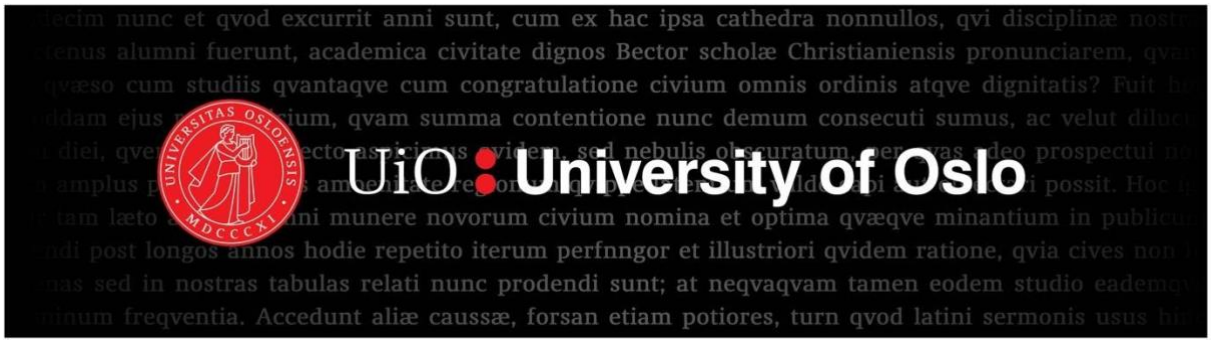

Video Games and Sustainability Transformations: Exploring the Potential for Empowered Subjectivities through Virtual Experience

A Qualitative Case Study of Eco

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Abstract

In the context of socio-environmental issues, increasing calls are made for social transformations. However, it remains unclear how to engender such processes. In this thesis, I aim to address this gap in knowledge through the exploration of the potential role of virtual sustainability games in engendering psycho-social transformation. I examine the research objective through a qualitative case study of *Eco*, an online virtual sustainability game. Based on a broad range of theoretical literature, the thesis has identified and developed four qualities that can have transformative potential. The relevance of the four qualities has been tested through confrontation with empirical data, suggesting some positive results. Further comparative studies would be required to explore how different sustainability-oriented video games (or perhaps other forms of media and art) engage the four theoretically-derived qualities I have explored in this thesis – or others that remain to be identified – and the degree to which these shape their transformative potential and outcomes. This would ideally include longer-term follow up research of participant's ongoing reflections and actions in the material world.

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Siri Friberg Gusland
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1 Introduction

> "So completely did humans feel nature's dominance and their own helplessness that they frequently denied the initiatives they were able to take. They tended to minimize their role as creators and shapers of reality, despite all the evidences that stretched before them" (Tuan 1984: 173)

The Earth is an ecosystem consisting of interacting and interdependent beings (Vignieri & Fahrenkamp-Uppenbrink 2017). For example, it is thanks to the ability of plants to capture and process sunlight that species like our own are enabled to live (Schrijver & Schrijver 2015). Indeed, "our lives are intricately coupled to the life of all plants, animals, fungi, and bacteria on the globe" (Schrijver & Schrijver 2015: 79). In order for the Earth to flourish, it is critical that we as humans acknowledge this interdependence (Vignieri & Fahrenkamp-Uppenbrink 2017: 259). Although many individuals and communities view "the self as entangled with the rest of the world" and "give primacy to relations and relational existence" (Singh 2017: 764), the dominant view is as Tuan describes, i.e., we are disconnected from our relational truth; we tend to conceive of nature as something external to us and hence as something outside our sphere of influence. This disconnect from ourselves and our surroundings is reflected in "environmental" issues and the concomitant destruction of the Earth.

To address these issues – to realize 'a relational ontology of responsibility and care' – we need to become aware of our interconnected nature and rethink our way of being in the world (Tschakert & St. Clair 2013: 268). In short, there is a need for new subjectivities (Singh 2013; 2017). It is in this context that researchers have called for methods that can help "promote transformative encounters between humans and nature" (Nieto-Romero et al. 2019: 113), "promote the development […] of social consciousness" (O'Brien 2015: 157), and "nurture and expand our 'response-ability'" (Singh 2017: 769). In this thesis, I will address these calls through the exploration of the potential role of virtual sustainability games in engendering psycho-social transformation, as such transformation can see us reconnect with our relational truth – including our powers as humans to act in ways that nurture, rather than disrupt, these relations.

1.1 "Environmental" Issues: A Crisis of Connection

Humans are agents. As agents, we co-construct "social space and ourselves through interaction with others" (Simandan 2020: 112). Indeed, we collectively create the systems that, in turn,

influence us (Bandura 2006: 164). The nature of these interactions, however, depends on how we relate to ourselves and our surroundings – our psycho-social state of mind. As stated, we are currently disconnected. Indeed, there is a prevailing belief "that humans are autonomous individuals, separated from each other, as well as from nature and other conditions of their existence" (Nieto-Romero et al. 2019: 113). This notion of a human-nature dichotomy is not new but originated in the sixteenth century (Moore 2015: 4). Since then, numerous scholars have claimed that we have "lost our sense of unity" (Bateson 1979: 17) and that there is a crisis rooted "in our individual and shared mind-sets" (Sharma 2007: 31). In fact, as Nieto-Romero et al. (2019: 113) point out, several researchers deem this worldview "the key worldview deeply responsible of the Anthropocene."

While 'worldview' is first and foremost a psychological construct that refers to individuals "general way of viewing themselves and the world around them" (Schlitz, Vieten & Miller 2010: 18), it is also a concept with very material effects (De Witt & Hedlund 2017: 307). As Cronon (1996: 87) points out, "[a]ny way of looking at nature that encourages us to believe we are separate from nature […] is likely to reinforce environmentally irresponsible behavior." This is because worldviews inform human behavior. In fact, worldviews "influence every aspect of how […] [people] understand and interact with the world" (Schlitz, Vieten & Miller 2010: 19). 'Environmental' issues are therefore not environmental per se but rather "connected fundamentally to human ways of being and relating to the world" (Singh 2017: 761). In acknowledging the anthropological dimensions of 'environmental' issues, I will refer to them as socio-environmental. This is not to suggest that the environment is in any way responsible for having created said issues or that environment equals passive background, but to recognize that the issues arise from unsustainable interaction between humans and the non-human[1].

Alongside the growing awareness of the anthropogenic nature of socio-environmental issues, researchers are stressing the need to move beyond measures that merely manage symptoms. As Bateson (1972: 494, emphasis in original) points out, "to relieve the symptoms without curing the disease is wise and sufficient *if and only if* either the disease is surely terminal *or* will cure

[1] In this thesis, non-human refers not only to animals and plants but to all "features and products of the earth, as opposed to humans or human creations" (The Oxford Dictionary of Phrase and Fable 2005). While I acknowledge that 'non-human' can be considered derogatory in the sense that it inherently favors the human species, "and other species [and earthly matter] remain a unified category rather than being recognized for the diversity they truly represent" (Sollund 2019: 4-5), I have decided to use the term for the sake of flow. Note that 'non-human,' 'nature,' and 'environment' are used interchangeably. 'Surroundings' include both humans and the non-human.

itself." Unfortunately, most efforts do not address the underlying issues but are instead "likely to reproduce the subjectivities and modes of being human" that caused them to begin with (Singh 2017: 769). It is in this regard that researchers are calling for "radical" (Tschakert & St. Clair 2013) and "profound" (Galafassi et al. 2018: 71), "broader and deeper" (O'Brien 2018: 155), "bold and drastic" (Ripple et al. 2020: 10) transformations.

Kothari et al. (2019: xxix) argue that transformations should seek to address the root cause(s) of a problem. In the case of socio-environmental concerns, researchers increasingly acknowledge that values and worldviews constitute the underlying issue (De Witt & Hedlund 2017; Tschakert & St. Clair 2013: 270). In this context, worldview transformation has the most leverage. Schlitz, Vieten & Miller (2010: 19-20) define worldview transformation as "a fundamental shift in perspective that results in long-lasting changes in people's sense of self, perception of relationship to the world around them, and way of being." Indeed, "[i]t is not only a change in what people do, but also in who they understand themselves to be at an ontological level" (Schlitz, Vieten & Miller 2010: 20). While there is broad agreement concerning the need for transformation and transformability, the transformation field is still in its infancy, and we do not yet know how to engender the changes that are called for (Galafassi et al. 2018: 72). It is this gap in knowledge that this thesis seeks to address. Specifically, I will examine the potential role of virtual sustainability games in engendering psycho-social transformation.

1.2 Play as an Adaptational Strategy

"For most of human history experience has been our best teacher, enabling us to understand the world around us while stimulating emotions – fear, anger, worry, hope – that drive us to act" (Rooney-Varga, cited in MIT Sloan 2018). In fact, "[m]ultiple studies suggest that it is through participative, experiential or action learning that people begin to question and reorient their existing values, knowledge and concerns" (Bentz & O'Brien 2019: 3). These findings further align with literature on embodiment which shows that practical experience can engage our bodies in ways that leads to new ways of being and doing – in other words, to new subjectivities (Singh 2013). However, due to the grave and urgent character of socio-environmental issues it is not desirable for people to have first-hand experience. Thus, as Rooney-Varga (cited in MIT Sloan 2018) contemplates,

> [t]he big question for climate change communication is: how can we build the knowledge and emotions that drive informed action without real-life experience which,

> in the case of climate change, will only come too late? The answer appears to be simulated experience.

In this thesis, I explore simulated experience through video games. As Yannuzzi & Behrenshausen (2010: 90) point out, video games tend to be dismissed as an "ineffectual" medium "disconnected from reality." Indeed, gaming is typically dismissed as "mere "play"" (Yannuzzi & Behrenshausen 2010: 90). However, play is a basic evolutionary function that has helped humans and other mammals adapt to their environments throughout history (Liebold, Koban & Ohler 2019: 19). Indeed, playfulness has been conceptualized as an asset that can help us face grave problems that are otherwise experienced as paralyzing (Kelly & Nardi 2014). From this perspective, play does not only have *a* function, but possibly a unique adaptive function. This makes play an interesting activity to explore in the context of socio-environmental issues.

Notably, 'play' and 'game' are conceived of as two different things. While play is an innate behavior of mammals, games are cultural artifacts constructed by humans (Klabbers 2018: 235). As such, games refer to "a particular kind of play […] that has […] been complexified and refined by human culture" (Costikyan 2013: 7). Nevertheless, as a form of play, it is argued that digital games can "elicit and support our innate disposition for playful thinking" (Liebold, Koban & Ohler 2019: 28). Arguments about play are therefore commonly extended to video games.

1.3 Research Objective and Research Questions

The purpose of this study is to explore *whether – and if so, how – participants experience and relate to themselves and the world differently after having engaged with a virtual sustainability game. Specifically, the research objective is to explore whether virtual experience through virtual sustainability games has the potential to trigger a psycho-social process of transformation.* I will address the research objective through the three following research questions ("RQ");

1. Can virtual sustainability games enhance players' feelings that they "matter" in relation to transformations to sustainability, and if so, how?

