VIRTUAL REALITY AS CONSCIENTIZATION MACHINE

A Postphenomenological Analysis of the use of VR in Environmental Communication

MA Thesis

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INTRODUCTION: 'EDUCATION' BEYOND THE CLASSROOM

A great many of us engage in this kind of climate change denial. We look for a split second and then we look away…Or maybe we do look – really look – but then, inevitably, we seem to forget. Remember and then forget again. Climate change is like that; it's hard to keep it in your head [for] very long. We engage in this odd form of on-again-off-again ecological amnesia for perfectly rational reasons. We deny it because we fear that letting in the full reality of this crisis will change everything. And we are right. (Klein 3-4)

Climate change is an issue that, while having entered the realm of mass media and public thought, lacks the widespread diligence, attitude and action needed to counteract it. Naomi Klein, a prominent journalist and author of the book *This Changes Everything* (quoted above), explains how climate change requires a mass movement (6) that is both social and political, which means reevaluating what it means to be human in the era of an ecological crisis. Julie Doyle, a media scholar and environmentalist, describes how environmental communicators mediate the issue of climate change as a distant problem of the future, rather than one of the present (3). An example of this is *Planet Earth*, an environmental documentary series created by David Attenborough, which managed to reach 11.4 million people during its airing on BBC1 and BBC 2 (Hughes-Games). Since then, it has continued to be consumed through online downloads and various streaming platforms. Despite its popularity, the series has been met with acute criticism. Richard Beck in his article "Costing Planet Earth" explains how *Planet Earth* "makes for excellent television but questionable environmental advocacy… [and in doing so] equates ethics with aesthetics" (64-65). Media scholar and environmentalist, Julie Doyle expresses that the fundamental problem is that it leads to "a disembodied and disconnected view of nature/environment as something 'out there'" (22). Professor and author of the book *Interactive Media for Sustainability*, Roy Bendor explains that sustainability relies on the media, in that it shapes "how we see ourselves, others, and the world" (3). Educator and philosopher, Paulo Freire in his book *Education for Critical Consciousness* suggests that in order for such problems to be dealt with, people need to intervene themselves in reality through dialogue and 'critical consciousness' (3-4). However, before such a critical attitude can be adopted, nature and the environment need to be seen as an integral part of humanity, rather than as a separate environmental issue (Doyle 3). This can be developed by taking a posthuman approach to

environmental communication, which aims to communicate an ontological perspective characterized by a unity between humans, nature and the world. However, according to Bendor for this to be effective, it needs to be and can be appropriated through interactive media and technology.

Research question and sub-questions

In this thesis I will examine the central question of: if (and if so), how might VR mediate climate change as a method of fostering critical environmental consciousness? This will be using the VR case study, *Tree*. In order to answer the central question adequately, I will address the following sub-questions: (1) What is wrong with environmental communication in the 21st century in terms of raising awareness? (2) How can interactive media and technology stimulate critical environmental consciousness? (3) What kinds of relations can VR mediate between humans and their world that is relevant for environmental communication? (4) How does VR mediate climate change in a personal, meaningful and engaging way that is different from traditional forms of environmental communication?

Brief theoretical framework

For my theoretical framework, I will first elaborate on the current state of environmental communication and the media in the 21st century, primarily through the work of Bendor and Doyle. Doyle investigates how climate change should be effectively mediated to be more personally meaningful and engaging. Bendor's research focuses on interactive media and how they can be utilized towards communicating (un)sustainability. Furthermore, I reflect upon their theories through Freire's concepts of "massification" and "critical consciousness", the latter being a prerequisite condition towards liberation from the former. Freire's work is then re-contextualized within the 21st century and expanded through Braidotti's concept of "critical posthumanism" (45) and Nikki Rotas' notion of "unlearning" (93). This constitutes the posthuman approach to environmental communication, which is then further analyzed in terms of games and play. The reason for this being that, beyond a posthuman approach to environmental communication, VR also adopts an emergent playful approach. The work of Braidotti and Rotas will therefore be expanded through Sonia Fizek and her notion of "emergent playfulness", which is a result of adopting Douglas Rushkoff's notion of the 'gamers' perspective'. These notions are then expressed in terms of Eric

Zimmerman's framework for 'gaming literacy'. All of these concepts and theories will then be applied to my case study *Tree* in chapter 3.

Brief outline of methodology

For my methodology, I will be using postphenomenology. Originally a school of thought founded by philosopher of technology Don Ihde, but since then has been adopted as a methodology. Robert Rosenberger and Peter-Paul Verbeek, editors of the book *Postphenomenological Investigations*, highlight that *technological mediation* can be used as a tool to analyse the roles that technologies play in transforming relations between humans, technology and the world (9, 11). Thus, VR will be analyzed in terms of its technological mediation; specifically, how it can mediate new perspectives on the environment and the issues within it. This conducted through micro-scale analyses of specific technological practices (empirical case studies), which help understand how these technologies mediate a certain perception or understanding of the world that are both non-neutral and intentional. Based on this approach, technologies do not merely involve themselves in human experience and perception but actively *transform* them (Ihde xii). These transformations are identified as human-technology relations (section 2.1), which will be further identified in the case studies and analyzed through critical reflection based on the concepts and theories discussed in chapter 1.

Outline of sections

In chapter 1, I will introduce the theories and concepts of my theoretical framework. This includes their background as well as how they will be used in this thesis. The second part focuses on interactive media and the ways in which they are able to appropriate the theories and concepts discussed in the first part; namely, through Bendor's "resonant" and "worldmaking" Interactions. The third part of this chapter will explain the cohesive integration of my analysis as a re-contextualization of Freire's 'conscientization process'. In chapter 2, I will introduce and describe my methodology, this includes its philosophical background as well as an explanation of the relevant key terms and concepts. A special section in this chapter is dedicated to describing the various 'human-technology relations'. This is followed by a description of the steps required to undergo postphenomenology as a

research methodology, and lastly a justification of my choice to do so. Chapter 3 includes my analysis of two empirical case studies on VR that are specifically relevant to my frame of research. This is conducted beforehand, in order to contribute to a more in-depth analysis of my case study *Tree*. This includes my critical reflection on *Tree* using the theoretical framework discussed in chapter 1. Lastly, in chapter 4 I will conclude with a short summary of my research and findings as well as discussion on some of the limitations of my research followed by insights and speculation about the future of VR within environmental communication.

1. CRITICAL ENVIRONMENTAL CONSCIOUSNESS IN THE 21ST CENTURY

In section 1.1. I will introduce the 'information deficit model' as well as highlight the problems with traditional environmental communication through Bendor and Doyle. This further linked to Freire and his necessity for a 'education for critical consciousness'. In section 1.2. I elaborate upon how environmental communication can move beyond the 'information deficit model' through its implementation of interactive media. In section 1.2.1 and 1.2.2 I will describe the specific 'interactions' required to do so according to Bendor; namely, 'resonant' and 'worldmaking' interactions. In section 1.2.3. I will explain how environmental education can be extended as a form of public pedagogy. In section 1.3. I explain how the nature/culture divide can be overcome through posthumanism. This is expanded upon is section 1.3.1 and 1.3.2, firstly, as an approach to environmental communication, and secondly as an approach to learning. In section 1.4. I re-introduce my theories and concepts from the perspective of game studies to comment on the design of interactive experiences for environmental communication and how they exhibit opportunities for playfulness (section 1.4.1.). Lastly, in section 1.5 I will briefly summarize the insights made in chapter 1.

1.1. RECONNECTING THE DOTS

Despite the growing concerns about climate change, many argue that the awareness of environmental issues has not translated into any significant societal nor systemic change. One such proponent of this viewpoint is Doyle, who highlights how environmental communication tends to be framed as a future scenario rather than an immediate, present reality. According to her, this leads to a lack of "effective, urgent action to both mitigate and adapt" towards climate change (2). Further, Bendor mentions how this might be due to 'weak' perceptual signals (94) conveyed through environmental communication. Using the 'boiling frog syndrome'[1] In Bendor's description of how society currently copes with the ecological crisis, he writes:

> if we expect to experience a phenomenon in a particular way or with a particular intensity yet fail to do so, we tend to assume that the phenomenon has not taken place (94).

Early examples of environmental communication followed a linear model of human behavior and psychology, which suggested that in order for environmental action to occur people needed to become knowledgeable about the issue first. This was known as the 'information deficit model' (Bendor 29, a somewhat paternalistic and decontextualized approach to communication that failed to grasp the complexity and non-linearity of the relationship between humans, nature and the environment. These forms of environmental communication are the cause of climate change being framed as a distant issue for the future. Hence, lacking any critical engagement or thinking. What this means for environmental communicators is to present climate change in a way that goes beyond being just informative, for example the presentation of scientific facts and projections, towards the production of communication that sends 'strong' perceptual signals.

