Creation of Audience Experience of Liveness Through Cinematic Virtual Reality Movies with Haptic Feedback

How do haptic feedback of a CVR movie supports the creation of an audience experience of liveness?

Student Name: Ezgi Arifoghlou
Student Number: 473034

Supervisor: Dr. Izabela Derda

Media & Business
Erasmus School of History, Culture and Communication
Erasmus University Rotterdam

Choose an item.
Thesis
June 23rd 2022

Creation of Audience Experience of Liveness Through Cinematic Virtual Reality Movies with Haptic Feedback

ABSTRACT

Movies have always had a certain level of immersion and ability to emotionally engage and connect their audience. This thesis aimed to go a few steps further and understand the level of immersion, interactivity, connection and presence Cinematic Virtual Reality (CVR) movies with haptic feedback create for their audience. CVR movies enhance the user experience through the immersive 360-degree view they create for their audience. Haptic technology on the other hand is capable of enhancing the feeling of immersion, presence and interactivity for its user. This thesis wanted to understand these concepts and the experience they create for the audience in a deeper level and thrived to find out how Haptic feedback support CVR movies in creating an audience experience of liveness. Liveness is a wholistic concept that brings many relevant themes to CVR and haptics underneath its umbrella. The concept refers to an audience feeling of aliveness whenever oneself interacts with a human or non-human event or a medium. This research allowed 10 participants to engage with CVR movies with manually created haptic feedback and carried out interviews about their experience. Findings suggest that haptics in CVR movies is able to create a general audience experience of liveness through the feelings of immersion, connection, presence and interactivity that are created in accordance with the CVR environment. Further research can be carried out into different CVR movies from different genres that include local and/or global diegetic haptic effects in order to reach to a broader conclusion.

KEYWORDS: *Cinematic Virtual Reality, Haptic Feedback, Liveness, Audience, Experience*

Table of Contents

1. Introduction

The immersive medium of Virtual Reality (VR), has been around since the 1960s, beginning with Sutherland's work which is considered as one of the first head-mounted VR devices (Mateer, 2017 & Syrett et al., 2016). Starting from the early 1990s commercial use of VR began to be explored, and only for the past decade it has become commercially viable and accessible to the wider public (Mateer, 2017). Since its early stages, different applications of VR have been explored including the development of Cinematic Virtual Reality (CVR) (Mateer, 2017).

Haptic technology has been used in VR to enhance immersive and intense user experiences (Danieau et al., 2014), therefore, haptic feedback is a crucial sensorial modality in VR interactions (Burdea, 1999). It further increases audience's feeling of presence and provides a high level of engagement for its users (Blenkinsopp, 2019). Use of haptic feedback in CVR has been discussed in literature, such as the inclusion of haptic cinematography in VR (Danieau et al., 2014), however, the research on the topic is still scarce. Therefore, understanding its influence on audience's experience within a CVR movie can contribute to the relevant area of research.

Due to the immersive nature of CVR and haptics and the feeling of presence they create for their user (Syrett et al., 2016 & Blenkinsopp, 2019), creation of an audience experience of liveness is a suitable topic to focus on in this research. Liveness is a concept that incorporates several themes that are relevant to VR; including presence, immediacy, continuity, interactivity and immersion (Auslander, 2012). The aim of this thesis will be to understand the creation of an audience experience of liveness in a cinematic virtual reality movie that provides haptic feedback.

As discussed by Auslander (2012), live experiences are highly valued by audiences and in certain cases even preferred over recorded or non-live content. Live experiences are crucial in creating a sense of presence for the audience (Auslander, 2012) and previous literature shows how a feeling of presence can be beneficial in enhancing customer engagement (Blenkinsopp, 2019). Therefore, understanding this experience and how it can further engage the audience is crucial for the media, VR and film industries that aim for higher customer engagement. Auslander (2012) further indicates that liveness is a historically contingent term meaning it adapts and changes as the technology and the expectations of the audience alters. Due to this reason, understanding how the current technologies such as haptic feedback and VR and expectations from the audience influence the concept of liveness is important with regards to contributing to this area of research.

The research question this thesis aims to answer is; "How haptic feedback of a CVR movie supports the creations of an audience experience of liveness?".

2. Theoretical Framework

This research mainly focuses on three different fields of study are virtual technologies cinema, and media spectatorship. The research has a phenomenological approach to the focus of study meaning an attention is paid on the technological capabilities of the virtual systems but in order to fully understand their impact, the audience's subjective interaction and understanding with these technologies are considered. Overall, understanding the relationship between the technology and the audience is a crucial aim of this study. In order to fully address this aim, it is important to understand certain concepts, technologies and approaches that are relevant to this thesis. These include; cinematic virtual reality, liveness and haptic feedback technology.

2.1 Cinematic Virtual Reality

2.1.1 Introduction

With recent technological developments, Virtual Reality (VR) started to become an inexpensive and commercially viable technology leading to the development of Cinematic Virtual Reality (CVR) (Mateer, 2017). CVR can be defined as "a type of immersive VR experience where individual users can look around synthetic worlds in 360°, often with stereoscopic views, and hear spatialised audio specifically designed to reinforce the veracity of the virtual environment" (Mateer, 2017). It is a type of experience where the viewer is able to watch omnidirectional movies using head-mounted displays (HDM) or any other VR devices (Tong et al., 2021). This helps the viewer experience a feeling of being there within the scenes and choose the direction they would like to look at (Tong et al., 2021). It also allows the audience to feel as part of the storyline and experience the events in the movie simultaneous to the characters (Ding et al., 2018). The term "cinematic" in this case refers to VR experiences that are narrative-based with a beginning, middle and an end rather than made purely for novelty, entertainment and exploration purposes.

2.1.2 Why CVR and CVR's Popularity

CVR has been attracting more attention from Hollywood studios with investments made by leading companies including 20th Century Fox and Walt Disney (Ding et al., 2018). Several CVR programmes began to appear in 2015 by major initiatives from Google, New York Times and Jaunt VR (Mateer, 2017). This interest from major film and media companies indicates the importance and promise of CVR within the film industry. Understanding why CVR is important through the experience it creates for its audience will further allow film companies to understand the influence of the medium and use it in its full potential.

Theorists argue that in an age of simultaneous and multiple screen viewing, the virtual experience of isolating spectatorship will be the new form of theatrical experience as the viewer is separated from 'the real world' and unable to distract themselves with another screen (Dolan &

Parets, 2016). CVR spectatorship demands an audience's undivided attention and this is a unique experience when compared to the multiscreen phenomenon of the 21st century (Dooley et al., 2021). Understanding the influence of new digital media on human beings is crucial since particularly in the 21st century digital media has become a key part of our lives and influence our day to day activities (Ding et al., 2018). Furthermore, In Baum (2020) article, Wallworth argues that VR is a powerful medium which tends to leave a different memory from traditional film for the audience as it feels closer to something that has happened to them and registered in the same part of the brain as dreams. This suggests the strong power the medium contains over the audience and proves how important it is to understand the experience VR creates for its audience. Therefore, understanding audience experience with regards to CVR will further provide relevant and crucial data to research areas that explores media effects.

Due to the recent popularity of the medium several studies have been carried out into CVR. The focus, however, has been mostly on the technical aspect of filmmaking within a CVR movie such as directing, mise-en-scène and editing (Mateer, 2017) and on the storytelling aspect of CVR movies such as narrative comprehension by the audience (Syrett et al., 2016). Only a limited number of researchers have focused on the experiences of a CVR audience with regards to a holistic concept such as liveness that incorporates several relevant themes including immersion, presence and interactivity.

In their study Ijsselsteijn et al. (1998) found that watching films in 3D were perceived as a more realistic and immersive experience compared to watching 2D films. VR is also considered to have a better effect compared to other forms of films with regards to stimulating a more real and stronger sensory experience (Dooley et al., 2021). Tong et al. (2021) took these claims further and carried out a study on audience's role and interaction in CVR. In their study they provide valuable insight into the importance of audience's role in the story of a CVR movie and discuss appropriate spaces for creating CVR experiences with higher audience engagement and immersion. Discussions provided by Tong et al. (2021) are used throughout this research to better understand the importance of audience experience in a CVR movie as well as the necessary elements within a cinematic VR to lead to higher audience engagement.

Another example can be Mütterlein and his focus on "three pillars of VR" that are immersion, presence and interactivity. Even though Mütterlein's focus is on VR in general rather than CVR, he still provides very valuable insights on the key characteristics of VR that makes it attractive for the audience and appropriate for immersive storytelling. Again, the arguments provided by Mütterlein are considered and used throughout the interviews. More details with regards to these theories and studies are discussed below.