2. If embodied experience is understood to have transformative potential, can 'virtual embodied experience' through sustainability games hold similar potential, and if so, how?

3. Are the virtual experiences transferred to, and hence affecting players' subjectivities in, the material world, and if so, how?

I will address these questions through a single case study of the sustainability-oriented video game *Eco*. While I am studying *Eco* in particular, the main purpose is not to learn about *Eco* per se but to generate knowledge about *Eco*'s transformative potential and, by extension, to ask questions about the transformative potential of similar games more broadly. Moreover, the purpose is to develop conceptual tools for exploring this kind of question, and to gain theoretical insight as to what characteristics of video games might have transformative potential and is worth evaluating in other cases. In the thesis, I distinguish between 'the virtual' and 'the material/physical', rather than 'the virtual' and 'the real'. This is to acknowledge that virtual experience is as real as non-virtual experience (Harmon 2011: 31), and circumvents creating a dichotomy between the two.

Most of the research that has been conducted on video games and learning has studied video games as tools for traditional learning outcomes such as knowledge-acquisition (Yannuzzi & Behrenshausen 2010: 82). This might be due to the relative ease with which data on knowledge-acquisition can be measured, as opposed to more intangible processes such as critical reflection, emotional engagement, and relational knowing, which are the three shaping factors of transformative learning (Singleton 2015: 2). Notably, this focus parallels the broader trend in which assessable results in the practical sphere tend to be prioritized over values-related changes in the personal sphere (O'Brien & Sygna 2013). However, this focus on tangible outcomes has been at the expense of research on less definite but more potent qualities such as empowerment and changes to belief systems (Behrmann 2017). Moreover, existing research on video games and perspective transformation is mainly theoretical, with "very little empirical work" on the actual nature and consequences of such perspective transformation (Whitby, Deterding & Iacovides 2019: 339). In this thesis, I aim to move beyond the conventional focus on learning objectives (Behrmann 2017: 144). Instead, I explore whether video games with particular characteristics have transformative potential that can help create "the conditions that promote the development and expression of social consciousness" (O'Brien 2018: 158).

This introduction has sought to clarify the broader relevance of empirical research on psycho-social transformation in the context of socio-environmental issues. However, two additional remarks can help emphasize the relevance of this particular thesis. First, human geography can be defined as the study of "how humans and their environments relate to each other" (Loftus & Royle 2017: unpaged) and the geographies that result from these relations. Indeed, as socio-environmental issues so grimly demonstrate, our "human" geographies are not separate from but instead intimately co-created with all living matter. In addition to addressing the dynamic interplay between the two, I consider it our responsibility as geographers to study ways in which these relations can be improved.

The second point illustrating the relevance of the thesis is that "[d]igital reality is transforming our society in fundamental ways" (Stanitsas, Kirytopoulos & Vareilles 2019: 934). There are, as Winders (2016: 336) points out, "complex interactions between the material and virtual worlds." Indeed, new media contribute to shape our ways of being in the world, which further shape and change our material geographies (Winders 2016). In this context, there is a need to "[i]nterrogate what new media allow users to do and how that doing transforms social, cultural, and political geographies and practices" (Winders 2016: 343). Considering that video games are "poised to be the dominant and most far-reaching media for the emerging generation" (Patterson & Barratt 2019: 8), it seems particularly urgent to study the possibilities that this medium offers.

1.4 The Structure of the Thesis

In Chapter 2, I introduce the reader to the realm of video games, review literature on their transformative potential, and contextualize the selected case. In Chapter 3, I establish the theoretical framework for the thesis. Through a wide-ranging review and discussion of literature from human geography, psychology, pedagogy and ludology, I propose the relevance of four key qualities that may be indicative of transformative potential; self-efficacy, (attention to) embodied experience, alternative subjectivities, and atypical experience. In Chapter 4, I present the research strategy and methodological decisions that enabled me to address the research objective of the thesis. In Chapters 5, 6, and 7, I present, analyze and discuss the findings. Finally, in Chapter 8, I provide a summary of the main findings, discuss the consequent implications and limitations, and afford some suggestions for future research.

2 Why (Not) Games?

In 2020, the number of gamers worldwide were estimated to be around 2.8 billion (Statista 2021a), with weekly online gameplay amounting to approximately 6.33 billion hours (Limelight 2020: 5). The audience is described as "global and growing", and is both demographically and geographically diverse (Patterson & Barratt 2019: 4-6). Many people also enjoy watching others play. Indeed, eSports, which refers "to competitive video gaming (broadcasted on the internet)" (Hamari & Sjöblom 2017: 211) has become a highly popular phenomenon, with 474 million viewers worldwide in 2021 (Statista 2021b). Furthermore, while the video games industry was growing before COVID-19, the global pandemic has spurred a growth in online player numbers and hours of online gameplay (Limelight Networks 2021: 3).

While the sheer size of the industry justifies scholarly attention, it is the notion that games have consequences in the material world that seems to motivate most of the research conducted on video games. Indeed, video games are conceptualized as time-consuming, mood-impacting, behavior-affecting, ideas-and-values-communicating mediums (Egenfeldt-Nielsen, Smith & Tosca 2016: 34-35). However, the nature of these effects has been subject to controversy. Indeed, "as relatively young cultural artifacts" (Liebold, Koban & Ohler 2019: 23) that occupy "an increasingly prominent part of the current cultural landscape" (Flanagan & Nissenbaum 2014: xii), digital games are a natural target of debate. In this chapter, I address this debate.

The chapter consists of three parts. In the first section, I introduce the cultural stigma that surrounds video games. I suggest that the stigma is related to a work-play dichotomy, and that the kind of dualistic thinking this dichotomy produces prevents us from appreciating the potentially fruitful relations between the two – particularly in the context of socio-environmental issues. I also address the fact that games, as cultural artifacts, communicate values. While this has been a topic of long-standing debate, I argue that it can also be considered an opportunity to design for specific purposes. This leads to the second section of the chapter, where I review some of the research that has been conducted on the transformative potential of video games. Here, I conclude that, because the potential is contingent, more research is needed on what the potential might be contingent upon. Finally, the third section contextualizes the chosen chase.

2.1 Why Not Games?

In this section, I address the cultural legitimacy of video games. The section consists of two parts. First, I introduce the concept of a work-play dichotomy, which I suggest contributes to the cultural stigma that surrounds video games. In the second part, I discuss video games as cultural, and thus values-communicating, artifacts. Overall, throughout the section, I emphasize the importance of non-dualistic approaches to the medium.

2.1.1 Work-Play Dichotomy

Egenfeldt-Nielsen, Smith & Tosca (2016: 158) discuss the cultural status of video games. They argue that video games tend to be categorized as pop culture rather than high culture, which means that they are placed in a lower cultural sphere. According to the authors, such categorization is "of great practical importance," as the video games industry "will develop in different ways depending on whether it is a part of the establishment or if it is denied legitimacy" (Egenfeldt-Nielsen, Smith & Tosca 2016: 159). In addition to being classified in a lower cultural sphere, the authors explain that

> [f]or most, play and games equal entertainment, one of the most suspect cultural categories. […] It is often considered synonymous with escapism, which carries very strong negative connotations, since it is associated with an unhealthy flight from reality. (Egenfeldt-Nielsen, Smith & Tosca 2016: 163)

This negative perception of the role of games has influenced both public and academic discourse. For example, Bulut, Mejia & McCarthy (2014: 344) criticize what they call "[l]udic-utopians" for placing "their faith in the concept of play." According to the authors, such beliefs are "capable of sustaining the faith in techno-utopianism" (Bulut, Mejia & McCarthy 2014: 343). They also critique ludic-utopians for communicating the belief that "pleasure is a powerful thing that can be harnessed to resolve existing social problems" (Bulut, Mejia & McCarthy 2014: 356). In their view, play represents "a precarious platform for establishing an ethical civil society" (Mejia & Bulut 2019: 159). While I agree that philanthropic games such as *Free Rice*, which is the one Bulut, Mejia & McCarthy (2014) study, can be morally debated as the willingness to help other humans depends on individuals' motivation to play a game, I still find their critique somewhat flawed.

First, Bulut, Mejia & McCarthy (2014) address a particular type of game and then, based on the findings from that one study, generalize in a way that seems to conclude that play and

pleasure simply have no function in the context of social issues. In so doing, they separate that which is enjoyable on one side from that which is serious on the other. This echoes the broader discourse in which gaming is dismissed as a frivolous activity. In addition to the aforementioned nature-society dichotomy, then, we seem to suffer from another ideology that separates work from play; when we are playing, we are thought to *only* play, and when working, we are thought to *only* work. However, as Klabbers (2018: 230) point out, "play can very well include seriousness." In fact, "[g]ames have already had positive social and environmental impacts" (Patterson & Barratt 2019: 10). One illustrative example is *Foldit*, an online multiplayer game where more than 57,000 players helped biologists decipher the 3D structure of a key protein from HIV (Cooper et al. 2010). In this case, gamers accomplished in 10 days what scientists and supercomputers had failed to achieve for over a decade (Patterson & Barratt 2019: 15) – and they did so voluntarily. In the paper published in *Nature*, the researchers concluded that

> [t]he integration of human visual problem-solving and strategy development capabilities with traditional computational algorithms through interactive multiplayer games is a powerful new approach to solving computationally-limited scientific problems. (Cooper et al. 2010: 756)

This example illustrates three points. First, it highlights the efficient nature of video games, both in terms of reach and time. Second, it demonstrates that there can be a mutually beneficial relationship between games and science (Kelly & Nardi 2014). Finally, it demonstrates that pleasure does play an essential role in solving serious issues. However, at a deeper level, one could ask what we mean by 'pleasure.' In the work of Bulut, Mejia & McCarthy (2014) and Mejia & Bulut (2019), it seems like pleasure is used to invoke connotations of 'indulgence' (just as 'ludic-utopian' and 'techno-utopianism' are deliberately used to dismiss proponents' arguments as 'unrealistic' and 'naïve'). However, Gee (2005: 4) argues that the pleasures a video game can give "are connected to control, agency, and meaningfulness." Gee (2005: 4) explains that

> [i]f people are to nurture their souls, they need to feel a sense of control, meaningfulness, even expertise in the face of risk and complexity. They want and need to feel like heroes in their own life stories and to feel that their stories make sense. They need to feel that they matter and that they have mattered in other people's stories. If the body feeds on food, the soul feeds on agency and meaningfulness. I will argue that good video games are, in this sense, food for the soul, particularly appropriate food in modern times. Of course, the hope is that this food will empower the soul to find agency and meaning in other aspects of life.