Climate change as a complex phenomenon requires a tremendous amount of commitment, compassion and understanding in order for 'real' change to be enacted. Paulo Freire, in his analysis of intensified urbanization in Brazil during the 1950s and early 1960s, highlights how in periods of change the public tends to remain *passive* (12): he refers to the process of dehumanization whereby the public becomes susceptible to distorted perceptions; for instance, the "over-simplification of problems" (14). This is what Freire refers to as 'massification' instilling, what he calls, a "naïve transitivity of consciousness" (Freire 14) – the disengagement from one's reality as well as limited spheres of perception. When applied to contemporary society, the changes brought upon by new media and digital culture can be analyzed as maintaining the naïve transitivity of consciousness that Freire observed in Brazil. For instance, this includes the rise of 'fake news' and 'post-truth society' (Jandrić 101). In order to emerge out of a naïve consciousness, Freire suggests the development of a strong sense of responsibility, which would cause people to engage in their own realities, actively transforming them according to their own desires opposed to those of the masses. This means the ecological crisis needed to be under scrutiny in order to for its complexity to be understood. It is about getting the public to adopt a more in-depth understanding of their own contexts and surroundings – a process that he refers to as "conscientização" (from here on: 'conscientization') (15). Freire writes:

> For without an increasingly critical consciousness men are not able to integrate themselves into a transitional society, marked by intense change and contradictions (12).

Rather than shifting responsibilities to others, Freire wanted people to become agents of their own rehabilitation and realize their own potential to actively transform society, which is based on their personal concern for society. Once concern was established, the oversimplification of problems no longer satisfied those willing to know more. These people integrated themselves in their own realities opposed to "remaining mere onlookers" (Freire 5). Environmental communication should therefore aim to facilitate the public adoption of responsibility towards the environment; to critically assess it and in turn willingly and effectively enacting change.

1.2. GOING BEYOND THE INFORMATION DEFICIT MODEL

Environmental communication is not a fixed process, rather it transforms as information is (re)interpreted through various media and then communicated to society – it is discursive. Bendor draws sustainability as a sociotechnical phenomenon. As mentioned earlier, new media are "part and parcel of how we see ourselves, others, and the world" (3); they are part of what makes our social and political imaginaries, which in turn make media responsible for how we see sustainability presently as well as in the future. Further studies have shown that in order for information to be translated in behavioral change and action, cognitive and contextual factors in communication need to be appealed to. The former, refers to our habits, attitudes and values; the way we acquire knowledge and process it; and the things that trigger us emotionally. The latter refers to elements in our social and physical environmental; for instance, social institutions, practices, norms, values and imaginaries that influence the collective outlook of the world (Bendor 30). He writes that "[a]s cognitive scientists showed, reason is embodied and relies on our instincts, intuitions, emotions, and feelings" (31). According to this, environmental communication needed to be strong enough to be significant across all these different dimensions. According to Bendor, this is done by 'designing with intent' (34); to persuade users to change the way they respond to an issue such as climate change. This includes 'strong' perceptual signals that are emotionally evocative and empathetic, which have the ability to stimulate discussion. Such a holistic approach to behavioral change, that is adaptive and appeals to multiple dimensions of experience, is more likely to appeal to people compared to the singular and fixed approach posed by the 'information deficit model'.

While Bendor explains the complexity of human psychology in interpreting climate change information, Doyle discusses the complexity of the environment itself, and subsequently how it should be framed. She maintains that visual images fail to communicate the "complex temporality of climate change" (25); namely, that it isn't a linear process but rather a complex and multiple one (26). Doyle distinguishes between clock time and environmental time. The former refers to the universal 'time' used in the sciences and everyday life, which is standardized, quantifiable and linear like the hours in a day. The latter implies the "multiple, complex, contextual rhythms and processes of the ecosystem" (Doyle 26). 'Clock time' trivializes the actual processes that underlie environmental change, which in actuality are more complex. Climate change information that presents future predictions of its effects decontextualizes climate change. This is because it gives the illusion of certainty over the issue; that we – humans and scientists – are in control of it. However, in reality these predictions and speculations are uncertain, especially when considering the factors may be able to accelerate or decelerate effects of climate change. This detaches people from a sense of responsibility, in that the responsibility is shifted towards science and technology to come up with solutions while the rest of society continue on with their daily lives. In order for the complexity and uncertainty of the environment can be properly communicated, it should be done creatively. This is to trigger people's faculties of imagination and experience that aid the conscientization process.

1.2.1 EXPERIENCING IS BELIEVING

Responsibility cannot be acquired intellectually, but only through experience […]
What was needed was to go to the people and help them to enter the historical process critically. The prerequisite for this task was a form of education enabling the people to reflect on themselves, their responsibilities, and their role in the new cultural climate (Freire 12).

Once people begin to realize the extent of climate change as well as humanity's role within it, they may acknowledge it as part of their historical process. Freire (quoted above) suggest that this may be achieved through education, since the perception of climate change and the environment is still currently limited. While people may attempt to fill this void by consuming numerous articles and videos online, Doyle mentions that these still make people feel 'personally distant' from the issue (24). As an example, the picturesque landscapes and

extreme animal close-ups in *Planet Earth* that present nature in a beautiful and evocative way. However, as mentioned earlier by Beck, it "makes for excellent television but questionable environmental advocacy… [and in doing so] equates ethics with aesthetics" (64-65). This too is problematic for Doyle as she draws upon the example of conventional photos of melting glaciers, which portray nature as either a sight to admire or to be shocked by. Regardless, they don't' make environmental issues feel personally meaningful nor accurate. Since, for the majority of people they are not present realities. Its lacks the understanding of the latency of environment effects that tend to develop invisibly (Doyle 24). To reiterate Frerie, the issue of climate change should not be 'looked at' like spectating a football game but rather experienced as 'players' part of 'the game' of climate change and sustainability.

For Bendor, such experiences are made possible through the interactivity afforded by new media and technology. According to him, people's everyday experiences and interactions are what help them to make sense of as well as determine how to act within the world (93). Environmental communicators must therefore produce *experiences* of climate change that are closer to everyday experience, or at least *feel* like they are. Doyle explains this as an "embodied and emotional engagement with climate change" (155). For Freire, such interactions can be analyzed by what he refers to as dialogue. He writes:

> Existence is a dynamic concept, implying eternal dialogue between man and man, between man and the world, between man and his Creator. It is this dialogue which makes of man an historical being. (14)

Environmental communication, beyond facilitating dialogue between each other is about facilitating dialogue between humans and their world. Bendor sees this through interactive media as "resonant interactions" (96). Resonant interactions facilitate an 'experiential affinity' with climate change and environmentalism that, in turn make them feel personally relevant (Bendor 95-96). Drawing upon Martin Jay's text *Songs of Experience*, Bendor notes that an experience occurs when there is change or something is altered (qtd. in Bendor 97). Within experience lies an 'inherent duality'; namely, between immediate and sedimented experience (Bendor 97). Whereas the former represents sensation, perception and embodiment, the latter relates to memory, identity, tradition and wisdom (96). These moments of change, transformation and newness embody the cognitive and contextual factors required to better grasp climate change and sustainability significantly and meaningfully. It is

then not a matter of 'seeing' climate change and other environmental issues but experiencing them, which is illustrated when Bendor writes: "Seeing – or more accurately, experiencing – is believing" (94).

1.2.2. IMAGINING IS UNDERSTANDING

Aside from creating an experiential affinity with climate change, what is also needed is the transformation and/or development of people's perception of what it is, what can be done, and what should be done. Bendor draws attention to the importance of people's imaginative faculties when communicating climate change. For Freire,

> […] in the act of critical perception, men discover their own temporality. Transcending a single dimension, they reach back to yesterday, recognize today, and come upon tomorrow. (3)

In order to look back in the past, for instance prior conceptions of the environment and climate change, we also need to transcend them to justify and/or question the present, as well as speculate about the future. According to Bendor, the imagination is able to "fill in the gaps and flesh out [an] imaginative event, object, or setting […] to reveal immanent, latent, or hidden possibilities already existing in the present" (143). Doyle herself sees the imaginative engagements through art as a means to (re)imagine climate change as a present issue (146). Thus, while experience aims to create resonance with the environment and climate change, imagination aims towards a better understanding of the latter. Bendor mentions that media act as 'scaffolds' for such imaginative engagements, in the sense that they guide imagination (Bendor 141, 146). These are "worldmaking interactions" (Bendor, 132), they allow people to imagine alternative futures, that is, between both the individual, personal imaginaries as well as collective, social imaginaries – to explore what is possible.

