Beyond the Goggles: Examining the Potential of Virtual Reality for Climate Change Empathy.

MASTER THESIS

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Alda Kote

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Abstract

Despite recognition of the dire consequences of human-caused climate change, addressing the issue had been slow. Individuals struggle to empathize with environmental issues due to a lack of personal connections and physical distance. Virtual Reality provides immersive experiences, allegedly promoting empathy. My research critically examines the efficacy of two VR experiences; *Symbiosis* and *Tree*, in generating empathy and encouraging pro-environmental behaviour. Using Fairclough's Critical Discourse Analysis as my methodology, I suggest an affordance analysis for the first layer, instead of the usual textual analysis. The findings suggest that while VR offers immersive experiences, it is limited by developers' biases and lacks concrete solutions to systemic issues. Virtual Reality should not be considered a substitute for real-world action towards meaningful change.

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1.   Introduction

Despite growing recognition of the dire consequences of human-caused climate change, individuals and organizations have been slow to address this pressing issue. Regardless of numerous warnings from climate scientists and increased media attention, many people have been hesitant to take the necessary steps to reduce their carbon footprint and mitigate the effects of climate change.

Individuals find it difficult to empathize with polar bears stranded on melting ice sheets or with trees being cut down due to deforestation efforts, owing to a lack of personal connection and physical distance. This makes it difficult for people to fully comprehend and empathize with the situation, limiting their motivation and willingness to take action to address the issue[1]. These situations are frequently perceived as abstract or detached due to their physical distance and remoteness, which results in a lack of personal investment, concern, or empathy. In addition, people may find it difficult to fully grasp the scope of the issue and the catastrophic effects it has on the planet and its inhabitants due to the complexity of the issues surrounding climate change and deforestation[2].

Virtual reality (VR) is a technology that was put forth in recent years to give head-mounted solutions to real-life issues. People have allegedly been shown to display greater empathy when wearing head-mounted displays, and when these devices are combined with pertinent simulations, they can see how environmental problems are felt locally, developing a deeper understanding of how it affects their immediate surroundings, thus supposedly developing empathy that was not there before.

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[1] Magnus Winther Warvik, 'Visualizing Climate Change in Virtual Reality to Provoke Behavior Change' (Master Thesis, Norwegian University of Science and Technology Faculty of Information Technology and Electrical Engineering Department of Computer Science, 2019).

[2] Magnus Winther Warvik, 'Visualizing Climate Change in Virtual Reality to Provoke Behavior Change' (Master Thesis, Norwegian University of Science and Technology Faculty of Information Technology and Electrical Engineering Department of Computer Science, 2019).

The primary objective of my research is to undertake a critical examination of the discourse surrounding the efficacy of Virtual Reality (VR) experiences in generating empathy and encouraging pro-environmental behaviour. My research aims to evaluate VR technology's limitations and potential drawbacks rather than assuming that it is always an effective tool for encouraging engagement with environmental issues. In order to do this, I intend to use Fairclough's Critical Discourse Analysis (CDA) as a research methodology and examine the official websites linked to the VR experiences that will be my case studies. Furthermore, because the official websites only provide a limited amount of data, I will be looking at (newspaper) reviews of these VR installations to supplement my corpus. My primary objective with this approach is to uncover the power dynamics, ideological influences, and linguistic strategies that falsely support the use of VR technology as a solution to environmental issues. Essentially, my research seeks to provide a critical examination of the discourse surrounding virtual reality technology and its role in promoting pro-environmental behaviour.

The research focus on the potential of VR experiences to generate empathy and encourage pro-environmental behaviour is a crucial area of investigation. VR is still largely untapped as a tool for environmental engagement and education because it is a relatively new technology. There is a significant research gap in the field of environmental studies regarding the efficacy of virtual reality (VR) in promoting empathy for environmental issues, despite the fact that academic studies[34] have closely examined the capacity of VR to generate empathy on social issues such as race, gender, and disabilities.

[3] Géraldine Fauville, Anna Carolina Muller Queiroz, and Jeremy N. Bailenson, 'Virtual Reality as a Promising Tool to Promote Climate Change Awareness', in *Technology and Health* (Elsevier, 2020), 91–108, https://doi.org/10.1016/B978-0-12-816958-2.00005-8.

[4] Katherine M. Nelson, Eva Anggraini, and Achim Schlüter, 'Virtual Reality as a Tool for Environmental Conservation and Fundraising', ed. Stefano Triberti, *PLOS ONE* 15, no. 4 (6 April 2020): e0223631, https://doi.org/10.1371/journal.pone.0223631.

Symbiosis and *Tree* are the names of the two virtual reality experiences that I have decided to concentrate on; I came across these two VR experiences in one of my classes for my master's course. In the third chapter of the thesis, along with my methodology section, I will go into greater detail about what the experiences are.

To add to the rigor and validity of my research, I also intend to include reviews in some articles online as well as Joost Raessens' personal experience and article with *Symbiosis,* which will be published in a book called Ecogames: Playful Perspectives on the Climate Crisis[5]. In that way I am broadening my corpus and giving a more detailed and nuanced analysis of the discourse surrounding the use of VR for environmental advocacy and education by including a variety of sources.

Both VR installations, *Tree* and *Symbiosis*, are significant to my thesis because they show the so-called potential of VR technology in addressing environmental challenges and eliciting pro-environmental feelings of empathy and actions from users.

1.1 Research Question

Critical Discourse Analysis will be used in my research methodology to examine how virtual reality (VR) is framed as a tool for (potentially) fostering empathy and raising awareness of climate change. The primary research question guiding my research is:

What are the ethical concerns of using VR to address climate change, and how are the VR projects *Symbiosis* and *Tree* addressing this issue in their respective VR experience and in their communication about the project's aims?

- **How do the affordances of *Symbiosis* and *Tree* contribute to the level of immersion and interactivity for the user?**

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[5] Laura op de Beke et al., *Ecogames: Playful Perspectives on the Climate Crisis* (Amsterdam University Press, (forthcoming)).

- **What does Discourse Practice reveal about the language used in promoting *Symbiosis* and *Tree*, and what are the limitations of the discourse in their respective attempts to address climate change?**

- **What does the social practice in *Symbiosis* and *Tree* reveal about the VR developers' ideological aims with their VR experiences?**

The aforementioned research question and sub questions aim to investigate how Virtual Reality (VR) is positioned and marketed as a tool to foster empathy and spread awareness of the critical issue of climate change. In order to "help" people understand and relate to the environmental challenges facing our planet, the study will delve into the underlying assumptions and discursive strategies that shape the narrative of VR. The power dynamics at work in the framing of VR as an empathy tool for climate change should be critically examined. How might their objectives and interests affect how VR is used and perceived in the context of environmental action? Who are the stakeholders and actors driving this narrative?

1.2 Thesis Outline

The introduction is one of the five chapters that make up the current thesis. The following chapter will give a general overview of virtual reality (VR) and briefly discuss its evolution as well as a dive into the concept of empathy and explore the ethical considerations surrounding the use of VR as a means of generating empathy. The third chapter will introduce

the case studies along with the methodology. The research findings will be presented in the

fourth chapter. The thesis will be concluded in the fifth and final chapter, which will include a

summary of the most important findings and reflections on the research process, as well as

any further research topics and look at the study's implications and limitations.

2.   Defining Virtual Reality & Theoretical Framework

The purpose of this thesis as mentioned above is to investigate the potential and limitations of using Virtual Reality (VR) to foster empathy in the context of climate change. To achieve this goal, a historical and social analysis of VR technology is required in order to comprehend how it has been influenced by cultural and social forces and how it can be used to serve specific interests and agendas. The section also investigates the ethical implications of using virtual reality to foster empathy and raise awareness about environmental issues. This section begins with a brief definition and examination of VR's key features, followed by a discussion on empathy. Finally, the chapter investigates the ethical concerns raised by using virtual reality to elicit empathy.