Here, pleasure is conceptualized not as indulgence but as significance. Undoubtedly, this latter version invokes connotations that are quite different from those of the former. This difference highlights the powerful role of language, in that how we talk about something reflects and influences how we think and feel about it. Because research serves to inform public discourse, it is imperative that we as researchers are mindful of what descriptions we apply and that our reasons for using them are well-anchored in empirical research. Otherwise, we run the risk of de-legitimizing potential tools on the basis of bias.

Another issue illustrating a flaw in their argument is that emotional engagement is a critical part of transformations. While this includes both "positive" and "negative" feelings, it is usually the former that prompt us to take action. Indeed, "negative" feelings such as guilt and fear seldom motivate people to act in constructive ways but rather see individuals retreat into unproductive coping mechanisms such as cognitive dissonance. Thus, in the context of social issues more broadly, and socio-environmental issues in particular, there is a need for positive emotions that fuel empowerment and feelings of self-efficacy. Such feelings are pleasurable but productive nonetheless as they motivate people to act. Hence, pleasure as meaningfulness is necessary to build and sustain engagement with serious issues. From this perspective, games can act as entry points and adaptive tools that help us move from a state of denial, to actively co-creating solutions. This aligns with the aforementioned conceptualization of playfulness as an asset that can engender engagement with problems that are otherwise experienced as paralyzing (Kelly & Nardi 2014).

The problem discussed requires a change of mindset. Specifically, we need to move from dualistic thinking of either-or, to inclusive rationales of both-and. For example, issues can both be serious, urgent and grim, yet require solutions anchored in inspiration, enjoyment, and meaningful hope. In short, we can *both* work *and* play. In fact, because "[p]leasure is the basis of learning" (Gee 2005: 4), the two seem to reinforce each other positively. Importantly, acknowledging and including the productive dimension of play does not mean that serious issues are not taken seriously. Rather, it acknowledges that for individuals to engage with serious issues, they cannot merely be experienced as such. Instead, transformations must nurture pleasurable feelings of self-efficacy and empowerment, which further generates agency and meaningfulness. In short, transformations cannot be a drudge. In that case, many people might tune out – and perhaps play video games!

2.1.2 Games as Cultural Artifacts

A second topic of debate relates to the fact that games, as cultural artifacts, are constructed by humans (Klabbers 2018: 235) and hence imbued with meaning. Indeed, "[a]ll games express and embody human values" (Flanagan & Nissenbaum 2014: 3). According to Steinkuehler (2004b, cited in Squire 2006: 23), these values are communicated to players as they are "socialize[d] into certain ways of being and understanding the virtual world, ways that are tied to particular values." This has led some to suggest that players' psycho-social behaviors in-game might be transported out into the material world. For example, Flanagan & Nissenbaum (2014: 3) suggest that "because games are engrossing and reach deep parts of the human psyche, they may not only reflect and express but also activate these beliefs and values in powerful ways." This provides the backdrop for a long-standing debate in both private, public, and academic arenas about whether video games can cause negative impacts such as antisocial attitudes and violent behaviors.

On one side, some argue that there is strong causal evidence linking video games to aggressive behavior. For example, one highly-cited article argues that the causal evidence is so strong that "debates can and should finally move beyond the simple question of whether violent video game play is a causal risk factor for aggressive behavior" (Anderson et al. 2010: 171). However, in the very same issue Ferguson & Kilburn (2010: 174) criticize Anderson et al. (2010) for having included suboptimal studies, using a biased sample, producing an unreliable analysis, and disregarding the non-standardized use of some aggression measures. Indeed, proponents tend to criticize video game critics for flawed methodological work (Ferguson, Coperhaver & Marley 2020: 1424), including a failure to consider important factors "such as the observation that aggressive individuals gravitate towards violent games" (Przybylski & Weinstein 2019: 2), thereby ignoring an important source of bias in their samples.

In addition to criticizing methodologies, proponents produce opposing findings. For example, Cunningham, Engelstätter & Ward (2016: 1261) suggest that "the evidence that violent video games have substantial social costs is weak." Similarly, Przybylski & Weinstein (2019: 14) found "that violent video game engagement, on balance, is not associated with observable variability in adolescents' aggressive behaviour." Furthermore, as Przybylski & Weinstein (2019: 2) point out, "[s]ome researchers conclude that gaming has social […] and cognitive […] benefits," whereas others contend "that both the positive and negative effects of time spent gaming, their addictive potential […], cognitive benefits […] and aggressive effects […] may

have been overstated" (Przybylski & Weinstein 2019: 2). From this concise review, it becomes clear that, despite the amount of research that has been produced, "violent-video-game scholars cannot reach consensus as to the true effects of violent video games" (Ferguson, Copenhaver & Markey 2020: 1423).

Instead of placing myself on either end of the normative debate, I find it more productive to restate that video games are a medium for communication and that communication cannot be deemed as either good or bad. This is because the individual is not simply a passive "receiver" but rather a co-creator of their own experience. There is never "one message" to be conveyed or received. As such, every individual will be left with different experiences – just as individuals are left with different reflections after having read a book or consumed a piece of art. This perspective suggests that there is little to gain from dualistic thinking that either endorses or dismisses video games. Instead, we might have to practice holding two (seemingly) opposing thoughts at once – for example, that games can both counteract known risk factors for mental disease (Kühn et al. 2014) and potentially trigger anti-social behavior in others – depending on the content of the game and the context in which the game is consumed. In any case, it is vital that future research "work with openness and rigour" (Przybylski & Weinstein 2019: 14) to prevent biasing the debate that it is meant to impartially inform.

In this section, I have discussed the cultural status of video games. As a young and popular artifact, the medium carries stigma. I have suggested that this stigma is a result of the perception that work and pleasure are incompatible categories, resulting in a work-play dichotomy. However, rather than representing opposites, the two can be viewed as mutually constitutive. Furthermore, the emotional rewards offered by video games go beyond mere indulgence to include feelings of meaningfulness. Because the industry will develop in different ways depending on how we conceptualize them, such conceptualizations are of great importance. Furthermore, all games comprise and communicate values. This demands that we, as Yannuzzi & Behrenshausen (2010: 96) point out, "be exceedingly critical of […] games' lessons, the skills they teach, and the value systems they perpetuate." At the same time, this implies that we can design for specific purposes. For example, some have suggested that we should challenge game developers to create "games [that] can make visible the possibility of low/no [economic] growth" (Kelly & Nardi 2014: unpaged) or implement the Sustainable Development goals (Patterson & Barratt 2019: 15). In the next section, I will review some of this research on the transformative potential of video games.

2.2 Why Games?

In this section, I review some of the research that has been conducted on the transformative potential of video games. Based on the limited research on this topic, I find that the potential is contingent, and that there is need for more research to identify what the potential might be contingent upon.

2.2.1 Video Games as Transformative Tools

It might seem like a big leap from rotating 3D amino chains, as was the case in *Foldit*, to conceptualizing video games as tools for social transformation and reconnection. However, Patterson & Barratt (2019: 6, emphasis added) argue that "[v]ideo games – *if seen and approached as serious and transformative tools* – could empower billions to contribute to urgently needed solutions." This emphasis on approach is important, as the transformative potential of video games depends not only on the game's qualities or the gamer's mindset (Yannuzzi & Behrenshausen 2010; Podleschny 2012) but also on researchers to approach them as such. Specifically, it compels a move beyond the notion of video games as tools for nudging people into making greener choices (Patterson & Barratt 2019: 20), to conceptualizing video games as 'possibility spaces' (Podleschny 2012) that can help engender the transformation that is called for.

According to Muriel & Crawford (2020), video games contain transformative agencies that impact on the people who play them. Indeed, several authors have conceptualized video games as sites for "identity work […] and rich meaning making" (Steinkuehler 2008: 612) in which players can "negotiate […] a sense of self" (Kirschner & Williams 2014: 594). For example, in their theory of 'transformational play', Barab, Gresalfi & Ingram-Goble (2011: 525) propose that video games can represent a medium for becoming:

> We believe that the opportunity to have a personal, agentic, and consequential role in resolving a dilemma is a significant component of both content learning and potentially more enduring outcomes, such as the development of identity or affiliation.

Nguyen (2019: 426) also conceptualizes video games as a potentially "valuable tool for human self-development." While for Barab, Gresalfi & Ingram-Goble (2011) a transformed understanding of the self could come about as the result of having a consequential role in solving a dilemma, for Nguyen (2019: 457), video games allow for experiential immersion in

alternative agencies, which he argues can expand one's 'library of agencies' back in the material world. In short, trying out other ways of being and doing in a virtual world can affect one's ways of being and doing in the material world. According to Nguyen (2019), this immersion in alternative subjectivities is more accessible in video games than in the material world. While players might have some freedom in their actions, they are simultaneously "limited by the game's own restrictions and possibilities" (Muriel & Crawford 2020: 139). According to Nguyen (2019: 458), it is precisely this restriction that makes games an ideal tool for self-development:

> it might be easier to acquire a mode of agency from a game than from real life. It is easier to start trying out an unfamiliar way of being when somebody tells you exactly what to do. This is true with yoga and other physical training. If there is a mode of movement or a postural stance that is unfamiliar to me, the easiest way for me to find my way there is to submit myself to very precise direction about where to stand, where to put my feet, and how to move. A new agential mode is likewise easier to find through precise directions about what goals to pursue and which means to use. In this way, we can find our way to a greater flexibility with our agency, by temporarily submitting ourselves to strictures on that agency. Games are yoga for your agency.

Thus, by lending us other ways of being and doing, video games are thought to have the potential to make us more flexible in our ways of being in the material world. While still a largely unmapped area, some empirical studies have begun to explore the transformative potential of video games. In a study conducted by Mitgutsch & Weise (2012), the researchers designed a game with uncommon patterns to confuse participants and encourage recursive learning (learning through failure). They found that, while players did rethink and adjust, explore new options, and refute old patterns in-game, "only a small number of players were able to transfer the in-game learning experience to real-life context" (Mitgutsch & Weise 2012: 4). In another study of transformative reflection, Whitby, Deterding & Iacovides (2019) explored what different types of perspective-challenging moments players experience and what triggers them. They also found that "transformative reflection […] chiefly consists of *game-internal* 'endo-transformations'" (Whitby, Deterding & Iacovides 2019: 340, emphasis in original). Hence, while transformative reflection did occur, this was largely limited to changes in game-related behavior and not brought back to the material world. Thus, in both studies, the experience had little to no effect on participants' subjectivities.

Yannuzzi & Behrenshausen (2010) argue that games can facilitate critical self-reflection. However, "[t]he mere introduction of games […] does not guarantee" critical self-reflection (Yannuzzi & Behrenshausen 2010: 95). In fact, while "[s]erious games have the potential for providing a learning framework for exploration, learning, critical thinking, reflection and transformation" (Podleschny 2012: 48) – this potential is negotiated and therefore highly contingent. More specifically, the transformative potential depends on the situational context and "on how well all actors relate and connect the game to the wider ecology of which they are part" (Podleschny 2012: 332). As a result, Podleschny (2012: 92) concludes that "we need to investigate what kind of meaning players derive from gameplay and how they do it." Indeed, "empirical research into the kinds and causes for reflection within games is scarce" (Whitby, Deterding & Iacovides 2019: 339). As reflected by the research objective, this thesis responds to these calls for research on psycho-social dimensions. In the next section, I introduce the case through which the objective has been studied.