Designing environmental communication in terms of experience and imagination will create more opportunity for dialogue, in Freire's sense, between people, their world, their past, their present and their aspirations for the future. Bendor cites Hart and Leiserowitz calling such designed interactions and experiences as "teachable moments"– events or contexts that facilitate the capacity for change (qtd. in 99). It is in this way that environmental communication can be extended as a form of critical public pedagogy.

1.2.3. TEACHING = LEARNING

So far, I have analyzed the new possibilities afforded by interactive media for environmental communication. These allow for environmental communication to extend itself as a form of public pedagogy – a means to stimulate a conscientization process. For Freire, this meant becoming critically aware of the oppressive forces, such as the elite, or, in a more contemporary sense, advanced neoliberal capitalism's ruling class, and their suppressing and discrediting of dissident voices in mass society (vii). However, with regard to environmental communication in the 21st century, this is formulated differently; in that we need to be aware of ourselves as the oppressors of nature. Beyond this, there is the need to formulate and understand the human interrelationship with nature. Part of the 'conscientization' process in this thesis aims to (re)examine what it means to be human in a period of ecological crisis. This means re-thinking the relationship between humans and nature through the affordances of interactive media. While the previous sections have touched upon *how* this might be taught in terms of interactions, the following sections of this chapter aim to explain *what* needs to be taught – the learning out comes of critical environmental communication – which by no means aim to mimic traditional learning such as the memorization of knowledge, but rather focuses on consciousness and understanding, which Freire describes as:

> an attitude of creation and re-creation, a self-transformation producing a stance of intervention in one's context. (43)

1.3. BEYOND THE NATURE/CULTURE DISTINCTION

Freire marks humanity as separate from animals and nature based upon their ability to be critical. However, when it comes to thinking about the environment, and specifically climate change, such a conceptual distinction becomes problematic. Doyle shares this concern. According to her, when mediating climate change, communicators tend to frame it as an environmental issue opposed to also being a humanitarian issue (3, 6). Climate change as an issue should be *embodied* as part of humanity in the sense that we grasp our roles in the causes, effects and potential solutions to it. Freire mentions this – although with a specificity to human problems – when he writes:

the role of man was not only to be *in* the world, but to engage in relations *with* the world… As they apprehend a phenomenon or a problem, they also apprehend its causal links. The more accurately men grasp true causality, the more critical their understanding of reality will be. (39)

We therefore need to grasp the 'true causality' between humans and the environment, which will bring the issues closer to everyday perception thereby making them more personally relevant. In the next section, I will focus on how this can be achieved through a posthuman approach to environmental communication. This will draw upon the theory of posthuman subjectivity by feminist scholar and professor, Rosi Braidotti, and the process of 'un/learning' by Nikki Rotas, a professor in interdisciplinary and inclusive education.

1.3.1. A POSTHUMAN APPROACH TO ENVRIONMENTAL COMMUNICATION

Posthumanism, according to Braidotti, is the "historical moment that marks the end of the opposition between Humanism and anti-humanism" (*The Posthuman* 37). This is fundamentally different from Freire's perspective, in that it aims to elaborate upon and explore different ways of thinking about what it means to be human, which includes rethinking the separation between humans, nature and the environment. A posthumanist perspective aims to move beyond such structural differences towards more horizontal relationships. In order to do so, Braidotti develops a 'posthuman theory of subjectivity', which she describes as:

A posthuman ethics for a non-unitary subject proposes an enlarged sense of inter-connection between self and others, including the non-human or 'earth' others, by removing the obstacles of self-centered individualism. (*The Posthuman* 49)

As part of her methodology she highlights the following key components; cartographic accuracy based upon ethical accountability; transdisciplinarity; the importance of combining critique and creativity; the notion of non-linearity; the powers of memory and imagination and the strategy of 'defamiliarization' (*The Posthuman* 163, *Posthuman Critical* 18). These are part of her critical posthumanism, which will be analyzed in terms of environmental communication throughout the rest of this chapter.

Braidotti's posthumanism rests upon the metaphysical position of a monistic ontology, drawing upon the "Spinozist legacy", which aims to re-position within "[horizontal] relations to multiple others" (*The Posthuman* 56); namely, matter and things. This suggests that human subjectivity is not only a result of social constructivism but also, in part influenced by material relations – a "nature-culture continuum" (*The Posthuman* 92) highlighting a between humans, matter (things) and the world. In this ontological perspective, humans, nature and the environment are seen in terms of performativity, as vital and self-organizing forces, each interacting with each other in multiple ways as an interconnected whole (*The Posthuman* Braidotti 60). From this perspective, humans are made ethically accountable to both human and non-human things. This is known as a vitalist materialist approach[ii], described by Braidotti as 'radical immanence'. This opposes transcendentalism – the search for overarching 'truths' – to instead explore the more hidden and latent structures of things within their specific contexts and historicity. A posthuman approach to environmental communication should therefore make people aware of these immanent structures in order for them to rethink their own subjectivities. Environmental communicators can achieve this by stimulating the public's memory and imagination through the design of resonant and worldmaking interactions. This embodies what Braidotti means with being critical yet also creatively searching for different ways in which environmental issues can be presented, thought about, and discussed.

Nevertheless, Braidotti acknowledges how such a shift in perspective can be problematic due to the 'inertia' caused by our previously established mental habits (58). Hence, the reason for environmental communication to be extended (re)education since it is not only about an exchange of information but also creative knowledge production. This is explored in the next section through Rotas and her work on environmental education and her notion of 'un/learning'.

1.3.2. A POSTHUMAN APPROACH TO LEARNING

> I do think that one of the most pointed paradoxes of our era is precisely the tension between the urgency of finding new and alternative modes of political and ethical agency for our technologically mediated world and the inertia of established mental habits on the other. Donna Haraway put it with customary wit: the machines are so alive, whereas the humans are so inert! (qtd. in Braidotti, *The Posthuman* 58)

Referring back to Freire, an environmental communication for critical environmental consciousness needs to teach those, who remain passive and 'inert', to engage themselves in the world; more specifically, the (geo-)historical processes of the ecological crisis. This means unlearning some of the consumerist desires and behaviors that are propagated by advanced capitalism and re-evaluating them with a posthuman subjectivity. Rotas introduces the notion of 'un/learning' – the potential to 'unlearn' traditions (93) – within environmental education. She does so by reconceptualizing its practice through new materialist frameworks and ontologies. This draws upon the work of Deleuze and Guatarri that aim to "dismantle the colonizing practices of capitalism […] that teaches the subject to desire their own repression and the oppression of other beings, places and things" (97). Rotas therefore embodies the work of Freire yet within the context of *environmental education*. According to her, the 'classroom' within environmental education should be seen as a relational space, that rather than aiming for the repetition and memorization of knowledge, aims at asking different questions. For her 'classrooms' should be 'chaotic and disruptive' and as a result teach students as well as teachers to get in touch with the "relational moment of things" (Rotas 99). That, not all things are fixed or go as planned, but rather are always incomplete and unpredictable, in a state of flow where there are complex interconnections between things both human and non-human, that together mutually constitute the world, as well as what is to come. This perspective is known as 'becoming', which Rotas explains as a performative praxis that is intensive towards more change, constantly looking to create new associations, shifting from passivity and inertness towards 'activity' and dynamism.

Rotas' notion of 'unlearning' can be used to understand Braidotti's strategy of 'de-familiarization'. Asking new questions, by unlearning, is about rethinking those frameworks, ontologies, and epistemologies that have for the majority been seen as dominant and fixed. Defamiliarization[iii] is "a form of estrangement", or making strange, that which aims to achieve a critical distance from dominant subjectivities and ontologies (Braidotti *The Posthuman* 88). Braidotti's monistic ontology is an example of such 'defamiliarization' that aims to neutralize the one-dimensionality of advanced capitalist society. According to Braidotti, defamiliarization, when it comes to dealing with environmental issues, is a 'becoming-earth' (*The Posthuman* 81). This means restructuring ourselvs as 'geo-centered' subjects with the agential capacity to facilitate change and transformation on a planetary dimension; "the open-ended, interrelational, multi-sexed, and trans-species flows of ['becoming'] through

interaction with multiple others (*The Posthuman* 89). This will be further used to analyze the processes in my case study *Tree* in chapter 3.