2.1 What is Virtual Reality?

The history of virtual reality (VR) predates the term's official coining in 1985. It can be traced back to the first magicians who tricked the brain into thinking that something was there that it was not[6]. Since the 19th century, many inventions have helped to shape the concept of virtual reality. The 1832 invention of the stereoscope can be viewed as a forerunner to modern VR technology. The stereoscope produced a 3D effect by showing slightly different images to each eye, which gave the impression of depth[7]. Similar technology was used by the 1939-released View-Master to display images in three dimensions[8]. Ivan Sutherland later developed the first head-mounted display (HMD) that

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[6] Jason Jerald, *The VR Book: Human-Centered Design for Virtual Reality*, ACM Books 8 (New York] [San Rafael, California: Association for computing machinery Morgan & Claypool publishers, 2016).
[7] Magnus Winther Warvik, 'Visualizing Climate Change in Virtual Reality to Provoke Behavior Change' (Master Thesis, Norwegian University of Science and Technology Faculty of Information Technology and Electrical Engineering Department of Computer Science, 2019).
[8] Warvik.

could offer a computer-generated virtual environment in the 1960s[9]. Since then, there have been numerous developments in VR technology, including the creation of Google Cardboard, which makes VR more widely available by using a smartphone as a display[10].

There are various ways to define Virtual Reality (VR), and one such definition is provided by Merriam-Webster, which describes it as: "an artificial environment that is experienced through sensory stimuli (such as sights and sounds) produced by a computer and in which one's actions partially control what happens in the environment[11]." Virtual reality is a technology that enables users to immerse themselves in a computer-generated environment. Users who use a head-mounted display can view and interact with the virtual world from a fixed position in the middle of it. The ideal virtual reality experience should offer a wide variety of objects to interact with and be fluid and uninterrupted[12].

Cross Reality (XR) is a classification that encompasses different forms of realities, including Virtual Reality (VR). In the context of XR, the user's entire reality is replaced by a computer-generated one, immersing them in a simulated environment[13]. In recent years, there has been a growing interest in exploring the potential of Virtual Reality (VR) to foster empathy and understanding by providing users with novel and immersive experiences. Numerous studies have investigated the use of VR to simulate situations and perspectives that may not be readily accessible to users otherwise[14].

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[9] Jeremy Norman, 'Ivan Sutherland and Bob Sproull Create the First Virtual Reality Head Mounted Display System', n.d.,
https://www.historyofinformation.com/detail.php?id=861#:~:text=In%201968%20Ivan%20Sutherland%20at,AR)%20head%20mounted%20display%20system.
[10] Warvik, 'Visualizing Climate Change in Virtual Reality to Provoke Behavior Change'.
[11] 'Virtual Reality', in *Merriam Webster Dictionary*, n.d., https://www.merriam-webster.com/dictionary/virtual%20reality.
[12] J. David Bolter and Richard A. Grusin, 'Remediation', *Configurations* 4, no. 3 (1996): 311–58, https://doi.org/10.1353/con.1996.0018.
[13] Warvik, 'Visualizing Climate Change in Virtual Reality to Provoke Behavior Change'.
[14] Thoma, Stefan P., Matthias Hartmann, Jonas Christen, Boris Mayer, Fred W. Mast, and David Weibel. "Increasing Awareness of Climate Change with Immersive Virtual Reality." Frontiers in Virtual Reality 4 (February 13, 2023). https://doi.org/10.3389/frvir.2023.897034.

2.2 Immersion, Immediacy and Presence

The primary objective of virtual reality (VR) is to create a psychological experience of being somewhere other than one's physical surroundings, whether that place is a simulation of the real world or a fictional realm[15]. The degree to which a VR system and its applications project stimuli onto users' sensory receptors in a way that is comprehensive, congruous, enveloping, realistic, interactive, and plot-informative is referred to as immersion[16]. Immersion is an objective technology with the potential to engross users in the experience, but it is only one aspect of the VR experience because human perception and interpretation of the presented stimuli also play a role. Immersion can influence but not control the mind.

Immediacy is closely related to immersion. Immediacy, which is currently being prioritized in the cultural redefinition of the computer, is closely related to empathy, and is made possible by the widespread use and commercial success of digital graphics[17] . The widespread use of digital compositing and the investigation of three-dimensional interfaces, which aim to remove the medium's barriers and enable users to interact directly with its contents, serve as examples of the desire for immediacy[18] . Another example of this effort to eliminate the mediated aspects of digital technology is the transparent interface of virtual reality. This desire for immediacy persists in digital technology despite its roots in linear perspective, which aims to conceal the process of creating art in favour of the finished product. The most recent manifestation of our desire for immediate gratification is computer

Markowitz, David M., Rob Laha, Brian P. Perone, Roy D. Pea, and Jeremy N. Bailenson. "Immersive Virtual Reality Field Trips Facilitate Learning About Climate Change." Frontiers in Psychology 9 (November 30, 2018). https://doi.org/10.3389/fpsyg.2018.02364 .

[15] Jerald, *The VR Book*.

[16] Mel Slater and Sylvia Wilbur, 'A Framework for Immersive Virtual Environments (FIVE): Speculations on the Role of Presence in Virtual Environments', *Presence: Teleoperators and Virtual Environments* 6, no. 6 (December 1997): 603–16, https://doi.org/10.1162/pres.1997.6.6.603.

[17] J. David Bolter and Richard A. Grusin, 'Remediation', *Configurations* 4, no. 3 (1996): 311–58, https://doi.org/10.1353/con.1996.0018.

[18] Bolter and Grusin, 'Remediation'.

graphics, which continues the tradition of Albertian windows by employing linear perspective to depict shading, illumination, and colour. The main goal of computer graphics professionals is to achieve "photorealism," or to produce artificial images that are indistinguishable from photographs[19]. As argued by Bazin in the context of photography and film, this strategy builds on earlier traditions while continuing to satiate our desire for realism[20] . The elucidation of the nature of virtual reality technology and its ability to provide users with an unmediated and immersive experience provides a glimpse into the cultural environment that surrounds virtual reality, as well as the goals of its creators[21].

Presence refers to the user's subjective perception of the immersive experience[22].Presence is a sensation of existing within a particular environment, even if physically located in a different space. Presence, as an internal psychological state and a mode of instinctive communication, is difficult to express in words and can only be fully understood through first-hand experience[23]. Despite the difficulty of defining presence, the International Society of Presence Research came up with a definition. The detailed explanation that follows, which can be found on the ISPR website (http://ispr.info), begins with[24]:

> Presence is a psychological state or subjective perception in which even though part or all of an individual's current experience is generated by and/or filtered through human-made technology, part or all of the individual's perception fails to accurately acknowledge the role of the technology in the experience.

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[19] Bolter and Grusin.

[20] André Bazin and Hugh Gray, 'The Ontology of the Photographic Image', *Film Quarterly* 13, no. 4 (1 July 1960): 4–9, https://doi.org/10.2307/1210183.

[21] Bolter and Grusin, 'Remediation'.

[22] Jason Jerald, *The VR Book: Human-Centered Design for Virtual Reality*, ACM Books 8 (New York) [San Rafael, California: Association for computing machinery Morgan & Claypool publishers, 2016).

[23] Jerald, *The VR Book*.

[24] 'Presence Defined', n.d., https://ispr.info/about-presence-2/about-presence/.

Immersion refers to technological attributes, whereas presence refers to the user's internal psychological and physiological state. It is the awareness of being immersed in a virtual world while ignoring the real world and the technical aspects of the experience[25]. The user's attention and perception are directed towards the objects, events, and characters that the technology portrays, rather than the technology itself, when in a state of presence. Users who have a strong sense of presence perceive the VR experience as a place they have visited rather than a mere perception[26].

Presence is a product of both the user and immersion. Immersion has the potential to evoke a sense of presence, but it does not guarantee it because users can easily imagine themselves in another location without the use of technology. However, the level of immersion achieved by a system or application can limit the user's sense of presence. The greater the level of immersion provided by a VR system or application, the more likely the user will feel physically present in the virtual world[27].

2.3 *Einfühlung* - Empathy

A complex concept, empathy, or *Einfühlung* in German, has been studied from a philosophical, psychological, and neuroscientific perspective. Given the growing understanding of the value of empathy in interpersonal relationships, education, and social justice, the concept of empathy has become more and more relevant in modern society[28].

The concepts of "*Einfühlung*" and "empathy" are crucial to understanding how VR is framed as a tool for presumedly promoting empathy for climate change. Virtual reality (VR) is frequently referred to as the "*ultimate empathy machine*" because it enables users to

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[25] Jerald, *The VR Book*.
[26] Ibid.
[27] Ibid.
[28] Grant Bollmer, 'Empathy Machines', *Media International Australia* 165, no. 1 (November 2017): 63–76, https://doi.org/10.1177/1329878X17726794.

immerse themselves fully in a variety of environments and perspectives[29]. Scholars,

practitioners, and the general public have all paid close attention to the development of

Virtual Reality (VR) as a tool for fostering empathy. However, it is crucial to approach this

framing critically and look into the power dynamics and underlying presuppositions involved.