2.1.3 History and Definition of Virtual Reality

Before focusing on CVR it is important to understand the history and importance of VR for its audience. Mateer (2017) defines VR as "the presentation of first-person experiences through the use of a head-mounted display and headphones that enable users to experience a synthetic environment as if they were physically there".

Sutherland and Sproull's device in 1968 that made use of a stereoscopic display and a mechanical tracking system is considered the first head-mounted VR device and has been argued to spark the beginning of the immersive medium of Virtual Reality (VR) (Mateer, 2017). However, it wasn't until 1990s that the commercial potential of VR was seriously explored by tech companies. Established manufacturers of the time including Silicon Graphics, Sun Microsystems, and Evans & Sutherland all significantly invested in this promising technology (Mateer, 2017). Only recently with the maturation of VR technology and the emergence of inexpensive high-powered computer processing display systems VR has become commercially viable and available to the public (Mateer, 2017). As a result, several entertainment companies including gaming, music and film started to invest into this innovative technology.

Over the years Virtual Reality has been praised for its unique immersive and interactive nature and therefore, seen as a breakthrough medium for storytelling. Burdea (1999) for instance defines VR as I^3 for "Immersion-Interaction-Imagination" which highlights the three main definitive features of VR. Mütterlein (2018) further highlights the disruptive potential of VR as a new technology and defines the medium as "the sum of hardware and software systems that seek to perfect an all-inclusive, immersive, sensory illusion of being present in another environment" (p. 63).

These definitions bring out the key characteristics of VR that are immersion, presence, and interactivity and many authors including Mateer (2017) highlight the importance of presence and immersion VR provides for its audience. Filmmakers realized the popularity and promise of VR with regards to storytelling as its immersive nature has the ability to move the viewer beyond the screen and allow them to become a participant within the storyline. The promise VR has for the movie industry has led to experimentations which resulted in the development of CVR (Mateer, 2017).

Even though VR and CVR has many similarities with regards to hardware and software; unlike VR in which the world is usually generated through graphics processing and audio triggers in real-time, CVR uses pre-rendered picture and sound elements (Mateer, 2017). Furthermore, the user's ability to move freely within the virtual world is limited in CVR in comparison to traditional VR. Usually the user is only able to choose an angle from which to view the scene (Mateer, 2017). With these arguments in mind two movies that fit in the aforementioned characteristics of CVR were selected and presented to the audience.

2.1.4 Definition of CVR

CVR is widely defined as an immersive form of storytelling that is used to create an engaging an enjoyable experience for its audience (Tong et al., 2021). It is a new type of film providing the individual user with the ability to immerse themselves in 360-degree synthetic world experiences (Ding et al., 2018). The user is able to look around 360-degree world with stereoscopic views, and hear spatialized audio that is specifically designed to reinforce the veracity of the virtual environment (Mateer, 2017).

Dooley (2021) divides 360-degree space viewing into two main categories of three degrees of freedom (3DoF) and six degrees of freedom (6DoF). 3DoF refers to works that allow the viewer to only look up and down and to rotator right and left from a fixed, central axis. On the other hand, works with 6DoF allow the viewer to shift the central axis and move forward, backwards, left, right, up and down within a contained rectangular space in addition to the same abilities of 3DoF.

Even though the CVR movies focused in this study allows for haptic feedback they are categorized as 3DoF projects since they only allow the viewer to look around in a central axis with no ability to shift the axis or move around.

2.1.5 Key Characteristics and Concepts of CVR

Just like any other audiovisual media CVR also contains the common structural narrative elements such as the inclusion of characters, point of view, causality, expected viewer emotion and empathy as well as the commonalities with regards to dramaturgical, sonic and performative aspects and a play on established notions of genre (Dooley et al., 2021). There are, however, some distinct characteristic differences between traditional media and CVR. Some of these include not watching straight ahead a rectangular screen, and being surrounded in a 360-degree environment where you are able to look around freely. This prevents use of different shots and editing techniques (Dooley et al., 2021). Some CVR experiences even consist of a single shot to keep that feeling of “real-time” for its audience (Dooley et al., 2021). In addition to these, Dooley et al. (2021) highlights four main concepts with regards to viewing in synthetic 360-degree environments which are; immersion, presence, embodiment and proximity.

Immersion has been identified as a key characteristic for experiencing CVR movies. Slater and Wilbur (1997) define the concept of immersion with relation to virtual environments as “the extent to which the computer displays are capable of delivering an inclusive, extensive, surrounding and vivid illusion of reality to the senses of human participation” (p. 3). Dooley et al. (2021) adds to this argument by indicating that in order for a medium to be counted as an immersive one a coherent story world should be presented in such a way that it allows the participant to transport in it. It is also important that the medium is audience centered and viscerally affective in the way that it places the audience within the narrative world (Dooley et al., 2021). In his article on VR, Mütterlein (2018) provides opposing arguments researchers have provided over the years on immersion. While some view the term as a state of mind, a subjective psychological experience of being absorbed by or

caught up in a virtual environment, others argue that immersion is a technological capability of a VR system meaning immersion would be assessable objectively by only using VR system's capabilities without the user's subjective experience. Mütterlein (2018) considers these arguments and provides a view of immersion as a psychological experience that is definitely based on and restricted by the technological capabilities of a VR system but needs to be assessed on a subjective level. Since this research follows a phenomenological approach on audience's experience of CVR movies, the argumentation and definition provided by Mütterlein and Dooley et al. are taken as the base for the understanding of the concept immersion.

Furthermore, the concept of presence is crucial for the creation of immersion as the two concepts are interlinked together (Dooley, 2021). Presence is defined as the feeling of being there, in a world that exists outside one's self (Riva et al., 2007). Mütterlein (2018) further describes presence as "the subjective experience of being in one place or environment, even when one is physically situated in another" (p. 1408). Lombard and Ditton (1997) further relate presence to the disappearance of the viewer's awareness of their real environment. There is no distance between the events occurring in the scene and the audience since the viewer is positioned within the story world (Dooley et al., 2021). Wallworth (2016) further suggests that this sense of presence makes everything personal. Dooley et al. (2021) also indicates that VR allows the protagonists within a storyline to communicate with the viewer in a more personal and poignant fashion compared to traditional films. This has to do with the powerful sense of presence VR provides; this characteristic also gives the actors the sense of being present with the viewer which leads them to communicate in a way that leads to a more personal form of storytelling (Dooley et al., 2021).

Another key concept that is argued relevant to CVR is interactivity. Steur (1992) has defined interactivity as the extent the user of a medium can influence the form or content of a mediated environment. However, Mütterlein (2018) considers interactivity as a psychological state similar to immersion and focuses on perceived interactivity. He highlights individual differences with regards to perceiving interactivity and experiencing a VR content as interactive. A specific influence on the form or content of a virtual environment can be viewed more or less interactive depending on the individual's experience with it (Mütterlein, 2018). Due to the nature of the study and its focus on audience experience this point of view from Mütterlein has been used as one of the key understandings for interactivity with CVR.

Dooley et al. (2021) contrasts viewing in a synthetic 360-degree environment to traditional two-dimensional, theatrical film viewing experience. As a main contrast they highlight the notion of watching from a 'safe distance' to being situated 'within' a storyline with several levels of viewer interactivity provided by 360-degree viewing. The traditional viewership provides a clear separation between the viewer and the material with regards to physical positioning where the scenario and events feel distant in place and time. This leads to discontinuity between the place of our current

reality and the reality that is shown to us (Slater & Wilbur, 1997). Therefore, the audience is aware that they are in a different space than the one displayed on the screen.

Tong et al. (2021) and Dooley et al. (2021) further highlight the different camera positions and viewer positioning within CVR movies that allow the spectator to engage with the movie from different points of views. Tong et al. identifies two main camera positions that are character view which allows the viewer to witness the storyline from the perspective of a character within the storyline and encourage them to respond to the story events in an affective style and immersive passive view in which the audience is not a part of the storyline but a mere spectator witnessing from a third persons point of view. Nicolae (2018) refers to first positioning as the 'hero' perspective while the second one as the 'witness' perspective. Dooley et al. further elaborates on the character view and divides it into either from a participant or a protagonist's point of view. Even though the 'witness' perspective may seem highly passive, Newton and Soukup (2016) argue that witness view still does not classify as a pure neutral observer since even with the third-person perspective a viewer can identify themselves with a particular role based on their physical positioning within the CVR scene. This is where the viewer embodiment come into play and impact the viewer's perspective of their role and interactivity within the storyline (Dooley et al., 2021).

