CHAPTER FOUR

READY VIEWER ONE: STORYTELLING AS A GAME

A major draw to 360/VR is placing the user directly into the middle of the narrative. As Rupp states "...360 videos can be highly immersive experiences that activate a sense of presence that engages the user to feel as if he or she is physically a part of the environment" (2108). By allowing the user to look around their environment while directly placed within a narrative, users are instantly invited to interact with the experience. The interactivity is dependent on the medium of the narrative, whether it is solely 360 vide, a fully constructed VR environment, or some combination of the two. By adding more interactivity into the experience, the storytelling become gamified because of the added cause and effect.

With the advent of 360/VR, film is overlapping more with video games. As Frans Mayra is quoted in Bogost's article "'There are many ways in which games overlap with other areas, such as various forms of storytelling, audio-visual media and arts, science and the art of programming, or various fields in business and marketing...'" (53). Many of the companies buying into virtual reality are seeking developers with knowledge of Unity and Unreal, both software used primarily for video game development. Unity is a cross multi-platform tool released in the mid-2000s. According to Unity's public-relations page, it "...is the creator of the world's most widely used real-time 3D (RT3D) development platform, giving developers around the world the tools to create rich,

interactive 2D, 3D, VR and AR experiences” (*Unity – Public Relations*). Unreal, or Unreal Engine, is similar to Unity as an open platform for real-time 3D graphics created primarily for video games. The use of this software is partly free to allow individuals and independent creators to use it. However, it requires time to learn the coding and nuances of creating 3-dimensional spaces in Unreal and Unity.

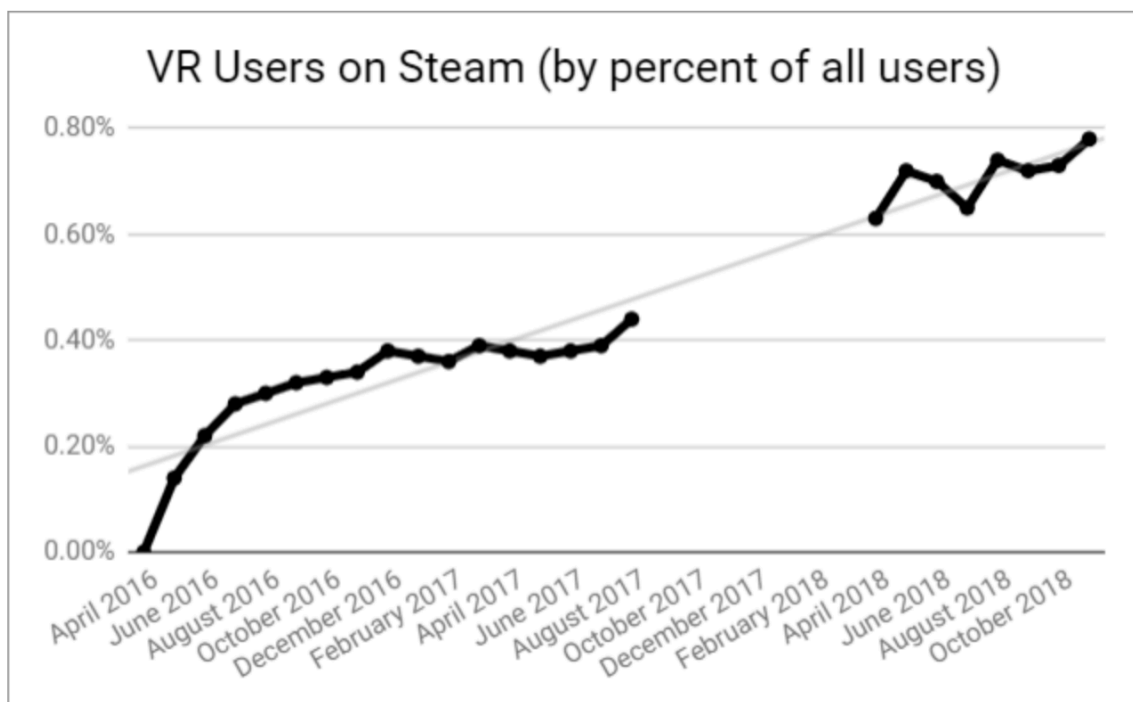
Additionally, many studios and companies interested in creating 360/VR documentaries and films are also seeking individuals who are versed in this software and know coding along with traditional film knowledge. It seems games are becoming more cinematic based on the expansion of skills desired for creating 360/VR. However, it is the opposite. There is a gamification occurring to maintain the purpose of storytelling in a 360 space. As Bizzochi and Woodbury state while talking about creating a narrative for cinema:

The expressive infusion of narrative throughout a film’s craft begins with the same recognition of cinema’s multimodal capability. Film contains many component crafts, and all can be used expressively, that is, to build the aesthetic goals of the entire work. (254)

As video games and technology used to create them become more sophisticated to the point of cinema-esque quality, the same skills are now a ‘component craft’ that can be used to create the aesthetic a 360/VR film might require to effectively tell a narrative.