2.3 *Eco*: Contextualizing the Selected Case

In this section, I will contextualize *Eco*. The section consists of three parts. I begin by introducing the basic components. I then move on to classify *Eco*. Finally, I review previous literature on *Eco*. I conclude by arguing that my research is novel in terms of research questions, as I focus on process rather than outcome.

2.3.1 A World of 1s and 0s: Introducing the Basic Components of *Eco*

Eco is an online multiplayer video game developed by the independent startup *Strange Loop Games*. At first glance, *Eco* might appear similar to *Minecraft*, the widely popular, flexible building game in which players gather resources from their environment to create the world they desire. However, in *Minecraft*, gathering resources does not harm the environment, and resources are technically infinite (although some might be rarer). In comparison, in *Eco*, "the players are forced to consider each individual aspect of the ecosystem in order to play the game effectively" (Fjællingsdal & Klöckner 2019: 9). *Eco* is thus more complex in terms of players' interaction with their surroundings.

In *Eco*, the main objective is to co-create a civilization whose level of technological expertise is sufficient to shoot down a meteor that threatens to destroy the planet in 30 days. However, the society's success in creating this technology depends on ecologically, socially, and economically sustainable behavior. More specifically, individuals have to interact with a simulated environment that provides realistic feedback mechanisms while collaboratively developing a well-functioning economy that balances the need for technological progress with ecological conservation. As a sustainably oriented "society simulator" (Krajewski, cited in Wired 2017) in which people have to collaborate, interact with the non-human and balance diverse goals and values, *Eco* is indeed highly complex and like a virtual (albeit simplified) version of the material world.

Since *Eco* is first and foremost a collaborative game where players are in charge of all governmental matters, the role of communication is important. While there are some language-specific servers[2], most players choose to join the international ones (Scholz, personal

[2] A server simply refers to the shared virtual space, or world, that players enter when they play multiplayer games. In *Eco*, players can create their own servers or join premade official ones.

communication[3]). On international servers, differing cultures and worldviews come together. "This allows them to reflect on their opinions, [and] learn opinions from totally different people – even across state or continent borders" (Scholz, personal communication). However, it also increases the game's level of difficulty. As Scholz (personal communication) stated, "Eco is a great place to find new friends – and people disagreeing with your opinion." For example, "[w]hile US players are mostly reluctant to accept taxes, the EU ones mostly feel very different" (Scholz, personal communication). By making discussions and interaction between players a central part of the gameplay, *Eco* incorporates the social and highly political nature of socio-environmental issues.

As in the material world, progress in *Eco* is intricately tied to the well-being of the ecosystem. The idea of having players manage environmental impacts in relation to building a society is not new. *SimEarth* from 1990 and *Civilization* from 1991 are examples of videogames that incorporate such aspects (Wired 2018). However, in *Eco*, the ecological aspect is more than "mere background"; through detailed and complex simulation, the ecology "comes to life" and affects, shapes, and responds to human action. Modeled after the biomes in the Pacific Northwest, players' actions affect ecosystems and population dynamics in a realistic way (Hall 2015). Consequently, players must continuously monitor their impact on a system that provides the necessary resources for progress, yet is vulnerable to the impacts of that progress. For example, over-hunting and deforestation will lead to extinction, while air-pollution from industrial activity will increase the global temperature (Wired 2018). The tools that visualize these interconnections help players understand how the ecological system works, including their particular influence on it. Players can then use this information in the form of statistical data to propose and vote in laws that help exercise restraint and conserve the environment. Laws that are passed turn into new game rules. After some time has passed, players can look at the situation anew and see whether the legislation worked as intended.

Furthermore, *Eco* is designed around the tragedy of the commons. 'The tragedy of the commons' is a concept that refers to situations where individuals pursue their own interest at the expense of the common good, ultimately depleting shared resources and bringing "ruin to all" (Hardin 1968: 1244). Hardin's (1968) idea that such tragedy is unavoidable has been

[3] Author's interview with Dennis Scholz via email correspondence, 05.12.19-07.12.19. Scholz is community manager in Strange Loop Games (SLG). For the sake of flow, further references to this interview will be indicated as "(Scholz, personal communication)".

contested since the 1980s. The work of Elinor Ostrom (1990) is highly cited in this regard. She argues that while a tragedy of the commons is possible, it is not inevitable. Rather, it depends on the capacity of individuals to organize themselves. Hence, while Hardin (1968) works from a rather individualistic and rationalistic paradigm, Ostrom (1990) argues that we are a collaborative species able to self-regulate, i.e., able to develop well-functioning norms, cooperate, and hence avoid the "unavoidable" tragedy. Singh's (2013, 2017) research on processual subjectivity is demonstrative in this regard. In a case study from Odisha, India, Singh (2013) shows that villagers not only cooperate and take care of the physical environment, but that this way of 'being-in-common' further led to the forging of affective ties. As such, it demonstrates that we as humans can come together, take care of the environment, and in that process ultimately generate a deeper sense of interconnection (Singh 2017).

Indeed, while players in *Eco* are "incentivised to be greedy" and to destroy the ecosystem that they rely on (Krajewski, in Wired 2017), to do so would imply failure to meet the game objective. Certainly, a dying ecological system threatens to halt all progress and result in a losing world for the players. Hence, players have to "[f]ind a balance between progress and protection, between individual needs and those of the group, succeeding or failing together" (Steam 2021). As such, it depends on players' capacity to self-regulate, in line with Ostrom's (1990) argument. As will be demonstrated in Chapter 5, this is in fact exactly what some participants do.

2.3.2 Classifying *Eco*

'Online multiplayer' is a very general definition and does not say much about the nature or complexity of the game. Further definitions are therefore needed. Windleharth & Lee (2018) have classified *Eco* as a "MUVE (multi-user virtual environment)", a "sandbox game", and a "simulation game". *MUVE* refers to multiplayer games that are designed to educate. *Sandbox game* indicates that "the game has an open world for players to explore and broad agency in which to create and operate" (Windleharth & Lee 2018). This definition is similar to that of the *free-form game* (Klabbers 2018), which are games that allow for unrestricted play. In such games, "the players have self-organizing, transformative power" (Klabbers 2018: 223). Finally, *simulation games* "simulate actions and situations from either an existing or a fictional reality" (Windleharth & Lee 2018: 2).

Based on these definitions, it is clear that *Eco* is leaning heavily towards the more complex end of the game-spectrum. However, an additional definition helps clarify why *Eco* was fit for the topic of this thesis. Klabbers (2018: 239-241) has made a typology of games in which he separates Type-I from Type-II games. Type I-games are rule-based games with a rigid structure where the social actors involved agree on the underlying values. In contrast, Type-II games are free-form games characterized by free play, conflicting goals and values among the social actors involved, tricky ethical problems, and wicked governance problems. To solve problems in such a game, actors must exert a willingness "to engage in a constructive dialogue, aiming at shared citizenship", where "[c]itizenship refers to a sense of responsibility by all actors involved towards the community and the wider socio-economic and ecological environment in which they operate" (Klabbers 2018: 241). *Eco* is a game in which individuals with conflicting goals and values must cooperate and act in-common with both human and non-humans to sustain their own civilization and the ecosystem that supports them. As such, it responds to the characteristics outlined by Klabbers (2018) and can be classified as a Type II-game.

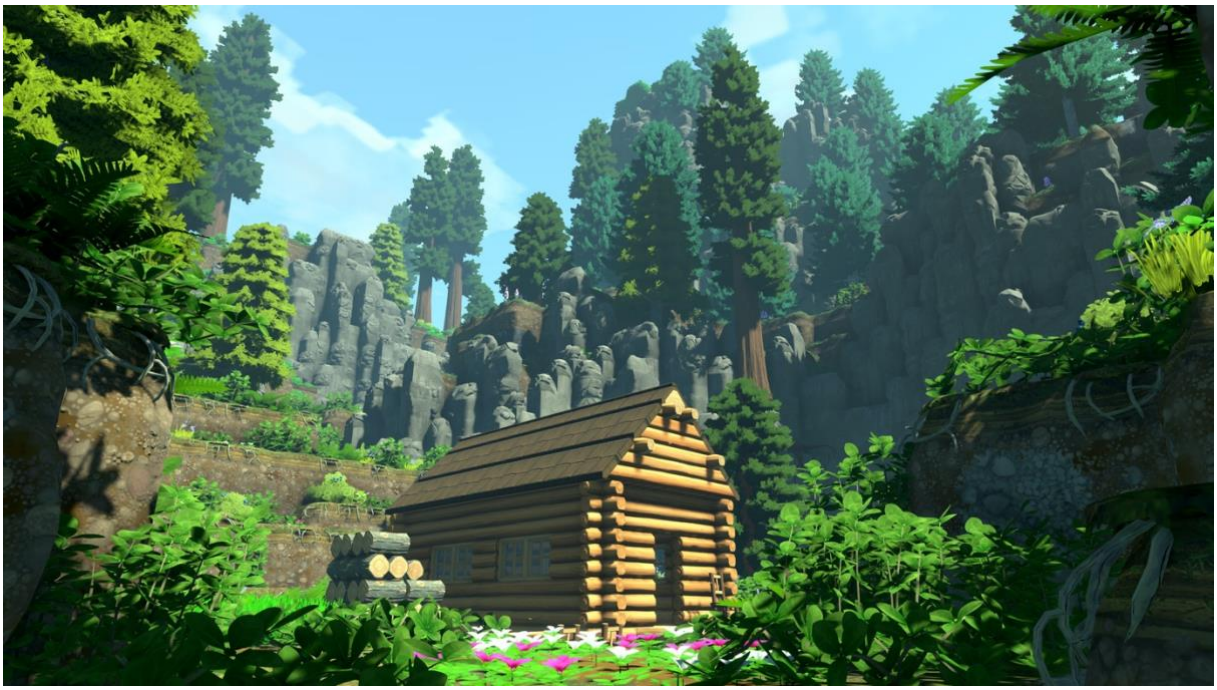

Figure 1 *Example of a player-generated house in Eco. All trees that go into building structures are felled and transported by the players themselves. Image used with permission.*