With regards to proximity and the creation of empathy and an emotional engagement from the audience CVR uses different tools compared to traditional media. The viewers are placed within the unfolding storyline and they find themselves sharing the same space with other characters that are placed at differentiating measures of proximity from across the viewer. The CVR lacks the existing of a "fourth wall" which divides the viewer and viewed therefore creating a new form of relationship with the characters (Dooley et al., 2021). This proximity can be harnessed in such a way to create an emotional response from the audience (Dooley et al., 2021). Furthermore, the audience can relate to characters and objects in the storyline in a way similar to persons and objects in real life (Dooley et al., 2021), this impacts the connection and proximity felt by the audience.

Viewer's role in CVR movies is also a key concept for this study therefore several argumentations on concepts with regards to this have been included as well. In traditional filmmaking and movie spectatorship, viewer agency is rarely considered since in a cinema, viewers are only passively sitting and looking straight at the screen with no interaction and influence on the story. However, this is not the case in CVR, the viewer has the agency to choose where to look and therefore how to interact with the storyline (Tong et al., 2021). Even though there might be an ideal direction to look at within the scene it is up to the viewer to choose their point of view (Dooley et al., 2021). The viewer's perception of their role has been changed extending their interactivity and agency. Due to this distinction viewer agency is also a key concept that needs to be considered and questions with regards to this characteristic has been addressed during the interviews.

Another main characteristic of CVR is its individualistic nature. While traditional TV and cinema viewing is a social experience, the use of HMD makes CVR an individualistic experience,

effectively blindfolding the viewer and isolating them from their surroundings (Dooley et al., 2021). Even when the viewer is experiencing the CVR in synchronization with other viewers, their agency to choose where they look will lead to a different point of view and thus ultimately to an individual experience. Furthermore, the use of HMD leads to a visual, auditory and mental separation from the 'real world' therefore restricting social interaction and discussions with others but allowing for an increased focus on story elements (Dooley et al., 2021).

However, still a CVR viewer is still not a fully active participant since CVR is a "lean-back-medium" where the viewer is rather passive and have limited interaction possibilities. It is still a movie experience so the viewer is required to watch the story unfold and follow the narrative instead of actively influencing it (Tong et al., 2021). Tong et al. (2021) stated that there have been discussions around how to provide for fill user interaction in immersive experiences, however, he argues that this level of interactivity would require complex hardware, and an overly demanding effort from the viewer and overall would not be applicable to CVR. If this level of interactivity is reached then the medium can no longer be defined as cinema and reaches more towards an immersive video game (Tong et al., 2021).

2.1.6 Theories on CVR and the Audience

A traditional film theory focused on this study is the spectatorship theory developed in the 1970s which was based on the works of Jean-Louis Baudry and Christian Metz and considers the conditions that lead for viewing pleasure and explore the notions of desire and identification with regards to spectatorship (Dooley et al., 2021). In his work *The Imaginary Signifier,* Metz (1975) likens the cinema screen to a mirror and argues that through spectatorship the viewer has the opportunity to identify with the characters or participants on the screen while ingesting the narrative that is being unfold.

Metz borrows from the basis of the reception theory proposed by Stuart Hall in 1973 and states that audience plays the role of an all-perceiving subject within a cinema as without them there would be no one to perceive and make sense of the storyline. Metz (1975) further argues that it is crucial for the spectator to identify with the camera as for instance when the image rotates through the pan of the camera the viewer understands it as he turning his head as an all-seeing spectator with an "all-perceiving eye" even though he hasn't actually rotated his head. This means that he has identified with the camera as a transcendental subject, in a way the camera has becomes his eyes (Metz, 1975). Just like Stuart Hall's arguments on encoding and decoding without the decoder, that is the audience, making a meaning from the content, encoding of the message by the author alone would have made no sense. It is the audience who decodes the content and gives a meaning to it (Hall, 1973). Nicolae (2018) adds to this argument by arguing that within a cinema setting the spectator may experience 'perceptual transference', which is an effect that implies the audience's forgetting of their immediate surroundings and project their perceptions wholly onto the scenery of the screen in front of them. As a

result, a perceptual transfer occurs. These arguments provide a parallel to the arguments on liveness; Auslander argues that until the audience accepts the claim made by the medium and perceives it as a live one the medium remains non-live, there is no sense for a medium to make its claim of being live unless the audience accepts and acts on this claim (Auslander, 2012).

Baudry and Williams (1974) further argue that the instruments used within a cinema such as the projector and the screen as well as the darkened room create certain ideological effects on the viewer leading to a viewing experience that prevent any exchange, circulation and communication with the outside world. This discussion is similar to the experience created within the CVR world where the viewer is immersed into a new world and are separated from the 'real world' (Dolan & Parets, 2016). Overall, both Metz and Baudry argue that the audience experiences viewing pleasure by identifying with a story protagonist (Dooley et al., 2021).

Dooley et al. (2021) further adds that traditional classical film theory argue that techniques of composition and editing are crucial for the creation of audience empathy with the protagonist, therefore, the framing of protagonist is very important as it will encourage audience identification by aligning the viewer with the main subject. However, Dooley et al. (2021) states that the explorations made by Baudry and Metz on viewer identification has been criticized for assuming that viewer identities are stable and fixed and concludes that the process of identification takes place in a complex and varied manner.

In line with the theories of traditional cinema that are discussed above; Within traditional cinema the filmmaker can decide what is seen by the viewer, that is on-screen, and what remains hidden, off-screen (Dooley, 2019). Through the rectangular screen of the cinema the viewer is offered a window to a new world. However, this is not the case with CVR. Slater and Wilbur (1997) argue that rather than looking through a glass, the audience steps through the glass and gets placed within the narrative. The viewer is placed in the scene and with their 360-degree vision they can look around as they wish cued by story events, visual and audio cues (Dooley et al., 2021).

In order to understand the audience's experience while interacting with a CVR movie Tong et al.'s argument's on viewer's role and interaction in CVR is taken as a key theoretical approach within this study.

Tong et al (2021), argues that most of the research done on CVR is from the point of view of filmmakers and on enhancing story elements to better direct viewer's attention. However, the amount of research on viewer's role while engaging with a CVR movie is limited and Tong et al. aims to provide some argumentation on this area.

One of the main points to keep in mind with regards to the relation of viewer and CVR is the viewer's agency. Even though it is argued that compared to other forms of VR media CVR is not able to provide as much interactivity and agency to its user it still allows the viewer to freely look around and choose their own point of view within the storyline (Tong et al., 2021). Even though filmmakers have developed several visual cues as well as story elements to be able to direct the viewer's attention

to a certain point in the 360-degree movie, the audience still holds the agency and power to look around and not follow the indications left by the filmmaker (Tong et al., 2021). This autonomy can change the viewer's perception of their role, extending their interactivity and agency. However, Tong et al. (2021) still highlight that viewer is more on the passive side and tend to mainly watch the story unfold and follow along with the storyline rather than actively participating or acting in it.

Tong et al. (2021) further states that CVR and video-game "users" usually tend to have different motivations and consist of different demographics. This might lead to some differences in the way varying demographics experience the CVR experience. In order to understand whether demographics of for instance being a gamer or non-gamer or being female or male play a role in the way the CVR movie is experienced; questions on gender and interactions with games were also included in the interviews.

One of the main issues identified by Tong et al. with regards to CVR viewership is Narrative Paradox which is the tension between the choice of freedom the viewer has to look around and the way director keeps control of how the narrative plays out. This creates a challenging situation for filmmakers since they are required to balance out the engaging interactivity and viewer agency with narrative progression. Another issue highlighted by Tong et al. (2021), is the "Fear of Missing Out" (FOMO) which is linked to viewer's control and freedom to look around. This can lead to the viewer missing important story elements resulting in the condition of FOMO and yielding weak narrative comprehension as well as low emotional engagement (Tong et al., 2021). The existence of audience's agency to look around and of these aforementioned issues also mean that the "all perceiving eye" suggested by Metz's arguments no longer apply to the CVR audience as they may not necessarily see all of the key events happening within the scene (Dooley, 2021).

These two issues were also considered when selecting the movies that the audience experienced and questions and comments relevant to Narrative Paradox and FOMO were addressed during the interviews. However, filmmakers have been using several techniques to avoid these issues and guide the viewer's attention. These include changing the user's viewpoint in the scene through camera placement, changing the placement of action and the story elements or using several diegetic story elements and visual cues and alternations to guide the viewer's attention. In the selected videos it is visible that some of these aforementioned techniques have been used to direct the audiences' attention. Furthermore, use of haptic feedback vest also helped with guiding the viewer's attention to a specific point or character in the scene.