Not only does the software used to create both video games and 360/VR indicate how film narratives are gamifying. The platforms where these films are streamed also show how film is evolving to include more game elements. Currently, the two most popular platforms to view 360/VR film experiences are smartphones (Google Cardboard and Samsung’s Gear VR) and computers. After these two platforms, the Oculus, HTC

Vive and other competitors in the VR/AR/MR market provide “consoles” primarily for gaming. However, there is a push by companies such as Facebook with the release of the Oculus Go to make Head Mounted Units (HMUs) more accessible while providing higher quality experiences compared to using a smartphone or computer. By releasing stand-alone platforms more people will be more likely to invest in 360/VR. All in one HMUs remove the need to invest a couple thousand dollars for a computer capable of handling the graphics and bitrates required for VR. According to a recent article by Ben Lang, the group of users purchasing and engaging with VR content is steadily growing leading to a new all-time high level of active users (Lang 1-2).



Data courtesy Valve / Mind the gap (seven months of erroneous data due to a Valve collection issue)

Figure 8: Graph using data from Valve in Ben Lang's article on the current upswing in VR users. *Image from:* Lang, Ben. “To the 'VR Is Dying' Crowd: There's More VR Users on Steam Than Ever Before.” *Road to VR*, 3 Dec. 2018, www.roadtovr.com/steam-vr-user-population-usage/.

This trend will continue as more quality content is created for the 360/VR film market. *The State of VR* touches on this issue stating:

The merit of each method depends largely on the needs of the filmmaker, the story and the resolution available. The size of your audience also decreases as you travel up this totem pole of technology, with web-streaming services like YouTube forming the foundation and dedicated head-mounted displays (Oculus and Vive) at the top end.

As HMUs become cheaper and more high-quality stand-alone units are released into the market, the need for quality content will determine how many users remain as active users.

Interactivity in 360/VR films will help users remain active. Bizzochi and Woodbury mention when writing about interactivity that “In each case the person brings his or her own experience, attitudes, and values to play within the work. There is, however, a significant difference between the two when it comes to explicit interaction and conscious exercise of choice” (551). While users bring their own experience and expectations of how 360/VR will be, it is ultimately up to the user to decide if and how she interacts with the experience.

One of the major ways in which 360/VR film will make cinema more game-like is how the experience forces users to take a more active role in the narrative they are viewing. They are transformed from passive viewers to active viewers who can influence or change the outcome of the narratives they watch unfold before them. This gamification of 360/VR films also acts as an extension of the filmmaker to direct users where to go and how to proceed through the narrative. By only presenting a limited number of choices, the filmmaker still directs the user on how to proceed in the experience. And if

not influence or change, users can garner deeper meaning from the characters in front of them as more 3-dimensional. In an interview about VR, Robert Stromberg said “We’re entering into a phase now in VR where we are going to be able to have real actors and real performances. I think that’s when you’re going to start to feel and emotional depth and the power, the real power of VR” (MacNeil 2). His statement suggests that actors will act around the camera rather than toward the camera allowing performances to feel real compared to the 2-dimensional shots that viewers are used to seeing.

Therefore, the challenge becomes how to create an engaging narrative where users will want to *interact* with the experience. “The challenge for the designer of the narrative is to conceive and present a plot that will yield a rich story in the minds of [users]. Some of the key narrative design parameters are character, story world, narrative themes, and dramatic arc” (Bizzochi & Woodbury 552-223). What Bizzochi and Woodbury are stating is in order to create a story that fully engages with users, the filmmakers must develop characters and the world they are in while figuring out how to introduce themes and the plot. All these elements go into creating a seamless user experience with interaction and as they state “...a [user’s] level of interactivity and expression of choice is at a much higher level. It is in fact the center of the experience” (551). To engage a user fully with the 360/VR experience, the filmmaker must also create a connection for the user to identify with, whether it is the character the user plays as or interacts with, or some sort of defining event or moment universal to all people. Neil Gabler mentions this when writing about personal celebrity:

The conversion of life into an entertainment medium could never have succeeded, however, if those who attend the life movie hadn’t discovered

what the early movie producers had discovered years before: that audiences need some point of identification if the show is really to engross them. (7)

It is important to touch on the importance of fully engaging the audience and create some way to identify the *virtual experience* with their own real-life experience. If the users are not interested in the experience, they will not want to interact with the virtual environment. Additionally, inviting users to interact with the experience using directions or providing some direct communication from the creator on how to explore the experience may increase participation (Nash 56). Yet, depending on previous expectations and experiences, this should not be a problem. Instead, creators have already been using techniques such as hiding *easter eggs* to increase interacting and to create a more intimate experience. In an interview Nicole Perlman talks about this:

Virtual reality allows viewers to ‘explore at their own leisure or follow the story,’ Ms. Perlman said. At a price point higher than regular downloads, it makes sense to plant ‘Easter eggs’ in the experience – hidden details or clues that are rediscovered on second or third viewings, she said. (Schwartzel 2)

In addition to exploring the area at their leisure to find *easter eggs*, there are additional ways to further convert users to an active viewer role versus the passive viewer. Some examples include the use of controls in which users can pick up objects virtually, click on links within the experience that can lead to new locations or open up additional resources, and the use of sound. The simplest form of interaction not mentioned, is simply the ability for users to look around their environment. All these abilities allow users for a more realistic experience. Furthermore, one of the best ways to

promote interaction is to create intuitive experience and controls in which users can instantly jump into the experience without the stress of learning new controls.

The shift of creating 360/VR films that invite users to become active viewers compared to the passive viewership of traditional 2-dimensional cinema hints at the possibility of storytelling evolving. A possible course, in terms of the active versus passive viewership, is interactive storytelling within 360/VR cinema allowing narratives to develop closer akin to video games. A gamification of 360/VR. As 360/VR continues to develop with storytelling evolving to fit the framework of 360/VR, the way in which users think may also be influenced and evolve to fit along with the expectations of 360/VR.

CHAPTER FIVE

FROM CAVE WALLS TO VR: THE EVOLUTION OF STORYTELLING
& THE EVOLUTION OF THINKING

To understand the full impact virtual reality might have on the world, we must briefly go through the evolution of storytelling and how people consume media can affect the framework of thought. This chapter will focus on how the process of thought and logic is influenced by the medium storytelling takes form of and how virtual reality may change the way people think.

The forms of storytelling are numerous and continue to evolve. Thousands of years ago, hunter-gatherer societies told stories sitting around the campfire, performing narratives passed down about legendary figures or about the gods. As people moved to cities, these campfire performances evolved into theater from fire lighting the walls of a cave to a stage lit by lanterns. This again changed with the advent of photography and film, allowing for the world of the stage to be expanded into a world represented by 2-dimensional images.

With these 2-dimensional images now proliferating the media and saturating the daily lives of viewers, more often than not, people imagine situations in the form of those 2-dimensional shots. If the form of storytelling is capable of influencing people to think in a certain framework of the mind, it is plausible to imagine that 360/VR films can do

the same. This depends on how much VR and 360 films spread, and whether or not they develop into the initial source of storytelling in the future.

Perhaps one factor that will influence whether or not VR and 360 films spread as widely as film and television on the screen, is the ever-growing popularity of personal celebrity that is increasingly prolific with online personalities, social media influencers, and reality television. Neal Gabler writes extensively about personal celebrity in his book *Life: The Movie*. The idea is individuals imagine themselves as a character in their own movie. This personal celebrity is further emphasized with 360/VR, wherein users are automatically placed in the starring role. Thomas Maschio mentioned a similar notion in his study after interviewing users of VR. Not specifically saying users are placed in the starring role, but instead in the comparison of VR as storytelling to really be *storyliving* (15-16). He even states “While a person can be immersed in a novel or a television storyline, there is rarely ever a sense that one is actually directly ‘living’ the story communicated in narrative” (15). Therefore, users through interactivity are the stars of the 360/VR narrative, and they are living the narrative as though it is their own life. Not only are they placed in the starring role, but users are instantly the director, camera operator, and editor who ultimately decides their own theatrical experience in the virtual space.