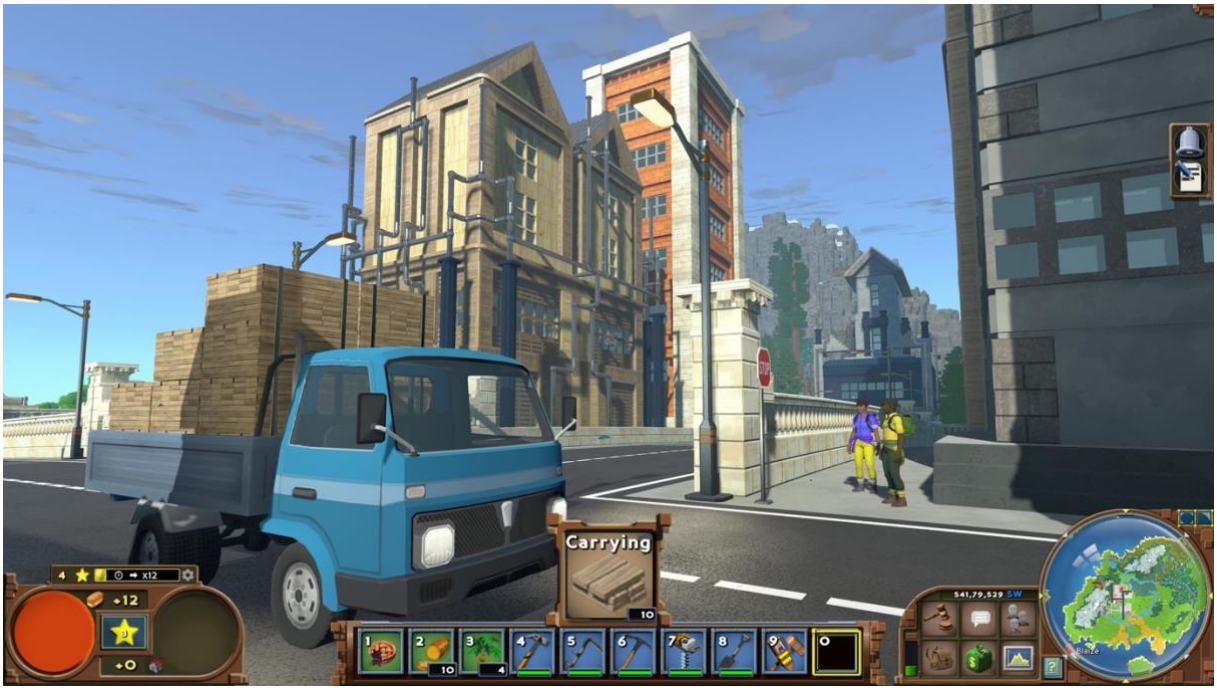

Figure 2 *Example of a player-generated landscape – and a player-generated vehicle! Trucks are helpful for managing and transporting larger loads of material. As individuals level up, they can produce different types of vehicles such as cranes and excavators by combining certain types of materials. However, to craft these different materials, different skill sets, levels and appliances are needed. As a result, many players choose to collaborate in their endeavors. Image used with permission.*

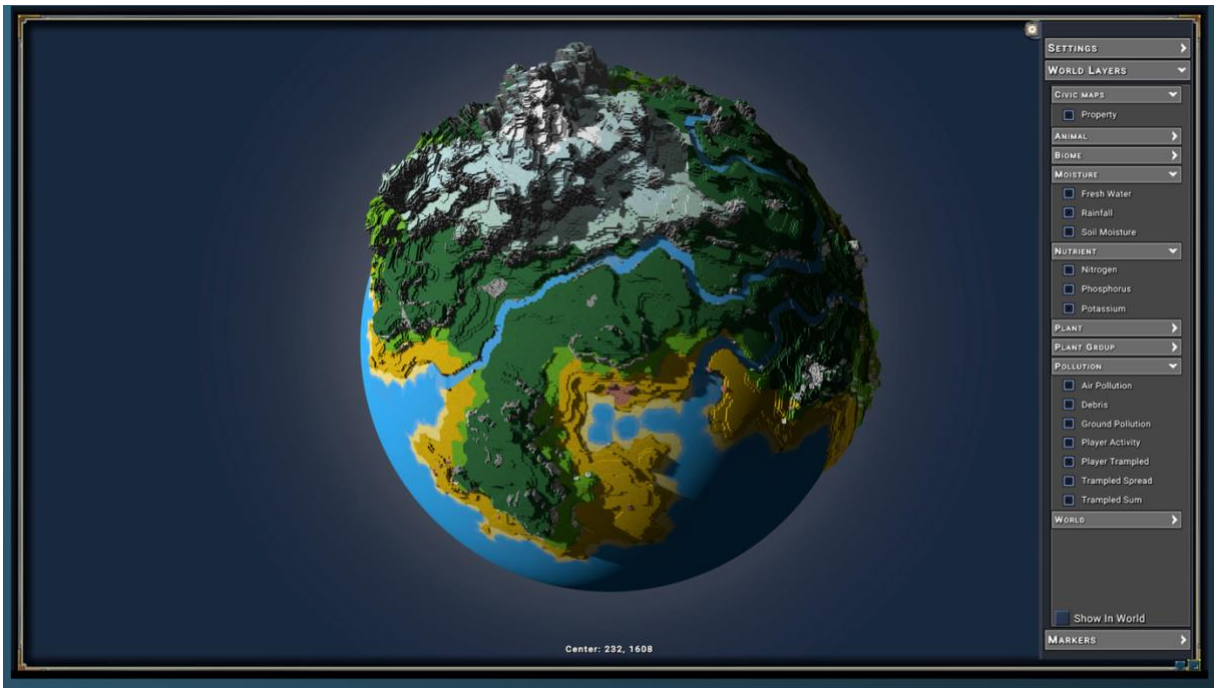

Figure 3 *A tool that allows players to monitor the ecological variables in the game, i.e., measure the extent to which a given factor effects their world. Image used with permission.*

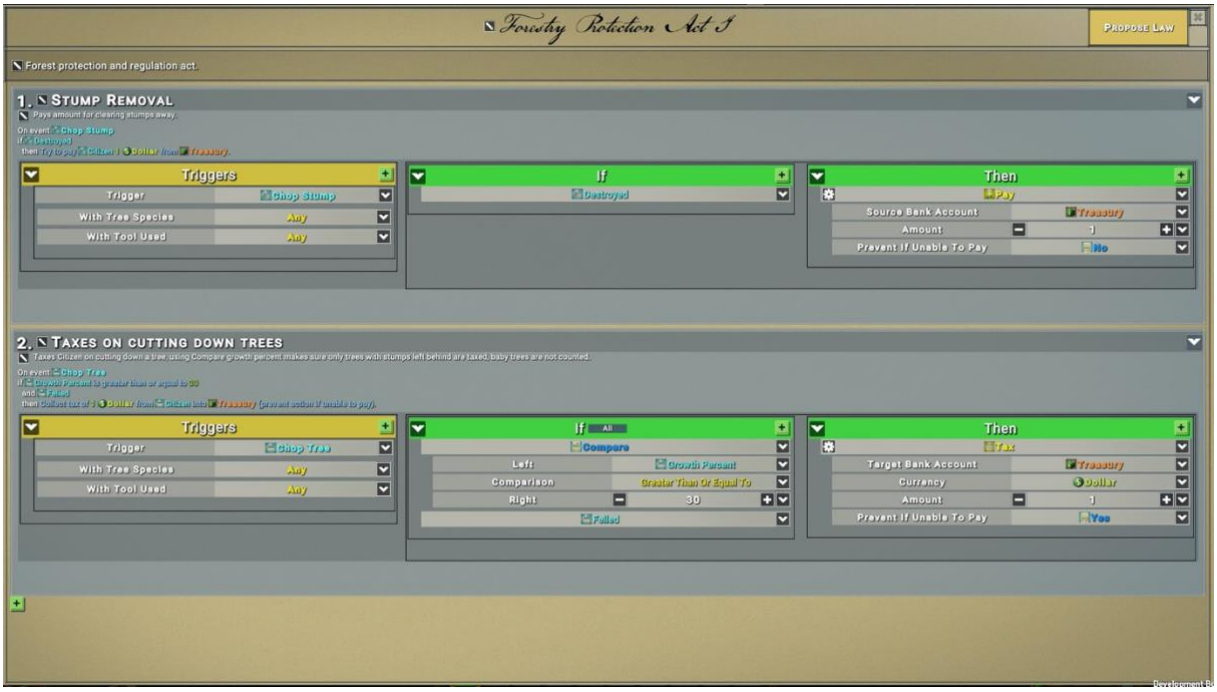

Figure 4 *In Eco, all laws are player-generated, meaning that they are proposed, discussed and voted in by citizens. This "forest protection and regulation act" rewards players that clear stumps, and taxes those who cut down trees. All players are affected by effective laws. Image used with permission.*

2.3.3 Research on *Eco*

Eco has been widely endorsed in the informal and private spheres of adults. Indeed, *Eco* has a wide geographical reach, with the top ten countries currently playing being the US, Germany, UK, France, The Russian Federation, Canada, Norway, Sweden, Australia, and Austria (Scholz, personal communication). Furthermore, while *Eco* is officially only available in English, players are currently contributing to translating the game into another 22 languages, wherein German, Russian, Spanish, Ukrainian, Portuguese and French are the most actively translated (Scholz, personal communication).

Aside from its popular use as a pastime, *Eco* has been implemented and studied as an educational tool. For example, *Eco* has been recognized by the US Department of Education as a tool that can "enhance middle school students' knowledge of ecology and environmental literacy" (IES undated). Indeed, in a study conducted by Windleharth & Lee (2018), results showed that students who played *Eco* had higher scores on systems knowledge and environmental attitudes after gameplay. Furthermore, in a qualitative study conducted by Fjællingsdal & Klöckner (2019: 9), the authors found that "Eco is capable of increasing systems thinking and reinforcing existing knowledge about the environment", and that it "has the potential to reinforce and increase some facets of environmental consciousness." They also

found that the majority of the respondents understood the importance of "cooperation in counteracting sustainability issues" (Fjællingsdal & Klöckner 2019: 9). As a result, the authors conclude that the game "is a valuable tool for future environmental education" (Fjællingsdal & Klöckner 2019: 9). Furthermore, in a literature review of 77 serious games that feature sustainable development practices and policies, *Eco* was one of the few games (25 games) deemed to "fully contribute towards the apprehension of all of sustainability's triple-bottom line […] parameters" (Stanitsas, Kirytopoulos & Vareilles 2019: 934).

As demonstrated, existing research has focused on the educational potential of *Eco*, such as impact on environmental knowledge and attitudes (Windleharth & Lee 2018), influence on environmental consciousness (Fjællingsdal & Klöckner 2019), and effectivity in facilitating sustainability education (Stanitsas, Kirytopoulos & Vareilles 2019). Such research tend to be outcome-oriented. In contrast, the approach taken in this thesis is more process-oriented. Specifically, I focus on *the nature of participants' experience* and the potential of those experiences to trigger *processes of reflection that contribute to transformative potential*. This focus responds to the aforementioned lack of empirical research on psycho-social processes in relation to video games, and highlights the broader relevance of the thesis.