1.4. DESIGNING INTERACTION FOR EMERGENT PRAXIS

A posthuman approach to environmental communication embraces the contextual and cognitive factors that were missing in the 'information deficit model', which as established are achieved through 'resonant' and 'worldmaking' interactions. By drawing upon games studies, we can understand what these interactive experiences mean for meaningful engagement. Sonia Fizek, a professor in games, media and design, distinguishes between games that are "playable" on the one hand and "playful" on the other. She makes this distinction against the background of Ian Bogost's text "Gamification is bullshit" in which he critiques trivial applications of gamification – "the adaption of game mechanics to daily activities" (Fizek 273) – used as marketing tools. These kinds of gamification are considered as *playable*, or the term Bogost uses "exploitationware" (qtd. in Fizek 276). Based on this communication following the 'information deficit model' can be considered as *playable*, in that they are not meaningful. On the other hand, *playful* gamified interactions exhibit something more complex allowing for more opportunities for significant meaning-making. For her, meaningful engagement is the result of fun, however she goes further by conceptualizing it as 'emergent playfulness' (Fizek 275). Playfulness is a result of interaction with the 'rules' *within* a system and it becomes 'emergent' when there is interaction *with* the system itself. The latter, however is unpredictable in that it is a "creative interpretation of [the] rules" (279). With regard to environmental communication it is about the creative interpretation of the cognitive and contextual factors to achieve a state of 'becoming'. To understand, what exactly this entails for the user/player/participant, Fizek refers to Zimmerman and his framework for media literacy in the 21st century (Fizek 278), which is explained in the next section.

1.4.1. EMERGENT, PLAYFUL POSTHUMANISM

Zimmerman acknowledges the complexities in 21ˢᵗ century society discussed thus far. For him these can be dealt with through a thorough understanding of games and their design. He writes:

> It is not that games will necessarily make the world a better place. But in the coming century, the way we live and learn, work and relax, communicate and create, will more and more resemble how we play games. While we are not all going to be game designers, game design and gaming literacy offer a valuable model for what it will mean to become literate, educated, and successful in this playful world. (30)

Environmental communication, besides being posthumanist, should thus also be playful. Keeping this in mind, I will describe the three concepts that function as the framework for what he calls a 'gaming literacy'. His first component, "systems" refers to a mode of thinking that particularly considers the world as a dynamic set of systems with constantly changing interrelationships (25). This embodies the posthuman idea of being transversal across the various structures and systems embedded in the world, including the distinction between humans and nature. The second component, "play" is defined as the "free movement within a more rigid structure" (26-27). With regard to games, this refers to a player's interaction with the rules of the game and the various potentialities to act that emerge from it. Play can also be seen in terms of Braidotti's strategy of defamiliarization, to play with dominant structures and subjectivities in search for alternatives that lie beyond them. The last component of his framework, "design" is defined as "the process by which a designer creates a context, to be encountered by a participant, from which meaning emerges" (Zimmerman 28). Design is what ties systems and play together as the creation of a set of possibilities that can be interacted with. An interactive experience that sets the right contextual parameters therefore allows for a process of signification that becomes meaningful/playful beyond 'playability'. Designing interactive experiences are therefore a means of designing open spaces for meaning to emerge. Zimmerman ends on the note that games are "radically interdisciplinary" (29) in the sense that they embody art, communication, aesthetics, logic, storytelling and human psychology and behavior. This same interdisciplinarity needs to be adopted by environmental communicators to convey environmental issues holistically, meaningfully and effectively.

According to Zimmerman, 'gaming literacy' presents a new set of cognitive, creative and social skills that the 21ˢᵗ century requires (25). While posthumanism presents a critique of dominant human subjectivities, playfulness allows for new creative figurations. Interactive environmental experiences should therefore be designed in terms of what I call *emergent, playful posthumanism*, a phrase to describe a novel kind of formally persuasive interactivity that aims to rethink what consciousness and participation in society means. According to both Freire and Braidotti, it is about approaching the world with a spirit that is simultaneously critical, flexible and inclusive. This is needed to deal with the unpredictability and dynamism of the ongoing entanglements between humans, technology, nature and the environment. In the words of American media theorist, Douglas Rushkoff this can be seen as a 'renaissance'. He writes:

> Renaissances afford us the ability to rethink and redesign our world using entirely new rule sets… I would place my renaissance bet on the gamers' perspective: the very notion that our world is open source, and that reality itself is up for grabs. (183)

1.4.2. THE CONSCIENTIZATION PROCESS

Up until this point, Freire's education for critical consciousness has been re-contextualized in terms of 21ˢᵗ century environmental communication. This was based upon Bendor's emphasis on the inseparability of sustainability and new, interactive media, in which 'dialogue' is replaced with "resonant interactions" and "worldmaking interactions". This has further been interpreted through the lens of posthumanism; namely, the texts of Braidotti and Rotas and the need for a praxis of 'becoming' and the adoption of a posthuman subjectivity that is relational and emergent, achieved through the process of 'unlearning' and 'defamiliarization'. These should be implemented *playfully* within interactive environmental communication practices in order to awaken critical consciousness, facilitating a conscientization process. However, it should not be mistaken that awareness is equal to critical consciousness. Awareness will only become the latter when it is critically placed in a system of relationships (Freire 132) – critical relationality, and it is posthumanist when these relations are based upon a monistic ontology. All of these insights will be taken into account to determine whether my case study *Tree* exemplifies a conscientization process based upon an emergent, playful posthumanist approach to environmental communication.

So far, the previous sections have introduced and established the conceptual basis for environmental communication for critical environmental consciousness. In the following section, I will introduce, analyse and discuss the empirical basis of technological mediation as a methodology for analysis. This will start with, first an introduction to postphenomenology as a philosophy of technology, its main concepts and the four human-technology relations outlined by Rosenberger and Verbeek. Second, I will explain postphenomenology as research methodology introducing the steps that I will take in my analysis in the following chapter as well as my justification for the use of this method.

CHAPTER 2: POSTPHENOMENOLOGY

Postphenomenology is a field of research pioneered by Don Ihde, that blends empirical research with philosophical reflection in order to study the way technologies mediate and shape human perceptions and experiences of the world (Rosenberger and Verbeek 9, 11-12). Postphenomenology distances itself from broad totalizing accounts of technology that are characteristic of classical phenomenology (Rosenberger and Verbeek 28). Instead it focuses on the various intentional implications a technology has in its applications different but specific contexts. Drawing upon science and technology studies[iv], it focuses on concrete case studies. For instance, Verbeek makes a postphenomenological analysis of ultrasound technologies in order to study its impacts on human perceptions of childbirth (see Verbeek 2008). As a methodological approach, postphenomenology studies alternative forms of technological mediation examining their "advantages, disadvantages, limits and places of potential expansion and enrichment" (Rosenberger and Verbeek 32). These analyses are however *based upon* empirical studies rather than *producing* them (Rosenberger and Verbeek 10). These empirical cases are used as the basis for philosophical reflection. In this thesis, I will analyze VR within the context of environmental communication. In doing so, I hope to identify VR as a means of mediating critical environmental consciousness as well as an *emergent, playful posthumanism*.

A key component to postphenomenology are Idhe's "human-technology" relations. According to Rosenberger and Verbeek, these denote a "relational ontology" between humans, technology and the world (19). Therefore, it studies the relations to the world that emerge as a result of technological mediation. Accordingly, technologies "shape the 'subjectivity' of their users as well as the 'objectivity' of their world" (19). Smartwatches like the Fitbit for example, shape individuals to become health conscious, which in turn transforms their perception of the world; where, for example walking becomes less as a mode of transportation and more an opportunity for exercise. These subjectivities and objectivities, however, are not predetermined but emerge *as a result of* technological mediation. These are also not "inscriptions of technological artifacts" (*Materializing Morality* 372) – fixed scripts – but depend on a user's interpretation and/or appropriation of that technological artifact. Humans and technology therefore mutually constitute each other, which is formulated as:

Humans – Technology → World

Another central component in postphenomenology the notion of 'multistability'. This implies that, while technologies are always intentional and context-specific (Rosenberger and Verbeek 16), they are not limited to a single context but rather can be applied to multiple contexts. Professor at Aarhus University, Jesper Aagaard, in his introduction to postphenomenological research, provides the example of a lighter, which can be used predominantly to make fire or alternatively to open a bottle (525). The former is considered a dominant stability, while the latter is an alternative 'stability'. These components are used to investigate the various "human-technology relations" that may emerge as a result of technological mediation; these are distinguished by Ihde as embodiment, hermeneutic, alterity and background relations (Rosenberger and Verbeek 14-18). The next section will briefly outline each of these relations.