What are the interests and goals of the stakeholders and actors who are promoting VR as a

tool for empathy? How might the use of virtual reality (VR) for fostering empathy be

constrained or problematic, especially when it comes to tackling complicated issues like

climate change?

    Chris Milk, the co-founder of the VR production company Within, has described VR as

"*the ultimate empathy machine[30]*" due to its immersive nature. VR, according to Milk enables

the user to enter and truly experience the world, as opposed to just viewing it through a

window. According to Milk, this causes an increase in empathy and offers a potent tool for

fostering change[31] . VR, according to VR enthusiasts has the potential to elicit feelings and

reactions that can increase understanding and awareness of significant issues, such as climate

change, by simulating a real-feeling environment[32]. Milk's statement demonstrates how VR

has the potential to go beyond the constraints of traditional media and develop a special

platform for connecting with audiences more deeply. Before we can investigate the potential

of VR in promoting empathy, we must first establish a clear understanding of the concept of

empathy.

    In the nineteenth and early twentieth centuries, the concept of "*Einfühlung*" arose from

German aesthetics. This phrase literally translates as "feeling into" and refers to projecting

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[29] *Chris Milk: How Virtual Reality Can Create the Ultimate Empathy Machine*, n.d.,
https://www.youtube.com/watch?v=iXHil1TPxvA.
[30] *Milk*.x
[31] Ibid.
[32] Fauville, Queiroz, and Bailenson, 'Virtual Reality as a Promising Tool to Promote Climate Change
Awareness'.

oneself into another body or environment[33]. Friedrich Theodor Vischer used this term to describe the act of understanding how it feels to be in another body or environment through an imaginary bodily "displacement" or "*Versetzung*." In essence, "*Einfühlung*" entails imagining oneself in another body or environment in order to comprehend what it would be like to be there[34]. It should be noted that the other body or environment being felt into does not have to be physically present, but can also be represented or even imagined . For instance, one can supposedly understand the emotional tone or "atmosphere" of a painted or verbally described landscape by "feeling into" it. Similarly, by "feeling into" a human being's portrait, sculpture, or story, one can supposedly understand their emotions or mood[35]. Furthermore, the body or environment one is "feeling into" need not be human; it could be any kind of body or environment. This indicates that it is possible to imagine oneself as other creatures, plants, or even inanimate objects with bodies and environments very dissimilar from one's own[36].

The concept of virtual reality (VR) as the "*ultimate empathy machine[37]*" has sparked a debate in the academic world. One of the most well-known opponents of the application of empathy and virtual reality (VR) is Grant Bollmer, an Associate Professor of Media Studies at North Carolina State University, USA. Bollmer defines empathy machines as cutting-edge technologies that use virtual reality and motion capture to simulate other people's emotional experiences, frequently with the goal of embodying them[38]. In the context of digital media, empathy is distinguished from sympathy and compassion by the capacity to comprehend another's experience at a neurocognitive level. Bollmer contends that empathy presents

[33] Grant Bollmer, 'Empathy Machines', *Media International Australia* 165, no. 1 (November 2017): 63–76, https://doi.org/10.1177/1329878X17726794.
[34] Grant Bollmer, 'Empathy Machines'.
[35] Ibid.
[36] Ibid.
[37] *Chris Milk: How Virtual Reality Can Create the Ultimate Empathy Machine*.
[38] Bollmer, 'Empathy Machines'.

ethical and political difficulties, contrary to the presumption that VR and digital media foster empathy[39]. Bollmer finds it problematic that the idea of empathy assumes a particular body and definition of affectivity based on modern neuropsychology and German aesthetic thought from the 19th century. Instead, he suggests adopting radical compassion as a moral position that accepts the impossibility of having first-hand experience of another person[40].

Empathy is often described as a neurological ability to comprehend another person's internal states, although the underlying mechanism remains a topic of debate. While Milk posits that empathy is crucial for recognizing the existence of others, Bollmer casts doubt on its link to aesthetic theory[41]. The historical origins of empathy suggest that it was initially centred around assimilating external objects into one's own experience, while its recent revival tends to objectify others as instruments for personal gain. The proliferation of theories on affect and affection has resulted in multiple interpretations and misunderstandings of empathy. To address this, Bollmer proposes a more nuanced understanding of the affective that recognizes the boundaries separating ourselves and our knowledge[42].

2.4 VR Developers & Ethics

Concerns have been raised about the potential for virtual reality (VR) technology to exploit or trivialize the experiences of disadvantaged groups, as well as other significant issues such as climate change, by transforming them into a mere spectacle or source of entertainment. Furthermore, there is concern that VR will reinforce existing power structures and stereotypes rather than promote actual comprehension and empathy. According to

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[39] Bollmer, 'Empathy Machines'.
[40] Ibid.
[41] Ibid.
[42] Ibid.

Roquet, the VR empathy machine may reinforce the developer's predetermined viewpoint, presenting it as an all-encompassing experiential verity[43]. Roquet argues that if we are to embrace VR as an empathy machine, it ought to be viewed as directing emotional energy unsettlingly away from the subjects of specific VR projects and toward those advancing and establishing the technology[44]. I will delve more deeply into Roquet's paper, in the third layer of my critical discourse analysis.

Regarding its ethical implications, the use of VR as a tool for empathy has drawn criticism. Moore's Law contends that advancements in technology are directly related to their social and ethical ramifications[45]. The development of virtual reality (VR) from a purely entertainment-focused technology to one with a wide range of innovative applications adds a new level of ethical concerns to this group of technologies[46]. The potential advantages of virtual reality are enormous given the expanding range of VR technologies and their intense immersion. However, there is a contentious discussion surrounding the complex ethical issues that this new technology raises[47].

In 2014, Facebook acquired Oculus VR, a VR headset manufacturer, for approximately $2 billion, signalling the convergence of social networking and VR and imbuing VR with a new emotional persona that promotes empathy[48]. As a result, VR has been marketed as a positive technology that promotes compassion, connection, and intimacy, as well as a means to address concerns about the contribution of digital industries to social inequality[49]. During the

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[43] Paul Roquet, 'Empathy for the Game Master: How Virtual Reality Creates Empathy for Those Seen to Be Creating VR', *Journal of Visual Culture* 19, no. 1 (April 2020): 65–80, https://doi.org/10.1177/1470412920906260.
[44] Roquet, 'Empathy for the Game Master.
[45] James H. Moor, 'Why We Need Better Ethics for Emerging Technologies', *Ethics and Information Technology* 7, no. 3 (September 2005): 111–19, https://doi.org/10.1007/s10676-006-0008-0.
[46] Ben Kenwright, 'Virtual Reality: Ethical Challenges and Dangers [Opinion]', *IEEE Technology and Society Magazine* 37, no. 4 (December 2018): 20–25, https://doi.org/10.1109/MTS.2018.2876104.
[47] Kenwright, Virtual Reality: Ethical Challenges and Dangers.
[48] Brooke Belisle and Paul Roquet, 'Guest Editors' Introduction: Virtual Reality: Immersion and Empathy', *Journal of Visual Culture* 19, no. 1 (April 2020): 3–10, https://doi.org/10.1177/1470412920906258.
[49] Lisa Nakamura, 'Feeling Good about Feeling Bad: Virtuous Virtual Reality and the Automation of Racial Empathy', *Journal of Visual Culture* 19, no. 1 (April 2020): 47–64, https://doi.org/10.1177/1470412920906259.

merger, Facebook and Oculus issued press releases emphasizing how their respective technologies would support Facebook's mission to connect people around the world through social networking, positioning VR as an ideal technology that enables utopian forms of social interaction[50]. Following the acquisition, VR was marketed as a "empathy machine," capable of facilitating ethical decision-making and moral education about the world. Through stereoscopic video that fully immerses the viewer, the novel VR technology aims to capture and communicate the experiences of marginalized and afflicted individuals. Facebook's adoption of VR technology offers a novel perspective on how new media are experienced and how "otherness" is conceptualized.[51]

Virtual reality (VR) was initially seen as a technology that could produce novel knowledge by allowing for first-hand encounters with the other, as opposed to just evoking feelings. The newest version of VR, referred to as VR 2.0, focuses primarily on a user's emotions and is based on the idea of toxic re-embodiment according to scholar Lisa Nakamura[52]. There are many similarities between VR and the early internet, including high costs, slow user adoption, a narrow target audience, and a developer community dominated by white men[53]. Video games are where virtual reality is used most frequently and most profitably. VR 2.0 reflects a nostalgia for a time when the internet and VR were viewed as utopian spaces that were not subject to governmental or public oversight and were only held accountable to stakeholders. Nakamura characterizes VR as both a promise and a problem and explains why VR hardware manufacturers and VR documentary content creators have sought to rebrand VR as a "empathy machine"[54].