Additionally, just as how television and film influenced the way people thought, 360/VR contains the same potential to influence and change how the population thinks.

Neal Gabler states:

In fact, the various forms of entertainment, including television, were only shadows on the wall of the cave. What made entertainment a cosmology

was the constellation of expectation that these shadows created, expectation that would weigh heavily on the American consciousness and change our mental architecture. (56)

While Gabler was insinuating films and television affected the way people acted in public after watching examples of “normal behavior” on film, he nonetheless touches on the point that watching films affected the way people thought. Our own perceptions and our own frameworks of mind are influenced by television and film. Gabler goes on to describe this saying:

At the same time that the public life movies starring celebrities playing in the mass media, personal life movies, billions of them, starring ordinary people who hadn't passed to the other side of the glass, were playing in everyday existence:... These didn't have audiences in the tens of millions as the public lifies did; sometime they had only an audience of one. (192)

The majority of the public is exposed to film and television while growing up, allowing those same individuals to be literate in the basic language of film. Rather than a sentence made up of words, the sentences in films are sequences made up by shots. When people imagine how a scene in their own lives will play out, most likely they imagine the scene in a sequence of shots. Gabler describes in the scenario that the person imagining also places themselves in the starring roles of the scene. It is difficult to visualize how people imagined the same scene over a hundred years ago when cinema was in its infancy during a time when theater was the main form of performance. Did audiences visualize their own lives set on stage?

Returning to the example of film as a language, the idea of how film continues to affect how people think can best be explored when looking at the study of languages. Specifically, how languages developed and how they affected the culture and vice-versa.

It is known Western thought and logic can be traced back to the roots of Greek philosophy. With the growth of literacy and the spread of cultures and languages, particularly through the Mediterranean and Western Europe, this logic of argument and debate spread. Conversely, a different form swept through and spread throughout the East. It is from these two different logic and thought processes that created a dichotomy between East and West, and is often seen as the cause of many misunderstandings philosophically and culturally. For example, Western culture prizes and promotes individuality while Eastern culture promotes homogeneity over individuality.

Another example of linguistic relativity with studies proving the relationship between language and ideology is the use of language to describe objects. Phillip Wolff and Kevin Holmes share:

Languages differ in how they partition the world into discrete objects (books, flowers) and unbounded continuous masses (rice, sand). In English, names for objects typically imply individuation. For example, when referring to multiple chairs in a room, we must use the plural marker. In languages like Japanese and Yucatec Maya, such markers are usually not needed; it is as if the noun for chair means 'chair stuff.' (260)

These examples show the relationship between thought and language. While these examples do not specifically refer to 360/VR films, it can show the implications and possibility of how 360/VR films can change the act of how people think.

A film sequence is made up of individual shots, just as how a sentence is made up of individual words. The editing of the shots and scenes are the paragraphs and punctuations used to get ideas and information across. This is all in the realm of traditional 2-dimensional cinema. After a little over a hundred years of cinema existing,

people most likely imagine scenes played out in their minds similar to film sequences using close ups, wide shots, long shots, etc., and subsequently imagine themselves in the leading role as a celebrity in their own movie.

With this, it is not surprising to expect that users will begin to imagine the world around them as shots in a 360/VR film. 360/VR is a language similar to film, but with a different “accent” using new grammatical rules and new words to describe ideas. Phillip Wolff even states “...language can sometimes build new doors...language may not replace, but instead may put in place, representational systems that make certain kinds of thinking possible” (261). Perhaps 360/VR films, or the technology created in order to make such films, is a new door leading to a representational system to make a new kind of thinking possible.

Artists and developers creating 360/VR content are realizing the influence VR can have over thought. In an article written by Helen Situ, she explains why she left the startup NextVR to start a new company called Moment “...a mind-opening prototyping tool for designers working on virtual reality...” (Situ Online). In the article Situ describes the software Moment develops as a way for designer to create VR/AR/MR experiences in a 3-dimensional space instead of using a 2-dimensional workspace. “Instead of everything being on flat physical 2D screens (computers, phones, and television), humans will constantly be taking in information overlaid on top of the real world” (Situ).