2.1.7 Arguments on CVR from the filmmakers

While VR filmmakers like Wallworth praise the medium of VR for its immersive nature and the creation of a strong sense of presence, well-known filmmakers like Spielberg are more cautious towards the medium stating it could be 'dangerous' to filmmakers as he believes it can give too much freedom to the audience leading them to not take direction from the storytellers but make their own choices which regards to where to look. Filmmakers are, however, already taking precautions to come

over this issue and avoid issues of narrative paradox or fear of missing out. These include technical visual or sound cues that lead the viewer to pay attention to a certain direction. Furthermore, compared to VR games and experiences CVR movies are much less interactive; their main property is just giving the audience the freedom to choose which angle to look at but other than that mostly the storyline is pre-determined and very little, if at all, interaction, as making real-time in movie choices similar to a VR game, from the audience is necessary.

2.2 Liveness

2.2.1 Introduction

Even though virtual reality has been discussed in multiple articles as a medium that can create an audience experience of liveness there is still a gap in the analysis of the experience the medium creates. Furthermore, TV and film are two of the main areas of focus with regards to the discussion of liveness (Morse, 1998). Therefore, understanding how a CVR movie creates an audience experience of liveness would both fill in the gap in research and further contribute to existing literature.

Liveness is a crucial concept that has been discussed through multiple academic disciplines, most prominently in media studies, performance studies and music studies. Since the focus of this thesis is on the media of VR and film, media and performance studies are the main fields discussed with regards to the concept of liveness.

2.2.2 History and Definition of the Term

The development of recording technologies made it possible and necessary for the concept of "liveness" to be coined (Auslander, 2012). Before mediatization in the forms of sound recording and film the term 'live' was not relevant since it did not make sense without a relation to an opposite such as the 'mediatized' (Auslander, 2008). Therefore, the history of the concept is interlinked with the history of recording media and has been around for the past 100 to 150 years (Auslander 2012).

The term "liveness" has been defined as "a performance heard or watched at the same time of its occurrence, as distinguished from one recorded on film, tape, etc." by the Oxford English Dictionary. The default definition of the concept distinguishes a live performance as one in which the performers and the audience are both temporally and physically co-present (Auslander, 2012). However, as the medium of performance changed and developed over time the concept of liveness also became more complex. Over time the term has been started to use in situations that do not meet these basic conditions. Liveness is now defined with historical specificity in mind (Kim, 2017) and considered a historically contingent term, meaning that a live experience changes over time with relation to technological and societal change (Auslander, 2012). Auslander (2012), further indicates how social necessity played a major role in bringing the concept of liveness into being, therefore, includes societal change as a key factor in the development of the concept. With the arrival of radio broadcasting the audience wanted to be able to distinguish whether the sounds they were hearing were

being produced live or recorded music was being broadcasted. Due to the audience's demand the distinction between live and recorded music became a social necessity. According to Auslander (2012), live and mediatized are not ontological opposites instead their opposition is defined with cultural and historical contingencies. Lee (2019), on the other hand, indicates that liveness can be related to qualities and properties that help users experience the process of creating an artifact as if they are there in real time and life. He further defines liveness as the extent to which the process of creating artifacts and the state of the artifacts are immediately and continuously perceptible (Lee, 2019).

Furthermore, Nick Couldry proposes two relatively new forms of liveness that are 'online liveness' and 'group liveness' and defines liveness as a continuous feeling of connection with other human-beings (Couldry, 2004). When understood in this way the experience of liveness is not necessarily limited to specific performer and audience interactions but instead refer to a sense of continuous and technologically mediated connection to other people known and unknown (Auslander, 2012).

A further investigation on the concept by Margaret Morse reveals a definition that does not even focus on the connection between human beings. Morse observes that nowadays with the advancement in interactive computer technologies audiences are able to have live experiences through connections and interactions with a machine and highlights feedback as an element that signals the capacity of a machine to respond to input instantaneously (Morse, 1998). She argues that if a machine is able to interact with a user even at this minimal level then it can produce a feeling of "liveness" as well as a sense of the machine's agency. Nowadays liveness is even attributed to the entities that we have access with the machine. Auslander provides the example of a website and how when it is first made available to the audience it is indicated to "go live" (Auslander, 2012). Auslander, further elaborates on this observation and provides a more recent definition of liveness. He refers to digital liveness and defines 'live' as a word "now also used to describe connections and interactions between human and non-human agents." (Auslander, 2012). Understood in this way, nowadays the experience of digital liveness refers to any interaction with machines that creates a feeling of aliveness within the audience through various feature such as interactivity, mobility, feedback and agency. He indicates the type of liveness the audience values is based on virtual entities responding to us in real-time, and feeling live to us by connecting and interacting with us (Auslander, 2012).

Auslander, however, carries on with this definition on liveness and indicates that even though real-time operations and the initiation of a feedback loop are necessary conditions for an experience to be perceived as live they are not sufficient conditions. He argues that through the aforementioned conditions of real-time operations, instant feedback, a sense of connection and interaction technologies artifacts make a claim on us with regards to them as being "live", however, only if we interact with them and accept this claim they actually turn into live experiences. This leads Auslander to focus on a phenomenological approach to liveness which is explained in detail in the next section.

2.2.3 Phenomenological Approach to Liveness

With these arguments in mind Auslander (2012) argues that liveness is not an ontologically defined condition but a phenomenological one. A phenomenological approach to liveness focuses on the experience and perception of the audience rather than the characteristics of the technology itself alone.

According to the phenomenological approach; liveness is neither an intrinsic property of a visual entity nor simply a construction by the audience, instead it is a relation between the self and other and it indicates "being involved with something" (Auslander, 2012). He further argues that the experience of liveness results from the audience's conscious act of accepting a medium as live in response to the claim of liveness it makes on them (Auslander, 2012). Rather than only focusing on a technologically or socially deterministic approach, this approach focuses on the importance of the relationship between the audience and the technology to understand the creation of the experience of liveness. It is a suitable approach since it considers both the importance of the technology, the audience and the relation between the two. With regards to this some of the main authors that are going to be used in analyzing the interviews are from Auslander (2008 & 2012), Couldry (2004) and Morse (1998).

2.2.4 Arguments and Examples on Liveness in VR

Auslander (2008), argues that newer media is remediating, and implicitly replacing, older ones and as an example provides film and television remediating theatre. He further adds that live performance has been aiming to keep their legitimacy by further remediating the newer technologies also endeavors to replicate television, video and film. He argues that nowadays live performance is incorporating mediatization and has become a product of media technologies itself. According to Auslander one of the reasons that live events are still preferred over mediatized ones is because they appeal broadly to the senses. Since the VR movie with haptic feedback will be appealing to three out of five senses of vision, hearing, and touch there is a high likelihood that it is experienced as a live experience by the audience. This is also one of the main reasons that it has been hypothesized in this research that haptic feedback supports the experience of liveness while experiencing a VR movie. The feedback adds an extra sense of touch to the already existing senses of vision and hearing within the VR movies.

Auslander (2012), further argues that the audience might view a live experience as unique due to its creation of community. However, later on he suggests that mediatized experiences are able to create a sense of community as well as this sense comes from being part of an audience and the quality of the experience of community derives from the specific audience situation. He further gives the examples of a group of neighbors watching a live event through television and leading to a

formation of an even stronger feeling of community than a group of strangers watching the same event due to their previous acquaintance.

Another research that provides a relevant argument on the creation of an audience experience of liveness through interactions with technological artifacts comes from Nass and Moon's (2000) explanations on what they call "Computer as Social Actor Paradigm". Nass and Moon (2000) argue that we tend to interact with our computers in a way that is similar to our social interactions with human beings. They point out three main cues with regards to the characteristics of a computer that might encourage a social response from a user. These include a computer that provides words for output, interactivity which can be its responsiveness based on multiple prior inputs and fills roles that are traditionally filled by human beings (Nass and Moon, 2000). Auslander elaborates on this argument provided by Nass and Moon and states that we might see these cues as claims made to us by any type of machine as to them being "live". Auslander (2012) further states that us as humans tend to accept these claims made to us by machines since we can perceive these engagements as parallel to our social interactions and since we as human beings put great value to socialization we tend to engage in an activity, responding to the demands and claim made by the machine and leading to the creation of an audience experience of liveness. When these arguments are considered the definition of the term and the experience it creates for the audience is better understood.

2.2.5 Themes Within Liveness

According to Auslander (2008) temporality plays a key role in creating an experience of liveness and immediacy, directness and personal exchange are necessary features of an experience to be considered as live. Furthermore, he states that responsiveness from a machine, which is also counted as a real-time feedback, communicative or human-like features of a machine, and a sense of connection between the user and the machine can all add up to the audience experience of liveness (Auslander, 2012).

Morse (1998) further states that an interactive machine has the capacity of creating a feeling of liveness. Morse observes feedback from the machine as an important sign of interacting with the user, and therefore for creating a sense of liveness. As a result, indicates feedback from the machine as a necessary feature of a live experience.