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[50] Belisle and Roquet, 'Guest Editors' Introduction'.
[51] Lisa Nakamura, 'Feeling Good about Feeling Bad.
[52] Ibid.
[53] Ibid.
[54] Ibid.

According to Nakamura, VR 2.0 enables people to "feel good about feeling bad" by providing powerful sensory encounters that evoke a sense of presence. As a result, (racial) empathy is made enjoyable, and the undercommons are employed in the production of empathy material.[55] Despite claims that virtual reality (VR) can potentially reduce racial bias by allowing users to experience another person's point of view or raise awareness of the severity of climate change, many VR experiences that claim to provide users with unique experiences can have cruel and offensive outcomes[56]. Rather than acknowledging the underlying structural factors that necessitate structural solutions, VR emphasizes compassion and presents racism and toxic behaviour as problems that can be solved with head-mounted solutions. While VR programs addressing racial bias and deforestation may help viewers adopt new perspectives, developing real-world solutions to issues like imperialism, hypercapitalism, racism, and sexism is far more difficult[57].

In conclusion, while virtual reality (VR) technology has the potential to provide users with immersive and unmediated experiences, its role in promoting empathy and compassion has recently been heavily marketed. This emphasis on emotions, however, can be problematic because it can lead to a reductive view of complex societal issues and a reliance on technology as a solution. As such, VR should be approached critically, with an understanding of its limitations and potential drawbacks, especially in terms of promoting social justice and addressing systemic inequalities.

[55] Ibid.
[56] Ibid .
[57] Ibid.

3. Methodology & Case Studies

3.1 Case Studies

The following provides a succinct overview of the Virtual Reality (VR) experiences that will serve as the main subject of my study. The chosen VR experiences are carefully chosen based on their applicability to environmental issues and their capacity to elicit pro-environmental feelings and actions from users. By analysing these VR experiences, I aim to gain a comprehensive understanding of the potential and limitations of VR technology in addressing environmental challenges.

I. Tree

Tree is a VR project created by filmmakers Milica Zec and Winslow Porter, along with researchers from the Fluid Interfaces group at MIT Media Lab, Xin Liu and Yedan Qian. The VR project offers an immersive experience, which includes haptic feedback and on-site smells. Users embody a tree's perspective from a seedling to a mature rainforest tree. The project according to the creators, aims to raise awareness about the fast pace of rainforest depletion. To further engage and motivate users in environmental action, they are given a real kapok tree seed to take home and plant[58].

In order to create a fully immersive installation, researchers Liu and Qian, created a haptic experience using Subpac vibration oversleeves and a vibrating floor, along with bass audio and other physical stimuli. This way, users could feel the sensations of a forest fire and a bird landing on a branch[59].

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[58] '_Tree, MIT Docubase', n.d., https://docubase.mit.edu/project/tree/.
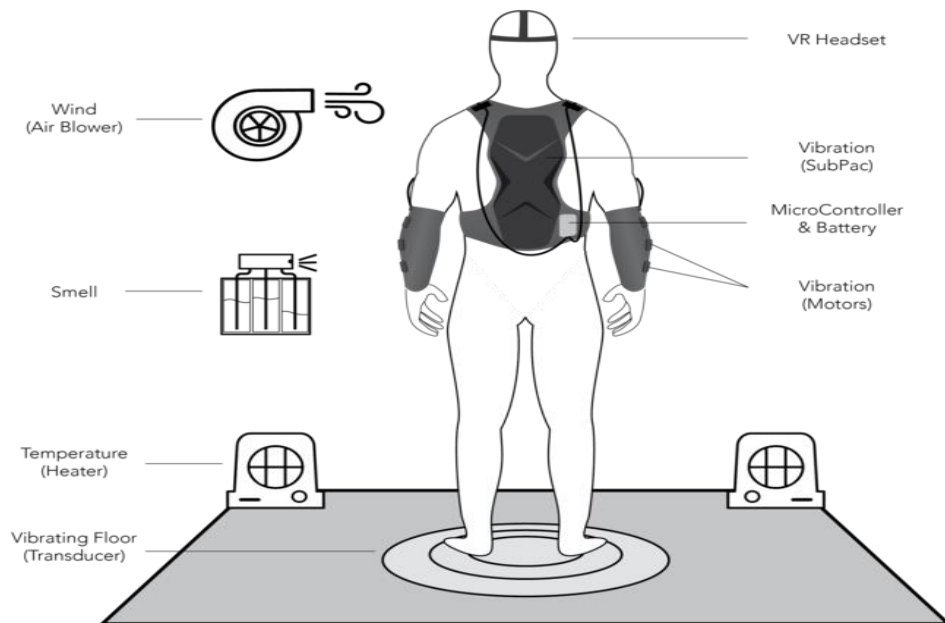[59] '_Tree, MIT Docubase'.

Figure 1: Equipment for the *Tree* project[60]
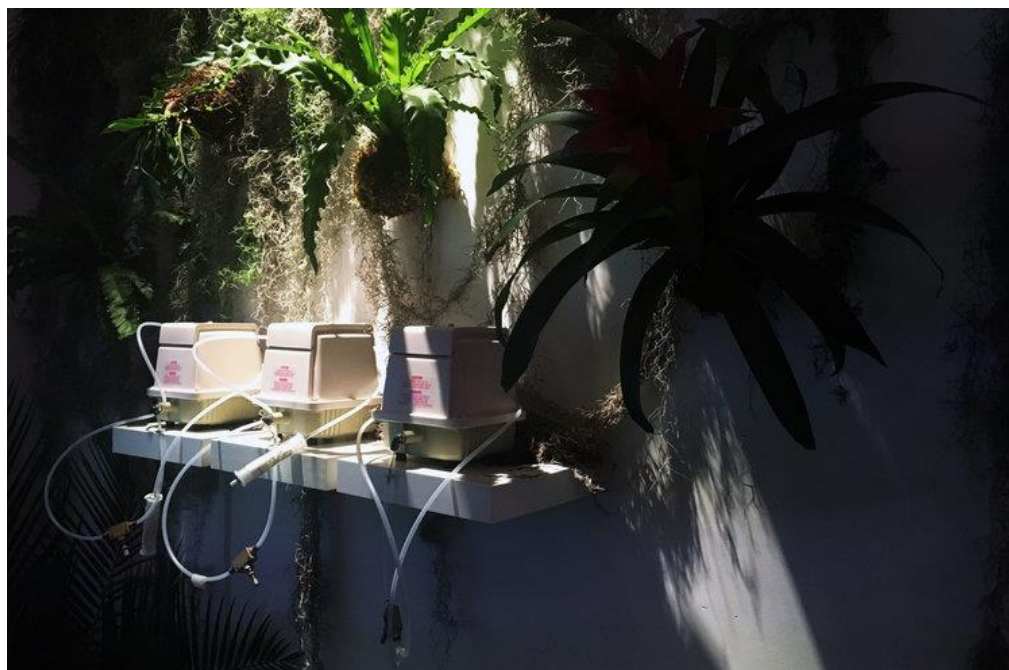

Figure 2: Scents generators (dirt, rain forest, smoke)[61]

[60] Yedan Qian, 'Tactile VR Film for Climage Change Tree', n.d., http://www.qianyedan.com/treevr.
[61] Qian, 'Tactile VR Film for Climage Change Tree'.

II.   *Symbiosis*

Polymorf's 2021 VR installation *Symbiosis* depicts a speculative world set in the distant future, 200 years after a climate disaster caused by human activity has rendered the planet unrecognizable[62].

Three linear (multi-linear) storylines are featured in the installation, each with a unique soft robotic wearable and bodily manipulations that enhance the immersion into the story. Camilla, a human-butterfly symbiont, leads participants through a forest, a ruined city, and a desert landscape populated with various 'children of compost' to the central meeting place where all characters and stories converge in one storyline[63]. Another storyline follows the symbiosis of a human and a Colorado River Toad as it swims in the ocean, encounters other sea animals, and meets other multibodies on the beach, The third storyline follows the Multibody, a symbiosis of an angler fish, an octopus, and an artificial intelligence entity, as it swims in the ocean, encounters other sea animals, and meets other multibodies on the beach[64].