2.1. HUMAN-TECHNOLOGY RELATIONS

EMBODIMENT RELATIONS

These relations are bodily-perceptual (involving body and perception), so when people interact with technologies and material artifacts, they *embody* them, which in turn creates a transformed perception of the world. A user's experience of the world is then "reshaped *through* the device" (Rosenberger and Verbeek 14). This is formulated as:

$$(I – Technology) \rightarrow World$$

This suggests that the world is experienced *through* technology, which in turn involves a transformation of a user's bodily and perceptual capacities. However, due to the non-neutrality of technologies the extent of such transformations differs. This is analysed in terms of structures of 'magnification/reduction' that express the technology's non-neutrality. For example, a blind man's stick while amplifying a blind man's sense of space reduces his sense of 'touch' to the stick itself. However, this brings up to another component of the embodiment relation; namely, technological transparency. When a technology fades into the background of perception it is due to our familiarity with it and thus provides a more explicit directedness towards the world.

HERMENEUTIC RELATIONS

Hermeneutic relations refer to a transformed human perception that is a result of a technologies interpretation of the world (Rosenberger and Verbeek 16-17), for instance a

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display or meter. An example of this is a calculator or a watch that interprets time. This is formulated as:

$$I \rightarrow (\text{Technology} - \text{World})$$

Rather than gaining access to the world through an experiential, embodied account, hermeneutic relations offer an interpretative account of the world. Whereas the former relation characterizes experience and Bendor's "resonant interactions" (96) the latter, relation is characteristic of imagination and his "worldmaking interactions" (132). However, this will be elaborated upon later in my analysis.

ALTERITY RELATIONS

Alterity relations refer to the certain technologies that mimic person-to-person interaction, the engagement with a technological 'quasi-other' (Ihde qtd. in Rosenberger and Verbeek 18). This is formulated as the following:

$$I \rightarrow \text{Technology} - (- \text{World})$$

In such a technological mediation, its mode of interface serves as analogous to human-to-human interaction. Rosenberger and Verbeek mention examples of the ATM or the GPS device in a car that facilitate a human-technological interaction (18). More recent examples include the developments in artificial intelligence and machine learning systems, as implemented in 'smart home' appliances such as Google Home and Amazon Echo.

BACKGROUND RELATIONS

Lastly, background relations, refer to the technologies that blend in with the ambient environment of the technology's use context. Rosenberger and Verbeek mention the example of the background noise of a working refrigerator (18). The interaction with technologies in this case is indirect, but nonetheless still contributes to the experience – a kind of "present absence" (Rosenberger and Verbeek 19). A more critical example may be the use of algorithms on social media to steer online consumption.

These forms of technological mediation depict how together *with* (and not *for*) their users, technologies constitute various ways of looking at and being in the world. That being

so, Ihde's human-technology relations function as a way to derive the subjectivities and objectivities that emerge from these relations, which in turn shape people's knowledge and worldview. These relations and concepts will be applied to existing implications of VR and concretized in terms of environmental communication through the case study of *Tree* in the next chapter. This is followed by a conceptual analysis that will reflect on the empirical work using the concepts and theories outlined in chapter 1.

2.2. POSTPHENOMENOLOGICAL METHODOLOGY

Rosenberger and Verbeek, in their "A Field Guide to Postphenomenology" present a loose framework for conducting a postphenomenological analysis, which will serve as a guideline for the analysis in the next chapter. The first step is to identify the human-technology relations within a technology. The second step involves the use of empirical studies on the technology to present how these human-technology relations are enacted. The third step involves a closer inspection of the various human-technology relations identified in step 1 and 2; namely, the way in which they mutually constitute a specific objectivity (of the world) and a specific human subjectivity. The fourth and last step takes the analyses and insights developed in steps 1-3 to reflect on them using the theories and concepts outlined in the chapter 1; that is, how they shape knowledge and perception (Rosenberger and Verbeek 31).

2.2.1. JUSTIFICATION OF POSTPHENOMENOLOGY AS METHOD

The preceding passages provide a pertinent and contemporary method of examining and understanding how environmental communication might facilitate critical consciousness through VR. This is due the methodology's explicit focus on technological mediation and the emergence of human-technology relations that in turn shape a certain subjectivity and objectivity of the world. It does so by discerning what, how and why VR might add or subtract from the practice of environmental communication. Considering Bendor's conception that media and technology are inseparable from implementation of sustainability within society, these technologies should be studied in their own right and not in terms of essentialism (as in classical phenomenology). The concepts outlined in chapter 1 will therefore be analyzed *through* technology rather than *with* technology within the specific context of environmental communication.

CHAPTER 3: POSTPHENOMENOLOGY OF VR

3.1. BREIF INTRODUCTION TO VR

Jason Jerald, author of *The VR Book: Human-Centered Design for Virtual Reality*, defines VR as "a computer-generated digital environment that can be experienced and interacted with as if that environment were real" (9). VR therefore embodies its users within a computer-generated digital environment (or VR world) thus transforming their bodily-perceptual experience. VR then predominantly mediates an 'embodiment relation'. In terms of the 'technological intentionality', VR is commonly used in the context of entertainment and games. However, due to VR's inherent digitality, its applications and the stimuli they provide are only limited to the skill and imagination of programmers. As a result, there are increasing instances where VR is being used in the fields of science and medicine, military, data and design visualization and occupational training (Jerald 12), which exemplifies its 'multistability'. In order for these applications to work, the goal of VR developers is to make the technology 'transparent' in order to facilitate a "direct communication" with the virtual world (10) – a '(human – VR) $\rightarrow$ virtual world' relation. Nevertheless, due to VR's technological flexibility Rosenberger and Verbeek would suggest a 'variational analysis' (28) of various stabilities to indicate it's mulitstability. However, for the sake of length and specificity I have limited this analysis to a learning-based application of VR, one that promotes pro-environmental behavior and lastly *Tree* a virtual reality installation experience. This is done through one of the two postphenomenological research methods posed by Aagaard; that is, "an in-depth exploration of a typical *use* of a given technology" (528) – this is opposed to a cross-variational analysis that looks at various stabilities of a technology.

3.2. A POSTPHENOMENOLOGICAL ANALYSIS OF VR

By elaborating on the concrete case studies of VR, its potential as an experiential and imaginative medium can be realized through a postphenomenological analysis. In these analyses, the aim is to identify VR as a means to broaden the understanding of environmental issues beyond its informative dimension as posed in the 'information deficit model'. This means potentially creating deeper levels of engagement across the multiple dimensions of environmental issues by facilitating embodied and cognitive responses to climate change afforded by VR.

3.2.1. VR FOR EXPERIENTIAL LEARNING

Science and technology researcher Chongsan Kwon conducts empirical work aimed at verifying the possibility of "experiential learning" through VR. Kwon makes a distinction between VR and AVR (authentic virtual reality). The former implies VR applications where experientiality lies on the spectator level – participants "see the real thing in a normal setting". The latter implies VR applications where experientiality lies at the exploratory level – participants "[p]lay, experiment, explore, and probe the setting" (103). Kwon's study tests the experience in both VR and AVR in a game-based learning experience that utilizes AVR to "experience contents that were impossible to experience in actual reality" (105); namely, moon exploration in order to learn the difference in gravity between the moon and earth. What is evident here are Bendor's 'resonant interactions' that act as a 'experiential proxy' (Bendor 99) to make the students feel as if they were on the moon. According to Kwon, this is known as "presence", or "the sense of being there" (102). This, then necessarily entails an embodiment human-technology relation, where AVR attunes a user's bodily-perceptual experience to the virtual world itself to facilitate such 'presence'. According to Kwon, this is achieved through the accuracy of sensory feedback, as well as the level of participation/interaction afforded to the user/participant. In postphenomenological terms, this has an impact on the level of 'transparency'. This illustrates an inherent quality within VR; namely, that immersion within a virtual world requires the reduction of the user's experience of the actual world. Technological mediation is therefore immediate opposed to imaging technologies that require training and familiarity with the device before mediation can occur.