Therefore, questions with regards to haptic feedback are going to be asked in interviews in order to figure out the role of feedback and interactivity with regards to creating an experience of liveness.

In the context of audience research Bundy et al. has identified the following components as the necessary characteristics for a young audience to identify an experience as live; the comfort and discomfort of presentness, performer vulnerability, risk and uncertainty, proximity to the live action, perceptions of realness, a sense of relationship with the actors and the intensity of engagement.

Reason's study on the experience of liveness of a younger audience attending an Othello performance reveals that the audience identifies directness, immediacy, responsibility and realness as key components of a live experience. Reason further argues that the real presence of actors, the danger of something going wrong, and the risk and fear of missing something during the performance all add urgency to the experience while increasing levels of tension and potential discord within the audience (Reason, 2006).

Lee (2019), provides an argumentation that further supports these claims. He argues that liveness can be considered in three values that are immediacy, continuity, and perceptibility. He describes immediacy as the latency between the time of creation and the time that the process is perceptible to the audience and relates it to the real-time operations of a machine and the real-time interaction it between the spectator and the creator or the machine. He also relates immediacy to the value of uncertainty and risk involved in a live experience. He defines continuity as how continuously the state of the process is perceptible to the audience. Finally, he defines perceptibility as the sense of being there and the perception of the experience as real (Lee, 2019).

2.2.6 CVR and Liveness

One of the main reasons for choosing the medium of cinematic virtual reality to better understand the concept of audience experience of liveness is the personal and poignant communication a VR movie allows for its audience. This personal interaction with the audience allows for a better investigation of the liveness audience experiences while engaging with a CVR movie.

CVR provides a different viewing experience for the audience as they are situated within the story world which provides various levels of interactivity when compared to watching a non-CVR movie from a 'safe distance' (Dooley, 2021). The concept of liveness provides the necessary themes of immersion, presence and interactivity that will allow the researcher to better understand how a CVR viewing experience contributes to the feeling of liveness whilst providing a unique experience to regular movie watching.

As discussed before immersion and a sense of realness are some of the key characteristics of a CVR movie. The concept of liveness also includes immersion and perception of reality as two key characteristics for an experience to be defined as live. Therefore, during the selection of movies as well as the analysis of interviews this feeling of realness and immersion were addressed.

Furthemore, Auslander (2008) argues that mediatized experiences do not engage all the senses that a live performance can. However, with the advancement of the technology since his text "Live performance in mediatize culture" this has changed. Recently there are several mediatized VR examples that are able to address all or most of the senses and as a result lead to a live experience.

Several projects that address the five senses already exist today. An example is Symbiosis Polymorph a VR art installation that allows the user to feel all five senses that are vision, hearing,

touch, smell and taste (reference, xxxx). Another example is Alice the virtual reality play which a VR game that allows the participants to see, hear, touch as well as taste (a mushroom shaped meringue) (reference, xxxx). This proves that through the application of human senses VR is able to create a live experience for its audience. Another example can be Sensiks sensory pods that allow the user to experience vision, hearing, heat, touch, and smell in a VR environment. the user enters the pod and is able to get into an immersive VR environment that allows for a live experience. Currently access to these technologies is only available during festivals or with high prices, however, over time as the technology becomes more accessible with regards to expenses the popularity of these experiences will further increase and a need to understand the experiences they create for the audience will enhance.

2.3 Haptic Feedback

2.3.1 Introduction

Haptic technology plays a crucial role in VR with regards to enhancing immersive experiences for the users (Danieau et al., 2014). Haptic feedback technology includes force and tactile feedback (Burdea, 1999) and it has a great potential for enhancing CVR movies and leading to new immersive experiences (Danieau et al., 2014). It also plays a key role in increasing audience's feeling of presence and has been used in current VR games to fully immerse the user within the storyline (Blenkinsopp, 2019). Recent technologies such as Teslasuit and HaptiX gloves prove successful in providing enhanced tactile feedback. Advancement in technologies such as these examples display how haptics are becoming a crucial part of VR experiences and how it is important to understand the type of experience it creates for the audience. As CVR is a strong example of a new immersive storytelling device (Mateer, 2017), understanding the support haptic feedback provides to further the immersive experience the medium provides is important. Furthermore, there is a lack of research on the audience experience and engagement haptic feedback within CVR provides. Therefore, this thesis will aim to fill in this gap.

2.3.2 Haptic Feedback Interfaces

As mentioned above haptic feedback can consist of force feedback, tactile feedback and proprioceptive feedback. Force feedback simulates object hardness, weight and inertia while tactile feedback simulates surface contact geometry, smoothness, slippage and temperature (Burdea, 1999). Finally, proprioceptive feedback senses the user's body position or posture.

The form of feedback used in this study is force feedback through the Tactsuit of bHaptics Haptic Feedback vest. Force feedback are computer extensions that apply physical forces and torques on the user. These vests provided force feedback in the form of vibrations. These vibrations were in synchronization with the movies selected and several questions were asked to the participants to understand the impact they had on the audience's overall experience with regards to creating liveness.

2.3.3 Haptic Feedback in CVR

Haptic feedback technologies have been used in games and VR to create an immersive and intense user experience (O'Modhrain & Oakley, 2003). With regards to cinema, however, so far haptic-audiovisual feedback in which the user is able to see, hear and physically feel the scenes is mostly experience in 4D cinemas and amusement parks (Danieau et al., 2014). However, over the course of the past few years new technologies have been developed in order to increase the feeling of immersion through haptic devices. An example is the haptic feedback chair developed by d-box company where the viewer is able to feel full-body haptic feedback while experiencing the content they want. Another instance is the bHaptics designer tool, a software that allows the developer or user to add haptic feedback they would like to experience while watching a video or movie of their choice. Since a haptic feedback vest was used in this study, bHaptics designer tool proved to be a suitable tool to create force haptic feedback in the form of vibrations for the selected movies.

In order to design the feedback for the movies the new type of haptic effect proposed by Danieau et al.'s study was used. Danieau et al. proposed a type of haptic feedback that is related to the camera motions in a movie to convey a certain meaning or emotion by the filmmakers and referred to it as camera effects. They divided this effect into two models of Cinematic Model and Semantic Model. The first model focuses on making the viewer feel the movement of the camera with relation to the camera effect that was used while the second one provides a haptic metaphor related to the semantics of the camera effect (Danieau et al., 2018). In order to enhance the immersive experience both cinematic and semantic model of haptic feedback was used when designing the haptic feedback for the movies. By using the Cinematic Model the camera effects of a tilt or movement around the scene was tried to be enhanced, while using the Semantic Model helped enhance the meaning behind a certain camera effect and to enhance the connection and relation to the characters, meaning behind the events and the storyline.

Danieau et al. (2014), argue that synchronization of the haptic feedback and the audiovisual content is curial particularly if one wants the viewer immersion to enhance. They further argue that haptic effects are mostly used in a form to represent the physical events that occur in the scene that are related to the onscreen character (Danieau et al., 2014). This technique is again used to increase the feeling of immersion. Lemmens et al., further created a jacket that creates haptic feedback related to the ambience or emotion in the scene. Danieau et al. (2014), further state that haptic feedback may be used to enhance several components in audiovisual content and could be considered as an equivalent of visual or audio effects. By using the aforementioned models this study aimed to relate the haptic feedback to the physical events and emotion in the scene in order to enhance the immersion, presence and emotional engagement of the viewer.

Danieau et al. (2014) also places importance on the paralle impact of haptic effect and audio in movies. According to them audio is used for increasing the realism, in the form of sound effects and are implied in the action of the movie are also called diegetic sounds. Audio, however, is also

used to create ambiance, through music for instance, which is called non-diegetic sounds. He then uses this argument to divide haptic feedback into the categories of diegetic and non-diegetic as well. While diegetic haptic effects enhance the physical events happening in a scene, non-diegetic effects are used to enhance elements that are not attached to the fictional world. Diegetic haptic effects are further divided into local and global effects. Local effects are associated with one object or an onscreen character in the scene while global effects refer to the environments and the events happening within a space such as an earthquake. In this study diegetic effects were used and both local and global effects were adopted.

2.3.4 Haptic Feedback, CVR and Liveness

As mentioned above haptic feedback technology is argued to be very successful with regards to creating immersive and intense user experiences in VR. One of the key characteristics of CVR is also argued to be immersion that allows the user to be psychological feel involved in and absorbed by the activities happening within a scene. Haptic technologies are also crucial in enhancing the feeling of presence, that is another key characteristic crucial to CVR movies. Haptic technology is argued to further enhance immersion and presence for VR content (Danieau et al., 2014), therefore understanding how it achieves this specifically with regards to CVR movies is crucial to understand haptic technologies role and potential within the film industry and for creating immersive cinematic experiences.