Symbiosis is a storytelling experience that is performative, multi-sensory, multi-user, and multi-species. Participants are immersed in a world where they can smell specific aromas, taste specific drinks and food items, and constantly feel their bodysuits as the installation combines the five main senses[65].

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[62] 'Polymorf, Symbiosis', n.d., https://www.polymorf.nl/interaction/symbiosis/.
[63] de Beke et al., *Ecogames: Playful Perspectives on the Climate Crisis*.
[64] Ibid.
[65] Ibid.

Figure 3: 6 person multi-user experience at SXSW Festival, Austin, USA[66]

Figure 4: Playable character: a genetic symbiont of human and Colorado river Toad[67]

3.2 Methodology

As a framework for my thesis, I am utilising Fairclough's Critical Discourse Analysis (CDA) model[68]. I will, however, deviate from Fairclough's initial layer of textual analysis and instead perform an affordance analysis of both VR experiences described above. My decision to use an affordance analysis approach is based on the belief that it is better suited to my

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[66] Luciano Pinna, 'Symbiosis', n.d., https://soulsonic.com/portfolio/symbiosis/.
[67] Pinna, 'Symbiosis'.
[68] Norman Fairclough, *Critical Discourse Analysis: The Critical Study of Language*, 2. ed., [Nachdr.] (London: Routledge, 2013).

research objectives. Critical Discourse Analysis (CDA) is a useful tool for examining the ways in which language is used to shape and reinforce power relations and social norms[69]. Additionally, affordance analysis is a methodology for determining the potential actions or interactions that a given object or environment can enable or constrain[70]. Conducting an affordance analysis in the context of virtual reality experiences necessitates an examination of the experience's numerous technical components. I suggest examining these technical components following the categories of (1) hardware and (2) software, (3) the user interface, and (4) navigational tools, as well as the (5) digital and (6) physical affordances. The purpose of this analysis is to determine how users may interact with the virtual environment, as well as the range of possibilities and limitations it offers. Fairclough's three-dimensional model of CDA provides a comprehensive framework for analysing the complex interplay between language, discourse, and social context. In the context of my thesis, I am utilizing Fairclough's model to analyse the discourse surrounding the use of Virtual Reality (VR) as a tool for purportedly promoting empathy and raising awareness about climate change. This analysis is crucial in understanding the ways in which VR is framed and positioned within broader societal discourses about environmentalism, technology, and social change. By applying CDA to the discourse surrounding VR and climate change, I hope to uncover the underlying power relations and ideological assumptions that shape public perceptions of these issues, and to identify potential opportunities for transformative social action.

The three layers that I will use are:

I. **Affordance Analysis**: I propose an alternative approach to Fairclough's CDA model in which affordance analysis[71] is used as the first layer of analysis rather than textual analysis. I am attempting to identify the various characteristics and

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[69] Fairclough, *Critical Discourse Analysis*.
[70] Donald A. Norman, 'Affordance, Conventions, and Design', *Interactions* 6, no. 3 (May 1999): 38–43, https://doi.org/10.1145/301153.301168.
[71] Norman, 'Affordance, Conventions, and Design.

functionalities of Virtual Reality (VR) experiences. The affordance analysis aims to reveal how these affordances shape the user experience and contribute to the discourse being conveyed by scrutinizing the technical components of the VR experiences, such as the hardware and software, the user interface, and navigational tools[72]. I decided to divide my affordance analysis into six separate sections. These sections cover the hardware, software, user interface, navigational tools, physical affordances, and digital affordances of the VR. This strategy aims to improve the presentation of the findings' clarity while streamlining the analysis process. I hope to discover how affordances present in VR experiences enable the user to embody different perspectives, aim at fostering empathy and emotional engagement, and convey a specific message or narrative by examining them. This method provides a distinct perspective on VR experiences that goes beyond the limitations of traditional textual analysis. By investigating the affordances present in VR experiences, I hope to shed new light on the debate surrounding the use of VR as a purported empathy tool for raising awareness about climate change.

II. **Discourse Practice[73]**: This layer is important for identifying distinct patterns in the discourse about the use of Virtual Reality (VR) as a tool for fostering empathy and raising awareness about the pressing issue of climate change. In this regard, recurring themes, discursive strategies, and language choices employed by the discourse's diverse stakeholders are to be scrutinized. This layer's primary objective is to meticulously examine the official websites and newspaper reviews/articles of the *Tree* and *Symbiosis* VR experiences in order to identify

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[72] James J. Gibson, *The Ecological Approach to Visual Perception: Classic Edition*, 1st ed. (Psychology Press, 2014), https://doi.org/10.4324/9781315740218.
[73] Fairclough, *Critical Discourse Analysis*.

potential recurring themes and patterns that may be discernible through the

language used.

III.   **Social Practice**[74]: This layer will be used to examine the discourse surrounding the

use of Virtual Reality (VR) as an empathy tool for supposedly raising awareness

about climate change in its social and (historical) context. An examination of the

evolution of the discourse over time and its variations across different countries or

cultures, as well as the power relations and social structures that shape the

discourse, becomes relevant in this regard. The overarching goal of this step is to

determine whether the discourse surrounding VR as an empathy machine is simply

an attempt by VR developers to market their product to a larger audience or a

genuine initiative aimed at addressing the issue of climate change.

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[74] Norman Fairclough, *Critical Discourse Analysis: The Critical Study of Language*, 2. ed., [Nachdr.] (London: Routledge, 2013).

4. Analysis & Findings

As a disadvantage, I was unable to personally experience the two Virtual Reality installations that serve as the foundation of my analysis because they were publicly displayed in The Netherlands during a time when I was not in the country and was unaware of these experiences so the affordance analysis will rely on online playthrough videos, as well as academic articles and reviews of these experiences. The analysis will seek to identify the potential actions or interactions enabled or restricted by the technical components of VR experiences, such as hardware and software, user interfaces, and navigational tools. While this methodological approach has limitations due to the lack of direct experience, it does allow for a systematic and rigorous analysis of VR experiences from an affordance perspective.

4.1 Symbiosis & Tree: Affordance Analysis

Figure 5,6 Camilla; Human-butterfly symbiont[75]

Figure 7, 8: *Symbiosis*, multi-user experience at Frascati Theatre[76]

4.1.1 *Symbiosis:*

Hardware: The VR experience employs a head-mounted display and a bodysuit that can inflate or adjust to mimic the movements or sensations of the experience's characters. Wearable technology allows for a variety of haptic bodily manipulations[77].

Software: The VR experience is multi-sensory in nature, combining the five primary senses of hearing, sight, smell, taste, and touch. The software allows for the simulation of specific aromas, food items, and drinks, which are essential for immersing oneself in the storyline of the character[78].

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[75] Laura op de Beke et al., *Ecogames: Playful Perspectives on the Climate Crisis* (Amsterdam University Press, (forthcoming)).
[76] Pinna, 'Symbiosis'.
[77] de Beke et al., *Ecogames*.
[78] Ibid.

User Interface: *Symbiosis* offers a 360° view of the virtual world, allowing the user to explore it from various angles. The bodysuit adds an extra layer of interactivity by allowing the user to directly experience the sensations of the characters they represent[79].

Navigational Tools: There are no specific navigational tools required for the VR experience because the user can explore the virtual environment by moving their head or body.

Physical Affordances: The bodysuit allows the user to mimic the movements or sensations of the characters they portray. When playing the Toad, for example, sections of the bodysuit can be inflated to mimic the toad realistically. This increases the user's immersion in the experience and strengthens the user's connection to the virtual environment[80].

Digital Affordances: The VR experience includes digital affordances that enable the user to interact with the virtual environment through their senses. The simulation of specific aromas, food items, and drinks is said to increase the user's immersion in the experience and provides a unique multi-sensory experience not found in other audio-visual media such as cinema or games[81].

While *Symbiosis* presents itself as an immersive multi-sensory experience that combines VR technology with theatrical and philosophical elements[82], a closer look reveals a number of issues. First, while VR technology enables a 360-degree view, the other sensory elements are not unique to *Symbiosis* and can be experienced in non-VR settings. In fact, the use of specific aromas, food items, and drinks appears to be more of a gimmick to enhance the immersive experience than a critical component of the overall narrative These gimmicks are

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[79] Laura op de Beke et al., *Ecogames: Playful Perspectives on the Climate Crisis* (Amsterdam University Press, (forthcoming)).
[80] de Beke et al., *Ecogames*.
[81] Ibid.
[82] Pinna, 'Symbiosis'.

used to create a fake sense of presence Jason Jerald supports that, presence, is an internal psychological state and can only be understood through first-hand experience[83], most users are aware that what they see in generated though technology but with the help of food, aromas and drinks, the users momentarily "forget" that what they are experiencing is made-up. We can assert that the immersion that *Symbiosis* claims to offer is a product of the user, as users can easily imagine themselves to be in another location, without the use of technology[84] or special gimmicks such as aromas, food, etc.