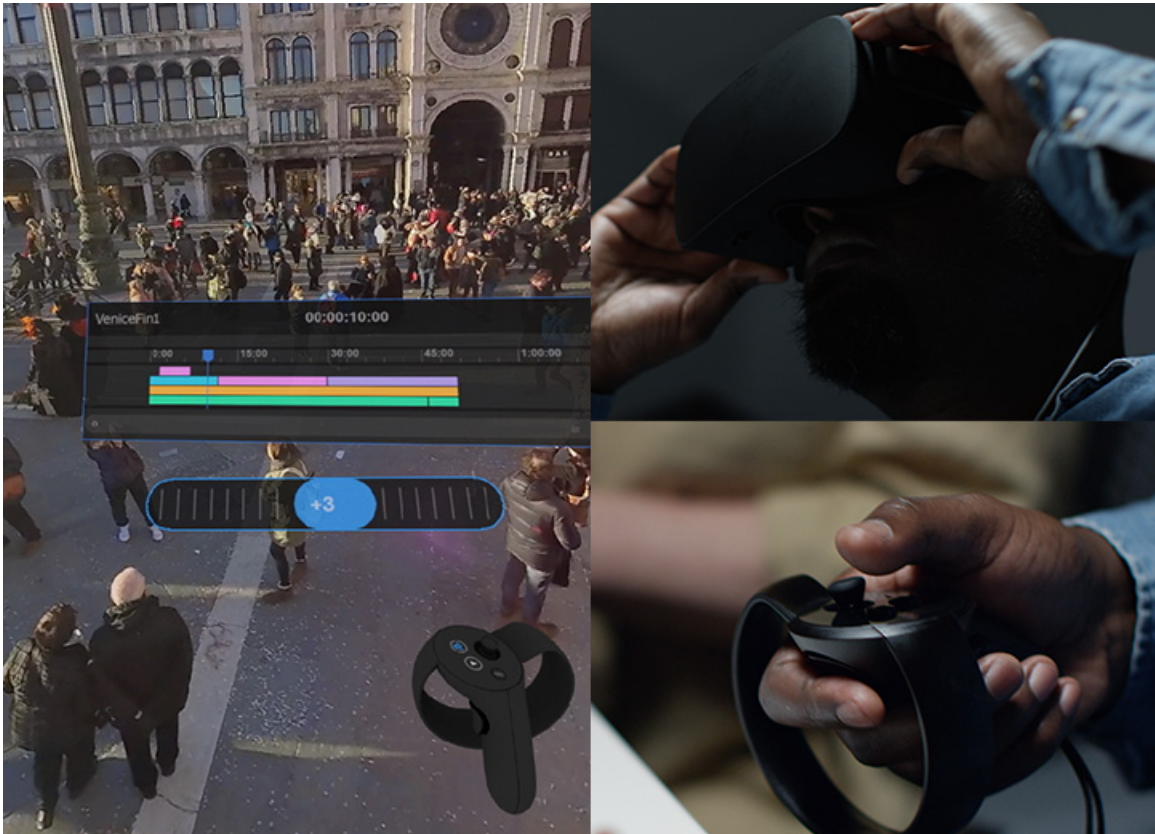


Figure 9: A promotional photo of Adobe Premiere and Adobe After Effects where creators can edit video directly within a 360 space using headsets such as the Oculus Rift. Image from: “Adobe 180 and 360/VR editing: More Immersive Storytelling.” *Adobe*. <https://www.adobe.com/creativecloud/video/virtual-reality.html?promoid=5S7K87QL&mv=other>. 1 June 2017.

With startups developing new software for designers and artists to create 360/VR experiences in a 3-dimensional space rather than on a 2-dimensional flat surface shows people creating experiences are already beginning to conceptualize and think in a 360/VR framework. This is further emphasized by the fact that Adobe Creative Cloud was recently updated to allow for 360/VR film editing within the 360/VR experience as shown in Figure 9.

However, this new possible way of thinking depends on many different factors such as the length of time it takes to influence thought processes and as to whether or not

360/VR will be widely adopted. With standalone 360/VR systems entering the market that do not require a smartphone nor a computer console, it is believable that 360/VR is here to stay. Now more engaging content is required to keep users interested.

Additionally, with companies developing software to help creators conceptualize experiences within a 3-dimensional space also indicates 360/VR and immersive media is here to stay.

CHAPTER SIX

EXPLORING THE BEARTOOTH MOUNTAINS FROM THE COMFORT OF HOME

As more people move to cities, and open landscapes are developed, there is an increasing fear among people that humans are losing touch with nature. This is increasingly exacerbated by the increased use of technology such as computers, television, phones and more. Conversely, with the rise of Instagram influencers and easier access to travel, there is concern that some natural places are being “loved” to death by visitors. This dichotomy in the relationship between humans, technology and nature is what drew me initially to the creation of the 360 film experience *A Road Through the Wild*.