Liveness, on the other hand, is a wholistic concept that is able to cover these crucial themes and characteristics related to haptic technology and CVR including immersion, presence and interactivity. The reason for choosing this concept, however, is its ability to branch and contain other several important and relevant themes including connection, identification, realism, proximity to the perceived action and directness. The aim of this study is to understand the crucial role of the concepts immersion, presence and interactivity that are relevant to haptic technologies and CVR and addressed by the concept of liveness but also to find out whether the other relevant concepts within liveness are able to contribute to audience experience with regards to these technologies.

3. Research Design

3.1. Method

In order to collect relevant data and successfully answer the research question semi-structured interviews are used in this research. Furthermore, a qualitative analysis method is being used since the selected units of analysis of interviews will require an interpretative analysis from the researcher (Boeije, 2010). According to Boeije (2010), in order to qualitatively analyze data, it needs to be "disassembled into elements and components… examined for patterns and relationships, sometimes in connection to ideas derived from literature, existing theories and hunches" (p. 94). Boeije (2010) further argues that in order to segment and reassemble data, one needs to go through a coding process

which is the process of defining what the collected data describes (Boeije, 2010). In this thesis thematic analysis is used to reassemble data through coding. By taking the aforementioned theories as a basis relevant themes discussed by the participants are identified to answer the research question.

3.2 Operationalization

In order to allow the audience to experience the CVR content, 10 participants were invited to the research room in a VR gaming area called Virtuorium in Leiden. Participants were provided with a VR head-set and a set of haptic gloves and a haptic suit. Before starting the research, each participant was given a form of consent to sign that indicates they have accepted to participate in the study. Several health and safety regulations were considered before, during and after the arrival of the participants in order to make sure that the participants are comfortable with using a VR head-set.

Before experiencing the CVR movie each participant was given a short briefing about the research and the movie they are going to watch. They were once again informed that if they feel uncomfortable or nauseous they can stop watching the movie at any time and withdraw from the research. Afterwards the participant was equipped with a VR head-set, a set of gloves and a haptic vest with the help of professionals. With regards to hardware Oculus Rift VR headsets, and bHaptics haptic vests were used.

Each participant experienced the CVR movie one by one through the head-set and with the haptic feedback hardware provided. Participants were observed while experiencing the CVR movies in order to see their physical and facial reactions to the experience and ask relevant questions during the interviews. Notes were taken with regards to their experience.

When participants finish experiencing the CVR movie, a short break of 5 minutes is given to each participant. Afterwards, a semi-structured interview of 45 to 60 minutes were carried out. Consent to record the interview with a voice recorder was taken from the participant. Some extra notes were taken during the interview in order to guide the researcher when a question that was not in the interview guideline needs to be asked. This interview technique was selected due to its flexible nature (Bryman, 2012). Even though there was be an interview guide to be followed during the interview, questions that were not included in the guide may be asked as important statements made by the interviewees are picked up on. This interview technique is beneficial as participants may talk about themes or experiences that were previously not discussed within the theory or the interview guide but might prove crucial for the research (Bryman, 2012). After reaching data saturation, thematic analysis be carried out on the collected data.

3.3 Data Collection

Units of Analysis & Sampling

Data of this thesis consists of primary data since it was collected first-hand by the researcher through semi-structured interviews and structured observations. A research sample of 10 participants

between the ages of 20 to 30 were interviewed. The age gap of 20-30 was chosen since the participants was recruited through convenience sampling from the subreddits of r/Leiden, r/Rotterdam and r/SampleSize. 7 out of 10 participants were students or working students while 3 were only working professionals. Convenience sampling, that is a form of non-probability sampling, was chosen due to its ease of use and lower cost (Sarstedt et al., 2018).

There were several criteria when selecting the CVR content that was used during the research. During the research for CVR movie it was found that there are many VR animated movies, however, a CVR movie with mainly real human actors were preferred for the research. According to the uncanny valley hypothesis theorizes that artificial agents that have human-like features might lead to feelings of eeriness in a human observer (de Borst & de Gelder, 2015). In order to avoid this as much as possible and encourage an experience of liveness from an audience a both of the CVR movies mainly consisted of real human subjects.

Currently a CVR movie with haptic feedback does not exist and is not available for public reach. Therefore, the software of bHaptics Designer tool was used to add haptic feedback to the selected movie. First the movies were uploaded to the bHaptics Designer tool. Later on, haptic feedback was manually added to the vest by using the software. Local and global diegetic haptic feedback that synchronizes with the action on the scene were added to the bHaptics vest. In order to provide as much realistic haptic feedback possible movies of “The Party” and “Help” were selected. “The Party” is a CVR movie that shows the daily struggles of a person with autism in a social context. “Help”, on the other hand, is a science-fiction movie providing a lot of action scenes and therefore several instances to use haptic feedback. “Help” was selected due to the prominence of action scenes as well as the fact that it includes an animated character. “The Party” on the other hand was selected due to less instances of action and more insight the movie and haptics can provide to the inner worlds of a main character. The realistic scenes in “The Party” were aimed to be compared to the animation and more sci-fi moments in “Help” in order to see how the genre and type of movie can affect the haptics as well as the audience experience of liveness.

3.4 Analysis of Data

Thematic analysis is the method of analysis as the aim of the research is to analyze and understand the vast range of relevant themes that lead to the experience of liveness.

According to Braun and Clarke (2006) thematic analysis offers an accessible and theoretically flexible approach to analysing qualitative data. Through the theoretical freedom it provides, the method of analysis is able to provide a rich and detailed, yet complex, account of data. Since liveness is a holistic concept that includes a vast variety of themes underneath its umbrella, it is only beneficial to use a flexible analysis method which provides a detailed overview of the data. It is also possible to apply thematic analysis to a range of theoretical and epistemological approaches which makes it suitable for liveness and the phenomenological approach that is going to be used in this research.

To carry out the analysis, patterns of meaning and potential interests in the data collected through interviews were looked for (Braun & Clarke, 2006). By taking the theoretical analysis as a base, a coding scheme was created in accordance with the patterns analyzed from the collected data. Due to the nature of the thematic analysis, there was a constant flow between the process of creating the coding scheme according to theory and the analysis of data to identify the themes. Therefore, the coding scheme changed and evolved several times before and during the analysis (Braun & Clarke, 2006).

After the analysis was fully done 6 selective themes were identified with 24 axial themes. All of these themes were counted and written in the results table in the appendix. Later on, the themes are discussed with the overall results of the study.

4. Results & Discussion

Thematic analysis was carried out on 10 different participants' answers. Even though there were recurrences and similarities between the answers, each participant gave unique answers according to the movies they experienced. Initially, during the coding there were twenty-nine axial codes and 10 selective codes. However, after carrying out the analysis and writing down the results it became clear that only 6 selective codes and twenty-four axial codes were necessary. Due to the very low amount of mention codes "Proximity", "No Presence" and "No Impact with regards to Haptics" were removed. "Proximity" was initially thought to be an important and highly popular code since according to Auslander (2012) it is a key theme for the creation of an audience experience of liveness. However, eventually it was found that only 2 participants talked frequently about the theme and even amongst them it was mentioned very rarely. Furthermore, since the codes of "Viewer Agency" and "Fear of Missing Out" were frequently discussed together by the participant they were combined. The codes of "Responsiveness" and "Personalization" were also combined due to their likelihood to be frequently mentioned together.

Overall, after the necessary changes, the most frequently mentioned selective code was found to be "Connection" with three hundred twenty-five mentions. Second most popular code was "Immersion" and the third most popular was "Interactivity". Furthermore, five axial codes stood out among the rest which are; "Connection", "Immersion", "Disconnection", "Interactivity" and "Presence" respectively. These findings were in line with the previous discussions provided in the theoretical framework with regards to the concept of Liveness and the experience CVR and haptic technology tends to create for the audience.

4.1 Connection

Connection was the most prominent theme amongst all the selective themes. This selective code covered 4 axial codes that are "Connection/Concentration", "Disconnection/Distraction",

“Emotional Engagement” and “Directness/Communication”. The code “Connection/Concentration” covered any mention of emotional or social connection with the movie, storyline, characters, and environment. It was also highlighted when a participant indicated that they identified or empathized with a character. Any mention of being fully focused and concentrated on the storyline or the movie was also counted underneath this code. “Disconnection/Distraction”, on the other hand covered any mention of disconnection from the movie, story, characters or the space, as well as when the participant felt confused or distracted due to a certain reason. Although it sounds similar to the code Connection, “Emotional Engagement” covered any mention of specific emotions or feelings the respondent experienced while participating in the study. Finally, “Directness/Communication” covered any mention of characters directly addressing, looking or talking with the participant.