The use of a soft robotic wearable for haptic bodily manipulations raises serious concerns about participant safety. Inflating parts of the bodysuit to look more like a toad could be uncomfortable or even dangerous for people who have pre-existing medical conditions.

In conclusion, while *Symbiosis* may provide a unique and engaging experience for some people, it is critical to not overlook significant concerns about safety and the philosophical worth of the experience, despite the use of VR technology and various sensory features.

4.1.2 *Tree*:

Hardware: The VR installation uses a head-mounted display to provide the visual and auditory components of the experience. It also includes a hardware prototype which is called Arduino and a tactile prototype, these provide accurate control of physical elements such as heat, fan, vibration and body haptics[85]. This is used a gimmick to attempt to raise empathy from the audience by using these elements to evoke a sense of bodily connection.

[83] Jason Jerald, *The VR Book: Human-Centered Design for Virtual Reality*, ACM Books 8 (New York) [San Rafael, California: Association for computing machinery Morgan & Claypool publishers, 2016).
[84] Jerald, *The VR Book*.
[85] Qian, 'Tactile VR Film for Climage Change Tree'.

Software: *Tree* is designed to be hyper-realistic and multi-sensory, combining auditory, visual, tactile and olfactory stimuli. Additionally, *Tree* VR experience makes use of the Ubiquity Games Engine, a powerful software that allows for the creation of highly interactive virtual environments. Furthermore, the experience runs on a Quadro P6000 GPU based on the Nvidia Pascal architecture to process complex environment, lighting, and shadow effects in real-time[86]. The P6000 GPU equipment consistently produces a minimum of 90fps (frames per second), guaranteeing a seamless and smooth user experience. The software is offering various sensations such as scent, temperature, and wind to unlock a higher level of realism and immerse the user fully. This combination of sensory stimuli creates a sensory alteration that delivers a vivid body illusion of being another life form[87].

User Interface: *Tree* provides a 360-degree panorama of the simulated world, allowing the user to explore the surroundings but not move around the space. The main navigational tool is the user's body. Their movements control the movements of the virtual tree. The body of the user serves as the trunk of the tree, whereas the user's arms are the tree's branches. The whole experience takes place in a first-person perspective[88]. Only at the end of the 8 minute experience is the user placed in a third-user perspective. This allows the user a complete view of the destruction caused by deforestation attempts.

Navigational Tools: As mentioned above, the VR experience does not require any extra navigational tools. The user explores the virtual environment by moving their head around.

Physical Affordances: The hardware prototype called Arduino and tactile prototype[89] provide physical affordances for the user to experience precise and controlled physical elements, some of them being: heat, wind and vibration. These physical affordances allegedly

[86] Cliff Saran, 'How the Immersive VR Film Tree Was Created', *Computer Weekly* (blog), n.d., https://www.computerweekly.com/news/252457943/How-the-immersive-file-Tree-was-created.
[87] Saran, 'How the Immersive VR Film Tree Was Created'.
[88] Yedan Qian, 'Tactile VR Film for Climage Change Tree', n.d., http://www.qianyedan.com/treevr.
[89] Qian, 'Tactile VR Film for Climage Change Tree'.

enhance the user's immersion in the experience and strengthen the connection between the user and the simulated environment.

Digital Affordances: *Tree*, provides digital affordances for the user to interact with the virtual environment using their senses and body. The simulation of various sensations such as scent, wind and temperature, as well as the arms being the branches, create a hyper-realistic and multi-sensory experience that is hard to replicate in other traditional media[90].

Based on this brief affordance analysis, we can see that *Tree* uses VR technology as a tool to create a hyper-realistic experience that transforms the user into a tree. *Tree* clearly employs cutting-edge technology in order to deliver an exceedingly immersive experience. The blend of a head-mounted display, hardware and tactile prototypes, and the Ubiquity Games Engine software allows users to embody the rainforest tree and witness its growth and inevitable fate. Both the physical and digital affordances present in the experience enhance the user's immersion and strengthen the connection between the user and the simulated environment. While *Tree* may be a compelling and moving experience, it is crucial to pair it with clear messaging and actionable steps that can inspire people to make tangible changes in the real world. Without this, the use of *Tree* as a tool for climate change communication falls short in achieving the desired impact.

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[90] Qian, 'Tactile VR Film for Climage Change Tree'.

4.2 *Symbiosis & Tree*: Discourse Practice

4.2.1 *Symbiosis*:

Quotes	Links
1. On the ruins of an inhospitable Anthropocene, after climate change has changed the world beyond recognition, Symbiosis takes place	https://www.polymorf.nl/interaction/symbiosis/
2. Our human-centric position—only thinking from a human perspective—is toxic and we can't sustain that in the current crisis with nature.	Marcel van Brakel, founder and lead designer at Polymorf and Symbiosis codirector, for https://www.wundermanthompson.com/insight/sxsw-2023-symbiosis
3. I thought it was such a beautiful, interesting solution [to climate change] to have the body completely hybrid, and able to change and adapt	Marcel van Brakel, founder and lead designer at Polymorf and Symbiosis codirector, for https://www.wundermanthompson.com/insight/sxsw-2023-symbiosis

By having a closer look at the discourse used in the official website of *Symbiosis* and an interview that one of the co-creators gave in an online magazine, we can see that the language used presents a utopian future that is more suitable for a science fiction novel rather than a truthful depiction of the current climate crisis and the possible effects it may have on

humanity. The language used also points to *Symbiosis* being the solution to the pressing issue of climate change, instead of offering a more feasible solution.

The language used in most sentences is somewhat abstract, using terms and concepts that may not be recognized or understood by the general audience at first. For example, on sentence 1, the term "Anthropocene" is used[91]. This term refers to an epoch in which human activity is considered to be the main influence of on the Earth's ecosystem and climate[92]. This technical language was perhaps used to create a sense of authority and expertise. It is important to note that this language choice might also alienate certain people who are not familiar with these terms. What is also worth noting in the first quote is that the language used is also extreme, emphasizing the catastrophic effects of climate change. It can also be characterized as an exaggeration. While it is true that climate change has disastrous impacts on the planet, the quote might contribute to a sense of discouragement and hopelessness that might not have the desired effects, which I assume are a more active role in the attempts to save the planet.

The statement that van Brakel makes: "Our human-centric position—only thinking from a human perspective—is toxic and we can't sustain that in the current crisis with nature"[93] is the most critical and explicit so far. It is a critique of human-centred thinking and the impact that this had in our environment. It highlights the urgency of climate change. However, it does not provide examples or solutions, and it is vague and abstract. This does not take aways from the importance of talking about such issues.

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[91] 'Polymorf, Symbiosis'.
[92] Katie Pavid, 'What Is the Anthropocene and Why Does It Matter?', n.d., https://www.nhm.ac.uk/discover/what-is-the-anthropocene.html#:~:text=The%20Anthropocene%20is%20sometimes%20used,on%20it%20has%20become%20clear.
[93] Emily Safian-Demers, 'Redesigning the Human Body and Upending Human Narratives.', n.d., https://www.wundermanthompson.com/insight/sxsw-2023-symbiosis.

The second quote from van Brakel, conveys admiration for a proposed solution to climate change, more particularly the idea of a "hybrid" body that can easily adapt to changing environmental conditions[94]. While the idea is intriguing and exciting, especially for people that have read Donna Haraway's books Staying With The Trouble and The Camille Stories: Children of Compost[95], *Symbiosis* does not provide any details on how such a solution could be implemented or whether if it is at all feasible. It is also worth noting that focusing solely on technological solutions to climate change, does not address the root causes of the issue. While it is important to explore new ideas and technologies, it is equally as important to consider the economic, social, and political factors that contribute to climate change and work towards systemic change.

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[94] Demers, 'Redesigning the Human Body and Upending Human Narratives.'.
[95] de Beke et al., *Ecogames: Playful Perspectives on the Climate Crisis*.