In sum, *Eco* is a unique game that is said to address all of sustainability's triple-bottom line parameters (the social, economic and environmental dimensions of sustainability). It can be categorized as a Type-II game, as the gameplay is largely characterized by conflicting goals and values, tricky ethical problems and wicked governance problems. This demands that players engage in constructive dialogue and exhibit responsible citizenship where the surroundings (and their impact on these) are taken into account. *Eco* has also been acknowledged as a tool with educational potential. Ultimately, it is the sum of these factors that made me interested in conducting research on the transformative potential of both *Eco* in particular, and virtual sustainability games in general. As the game continues to extend its reach, such research will be of increasing relevance.

3 Theoretical Framework

In Chapter 1, I situated the research problem in relation to the literature in the field of transformation, and in Chapter 2, I provided a literature review on the potential role of video games in transformation. I ended the review by concluding that the transformative potential is contingent. In this chapter, I will explore what conditions the potential might be contingent upon. Specifically, I will explore four qualities that may contribute to engender processes of psycho-social transformation; self-efficacy, (attention to) embodied experience, alternative subjectivities, and atypical experience.

To develop these four qualities, I first present the interconnected nature of agency, empowerment, and self-efficacy, and consider their foundational role in transformations. I then introduce Singh's (2013, 2017) processual understanding of subjectivity, and discuss the role of interaction in engendering new subjectivities. As I come to understand interaction as an embodied experience, I adapt the holistic framework of *Head, Heart and Hands* from the field of transformative learning, to address the body, or the psychomotor domain. I then conceptualize video games as spaces for embodied and atypical experience. Together, I argue how the four concepts of self-efficacy, embodied experience, alternative subjectivities, and atypical experience provide a relevant conceptual framework with which to address the research questions.

3.1 Being Matter(s)

Agency is an inherent part of transformations because *agency produces change* (Muriel & Crawford 2020: 142). While often conceptualized as a human quality, agency refers to any "matter in motion" (Ruddick 2017: 135). This means that all matter, including the non-human, contributes to shaping the world. Furthermore, because agency is also a quality of non-thinking creatures, it can be *devoid of intention* (Muriel & Crawford 2020: 142). It follows that agency is a neutral concept referring to any action effecting change, disregarding the implications of this change. However, while agency may be neutral, to achieve deliberate goals such as equity and sustainability we need a particular quality of agency that aligns with these values. This has led to the call for deliberate transformation. In this section, I first introduce the need for transformability in the context of deliberate transformation. I then introduce the three interrelated concepts of agency, empowerment and self-efficacy and suggest that, as a foundational element of the two former, self-efficacy represents the first of the four potentially transformative qualities.

3.1.1 Deliberate Transformation and Transformability

As opposed to unintentional change processes, *deliberate transformation* warrants conscious engagement with space and time in order to realize the fundamental shifts that are considered "necessary to enable desirable futures to emerge" (O'Brien 2012: 670). Such conscious engagement is possible because, while all matter can be considered to have agency, humans have an additional symbolic dimension that allows for meaning-making and reflexivity (Westley et al. 2002). This "advanced symbolizing capacity" gives us unique powers to shape our life circumstances (Bandura 2006: 164). Indeed, "the power that humans wield is unlike any other force of nature, because it is reflexive and therefore can be used, withdrawn or modified" (Lewis & Maslin 2015: 178). Ultimately, it is in this ability to reflect and consciously engage with different timescales – review the past, act and reflect in the present, and imagine the future – that we find the responsibility and potential of humans to engage with psycho-social transformation.

In order to deliberately engage with psycho-social transformation, there is a need for transformability. Transformability has been described as "an essential property of long-lasting functioning systems" (Feola 2015: 377) and as "the strongest form of system resilience" (Meadows 1999: 15). As Meadows (1999: 15) put it, "[a] system that can evolve can survive

almost any change, by changing itself." Broadly defined, 'transformability' refers to "the capacity to actively transform" (Feola 2015: 377). More specifically, it refers to "the capacity of individuals and organisations to be able to both transform themselves and their society in a deliberate, conscious way" (Ziervogel, Cowen & Ziniades 2016: 2). This emphasis on 'capacity,' 'actively,' 'deliberate,' and 'conscious' is significant, as it suggests that individuals can play a creative role in the process of transformation. As such, the concept of transformability signifies an important shift from traditional conceptualizations that have reduced individuals to "objects to be changed," to instead viewing individuals as "agents of change" (O'Brien 2018: 157).

In order to transform to more sustainable ways of living in which all life can flourish, our transformative capacity needs to be strengthened (Ziervogel, Cowen & Ziniades 2016). According to Ziervogel, Cowen & Ziniades (2016), this can be achieved through nurturing three key and mutually reinforcing domains, namely 1) an awareness of and a reconnection to life-support systems, 2) a well-developed sense of agency, and 3) social cohesion. In short, we need to re-connect with ourselves and our surroundings to change our unsustainable ways of being in the world. While I will discuss how such alternative subjectivities can emerge in Section 3.2, the focus of this section is on the second domain of agency, and in particular, the role of self-efficacy in engendering such agency. As will be demonstrated, the concept of self-efficacy relates to feelings of mattering, and as such, relates directly to research question 1 on how virtual sustainability games can enhance players' feelings that they "matter" in relation to transformations to sustainability.

3.1.2 Agency, Empowerment, and Self-Efficacy

A focus on deliberate transformation requires first that we acknowledge our agential truth – that we identify as 'agents of change' – and second, that we become 'deliberate agents of change.' *Deliberate agency* refers to "effective, intentional, unconstrained and reflexive action by individual or collective actors" (Dietz & Burns 1992: 187). For such agency to develop, two conditions are considered particularly important; empowerment and self-efficacy. Bentz & O'Brien (2019: 4) define *empowerment* as the process of "enhancing an individual's or group's capacity to make choices and transform those choices into desired actions and outcomes." In short, it is a process that enhances agency. Indeed, "we need to feel empowered *to make the changes* to our day to day lives that have an impact" (King, in Buckland 2006: 129, emphasis added). While these definitions illustrate the importance of empowerment, they do not specify

what enhances our capacity to act. This is where efficacy beliefs come into play. *Self-efficacy* can be defined as what "motivates people to take individual action and believe in their own power to make a difference" (Weaver 2015: 8). Such beliefs play a vital role in social transformations. As Bandura (1982: 123) explains

> [s]elf-efficacy judgments, whether accurate or faulty, influence choice of activities and environmental settings. People avoid activities that they believe exceed their coping capabilities, but they undertake and perform assuredly those that they judge themselves capable of managing.

Indeed, "people only join efforts if they believe that their individual contributions can make a difference" (Amel et al. 2017: 277). As such, self-efficacy is intimately tied to feelings of significance and the experience that 'I matter'. Furthermore, self-efficacy is a necessary foundation for collective efficacy, which refers to "a group's shared belief in their capabilities to organize and produce a greater product as a group" Weaver (2015: 8). As an extension of self-efficacy, collective efficacy is another crucial component of social transformations. Indeed, collective efficacy "will shape […] how future generations will live their lives" Bandura (1982: 145). Bandura (1982: 145) therefore argues that

> [t]he times call for a commitment of collective effort, rather than litanies of powerlessness that instill in people beliefs of inefficacy to influence conditions that shape the course of their lives.

Thus, in contrast to a perceived sense of self-efficacy, *inefficacy* refers to feelings of powerlessness and a sense that one's efforts do not matter. Specifically, it refers to the beliefs individuals hold when they perceive themselves as unable "to influence conditions that shape the course of their lives" (Bandura 1982: 145). Such beliefs are disempowering and can see us "turn to coping defenses such as denial or distraction" (Amel et al. 2017: 276). As such, they represent a key psychological barrier to engagement with socio-environmental issues.

"Any system […] that becomes so encrusted that it cannot self-evolve […] is doomed over the long term", Meadows (1999: 16) argues. Indeed, "[i]f our species does not survive the ecological crisis, it will probably be due to our failure to […] rework ourselves" (Plumwood 2007: unpaged). In this section, I have discussed how, thanks to our symbolizing capacity, we as humans have the ability and the responsibility to "rework ourselves" in ways that align with our relational truth. Specifically, I have discussed the importance of deliberate transformation,

and the role of agency, empowerment and self-efficacy in engendering such transformation. Based on the discussion, I have come to understand agency to refer to *the capacity to make deliberate choices and act* on them; empowerment as *a process that enhances agency*; and self-efficacy as individuals' *perceived capability and concomitant feelings of significance*, which fuels the process of empowerment. In contrast, in-efficacy beliefs refer to *disempowering feelings of powerlessness and insignificance*. Because self-efficacy is a foundational element of both empowerment and agency, I conceptualize self-efficacy to represent the first of the four potentially transformative qualities.

3.2 Engendering New Subjectivities

Subjectivity refers to "ways of perceiving, understanding, and relating to the world" (Read 2010: 114). Furthermore, it is about how we understand and relate to ourselves, and "our ways of being human" (Singh 2017: 769). As such, subjectivity relates to the concept of worldviews, which I previously defined as ways of viewing ourselves and others that inform our behavior. As a concept that allows us to think critically about how people conceive of themselves and others, how such conceptions inform our behavior, and how these may be perpetuated and shifted, subjectivity relates directly to research questions 2 and 3 on the transformative potential of 'virtual embodied experience'.

While the concept of subjectivity has seen important theoretical developments over the past 60 years, it is not until recently that the concept has fully emerged in nature-society studies (Singh 2017: 761). Singh (2017: 761) attributes this emergence to the "increasing realization that the crisis of the environment is connected fundamentally to human ways of being and relating to the world." Indeed, current subjectivities – "ways of being and relating" – are unsustainable and result in geographies of climate change, bio-diversity loss and exacerbated inequality. Alternative subjectivities are therefore needed for more sustainable geographies to arise. Indeed, because subjectivities are "a major force shaping the world that we live in" (Singh 2017: 763), we need to find ways of producing alternative subjectivities that are more in line with our relational truth. In order to understand how alternative subjectivities may emerge, however, we must first understand how subjectivities develop. Given the thesis's attention to the role of subjectivity in processes of transformation (RQs 2 and 3), in this section I elaborate how subjectivity can be viewed as a process.

3.2.1 Subjectivity as Process

According to Singh (2017: 769), "the conditions of subjectivity do not reside solely in an individual or in the environment but are part of the conditions that constitute both but cannot be reduced to either." In other words, "subjectivities emerge from engagement with the world" (Singh 2017: 761). Because interaction is the key factor of production, Singh (2017) argues that we need to apply a processual understanding of subjectivity. Singh's (2017) processual approach aligns with the basic element of most contemporary learning theories, which suggests that "learning, especially self-learning, is driven through social experience" (Yannuzzi & Behrenshausen 2010: 77). More specifically, "human thought about self is constructed in the self's interaction with her/his world" (Yannuzzi & Behrenshausen 2010: 77). This understanding of subjectivities as emerging from engagement with the world has three important implications.