4.1.1 Connection and Liveness

A high level of frequency with regards to this selective theme was expected. Connection is one of the key themes underneath the concept of liveness. According to Auslander (2012), a continuous form of connection between humans or a human and a non-human is necessary in order for an experience to be counted as “live”. Nearly half of the participants seemed to agree with this description. 4 out of 10 participants indicated that feeling a sense of connection is crucial for them to experience an activity as live. They have also indicated that the movies created an overall audience experience of liveness for them; however, all of these participants also had high levels of disconnection. For instance, although he has indicated a strong necessity for the feeling of connection to experience an event as live, participant 8 mentioned “Disconnection/Distraction” much more frequently compared to the rest of the codes. He did, however, mentioned that he experienced the movies as live. This indicates that other codes relevant to Liveness such as Interactivity, and/or Perceptibility must have played a major role for this participant to have a live experience which is discussed further below. The high level of connection with regards to experiencing these movies are in line with the arguments provided by Couldry (2004) and Morse (1998). Their arguments mainly focused on how with technological advancements it is now possible to experience a digital form of liveness not only with humans but with machines such as interactive computer technologies as well. Even though, participants frequently referred to the connection they felt towards the characters within the movies, at the end of the day, the content and subject they were connecting with was a virtual reality environment with the functions of a computer and a movie. These results prove the connection between humans and non-humans discussed by Morse (1998) and Auslander (2012) in order to create a digitally live experience.

4.1.2 Connection and CVR

Dooley et al. (2021), further argued that when engaging with a CVR movie, an audience is able to relate to the characters and objects within that storyline enhancing the feeling of connection.

This argument proved to be widely popular among the participants. Each participant talked about how the virtual environment and the 360-degree view of the CVR movies was successful in creating a form of connection for them. Code of "Emotional Engagement" was one of the codes that was frequently referred to when talking about the 360-degree view. One participant, who mentioned this axial code seventeen times, recurrently referred to the feelings experienced by the protagonist in the movie "The Party" as her feelings, making statements such as "…because you felt awkward, you felt afraid, you felt happiness, coziness, mother gave me the cake and then you're like, oh, it feels nice to be here". This statement shows a very high level of identification by the participant with the protagonist leading them to talk about the feelings of protagonist as their own.

The high level of connection 360-degree view creates was discussed very prominently amongst the participants, however, "Disconnection/Distraction" still proved to be the third most frequently mentioned axial code. There was a distinct reason for this finding which leads us to the axial code of "Embodiment". Embodiment is one of the four key characteristics of CVR that was identified by Dooley et al. (2021). It refers to the camera positions and viewer positioning within CVR movies. Tong et al. (2021) identifies two main camera positions that are character view allowing the audience to witness the movie from first-person point of view (POV) and the passive view which allows the spectator only to witness the events in the third-person POV. Nicolae (2018) calls the first POV 'hero' and the second one 'witness' POV. Newton and Soukup (2016), further elaborates on this discussion and states that 'witness' perspective divides into the positions of 'neutral observes' or that of a 'participant' where the viewer identifies themselves with a certain character or role in the VR storyline. Due to these discussions, the code of "Embodiment" was further divided into "Hero" and "Witness/Participant".

As a result of the thematic analysis it was found that participants were more likely to better connect socially and emotionally with the protagonist as well as the characters around them with the "Hero" perspective, thus leading to the higher level of connection and emotional engagement points discussed when talking about the second movie, "The Party". The points of disconnection was mostly discussed with regards to the breaking of the feeling of connection when the participant had to experience the first movie through the viewpoint of a participant or witness. 3 out of 10 participants stated that they experienced the movie from the viewpoint of an existing or an imaginary character in the movie, while the rest stated that they didn't feel like they existed at all within the movie. One mentioned "it was as if I was a piece of air…", another participant added "they didn't talk to me". This lack of acknowledging the existence of the viewer took away from the feeling of connection, and identification. For some participants it also led to low levels of emotional engagement with the movie. These findings show how important embodiment is with regards to enhancing levels of connection thus immersion for the viewer (Dooley et al., 2021).

4.1.3 Connection and Haptics

The final but most important theme discussed with regards to this feeling of connection was the Haptic Feedback. Overall, the use of vibrations enhanced the feeling of connection, however, just like in the case of embodiment there was a crucial distinction. Two forms of haptic effects were used when designing the haptic feedback that are "Local" and "Global". "Local" refers to diegetic local haptic feedback associated with one object or an onscreen character in the scene. While "Global" refers to diegetic global haptic feedback representing the environment and the events happening within a space such as an earthquake. Even though both codes were discussed on very similar levels, local thirty-four times and global thirty-one times, overall, diegetic local haptic effects seem to have contributed more to the feeling of connection. Local diegetic effect was discussed with regards to the second movie since the haptics were designed in a manner to represent the distress and anxiety the protagonist girl was going through. 4 out of 10 participants argued that local created a better feeling of connection for them, 2 of these participants also mentioned global creating a high level of connection; however, rest of the 8 participants did not mention the effect of global on connection at all. Therefore, overall, local's effect on audience connection was higher when compared to global.

4.2 Immersion

Immersion was another key concept that has been investigated closely with regards to liveness, virtual reality technologies and haptic feedback. Danieau et al. (2014), highlights the high potential of haptics with regards to enhancing VR content and further states its benefits for enhancing presence as well as immersion for movies. Therefore, when this selective code was found to be the second most popular mentioned across participants it further supported the previous studies' findings. The concept of immersion included four main themes that are "Immersion", "Non-Immersion", "Realism" and "Un-realism". The opposites of "Immersion" and "Realism" were included since participants tended to make comparisons across experiences with regards to feeling of being more immersed or not immersed enough as well as how realistic or un-realistic the experiences were. Overall, code of "Immersion" was the highest with one hundred and nine statements discussing this theme suggesting that the CVR movies were perceived as highly immersive by the audience.

4.2.1 Immersion and Liveness

Immersion is discussed underneath the concept of Perceptibility in close link with Presence with regards to the concept of liveness. According to Lee (2019) live experiences are able to create a high sense of immersion and perceptibility. This feeling of immersion with regards to liveness was also discussed by the participants. Particularly the role of realism and presence was very important for the respondents in order for them to experience a medium or event as live. 6 out of 10 participants made recurrent references to realism, temporality and presence when they were talking about a live experience or referring to the movies they have watched as live experiences. This finding shows the

close relationship of the code presence to immersion with regards to live experiences, as well as the close role temporality, which is perceiving the events happening in real-time, plays in creating live experiences for audiences.

4.2.2 Immersion and CVR

VR content is very well known for creating immersive experiences to its audiences. In this case immersion refers to the viewers transportation into the story world, an environment delivering inclusive, extensive, and vivid illusion of reality resulting in a sense of human participation (Slater & Wilbur, 1997). 10 out of 10 participants talked about the immersion that is created by the 360-degree view, and the mostly realistic environment. Mütterlein (2018) and Dooley et al. (2021), arguments on VR and CVR enhancing immersion was supported by these findings.

4.2.3 Immersion and Haptics

There were several differentiating findings with regards to immersion and haptics. 8 out of 10 participants indicated that the haptics were able to provide immersion for them. One indicated haptics led to non-immersion, and caused them to get out of the immersive feeling they were experiencing. Another indicated that it had no impact with regards to creating an immersive feeling. Discussion of realism and un-realism were again common amongst the participants. This was expected since immersion is discussed by Auslander (2012) with regards to the feeling of realness that is created by the live event. An interesting finding was the relation of realism/un-realism to local/global and hero/witness. Even though local was successful in creating a feeling of connection 4 out of 10 participants perceived the local haptic effects as unrealistic. Meanwhile 6 participants indicated that global effects were more realistic and highly enhanced the immersive experience. On the other hand, when the haptics were added in the “Hero” perspective, the participants perceived the experience as more immersive compared to when it is added to the “Witness/Participant” experience. This shows a somewhat contradicting finding since only local haptics were added to “Hero” perspective while mainly “Global” haptics were used in “Witness/Participant” one. However, an interesting finding was the mention of the CVR storyline. Four participants stated that the blurry vision and the haptic feedback that was supposed to represent the feelings and experiences of the autistic girl did not feel realistic for them. One even indicated that they don’t think the representation is how an autistic person feels like. On the other hand, 3 of the participants were able to understand the “panic attack” feeling that was trying to be represented through the haptic feedback and the blurry vision. One even felt the heart attack that others missed. This shows that the movie may not have been fully suitable in the case of a local/hero view due to the personalized nature of a panic attack. It can simply be different for each person.