4.2.2 *Tree*:

Quote	Link
4. "Take action to keep forests standing."	https://www.treeofficial.com
5. "you'll experience the tree's growth from a seedling into its fullest form and witness its fate first-hand."	https://www.treeofficial.com
6. "We empathise with the tree,"	https://www.computerweekly.com/news/252457943/How-the-immersive-file-Tree-was-created[96]
7. "The immersive experience touches all the senses."	https://www.computerweekly.com/news/252457943/How-the-immersive-file-Tree-was-created
8. "Tree takes the concept of virtual reality empathy to (literally) new heights."	https://www.theverge.com/2017/1/26/14396976/best-vr-sundance-film-festival-2017[97]
9. "before each person starts the experience, they're asked to actually take a seed and place it in soil behind them, symbolizing their virtual avatar's creation"	https://www.theverge.com/2017/1/26/14396976/best-vr-sundance-film-festival-2017
10. "You become that seed, watching and feeling as you grow from beneath the ground."	https://techcrunch.com/2017/01/20/sundance-new-frontier/

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[96] Cliff Saran, 'How the Immersive VR Film Tree Was Created', *Computer Weekly* (blog), n.d., https://www.computerweekly.com/news/252457943/How-the-immersive-file-Tree-was-created.
[97] Adi Robertson, 'The Best Virtual Reality from the 2017 Sundance Film Festival', n.d., https://www.theverge.com/2017/1/26/14396976/best-vr-sundance-film-festival-2017.

11.	"watched one woman come out of VR crying, having so fully identified with the now fallen tree"	https://techcrunch.com/2017/01/20/sundance-new-frontier/
12.	"Vibration has a very powerful effect on empathy."	https://techcrunch.com/2017/01/20/sundance-new-frontier/
13.	"You're even given another seed to take home. "We really like the idea of planting the seed. Then people have an amount of responsibility" says Tree co-creator Winslow Porter. "When they get the seed back, it becomes something you can take with you to always remind you of being in the experience.""	https://techcrunch.com/2017/01/20/sundance-new-frontier/[98]

The second layer of CDA reveals that the language used to describe the *Tree* VR experience is intended to evoke empathy for deforestation and forest destruction. However, emphasizing individual action, such as planting a seed, may be interpreted as shifting responsibility and culpability to individuals rather than holding large corporations and governments liable for their greater environmental impact. Individualism falls short in addressing the systemic issues and establishments that contribute to deforestation. The texts address the complex issue of deforestation in a simplistic and individualistic manner, as evidenced by the emphasis on the emotional bond between the audience and a tree. Consequently, the texts fail to address the larger systemic issues that contribute to deforestation and lack concrete actions for the audience to take beyond a general call to

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[98] Josh Constine, 'Sundance Merges VR with Real Life through Props, AR, and Vibrating Suits', n.d., https://techcrunch.com/2017/01/20/sundance-new-frontier/.

action to "keep forests standing[99]" and a seed to take home and plant[100]. Although the texts and experience may persuade some people to act, both the texts and experience fail to offer a comprehensive solution or an adequate plan of action for dealing with the issue of deforestation. The language used in the aforementioned texts is persuasive in nature and makes use of a number of rhetorical techniques to persuade the audience to take action to preserve forests. The quote "We empathise with the tree"[101] is appealing to the audience's emotions, using empathy to persuade them to care about the forest's fate. The use of the first person plural "we" establishes a sense of solidarity between the speaker and the audience, adding to the statement's persuasive power. Furthermore, using phrases like "literally new heights" and "powerful effect on empathy" may come off as hyperbolic and possibly manipulative language.

In order to appeal to the audience's desire for a distinctive and engrossing experience, the texts also highlight the multi-sensory and immersive nature of the experience, employing phrases like "touches all the senses"[102] and "witness its fate first-hand."[103] The texts contend that by doing this, readers will comprehend the effects of deforestation more fully and be more motivated for taking action to stop it. Although the experience is intense and intended to engage the senses and supposedly raise empathy about deforestation, it is crucial to consider the goals behind this kind of virtual empathy. Is it truly an effective method for bringing about change, or is it just a means of evoking an emotional response?

In conclusion, despite claims that the *Tree* VR experience is effective at raising empathy, the discourse used in the official website but also in different reviews raises questions about

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[99] 'TREE: A VR Experience from the Creators of Glant', n.d., https://www.treeofficial.com.
[100] '_Tree, MIT Docubase'.
[101] Cliff Saran, 'How the Immersive VR Film Tree Was Created', *Computer Weekly* (blog), n.d., https://www.computerweekly.com/news/252457943/How-the-immersive-file-Tree-was-created.
[102] Saran, 'How the Immersive VR Film Tree Was Created',.
[103] 'TREE: A VR Experience from the Creators of Glant'.

the efficacy of individual efforts and the motivations behind evoking an emotional response without offering concrete solutions or approaches to the issue at hand. Albeit the rhetoric may be influential enough to persuade some people to take action, it ignores the larger structural issues that also contribute to deforestation and offers no real solutions beyond an ambiguous call to action and a seed to take home While the creators' intentions may be well-intentioned, it is crucial to advocate for action from governments and corporations and shift the responsibility to them rather than individuals who realistically cannot do much on their own.

4.3 *Symbiosis & Tree*: Social Practice

Does Virtual Reality have a special gift for generating empathy? Does being immersed in someone else's perspective through VR goggles make it more accessible to understand and share their experiences?[104] This was the central point of contention in the early years of second renaissance of VR after Chris Milk declared VR an 'empathy machine' in his viral 2015 TED talk[105]. This was widely influential and served as a money-making marketing pitch for developers and creators alike but as we have seen it has also been widely critiqued[106].

The third layer of CDA focuses on the sociocultural and ideological context in which discourse is produced, interpreted, and distributed. The layer notes that discourse is shaped by power relations, social practices and assumptions made my culture[107]. In this layer, I will closely examine the notion that majority of the people that refer to VR as an empathy machine, are VR developers themselves, in an attempt to promote their own product and ideologies. To do so, I will draw on Paul Roquet's paper "Empathy for the game master: how

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[104] Roquet, 'Empathy for the Game Master'.
[105] *Chris Milk: How Virtual Reality Can Create the Ultimate Empathy Machine*.
[106] Roquet, 'Empathy for the Game Master'.
[107] Fairclough, *Critical Discourse Analysis*.

virtual reality creates empathy for those seen to be creating VR," which focuses solely on the influence of VR developers[108].

Paul Roquet argues in his article that if we are to consider Virtual Reality as a tool for generating empathy, we must take into consideration that this directs emotional energy not towards the subjects depicted in the said VR projects, but instead towards the individuals and institutions involved in promoting and developing the technology[109]. This can be considered unsettling as it reveals how the design and marketing of VR experiences are chiefly focused on creating a particular perception of the technology, rather than on fostering genuine empathy towards the issues presented in the experiences.[110]

As an illustration, it is noteworthy that *Tree[111]* provides its users with a physical kapok tree seed to plant, which may appear as a considerate and poignant gesture. The rising problem of deforestation, however, is not directly addressed by this token offering. It could be claimed that despite the intense experience of watching the tree's demise, the distribution of such seeds is merely a marketing gimmick designed to attract more media coverage and attention. Instead of inspiring empathy for the forests themselves, this gesture encourages empathy for the VR creators and their purportedly admirable attempts to protect the rainforest.

Roquet highlights Bollmer's claim on how VR relies heavily on the user's own pre-existing understanding of their perceptions, even though that users are often prompted to believe that they are experiencing the world through someone else's point of view[112] a false sense of *Einfühlung* or empathy[113]. This entails that VR often provides a false sense of empathy where users feel as though they have gained a new perspective on the world, but in

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[108] Roquet, 'Empathy for the Game Master'.
[109] Ibid.
[110] Ibid.
[111] '_Tree, MIT Docubase'.
[112] Bollmer, 'Empathy Machines'.
[113] Ibid.

reality, they are experiencing it through their own pre-existing perspective. Furthermore, both Bollmer and Roquet suggest that users may find comfort with VR empathy devices because they give the impression that everyone else shares their current emotional perspective. This implies that even though users may experience a situation from a different perspective, they can still cling onto their own beliefs without having to confront any considerable changes to their own beliefs. Bollmer and Roquet emphasize the limitations of VR as an empathy machine, as it often fails to challenge user's existing perspectives and can cater a false sense of shared emotions and experiences[114].