In Kwon's study, students were instructed to make the relevant associations between the difference of gravity on earth versus that of the moon by throwing a rock and jumping in VR. Thus, a further hermeneutic relation can be identified where the students need to interpret the output created by the virtual world which transformed their perception of the actual world. Hence, a reformed formulation of the relation is necessary; namely:

$$((I - VR) \rightarrow VR \text{ world}) \rightarrow \text{Actual World}$$

This shows that *through* VR the students gain access to a virtual world, which in turn facilitates new information about the actual world; that there is a difference between gravity on the moon versus the earth. The idea behind this is to get a more personal and experiential understanding of such a difference since it is unlikely for the students to actually experience

this, unless any of them will become astronauts in the future. In a way, this embodies Freire's idea that a sense of responsibility cannot be adopted intellectually (in the classroom) "but only through experience" (12). This mediates a relation between the students as astronauts/field researchers and the exploration of the 'objective' difference in gravity between earth and the moon. The mediated subjectivity and objectivity therefore transforms this understanding of the gravity through the experiential dimension of VR.

Based on Kwon's results he concludes that the AVR experience facilitated an experience that was closer to direct perception than VR, which in turn led to the partial enhancement of the learning effect (Kwon 115). As a result, the presence, vividness, and interactivity afforded by VR did had a positive impact on learning experiences. Kwon also notes that, in particular, AVR triggered more complex levels of thinking – analyzing, evaluating and creating (113). Thereby presenting the opportunity for creative knowledge production beyond the remembering of information.

3.2.2. VR AS CATALYST FOR PRO-ENVIRONMENTAL BEHAVIOR

An empirical case study by Ahn et al. examines the ability of immersive virtual environments (IVEs) to stimulate pro-environmental behavior (235). In order to evaluate this, they made a comparison between the effects of IVEs with more traditional methods of environmental communication such as print and video (235). The IVE used in the experience simulated a first-person perspective within a forest environment equipped with visual, auditory and haptic feedback (Ahn et al. 237). Participants in this experiment were asked to take time to acknowledge their virtual surroundings before eventually being asked to start moving a virtual chainsaw to cut down a tree. This resulted in a programmed change within the virtual environment; namely:

> As a result of cutting the tree, the forest was programmed to become completely quiet and all movement was removed to emphasize the damage inflicted upon the forest. (Ahn et al. 238)

This is exemplary of what Rosenberger and Verbeek call 'technological intentionality', or in terms of Bendor, 'designing with intent' where the goal is to change the user/participant's response to a certain situation (Bendor 35). In other words, the act of virtually cutting the tree is amplified by reducing the background stimuli in the virtual environment. The other

experiment using the "print stimulus" (Ahn et al. 237) consisted of a detailed transcription of the experience of the IVE. Prior to the experiment, both sets of participants (IVE and print stimulus groups) were pretested online to measure their "environmental locus of control" (237) and "perspective-taking propensity" (237). One week later, they attended an introductory presentation by one of the researchers on the background of paper consumption and its connection to deforestation (237) before participating in their respective experiments. The researchers set up a second irrelevant experiment for both participant groups. In the experiment a researcher would knock over a cup of water, "ostensibly by mistake" (238) and ask help from the participants to help clean it up using napkins (that were pre-counted) while the researcher apparently had to leave to set up the experiment for another participant. Subsequently, the number of napkins they used acted as an "inverse measure of environmental behaviour" (238).

   The results of the experiment outlined above were that 20% fewer napkins were used by participants of the IVE compared to those of the print stimulus (239). However, in terms of the participants' belief that their individual actions were the cause of deforestation, that is their environmental locus of control, the results of the questionnaires showed that there was an equally significant increase in the environmental locus of control for both groups (241). Based on this, the second experiment replaced the measure of "perspective-taking propensity" with an awareness of the impact of the participants' excessive paper consumption (240). A second experiment was conducted but this time with a video stimulus to account for the difference between using print, video and VR. The video stimulus "closely mimicked" the depiction of the tree-cutting process (without audio) shown in the IVE but then on a desktop monitor (240). In this experiment, the measure of the number of napkins used was removed to avoid raising suspicion. Instead participants were assessed on their "environmental behavioural intention" and "environmental behaviour" via self-report which was conducted through e-mail. The result of the second experiment showed that out of print, video and VR, the participants in the IVE sustained their environmental locus of control and behaviour one week after the experiment, whereas those of participants in the other two groups declined (241-242).

   While Kwon's study exhibits both embodiment and hermeneutic relations, postphenomenologically speaking, the study of Anh et al. is purely an embodiment relation. This is since, the former specified a virtual learning environment (VLE), while the latter takes place in an immersive virtual environment (IVE) – thus implying a stronger emphasis on immersion rather than learning. Regardless, both case studies showed that the embodiment

relations of VR have the ability to mediate the bodily-perceptual awareness of its participants and in turn influence their thought and behaviour of a certain issue and/or situation. First, in terms of creating a sense of being in the virtual environment that felt real and convincing. Second, that it changed the perception of participants, which for Kwon were the student's acknowledgement that the environment on the moon was different than on earth (without going to the moon), while for Anh et al. it was that the change in perception of participants' environmental locus of control and behavior, which was sustained post-VR experience. These findings present a clear basis for understanding the implications of VR, particularly in terms of human-technology embodiment relations. Based upon these grounds, in the next section, I will make my own analysis of *Tree* using resources such as reviews and articles found online as well as drawing upon the empirical studies mentioned above.

3.3. A POSTPHENOMENOLOGICAL ANALYSIS OF *TREE*

Tree was one of the many projects that were selected to be premiered at Sundance Film Festival New Frontier in 2017, in which the theme was climate change. Sundance's New Frontier Story Lab puts an emphasis on the convergence between storytelling, art and technology. The VR experience created by Milica Zec and Winslow Porter has been described by them in an interview with Stephen Reid from virtual reality company Vive for their blog, as:

> a first-person VR experience where users take on the body and perspective of a seedling, which eventually grows into a majestic rainforest tree above the canopy. We take participants through the stunning Peruvian Amazon, replete with biodiversity, as their arms transform into branches and their bodies turn into a trunk […] With this piece, we wanted to make deforestation appear as something deeply personal. In *Tree,* climate change happens to you. Beyond that, it's an intimate and solitary experience that hopefully increases respect for nature – how it functions, and how much it does for us on earth. (Reid)

From this description it can be concluded that *Tree* exhibits an embodiment human-technology relation. Just as with the two examples above, VR is predominantly used to transport its participants/users into another virtual context, setting and/or world. *Tree*
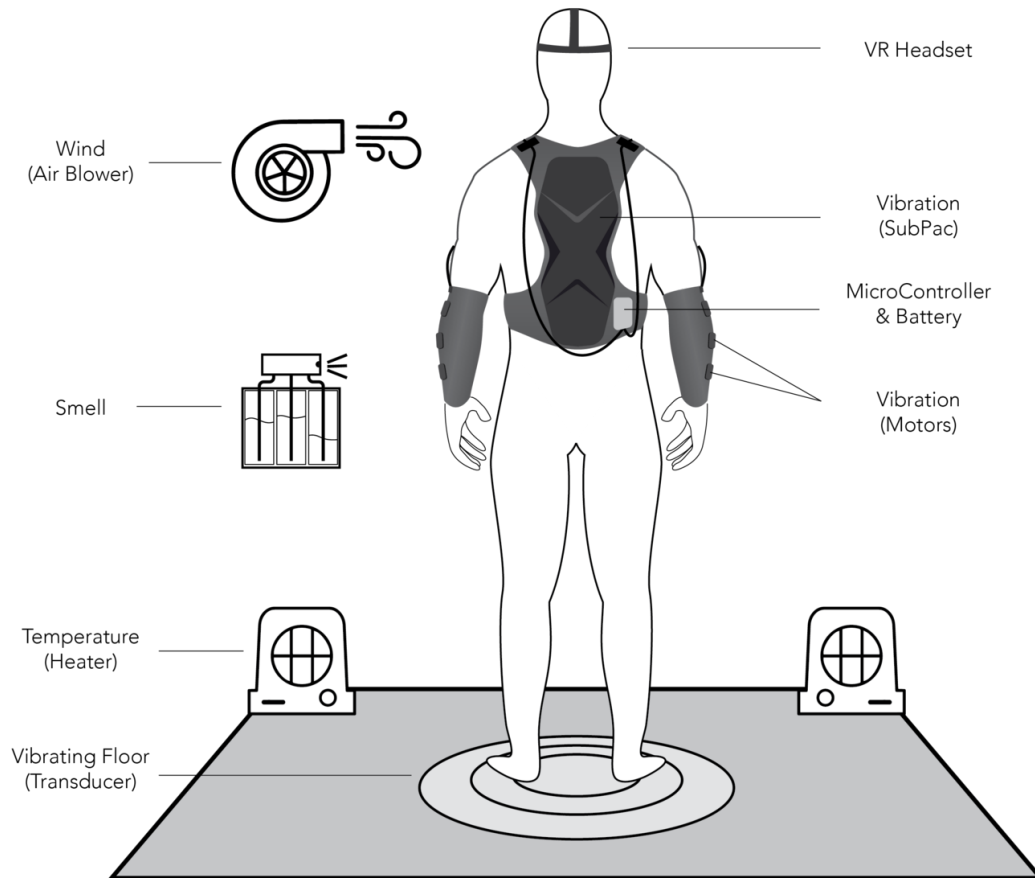
Figure 1: *Tree's* embodied storytelling (with sensory alteration) diagram. From: Yedan Qian. "TreeVR." Yedan *Qian,* http://www.qianyedan.com/treevr. Accessed 21 May 2019.

compared to the previous examples has higher levels of transparency. In the installation space, participants wear vests (see Fig. 1) that allow for haptic feedback through electronic muscle stimulation (EMS), thereby allowing them to feel as if they were growing. As seen in Fig. 1, the VR experience was further enhanced by manipulating temperature, wind and smell throughout the installation experience. The level of technological transparency is therefore a lot higher than the examples above to create a deeper sense of immersion in the virtual 'story' world.