A Road Through the Wild is a 360 interactive video that allows users to “virtually” visit locations along the Beartooth Highway and off the beaten path. Each location is its own long shot rather than an edited combination of shots. This is to replicate visiting the locations while also allowing users to decide how long to stay and when to leave. Each shot or location is roughly between three to five minutes in length to allow for this decision making. In cinema and editing, this amount of time may seem an eternity for viewers. Yet, I feel it is necessary to allow a location to play out at these lengths for 360/VR. When people visit locations in real life, they spend more than a minute to take a look at the scenery and explore it to some degree. Additionally, each person’s experience when visiting a location is individual and cannot be experience the

same exact way by other people. With five-minute images of a location, users can engage with the virtual world in their own private experience. By allowing users to “visit” a location virtually with a longer length of time allows users to be their own director, editor and cinematographer by giving the option of where they look, how long they look and when to decide to move on.

Each location contains hot spots for users to discover and learn more about the history and natural history of the area. Providing these hot spots invites users to spend more time in the location and to further find a connection with the physical location and landscape. Hotspots also allow users to develop a deeper understanding of the area by creating changes to learn about the area. The hotspots also act as direction from the filmmaker because the user can only select them to learn something new or to move to a new location. The hotspots give the illusion of freewill and choice to the user but are really only an extension of the director as a form of editing and direction. Additionally, *easter eggs* are included to create individual experiences such as secret or hidden locations. Providing secret locations as *easter eggs* also instigate a game-like experience wherein users are encouraged to find all the hidden locations.

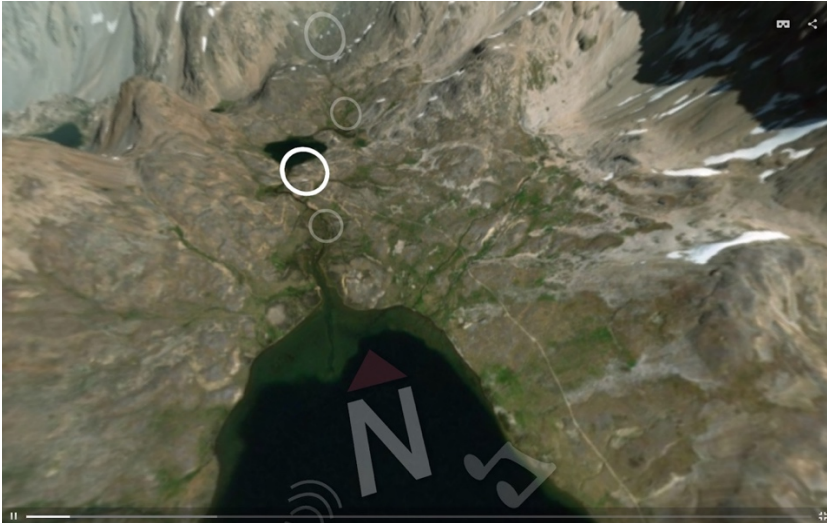


Figure 10: A screenshot from *A Road Through the Wild*. Each circle is a location created to indicate to viewers where look. The North Compass symbol is to help viewers from getting lost during the experience. Image from: *A Road Through the Wild*.

The experience of *A Road Through the Wild* is concerned overall with the idea of access to public lands. By filming various locations on and around the Beartooth Highway in 360, users are able to “virtually” visit these locations. By allowing people to visit the locations, even virtually, can evoke empathy and connection between the viewer and the location. This ability for 360/VR experiences is already documented indicating it is possible for such experiences to create empathy in users and to instill a new appreciation for the subject. It is particularly important the experience allows users to visit these sometimes remote locations because as more people are living in cities, people are not in contact with these locations. It is also important creating these experiences for those who are physically unable to visit these remote locations due to disability. It allows people to “visit” who do not have the means to travel due to cost of transportation or due to disability. Even though they are virtually visiting, it can instill an appreciation for the landscape. To solve the issue of “out of sight, out of mind,” *A Road Through the Wild*

allows users anywhere to visit locations through a smartphone, computer or HMD device. The ability to access the experience is particularly important and resolves an additional layer of accessibility by ensuring users who may or may not own an expensive high-end



Figure 11: Locations such as Goose Lake are within the wilderness boundary of the Absaroka-Beartooth Wilderness. Accessibility to this location requires visitors to own or rent ATVs and hike up to the location. A historical photo shows what the abandoned Copper King Mine once looked like at the turn of the 20th century. Image from: *A Road Through the Wild*.