4.3 Interactivity

Interactivity was the third most prominent code amongst the rest. The axial code of "Perceived Interactivity" was mentioned for a total eighty-two times in the interviews while the code of "Limited Interactivity" was mentioned 35 times. Most of the participants perceived interactivity as a mutual relationship between the user and the machine, as well as an option of a personal choice. This is where the theme "Responsiveness/Personalization" came into play. Responsiveness is understanding interactivity as the feedback received in response to the input provided by the user. Personalization is this personalized input, choice, or decision the user provides. These two themes were initially separate but due to their recurrent co-discussion by participants, they were turned into one main code. "Viewer Agency" was another code currently discussed by the participants and highly contributed to the interactive experience.

4.3.1 Interactivity & Haptics

An interesting finding was most of the participants didn't describe the haptic effects as interactivity. Only when they were asked specific questions about the concept and its relation to the haptics, 5 of them talked about the level of interaction the feedback was creating for them. Out of these 5, 2 of them saw the movie as interacting with them, 1 indicated that there was only "some level" of interactivity with regards to haptics and the rest talked about the concept of presence, connection and immersion with regards to the interactivity feedback created. This indicated a connection between these different themes. Similar to Mütterlein's (2018) discussion, this research also seems to have found a strong link between the concepts of immersion, interactivity and presence with regards to VR experiences.

5. Limitation & Conclusion

The main limitation with regards to this research was the lack of the existence of Cinematic Virtual Reality movies with haptic feedback. This gave the researcher two options; either use a narrative based video game with haptic feedback or manage to create a CVR movie that is able to provide haptic feedback in some form. Since the researcher wanted to have a content that is as representative of a CVR movie as possible for reliable results the second option was selected and the search began. This is where bHaptics Designer tool came into play. By using the software the researcher was able to manually add diegetic local and global haptic effects for the movies. However, since the effects were manually created by a creator who is not necessarily an expert on haptic design this led some participants to experience the haptics as unrealistic. A resolution to this issue can be a study in the future that focuses on the creation of the most efficient and effective forms of haptic feedback specifically for CVR movies. This study also tried to touch upon that issues by taking "Hero" and "Witness" POVs as well as the "local" and "global diegetic effects, however, the scope of the study was not broad enough for further inspection.

Another issue was the lack of available CVR movies that fully suit the aim of this study. An extensive research was carried out on the CVR movies as well as 360-degree videos. There is an abundance of animated CVR movies as well as animations, however, fictional CVR movies with a coherent storyline, and high-level acting that can engage the audience, while providing enough room for the addition of haptic feedback was very limited. As a detailed research, the two selected movies were used for the experiences. However, the movies were from 2015 and 2016 which led to low quality resolution that unfortunately was pointed out by several participants. There is a high likelihood that the low quality impacted their level of engagement with the movies and to some level took away from the live experience. Due to this reason, it would be beneficial for the industry to have more focus on fictional films that provide the potential for addition of relevant haptic feedback.

With regards to conclusion there were several important findings that contribute highly to answering the research question of this study. 'Hero' perspective enhances the social and emotional connection as well as the emotional engagement with the characters. Most of the participants also indicated that CVR movies should create the storyline around a main character through whom the viewer can witness the events. This argument is in line with Dooley et al.'s (2021) discussion with regards to creating higher audience engagement through the use of 'Hero' POV. This concludes that in order to have high levels of audience connection and engagement CVR movies should provide the storyline from the point of view of a protagonist who gets directly addressed by the characters around them or by their own inner thoughts. This will both enhance the interactivity as well as the connection experienced by the viewer and as a result lead to higher levels of immersion (Dooley et al., 2021).

Although Danieau et al. (2014) discusses the effects of diegetic local and global haptic effects they do not provide a distinction with regards to which one provides a better form of audience experience. The participants in this study have indicated that local diegetic effects are more successful in creating a feeling of connection and emotional engagement for the audience while global effects are perceived as more realistic and therefore immersive. Different genres of movies were also discussed in relation to different forms of haptics and it can be concluded that while diegetic global effects are suitable for action and sci-fi movies that contain a lot of movements within the story's environment, local diegetic effects are suitable for a broader genre of movies including action, sci-fi, horror and drama since they create a representation of the experience the protagonist or the character is going through.

It is possible to conclude in order to create an immersive experience of CVR movies with haptic feedback, one needs to choose the content very carefully. The quality of the content should be high resolution and the storyline should be to some extent relatable in the form of human emotions. The results also suggest that in order to have an immersive CVR experience, diegetic global haptic effects can be used since this seemed to lead to higher level of immersion for the participants in this study. Furthermore, using a first point of view through the "Hero" perspective can further add up to the feeling of immersion experienced by the user.

Even though interactivity was assumed to be a highly relevant concept for the haptic feedback, most of the participants did not received this technology as interactive per se. However, the viewer agency provided by the 360-degree view of the CVR movie was very beneficial in adding to this interactive feature.

To conclude haptic feedback is able to support the creation of audience experience of liveness with CVR movies through the creation of the feelings of connection, immersion and interactivity.

References

Auslander, P. (2008). Live and technologically mediated performance In T.C. Davis (Ed.), Body politics: the individual in history (pp. 107-119). Illinois, IL: Cambridge University Press.

Auslander, P. (2012). Digital liveness. A historico-philosophical perspective. PAJ. A Journal of Performance and Art, 34(3), 3-11. http://www.jstor.org/stable/26206427

Blenkinsopp, R. (2019, April 5). *What is haptic feedback*. Ultraleap. https://www.ultraleap.com/company/news/blog/what-is-haptic-feedback/#:~:text=Haptic%20feedback%20is%20the%20use,is%20much%20more%20than%20that

Boeije, H. (2010). *Analysis in qualitative research*. Sage.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative Research in Psychology, 3(2), 77–101. DOI: 10.1191/1478088706qp063oa

Bryman, A. (2015). *Social research methods (5th ed.).* London, UK: Oxford University Press.

Burdea, G. (1999). Haptic feedback for virtual reality. *In International Workshop on Virtual Prototyping* (pp. 87-96). Laval, France. https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.135.6358&rep=rep1&type=pdf

Danieau, F., Fleureau, J., Guillotel, P., Mollet, N., Christie, M., & Lécuyer, A. (2014). Toward haptic cinematography: Enhancing movie experiences with camera-based haptic effects. IEEE MultiMedia, 21(2), 11-21. https://hal.inria.fr/hal-00918074

Ding, N., Zhou, W., & Fung, A. Y. (2018). Emotional effect of cinematic VR compared with traditional 2D film. *Telematics and Informatics, 35*(6), 1572-1579. https://doi.org/10.1016/j.tele.2018.04.003

Dixon, S. (2015). Digital performance: A history of new media in theater, dance, performance art, and installation. London, UK: The MIT Press.

Dooley, K. (2021). Cinematic virtual reality: A critical study of 21st century approaches and practices. Palgrave Macmillan. https://doi.org/10.1007/978-3-030-72147-3

Mateer, J. (2017). Directing for cinematic virtual reality: How the traditional film director's craft applies to immersive environments and notions of presence. Journal of Media Practice, 18(1), 14-25. http://dx.doi.org/10.1080/14682753.2017.1305838

Moon, Y. & Nass, C. (2002). Machines and mindlessness: Social responses to computers. Journal of Social Issues, 56(1), 81-103. https://doi-org.proxy-ub.rug.nl/10.1111/0022-4537.00153

Morse, M. (1998). Virtualities: Television, media art, and cyberculture. Indiana, IN: Indiana University Press.

Mütterlein, J. (2018). The three pillars of virtual reality? Investigating the roles of immersion, presence, and interactivity. In Hawaii International Conference on System Sciences (pp. 1407-1415). Munich, Germany. http://hdl.handle.net/10125/50061

Sarstedt, M., Bengart, P., Shaltoni, A., & Lehmann , S. (2018). The use of sampling methods in advertising research: A gap between theory and practice. International Journal of Advertising, 37(4), 650-663. https://doi.org/10.1080/02650487.2017.1348329

Syrett, H., Calvi, L., & Van Gisbergen, M. (2016). The Oculus Rift film experience: A case study on understanding films in a head mounted display. In R. Poppe, J.J. Meyer, R. Veltkamp & M. Dastani (Eds.), *International Conference on Intelligent Technologies for Interactive* Entertainment (pp. 197-208). Springer, Cham. https://doi.org/10.1007/978-3-319-49616-0_19

Tong, L., Lindeman, R. W., & Regenbrecht, H. (2021). Viewer's Role and Viewer Interaction in Cinematic Virtual Reality. *Computers 2021, 10*(5), 66. https://doi.org/10.3390/computers10050066

Appendix

Fig. 1 Coding Tree and Results

Fig. 2 Transcripts and Analyses