The experience begins with participants planting a real seed given to them by moderators, this was symbolic of the seed they were about to become in *Tree*. Once in VR, over the duration of 8 minutes, the participants grow from a seedling into a kapok tree that grows to the top of the canopy with a rainforest soundscape in the background. Throughout this experience, participants are able to move their heads to explore the surroundings as well as their arms which become branches, in which participants can feel birds land on them. While it starts off as a serene sensory and aesthetic experience, towards the end participants begin to hear the sounds of humans and trucks coming closer. At this point, smoke begins to

appear along with a fire that spreads across the surroundings in front of the participants' point of view. Once this happens, the perspective in VR slowly shifts from first person (as the tree) to a third person perspective looking down at (virtual) deforestation. At the end of the virtual experience, participants are left with a quote by Chief Edward Moody of the indigenous group Nuxalk Nation:

> We must protect the forests for our children, grandchildren and children yet to be born. We must protect the rainforests for those who can't speak for themselves such as the birds, animals, fish and trees. (*Tree*)

Once participants come out of VR, they are given back the seed in a small paper pouch with a message that says: "This is a reminder to keep our forests standing" (Reid), which they can take home.

Josh Constine, wrote an article for *TechCrunch*, in which he said: "I watched one woman come out of VR crying, having so fully identified with the now fallen tree". Participants of *Tree* thus 'personally' experience deforestation in an immersive way, an experience that most people might not even be able to see/visit in the actual world. This allows for what Doyle refers to as a more personal, embodied and meaningful response to deforestation as an immediate and ongoing present issue. In the same article, Porter is noted saying that the act of planting the seed leads the participant to adopt a sense of responsibility, which they are reminded of when it is given back to them at the end. This is expressed in an online article by Ken Jacobson for *International Documentary Association* in which he describes it as a moment to remind himself of the "transformative journey" that he took part in. MIT Media Lab, who collaborated with Zec and Porter amongst others, in their project overview on their website explain how the tactile experience created a "body ownership illusion" to have participants directly perceive and feel as if their body was the tree. Based on these articles and reviews, *Tree* communicates 'strong' perceptive signals by being an emotionally evocative piece that made the issue of deforestation feel personally relevant. This, in turn should create a revised response that persuades people to look at the issue more critically in terms of their own contexts and what they can do about it. However, in the next section I will delve into my conceptual analysis of *Tree* based on the concepts discusses in Chapter 1.

3.3.1. *TREE* AS INTERACTIVE ENVRIONMENTAL COMMUNICATION

When participants in *Tree* become immersed in the virtual narrative and environment, it mediates an embodiment relation – the embodiment within a VR world, which would be formulated as follows:

$$I - VR \rightarrow VR\ World$$

This is because it mediates the perception of a virtual environment that represents deforestation in the actual world and thus needs to be interpreted as such. This then also presents a mediated hermeneutic relation:

$$((I - VR) \rightarrow VR\ World) \rightarrow World$$

When interpreted as a virtual experience of deforestation, causal links are created between deforestation and climate change in the actual world. Here, we see Bendor's 'resonant interaction' at work, creating an experiential affinity with unsustainability. By 'designing with intent' *Tree* persuades people to rethink what it means to be human within the Anthropocene, especially with regards to mutual relationship between humans and nature (Bendor 111). This conveys a certain relationality between humans and trees; namely, that while humans can move away from problems and danger, trees can't. According to Bendor, these kinds of 'resonant interactions' "de-abstract environmental phenomena" (112) by making people resonate with them on a personally meaningful level. These are unlike, the visual imagery used in environmentalist campaigns that portray melting ice caps and glaciers, which still detach people from the issue. Rather than conveying a certain projection or effect, *Tree* conveys a cause of climate change – a factor that has the tendency to be overlooked. *Tree* is thus an embodied experience that further aims to create an embedded relationship to the world. The latter is a result of what Bendor calls 'worldmaking interactions.

To reiterate, 'worldmaking interactions' are essentially the interactions that facilitate the Freire's conscientization process; "to rediscover [the] capacity to critically make, unmake and remake the world" (Bendor 132). This is where *Tree* begins to adopt a posthuman approach to environmental communication. First, as a means of 'defamiliarization', both in terms of Braidotti as well as literary theorist Viktor Shklovsky (see endnote iii). Through Shklovsky, *Tree* can be seen as estranging the perspective of the (virtual) world, by situating

it from tree's point of view, which 'deautomatizes' perception, 'slowing it down' thereby emphasizing the material reality of the environment (5). Participants explore the virtual world with more detail, noticing their arms as branches and embracing the qualities of their surroundings, opposed to automatized/habitualized perception where these things are easily overlooked.

In terms of Braidotti, it is looking at the 'immanence' of deforestation from an insider's perspective as *player* rather than from the outside as *spectator*. This creates a shift in perspective from the anthropocentric worldview towards a geo-centric worldview. This causes them to be *embedded* in the relations of nature while reflecting upon their role as humans within these relations. In doing so, stimulates the development of an ethical accountability towards trees and the environment. This is because in *Tree* humans and trees are one and the same. *Tree*'s worldmaking interactions, imaginatively disclose such "immanent, latent, or hidden possibilities" of thought (Bendor 143), to think about "those who can't speak for themselves". This encourages a reciprocal relationship with trees, to acknowledge what they do for humanity and in turn what humanity can do for them. In terms of critical consciousness, it aims to facilitate dialogue with trees but also within the bigger picture of nature as a whole. Appropriately, a new posthumanist subjectivity emerges that create the impulse to reevaluate contemporary ontology as monistic where humans, nature and the world co-evolve and are thus co-dependent on each other.

3.3.2. *TREE* AS EMERGENT, POSTHUMANISM

Tree's utilization of both resonant and worldmaking interactions complement each other. VR's embodiment relation allows for the *amplification* of the experiences of nature while *reducing* the experiences that humans encounter in the actual world, which distract them from environmental issues. It does so to enhance the facts and information we hear about deforestation and climate change to the point that they are *felt* and processed through imagination and memory (Bendor 116). The combination between the two interactions guide the participants' imagination to think about an alternative, sustainable outlook of the world – a more accurate cartography of the present. It calls on participants to question the epistemological and ontological ideas that are seen as normative – presenting the possibility to liberate ourselves from them – in search for alternative subjectivities. That is, unlearning the consumerist lifestyles propagated by advanced capitalist society, as *critique*, and in turn through *creative* acts of self-transformation intervene in one's context (Freire 5, 43). This is

what Braidotti means with 'radical immanence', the realization of a conception nature as complex, vital and self-organizing, which in turn requires critical scrutiny and the development of a more inclusive and compassionate worldview.