This can be true for the case of *Symbiosis*, the developers of *Symbiosis* claim that they employ VR as a 'philosophical tool'[115]. The claim of Marcel van Brakel, founder and lead designer at *Polymorf* and *Symbiosis* codirector that VR technology is used as a "philosophical tool" within the context of the *Symbiosis* experience to sensitize people about the impact that climate change can have on humanity is ambiguous and unconvincing. Despite the experience's alleged potential to elicit philosophical questions, it is unclear how *Symbiosis'* design is specifically geared toward encouraging philosophical inquiry or whether it effectively fosters substantial philosophical discourse. However, for users not familiar with the works of Donna Haraway, such *as Staying With The Trouble* and *The Camille Stories: Children of Compost*, the VR experience may appear implausible and may not evoke any emotional or empathetic response, just confusion. This highlights the potential limitations of using VR as an empathy tool without considering the audience's level of familiarity with the underlying philosophical concepts. This VR experience is allegedly a philosophical tool that effectively generates empathy towards climate change among individuals who share the same ideological framework as the VR developers. According to Roquet, VR creates a false sense

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[114] Roquet, 'Empathy for the Game Master'.
[115] 'Polymorf, Symbiosis'.

of familiarity and universality, notably for those who fit into the dominant position modelled by the system[116]. The relationship between VR developer and user is crucial, those who fit into the default position are more likely to have their ideologies and perspectives confirmed[117]. This happens because VR developers design the experiences with their own perspective and their target audience in mind, thus resulting in a presentation of a generalized experiential truth.[118]

In conclusion, the use of VR as an empathy machine presents challenges. While I cannot deny that it offers immersive experiences that might raise awareness about climate change, it is limited by the developers' biases and beliefs. As Roquet highlights, the default subject position imagined by VR developers often excludes those who do not share the same beliefs as them, resulting in a limited empathy machine that caters only to a specific audience[119]. It is important for VR developers to consider the diversity of audiences and create experiences that challenge everyone alike. Furthermore, while VR experiences may offer a glimpse into various issues, such as climate change, they should not be considered a substitute for real-world action towards meaningful change. Finally, while empathy is considered an ethical principle in the context of Virtual Reality, it can be problematic as it can often deny the existence of the Other[120]. Sara Ahmed suggests that ethical affective relationships require openness to the unknown and the Other[121]. However, Bollmer argues that empathy and taking "someone else's perspective" can result in the annihilation of the Other. The neurological mechanism of empathy remains controversial and problematic[122]. VR should not be a substitute for real-world action, and we must be aware of the potential

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[116] Roquet, 'Empathy for the Game Master'.
[117] Ibid.
[118] Ibid.
[119] Ibid.
[120] Bollmer, 'Empathy Machines'.
[121] Sara Ahmed, *The Cultural Politics of Emotion*, Second edition (Edinburgh: Edinburgh University Press, 2014).
[122] Bollmer, 'Empathy Machines'.

ethical issues surrounding the prioritization of empathy. As VR technology moves forward, it

is important to consider, how it can be used to create more inclusive, educational, and

impactful experiences that foster change.

5. Conclusion, Limitations & Further Research

5.1 Conclusion

My research has given a critical evaluation of the discourse around the use of virtual reality with an emphasis on the alleged potential for VR experiences to foster empathy for environmental challenges. The VR experiences that I focused on were *Tree* and *Symbiosis*. To summarize my findings, I will address the sub-questions I introduced first, followed by the main research question.

My first sub-question was the following: How do the affordances of *Symbiosis* and *Tree* contribute to the level of immersion and interactivity for the user? Based on my affordance analysis, both *Symbiosis* and *Tree*, offer immersive experiences for the user. *Symbiosis*, uses a bodysuit that inflates or adjusts to mimic the movements or sensations of the characters. On the other hand, *Tree*, uses a tactile prototype to mimic physical elements such as heat, body haptics, vibrations, etc, which allegedly enhances the user's immersion in the experience and strengthens the connection between the user and the virtual environment. Both *Symbiosis* and *Tree*, use multi-sensory software, incorporating all senses. However, *Symbiosis*, uses food items and drinks to enhance the immersive experience, potentially seen as a gimmick. Overall, both *Symbiosis* and *Tree* offer immersive experiences for certain people. It is however unclear if these affordances are essential to the narrative of the experiences.

The second sub-question was: What does Discourse Practice reveal about the language used in promoting *Symbiosis* and *Tree*, and what are the limitations of the discourse in their respective attempts to address climate change? After conducting a thorough analysis of the language used in promoting *Symbiosis* and *Tree*, I identified some of their limitations of their discourse in addressing climate change. The language used in *Symbiosis* for example, is abstract and technical, which can alienate some audiences. Moreover the language of

Symbiosis presents a utopian future that is not realistic, and the emphasis on technological solutions, overlooks the economic, social, and political factors contributing to climate change. In similar manner, the language used in *Tree,* may be persuasive but it lacks concrete solutions and fails to address the larger systematic issues behind deforestation. It is important to consider what are the motivations behind evoking an emotional response without offering any real-world solutions or approaches.

My third and final sub-question was: What does the social practice in *Symbiosis* and *Tree* reveal about the VR developers' ideological aims with their VR experiences? My findings highlighted the challenges of using VR as an empathy machine. VR experiences are limited by the biases of the developers, and their design and narrative only cater to a specific audience. VR experiences may offer a glimpse into various issues, but they should not be considered a substitute for real-world action towards meaningful change. Furthermore, empathy is considered an ethical principle, but it is not enough on its own to address and challenge systemic issues. It is crucial for VR developers to create experiences that challenge everyone alike. Overall, the social practice in *Symbiosis* and *Tree* reveals that the VR developers' ideological aims with their experiences are not solely focused on generating empathy towards the subjects depicted in the projects, but also on curating a certain perception of the technology and promoting their own personal ideologies.

Now that I've addressed the sub-questions, I'll move on to the main research question, which is as follows: What are the ethical concerns of using VR to address climate change, and how are the VR projects *Symbiosis* and *Tree* addressing this issue in their respective VR experience and in their communication about the project's aims? VR is often characterized as a utopian technology that facilitates ideal forms of social interaction and has been touted as a "empathy machine" that can foster ethical decision-making and moral education about many

issues such as racism, sexism[123] and even climate change. Compared to other forms of digital media, I have to admit that VR offers a distinct viewing experience. VR 2.0 presents itself as a technology that revolves around feelings and is grounded in the idea of toxic re-embodiment[124]. Nakamura describes VR as both a promise and a problem and explains why VR hardware manufacturers and VR developers have endeavoured to reframe VR as an "empathy machine". Nakamura contends that by giving consumers powerful sensory encounters that evoke a sense of presence, VR enables people "to feel good about feeling bad"[125]. VR's claims to foster empathy and depict racism and climate change as problems with head-mounted solutions[126]. While VR programs on climate change, such as *Symbiosis* and *Tree*, can help users adopt new perspectives, it is more difficult to imagine them providing solutions for hypercapitalism, global warming, deforestation, and rising emissions in the real world. This is what this study has argued and demonstrated in the case of *Symbiosis* and *Tree.*

5.2 Limitations & Further Research

One of the limitations of this study, is that it relies almost exclusively on online videos of the VR experiences, their official websites, and the reviews, as I did not have the opportunity to experience first-hand the VR programs that I analyse. Although, I offer a detailed understanding of the affordances and limitations of the VR experiences, it should be noted that it is limited by the lack of direct interaction with the installations. Another limitation is the highly debated concepts of empathy and VR, in the context of climate change. Most published research on VR and empathy has to do with race and gender, and the research

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[123] Lisa Nakamura, 'Feeling Good about Feeling Bad: Virtuous Virtual Reality and the Automation of Racial Empathy', *Journal of Visual Culture* 19, no. 1 (April 2020): 47–64, https://doi.org/10.1177/1470412920906259.
[124] Nakamura, 'Feeling Good about Feeling Bad.
[125] Ibid.
[126] Ibid.

published on the use of VR for climate change empathy, favours the technology. Therefore, the findings of this study, are to be considered withing the context of these limitations.

For future research, I would suggest in-depth interviews with the VR developers of *Symbiosis* and *Tree* to gain a better understanding of their design choices and ideological aims. Additionally, questionnaires or surveys could be distributed to users to gain insight into how they were impacted by the VR experiences. This would provide a more comprehensive understanding of the impact of *Symbiosis* and *Tree* on climate change awareness and empathy. Finally, another avenue of research could be a comparative study between the VR experiences and other forms of climate change communication, such as documentaries or classroom education to compare the effectiveness. This would showcase the affordances and limitations of VR compared to other media.

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