VR console can enjoy the experience. Making the experience easy to access further democratizes the wilderness, an ever-growing concern as the debate of public, federal and private land wages particularly in the western states where most of the public land is administered by the federal government.

Conversely, creating a virtual experience can eliminate the need for some individuals to visit these locations. Although, a 360/VR experience might instigate individuals to visit the landscapes they see in person, particularly when it is a location close to one of the most visited national parks in the United States.

The closest experiences similar to that of the *Road Through the Wild* are virtual tours of houses, apartments and Google Map's Street View. As 360/VR began taking off, Google recognized the popularity of Street View increasing the number of locations

recorded with the help from small camera systems, and workers wearing the Google Street View Trekker backpack while walking trails, streets and more. In addition to



Figure 12: Rob Pacheco of Hawaii Forest & Trail treks around Hawaii Volcanoes National Park as a Google Trekker taking 360 images of trail systems in the national park. Image from: Yick, Deann. “Apply now to be the next Google Maps Trekker.” *Google Maps Blog*. 27

June 2013. <https://maps.googleblog.com/2013/06/apply-now-to-be-next-google-maps-trekker.html>. 15 January 2019.

Google’s Street View, Google is also contracting creators to create virtual tours of museums for the Google Arts & Culture app that was released in early 2018. These tours for Google’s Arts & Culture use the same technology as Street View to map out locations such as interiors of museums. However, the extent of these experiences is minimal interaction. The most that is possible is looking around the 360 space and moving to new locations.

Additionally, one of the major differences between Google’s Street View and *A Road Through the Wild* is the image itself. Street View is a single image while *A Road* is a series of 360 videos allowing for movement and the passage of time. Furthermore, *A Road* includes the hotspots inviting users to interact with the piece while Street View does not offer any interaction beyond moving to the next image and looking around. At

most, Google's Street View is sterile because its primary purpose is to help people with directions, so they do not get lost. *A Road Through the Wild* in comparison is meant to be the experience encouraging exploration in the virtual 360 space.

While many immersive 360/VR projects built around wild places are edited heavily using cues to point out where to look such as National Geographic's *Glow Worm Caves of New Zealand in 360*, few experiences exist that allow for users to choose where to go and in some cases where to look. Such examples of this are National Geographic and Black Dot VR's shorts specifically produced for social media platforms. The experiences produced in collaboration with one another tend to heavily rely on text to tell users where to look and what they are looking at. While it works for the purpose to gain viewers on platforms such as Facebook, it is not fully effective by taking the surprise of exploration out of the formula and defeats the purpose of 360/VR overall. Differently, Conservation International's *Under the Canopy* 360/VR experience does not tell viewers where to look as they watch the film allowing each experience to be slightly different. For example, with Conservation International's experience, many people were surprised upon second viewing that they did not notice a python in view. Furthermore, Conservation International's approach utilized a guide to structure a journey through the rainforest and used narration to direct users where to look. They also included ambisonic sound to indicate to viewers where to look in the 360 space. However, again similar to National Geographic and Black Dot VR, the film overall is intended primarily for social media platforms particularly YouTube 360.

Many of these higher-production value 360/VR science and natural history pieces rely on invoking empathy within the users. *Under the Canopy*'s use of narrator-guide shows this as he not only talks about the history of his people to the user but introduces them to his family. When he introduces his family, he shows how they rely on the rainforest and how they are affected by deforestation. Similarly, Kathryn Bigelow's *The Protector's: Walk in the Ranger's Shoes* attempts to instill empathy in users for the work and dangers that the park rangers in Garamba National Park face every day in order to protect the elephants that reside there. By utilizing empathy in these experiences, users might not learn anything new, but they develop an appreciation for nature and science by "experiencing" these realities. These experiences might be enough to call users to action or to establish an interest in the topic.

A Road Through the Wild was created over a series of four years using the 360Rize 10-GoPro Rig to shoot the locations, and shots later stitched in Kolor's AutoPano Giga software and Mistika VR. From there, interactive elements were added using WondaVR, a software program made for filmmakers taking out the stress of needing to learn code vital for programs such as Unity. Additionally, 360 aerial maps of the region were created for the experience using a combination of plugins for After Effects such as Skybox Mettle Freeform Pro and GeoLayers 2. These location maps were specifically created to act as anchors for users if they got "lost" in the experience as well as to give a big-picture of the overall landscape the Beartooth Highway goes through.