3.3.3. *TREE* AS GAMES AND PLAY

From the perspective of game studies, VR shows the potential for a 'renaissance', which Rushkoff sees as a 'moment of reframing'. He writes:

> We step out of the frame as it is currently defined, and see the whole picture in a new context. We can then play by new rules. (179)

This embodies the non-linearity that Braidotti and Freire speak of, to look back to the past in order to inform our present and then look towards the possibilities for the future. This also means not being too determined upon the past nor the present but being open and desirable for change if it means sustainable progress. Such a non-linear perspective sets the stage for more possibilities for the future. In terms of 'play', *Tree* does so on various levels. First, it plays with VR by adopting it as a mode of environmental communication rather than its more dominant stability as entertainment. It also does so with immense interdisciplinarity, since Zec and Porter – Zec a film and VR director and Porter a VR director and creative technologist – collaborated with ad agency Droga5, interaction specialists from MIT, 3D animators, environmentalists and scientists from the Rainforest Alliance amongst many more actors to design a contextually rich interactive experience. Secondly, with regard to Zimmerman's gaming literacy, *Tree* is designed to be played as well as to be played with. The latter allowing for new possibilities of thought to emerge as well as the desire to explore more possibilities for action – analyzed as a form of 'emergent playfulness'. Third, it means understanding the systems and structures that are in place, navigating across them and critically assessing them accordingly. 'Play' and a 'gamers' perspective are necessary to reconstitute what it means to be (post)human in an era of ecological crisis in order to find alternative ways of enacting these relationships on an individual and collective level.

3.3.4. *TREE*: LIMITATIONS AND POTENTIALITIES

Nonetheless, *Tree* does not present a solution to climate change nor deforestation, but that isn't the point, the goal is to see it as a platform for conscientization – to awaken critical consciousness – and emerge in a state of becoming. That is, to take part in dialogue between each other, the world itself as well as the emergent thought about the future. *Tree* embodies Rotas' 'chaotic classroom' imbued with disruption and leaving participants dissatisfied with the current state of the world, yet also hopeful and motivated to critically change and adapt to the chaos as relational beings. Regardless, *Tree* is a predominantly subjective experience – not everyone will have the same nor desirable response. While the emotional response to *Tree* may vary in levels of perceptual strength, it is regardless a conversation piece that can trigger dialogue and thought on a collective scale. *Tree* is further reliant on the actual surroundings of the installation. An exhibition space crowded with other installations might take away from its significance and the overcoming of the sense of forgetfulness expressed towards environmental issues. *Tree* requires a dedicated amount of time after the experience for participants to contemplate and reflect on it in order for the conscientization process to be effective. It makes it a shame that *Tree* cannot be experienced as a group. However, it is something worth developing, especially considering the increased technological capacity of VR in the future.

Tree is a stepping stone into new territory for VR and environmental communication and can be considered as pioneering a new realm within environmental communication. Porter and Zec told KCRW in an online article that they have plans to make it a mobile art installation that could be fully experienced all around the world (Caroni). According to Sol Rogers and his online Forbes article "The Arrival of 5G Will Unlock The Full Potential of VR and AR" the level and quality of immersion illustrated in *Tree* will become more accessible in domestic settings; rather than requiring computers with powerful processors, 5G presents an opportunity for these experiences to be stored and played off "The Cloud". That being the case, *Tree* has already been exhibited at a number of festivals around the world, ranging from film festivals to conventions and conferences specified towards games, climate change, VR, nature conservation, and science to name a few. *Tree* has also notably been presented at the World Economic Forum as well as the World Government Summit.

Tree is advertised as a universal experience, predominantly because it isn't bounded by language (apart from the quote and text at the end). This makes it a valuable tool to not only make the public more critically conscious of deforestation but also policymakers,

politicians and other influential actors. Whereas the former creates the potential for a collective social movement, the latter embodies the potential for real social systemic change. *Tree* is entertaining and enlightening, but it is at the same time also political. This is what environmental communicators need to strive for, the design of experiences that not only inform, but to inspire and make significant the environmental issues at hand on the social, cultural and political level.

4. VIRTUAL REALITY AS CONSCIENTIZATION MACHINE', OR IS IT?

The aim of this thesis was to explore how VR could be implemented into environmental communication; specifically, in terms of facilitating a critical consciousness towards environmental issues. This was done through a postphenomenological analysis of *Tree*, which drew upon two empirical case studies of VR: (1) for experiential learning and (2) to stimulate pro-environmental behavior. By analyzing the way VR is implemented in different specific contexts, this thesis shows how VR mediates a more embodied, embedded and relational approach to the world in order to look at and think about environmental issues from a critical perspective. This research has shown that environmental communicators need to appeal to more than the informative dimension of environmental issues. This means being more creative, in terms of facilitating new perspectives and experiences, and more critical by appealing to the ethical, epistemological and ontological dimensions of environmental issues. *Tree* achieved this by taking a transdisciplinary approach to communication that was interactive, playful and posthumanist. However, the exploration of VR for environmental communication through *Tree* showed that it is more effective at integrating the public within the context of climate change, to better understand it and successfully interpret environmental issues with a critical consciousness. *Tree*, however lacked in terms of informing people about the specifics such as the detailed causes, effects, and solutions towards environmental problems. However, these are mentioned on the Rainforest Alliance website, which participants are linked to through the 'souvenir package' with the seed in it that they are given after the experience. Far from perfect, *Tree* acts as a source of immense inspiration for other creators, environmentalists, scientists, game developers, artists, politicians, marketeers, and media specialists to adopt such emergent, playful and posthumanist techniques for communicating climate change in a way that is meaningful, personal and engaging. Especially considering the plethora of new opportunities and capacities that will become available to the realm of VR in the near future.

Tree, regardless has shown that VR can contextualize environmental issues and make them relevant on a personal level, which in turn can make dialogue more fruitful on a collective level. This is because VR allows for these more complex levels of thinking that subsequently allow for the emergence of a posthuman subjectivity. It also does so by 'refreshing' perception outside of habit – what I have referred to as 'defamiliarization' – to see things in a new light. Therefore, it *should* put people in a state where they are more

receptive to communication and information about climate change and adopt the willingness to integrate themselves within those problems. Nonetheless, this is not proven by my research since this is a theoretical and speculative thesis that aims to provide insight and new ideas rather a thesis based on empirical research. Regardless, through my methodology, which is considered an empirical-philosophical method, I have attempted to base my insights on existing empirical research in order to present a critically informed analysis of the potential of VR for environmental communication.

With regard to my methodology, Smith in his article "Rewriting the Constitution: A Critique of 'Postphenomenology.'" critiques it in terms of its usage of the notion of "constitution", which he considers to be too ambiguous due to its "semantic instability" (534). To resolve this, he proposes an expansion of the field of phenomenology as less of a philosophical school of thought than a set of problems that should be addressed through contemporary philosophy of technology (541). Smith subsequently suggests that postphenomenology's emphasis towards the 'empirical turn' of philosophy of technology in the 1990s is too strong. Instead, he proposes to expand postphenomenology to consider poststructuralist thinkers such as Foucault and Deleuze, in particular their turn towards language (543). The merit in Smith's critique is that by drawing upon poststructuralist thought, a more critical outlook of technologies can be fostered. This in turn also relates to another criticism posed by Aagaard; namely, that postphenomenology fails adequately engage with the political, for instance a critique on systems and conditions, such as technocracy, capitalism and neoliberalism, in which technological practices are embedded in. However, this criticism has been addressed by embedding my research within Braidotti's critical posthumanism as well as Freire's pedagogy for critical consciousness. Although the political dimensions could have been more adequate, this is also limitation of the length of this thesis.

Regardless, my research has delved into a more critical form of postphenomenology, whereas other postphenomenologists have remained closer towards the 'empirical'. In doing so, I was able to show that interactive technologies in VR were more competent, than traditional forms of environmental communication, in that they act as a platform to engage people in complex issues by making them more tangible and experiential and thereby making it easier for people to be critically conscious of them. This in turn invites further academic exploration of environmental communication and how it can be enacted in terms of emergent, playful posthumanism. That is, to counteract trivial applications of media and the rise of

misinformation seen with the emergence of a 'post-truth' society. My findings show that environmental communication practices, could benefit from more alternative, playful and interdisciplinary approaches, which means including more than just environmentalists, mass media and scientists as the main actors. In doing so these issues can be seen in new and engaging light, in order for consciousness to become more critical, improvisational and creative.

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6. END NOTES:

[i] The myth where when a frog is put immediately in a pot of boiling water it will jump out immediately, whereas if it were to be put in room temperature water that would gradually come to the boil it will remain there until it dies. It suggests thought towards the reason for why people tend to 'look away' from climate change issues.

[ii] See Jane Bennet and her book *Vibrant Matter* especially chapters 1 and 2 for an overview on what vital materialism entails.

[iii] "Defamiliarization" is also a concept used in literary and film studies, developed by Viktor Shkovsky, during the art movement of Russian formalism. This was term used in art and film as a device that made familiar things seem strange and as a result they could be seen in a new perspective – in a sense revitalizing perception – which he Shklovsky referred to as "deautomatized perception" (5).

[iv] See the work of Bruno Latour and the development of his 'Actor-Network Theory'.