First, if "[r]eflection often occurs through interaction with others" (Singleton 2015: 7), it becomes imperative what we are surrounded by, who we interact with, and what relationships we build with these other beings. Importantly, this includes both human and non-human others. Second, there is a mutually constitutive relationship between mental and material landscapes. Not only do our subjectivities result in particular geographies, but we are in turn shaped by the geographies that we create. As Milkoreit (2016: 172) points out,

> [o]ur imagination is to a large extent bound to the systems we live in. The ideas represented and representable in the reality that surrounds us – the things we know – provide most of the source material for our thinking.

This quotation reflects that *what* we surround ourselves with affects our thinking and therefore our subjectivities. The 'what' includes both physical matter, such as landscapes, places and other living beings, but also cultural dimensions such as language and customs. Taken together, what we surround ourselves with affects our psycho-social state of mind; how we relate to ourselves and how we relate to others, where 'other' includes the non-human. In fact, what we think is not only intimately linked with but also constrained by the qualities of the beings and places that we surround ourselves with. This is because "[t]he places we encounter and the people we share experience and thoughts with are mirrors and sounding boards for our own reflection" (Singleton 2015: 7). This underlines the importance of place and socialization in shaping our subjectivities. Subsequently, it is important what kind of experiences we have; what

interactions we participate in and what environments we engage with – including virtual ones, as I will argue below.

A third implication of understanding subjectivities to be constituted through interaction is that the body is granted a central role in shaping the mind. This is because the body is the medium through which we engage with our surroundings. In her paper on embodied cognition, Wilson (2002: 625) states that there is in fact "a growing commitment to the idea that the mind must be understood in the context of its relationship to a physical body that interacts with the world." This idea of a mind and body parallelism is not new, but dates back to Spinoza. According to Spinoza's philosophy, "what is an action in the mind is necessarily an action in the body as well, and what is a passion in the body is necessarily a passion in the mind" (Spinoza, in Deleuze 1988: 18). To understand cognition as an embodied concept has important implications for how we approach transformation. As Trangsrud et al. (2020: 1-2) argue,

> the understanding that to be a subject is to be in the world as a body […] holds several ontological and epistemological implications. If we are our body, then we must know that all that we have is acquired through our body: We live, perceive, and sense the world with our body and all our previous experiences, our background, and social relations are incorporated within our body.

In short, the body emerges as an essential tool for psycho-social transformation as it represents a means to re-connect with self and surroundings. This understanding opposes the logic of traditional (yet largely influential) approaches that concentrate on the cognitive and affective dimensions, for example by "informing and educating the public" or by seeking to scare or guilt people into action. However, awareness, concern, fear, and guilt are all insufficient in inspiring behavioral change (Amel et al. 2017: 275). Indeed, "changing sustainability values and environmental paradigms require more than a logical argument or an emotional appeal" (Singleton 2015: 5). Instead, there is need for a holistic approach that "reflects that transformation is a multi-dimensional process" (Singleton 2015: 5) and, therefore, includes the physical body. In light of the points discussed in this section, I conceptualize embodied experience to represent the second of the four potentially transformative qualities.

3.3 Understanding Transformation as a Multi-Dimensional Process

A dominant assumption hitherto has been that apathy and lack of sustainable action stems from a lack of awareness. However, following the logic of embodied cognition, one could also reverse this argument and argue that it is instead a lack of sustainable action that causes a lack of awareness and the concurrent disconnect. Either way, when conceptualized as a multi-dimensional process, research on transformation must take the psychomotor dimension into account. In light of the thesis's attention to the role of embodied experience in processes of transformation (RQ 2), in this section, I will explore theory that has come to embrace the role of the body in shaping the mind. While several theories exist, I will mainly focus on the *Head, Heart, and Hands* model for transformative learning (Singleton 2015), and relate this back to Singh's (2013, 2017) theory of processual subjectivities.

3.3.1 The Head, Heart and Hands Model for Transformative Learning

Transformative learning can be understood as a process of developing new perspectives (Mezirow 1990). More specifically, *transformative learning* refers to the process of developing "novel perspectives on the world, others, and ourselves through the adjustment and revision of old experience patterns" (Mitgutsch & Weise 2012: 2). This emphasis on perspective – or worldview – transformation makes the concept of transformative learning applicable beyond the educational sector, and particularly relevant for the research objective of this thesis. But how do we come to adjust and revise? According to Mezirow (1990: 13), "perspective transformation occurs in response to an externally imposed disorienting dilemma." As such, perspective transformation can be understood to happen through interaction with the world. This logic aligns with the concepts of processual subjectivity and embodied cognition presented in the previous section. The *Head, Heart and Hands* model for transformative learning (Singleton 2015) incorporates this experiential dimension of transformation.

Initially developed by Orr (1992), the *Head, Heart and Hands* model was later refined by Sipos, Battisti & Grimm (2008). As indicated by the name, the model stresses the need to engage the cognitive, affective and psychomotor domains in order to trigger transformative processes (Singleton 2015). Specifically, it works from the understanding that "[e]xperience and reflection along with awareness and caring are needed to initiate a true transformational event" (Singleton 2015: 5). Indeed, "thinking and feeling happens not only in our brains but is also connected to embodied ways of being and negotiating our way through the environment" (Singh

2017: 760). As the model recognizes the experiential and embodied dimension of transformation, it takes a holistic approach to transformation.

In the *Head, Heart, and Hands* model, the cognitive domain refers to reflection. According to Singleton (2015: 6, emphasis added), "[*t]he function of reflection is to create meaning from experience* by drawing connections and relations to previous experience, knowledge and ideas." This understanding aligns with Mezirow's (1990) interactional take on meaning-making, or of reflection as taking place in the context of "externally imposed" events. Indeed, meaning-making is about "[making] sense of an experience" (Mezirow 1990: 1). As experience constitutes the foundation upon which we reflect, experience can be understood to be at the core of transformative processes. Furthermore, reflection is considered "an essential element of transformational experiences" (Singleton 2015: 6-7). This is because

> [r]eflexivity, described as the ability to step back and reflect upon one's own thought process, values, prejudices and habitual action, is a prerequisite to questioning and, if necessary, breaking away from existing paradigms and ways of doing things. (Bentz & O'Brien 2019: 4)

Indeed, "[c]ritical reflection can lead to self-awareness", which is a precondition for recognizing and challenging our assumptions (Singleton 2015: 7). However, for reflection – understood as introspection and self-examination – and transformation to take place, emotional investment is needed (Singleton 2015: 8). This is because an emotional connection will let us "feel and experience what it is we are talking about […] in a way that registers in our minds and bodies" (Milkoreit 2016: 175). Indeed, it is "what motivates a person to look within" (Singleton 2015: 8). That brings us to the second dimension, which is that of the heart.

The heart refers to relational knowing Singleton (2015). Singleton (2015: 7) defines relational knowing "as awareness of the relationships shared with community and the natural world." According to Popke (2006: 507), such relational awareness can instill a sense of responsibility toward others that, rather than being located "in the abstract universals of justice", is "located […] in the recognition of our intersubjective being." However, beyond relational awareness, Singleton (2015: 2) argues that "a sense of connection or belonging […] [is] foundational toward development of sustainability values." Emotions play an important role here, as emotions are what "connect and disconnect people from each other, from objects, and from places" (Wright 2015: 398).

Finally, hands represent the psychomotor dimension, which refers to engagement. Singleton (2015: 9) says that "[t]o be engaged is to actively participate, to be involved and invested." It is thus about activating the physical body through action, "such as building, planting, [or] painting" (Singleton 2015: 4). As such, the model goes beyond awareness and reflection to include embodied engagement which, as discussed, is the most neglected dimension. Taken together, the underlying idea of the *Head, Heart, and Hands* approach is that without a change in all three domains - "[w]ithout expanded perspective of self and environment, expanded value of relational knowing, and changes in environmental behaviors" – sustainability is unattainable (Singleton 2015: 10). Importantly, the three elements are interrelated such that what I perceive (head) depends on what I value (heart) and do (hands), what I value depends on what I perceive and do, and so forth. Singh's (2013, 2017) study of affective practice is a relevant example in this regard.

3.3.2 Transformative Interaction

Singh (2013, 2017) studies the role of affective practice in processes of subjectivity formation. She finds that individuals, by engaging in affective labor where they take care of nature, develop "new ways of being, new subjectivities, and new forms of human communication and cooperation" (Singh 2013: 190). In her fieldwork from India, Singh (2017: 757) describes that

> villagers in Odisha have forged intimate relations with forests in the process of taking care of them. Through their embodied caring labour, local residents have not only grown forests but also their sense of community and 'being-in-common' with the rest of nature and with each other. In the process, they have cultivated new subjectivities of being forest caregivers.

In this example, affective practice led villagers to new understandings of and relationships with both themselves and their surroundings. As such, Singh's research supports the idea that it is through body-world interaction that we develop into ourselves, and that this interaction is not limited to other humans but include the non-human as well. Indeed, it was "the interactions among humans and non-humans […] [that] produced new ways of being, and new subjectivities" (Singh 2013: 197). As a result, individuals were "transformed through […] engagement with the material world" (Singh 2017: 759), demonstrating a process of reciprocal transformation through affective practice.

Ultimately, Singh's (2013: 190) research demonstrates "the role of affect and environmental care practices in the production of new subjectivities." In so doing, she illustrates that to externally effect change is to simultaneously effect change within (Singleton 2015: 3). The body thus emerges as a central mechanism for change. Indeed, through practice, "villagers not only transform natural landscapes but also transform their individual and collective subjectivities" (Singh 2013: 189). This finding aligns with Milligan & Wiles' (2010: 742) argument that care should "be understood as an embodied phenomenon rather than a disembodied experience" that "can impact on and shape an individual's […] belief systems." As mentioned, it is upon this foundation Singh (2017: 764-765) concludes that we need to adopt a processual understanding of subjectivity, as how we understand and relate to ourselves and others is not fixed but rather the result of dynamic processes of interaction.

Other research has produced similar findings. For example, in a study conducted by Trangsrud et al. (2020), psychologists explored the role of nature and outdoor pursuits in the recovery of individuals with eating disorders. Although the matter is different, there are similarities in terms of exploring and changing how we relate to ourselves and our environment. The researchers found that, through embodied experiences with nature, individuals were able to (re)connect with their own bodies (Trangsrud et al. 2020: 1). In essence, for these individuals, immersion in nature stimulated new relations to self. Consequently, the researchers argue "for the importance of an integrative focus on body and mind in ED [eating disorder] recovery" (Trangsrud et al. 2020: 14). The examples of both Singh (2013, 2017) and Trangsrud et al. (2020) demonstrate the interconnected nature of the three dimensions (head, heart, and hand), and the role of psychomotor engagement in transforming thoughts, feelings and relations both to self and surroundings.