One area of future development is to add new locations for the experience and re-visit other locations to show the passage of time and keep the experience up to date

inviting users to return and have a new experience. Additionally, the development of better camera systems with sharper image quality and better software that does not require compressing the image as WondaVR does, is another reason I am interested in continuing the project.



Figure 13: The 360Rize GoPro rig at Goose Lake in the Absaroka-Beartooth Wilderness. Image: Liz Wilk

With *A Road Through the Wild*, I aimed to instigate and provoke in users a deeper connection to the landscape or to create that connection. The experience attempts this by allowing users to enjoy the landscape itself, or by inviting users to explore the area through game-like elements to create a more engaging memory. Overall, the hope is this experience in addition to other 360/VR content will change the way we imagine a place and landscape outside of a 2-dimensional window of the world. *A Road Through the Wild* is a concept piece showing 360 films can be more than a passive experience with minimal participation, inviting exploration and discovery of new stories and locations tied to

landscapes under threat of climate change or development. That these 360/VR experiences can be memorable for those who will never see them in person.

Currently, *A Road Through the Wild* can be categorized as a 360/VR educational piece because of the interactive elements in it, the project is more than 360-video. However, this categorization may change as definitions for immersive media continue to change as 360, VR, AR and so on are evolving. The latest term introduced to this realm of media is XR or eXtended Reality. XR is now serving as an umbrella term to categorize all immersive media the involves the use of a 360 space.

CHAPTER SEVEN

CONCLUSION: LOOKING AHEAD TO THE FUTURE

Despite the setbacks virtual reality experienced in its early days, technology is catching up allowing for VR to be fully realized. This is due to creators accessing cheaper camera systems to create 360 videos and technology companies heavily investing in immersive media. By investing in immersive media and pushing for consumers to access 360 content, companies such as Facebook are creating platforms for users to see this media in order to sell the technology. As this accessibility to 360/VR grows, the amount of content will increase. This content will be game-like and interactive compared to traditional, passive viewing, giving users choices to make throughout the experience. The content will give users choices with consequences allowing creators to connect the user to subject more meaningfully. Additionally, the surge of content, increased interactions with the content and the amount of time spent in the experiences may cause viewers to think differently and imagine beyond the traditional 2-dimensional window of television and film.

While filmmakers are creating new content for 360/VR, skeptics remain unconvinced of the role that 360 film and virtual reality will play. The cost of HMDs is a concern as many remain too expensive for the majority of consumers and those cheaply available, leave more to be desired. Another concern yet to be acknowledged is the expectation of content creators to know coding in order to make a 360 video.

Additionally, the recent closure of Spotlight Stories, Google's "immersive entertainment unit" shows the possible end of tech giants backing immersive media (Roettgers).

However, the closing is more to do with Google's struggle of breaking into the 360/VR HMD market with the Google Pixel smartphone. Roettgers states "...while Spotlight Stories films pushed the medium forward, the group didn't necessarily improve the fortunes of Google's VR efforts, with the company struggling to find an audience for its Daydream VR headset."

Despite these setbacks, 360/VR is a growing medium. As HMDs and consoles become more affordable, and content is created with the push by tech companies, more users will buy into it. Additionally, as the editing grammar develops for 360/VR experiences, users will learn intuitively how and experience works. Other industries outside of entertainment are also utilizing 360/VR, AR (augmented reality) and MR (mixed reality). Examples of this include the medical field to look at x-rays or MRA scans of a patient's body, forensic science with the documentation of crime scenes, and environmental science recording changes over time of a landscape such as glaciers and waterways. Job training is another area of industrial use to teach safety standards when operating heavy machinery. These other uses for 360/VR will help normalize the medium and nurture its growth.

Therefore, as 360/VR continues to evolve as an entertainment medium, users will become accustomed to active participation in a narrative story that will build deeper, meaningful experiences all the while leading users to think a 3-dimensional way beyond a 2-dimensional window of the world. As the editing grammar of 360/VR films is

established, differences between 360 editing and traditional 2-dimensional editing will emerge to be recognized separately. One editing difference will be the inclusion of interactivity as an extension of editing. This interactivity will lead to the gamification of 360/VR content to create deeper meaning and connections between the user and the subject of the film.

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