I have hitherto argued that, in order to engender psycho-social transformations, the information that we want to convey should be communicated through embodied experience, as the body has a central role in shaping the mind. However, as mentioned in the introduction, in the context of socio-environmental issues, it is for quite obvious reasons not desirable to wait for people to have first-hand experience (Rooney-Varga, in MIT Sloan 2018). It is here that *virtual embodied experience* comes into play.

3.4 Subjectivity and Gaming

In the previous section, the cases of Singh (2013) and Trangsrud et al. (2020) demonstrated that shifts in consciousness, rather than relying on life-changing events, can be invited through experience (Schlitz, Vieten & Miller 2010: 31). In a similar vein, Mezirow (1990) suggests that perspective transformation can be triggered through so-called *disorienting dilemmas*. According to Mezirow (1990:14), disorienting dilemmas function as "catalysts or "trigger events" that precipitate critical reflection and transformations." Mezirow (1990: 13-14) further argues that such disorienting experiences can be triggered by more significant life-changing events, such as a divorce, death, or retirement, but "may also be evoked by an eye-opening discussion, book, poem, or painting or by one's efforts to understand a different culture that challenges one's presuppositions." Whatever the cause, the core idea is that "[a]nomalies and dilemmas of which old ways of knowing cannot make sense become catalysts or "trigger events" that precipitate critical reflection and transformations" (Mezirow 1990: 14).

Harmon (2011) extends Mezirow's (1990) argument to video games and proposes that virtual worlds can facilitate trigger events that jolt people into reflection. Specifically, Harmon (2011) suggests that the jolt can be triggered in four different ways, two of which are most relevant to this thesis's focus on subjectivity and virtual experience (RQs 1, 2, and 3); 1) through alternate manifestations of the self and 2) through atypical experience. In this section, I will present each of these two types of triggers. I ultimately conceptualize alternate manifestations of the self – or, *alternative subjectivities* – and *atypical experience* as the third and fourth potentially transformative qualities.

3.4.1 Alternative Subjectivities

According to Harmon (2011: 30), the primary way in which a virtual world can function as a trigger event for transformative learning is through enabling "alternate embodiments or manifestations" of the self. Indeed, in order to maneuver a virtual world, we need to temporarily inhabit a virtual character, called an avatar. The avatar can be very similar to or different from our real-world selves in terms of physical traits, skills and so forth, and will depend on a combination of the player's preferences mixed with the options that the game puts forth. However, disregarding the level of similarity, "the form of the digital game is an allegory for the form of being. Games are our contemporaries, the form in which the present can be felt,

and, in being felt, thought through" (Wark, cited in Yannuzzi & Behrenshausen 2010: 88). The avatar can therefore be considered a virtual extension of the self.

It is in this space that the basis for the transformative potential of video games can be found. Indeed, it is the players' identification with the avatar, combined with the sense of presence in the virtual world that the avatar enables, that "allows virtual worlds to become a bridge back to the real world" (Harmon 2011: 30). Ultimately, this implies "that events which occur there [in the virtual world] can have meaning in the real world" (Harmon 2011: 31). Indeed, "[b]ecause the player is driving the unfolding story line, it becomes, in a very real way, the player's own story" (Barab, Gresalfi & Ingram-Goble 2011: 526). From this perspective, virtual experience emerges as embodied experience, as one's ways of being and doing are understood to be registered physically, emotionally and mentally in the body of player. As such, 'virtual embodied experience' is thought to have the potential to transform our ways of being and doing in the real world.

As reviewed in Chapter 2, Barab, Gresalfi & Ingram-Goble (2011) also theorize that gaming can lead to transformation. In their theory of 'transformational play', the idea is that by taking on a protagonist role that actively engages with and transforms the virtual world, the gamer simultaneously transforms herself; there is "a dynamic (transactional) unity of person, content, and context in which all are transformed through participation" (Barab, Gresalfi & Ingram-Goble 2011: 525). This understanding of virtual 'doing' as a potentially transformational process corresponds with Singh's (2013, 2017) processual understanding of subjectivities. Thus, just as identity and experiences in the offline world bleed into virtual worlds, identity and experiences in virtual worlds are thought to affect our subjectivities in the real world (Steinkuehler 2008).

This is because, through our avatars, we experience things first-hand, as if it was not a virtual character but rather our material selves that performed the actions. While virtual tend to be equated with unreal, the human body does not discern between simulated and non-simulated experience. For example, it is not unusual when watching a fast-paced movie that the body responds with sweating or a racing pulse, despite one's awareness that it is just a movie. Similarly, while we remain aware of the fact that the game is indeed 'just a game,' the virtual experience is still real from the perspective of the player; it is "a real experience which occurs in a virtual environment" (Harmon 2011: 31). This perspective aligns with psychologist Nico

Frijda's approach (2007: 10), who contended that "[e]vents are "real" in the emotional sense when they affect one's affective and bodily existence – when they involve embodiment." Indeed, events need only be *experienced* as real to elicit real emotions (Frijda 2007: 8). Taken together, virtual experience emerges as embodied and potentially transformative experience as it has the potential to change our ways of being and doing back in the material world. I therefore conceptualize alternative subjectivities as the third quality with transformative potential.

3.4.2 Atypical Experience

The second way that virtual worlds can trigger transformative learning is through offering *atypical experience*. In contrast to the real world, virtual worlds can be molded to include any design that the game developers desire, including the possibility to transcend the physical boundaries of the real world. However, the design need not be inspired by science fiction – it can be perfectly realistic, yet still provide players with atypical experience. For example, players can simply encounter "people and situations they might not ordinarily encounter" (Klabbers 2018: 218). As long as the virtual experience is "outside the normal bounds of a learner's experience, and […] contain consequences (simulated consequences) of sufficient gravity to emotionally engage the learner beyond a surface level", it qualifies as a potential transformative trigger event (Harmon 2011: 31). Such events are then thought to initiate reflection in individuals.

The first dimension of the atypical experience – that it must be outside the normal bounds of one's experience – might be more accessible in virtual worlds. This is because the virtual environment is likely to differ from our surroundings in the material world and hence produce other types of experience. Following the argument that our imagination is largely conditioned by our surroundings (Milkoreit 2016: 172), surrounding ourselves with other environments may expand the foundations upon which we base our thinking and, thus, open up for new reflections. Having considered the embodied nature of video games, these geographies may well be of a virtual nature. In short, virtual worlds can expose us to other surroundings (geographical locations, mechanisms and types of interaction) that make room for other kinds of being, doing, reflecting and relating.

The second dimension of the atypical experience is that it must trigger deep emotional engagement. Several researchers have written about the transformational nature of emotions. For example, Davidson & Milligan (2004: 524) point out how emotions play a decisive role in

shaping our worldview, as "[o]ur sense of who and what we are is continually (re)shaped by how we feel." This in turn has very material effects as it "can shape the very nature […] of our being-in-the-world" (Davidson & Milligan 2004: 534). In fact, emotions shape "how geographies [are] made and futures shaped" (Wood & Smith 2004: 533). Because emotions affect how we interact with our surroundings and result in specific landscapes, they are deeply geographical and transformationally potent concepts. Ultimately, as atypical experience is thought to trigger transformative reflection, I consider atypical experience to represent the fourth and final quality with transformative potential.

3.5 Conclusion

Based on the argument that the transformative potential of video games is contingent (developed in Chapter 2), this chapter began with the question of what that potential could be contingent upon. Gathering insights through a wide-ranging review and discussion of literature from fields such as human geography, psychology, pedagogy and ludology, I have proposed the relevance of four key qualities, or characteristics, that may be indicative of transformative potential – self-efficacy, (attention to) embodied experience, alternative subjectivities, and atypical experience. At the same time, this discussion suggests that video games could be tools that can help us transform through creating alternative subjectivities. The thesis will apply and interrogate the relevance of the four concepts in answering the research questions.

4 Methodology

In this chapter, I present the research strategy and methodological decisions that enabled me to address the research objective of the thesis. I begin by outlining the research design and describing the process of case selection. Next, I present the different methods I applied to address the research questions before I describe the processes of participant selection. I then present the techniques that were used to analyze the data. Towards the end, I discuss some advantages and limitations of conducting online research. Finally, I discuss the concepts of validity, reliability, and ethical aspects of the research process. Justification of the methodological choices that were made will be provided throughout the chapter.

4.1 Introducing the Research Design

The thesis is based on an exploratory, instrumental case study of *Eco*, with a qualitative thematic analysis of data generated from diaries, interviews, and a survey. A total of 39 participants (between 16 and 38 years old) from 14 countries partook in different parts of the study. In this subchapter, I will introduce the research design and describe the process of case selection.

4.1.1 Designing a Qualitative Case Study

Research design can be defined as "the pairing of a primary research objective and a specific research method" (Ragin & Amoroso 2011: 36). Since the objective of this study is to *explore* the transformative potential of virtual sustainability games, I decided to conduct a qualitative case study. According to Eisenhardt & Graebner (2007: 25-26), case studies is a fruitful research strategy for building theory, as the ideas that are generated are "embedded in rich empirical data" and thus "likely to produce theory that is accurate, interesting, and testable." Indeed, proponents of the methodology typically argue that case studies are valuable because of the in-depth, contextualized understanding that they provide (Baxter 2016; Schwandt & Gates 2017). Conversely, critics argue that particular knowledge is non-generalizable and therefore ineffective for social research (Baxter 2016). This critique is not limited to case studies but tends to be directed at qualitative research in general. However, it is not a primary objective of qualitative research to generalize results. Instead, "the value of qualitative research lies in the particular description and themes developed in the context of a specific site" (Creswell & Creswell 2018: 202). From this perspective, particularization is not only valuable but essential.

Because most qualitative research involves a case study methodology (Baxter 2016: 144), there is "significant variation in the ways in which case study is understood" (Schwandt & Gates 2017: 342). Robert Stake (1995; 2003) organizes cases into three categories in which the *instrumental* and *intrinsic* case study is of relevance here. In an instrumental case study, "[t]he case is of secondary interest […] and […] facilitates our understanding of something else" (Stake 2003: 137). As previously noted, the main purpose of this thesis is not to learn about *Eco* per se but to generate knowledge about its transformative potential and ask questions about the transformative potential of video games more broadly. However, since I will need to generate knowledge about *Eco* in particular, the study can also be categorized as intrinsic (Stake 2003: 136-137). In fact, "[b]ecause the researcher simultaneously has several interests, particular and general" (Stake 2003: 137), it is not unusual that a case is classified as both. Nevertheless, since the main purpose of the study is to learn about the transformative potential of video games more broadly, I have come to define it as primarily instrumental.

4.1.2 Case Selection

Case selection "is an essential part of the case study research design" and refers to "the rational selection of one or more instances of a phenomenon as the particular subject of the research" (Bleijenbergh 2010: 61). I began the process of identifying a potential case by searching for games that address socio-environmental issues. There is a significant variety of games in both analog and digital formats available, including board games, role-play simulations, browser games[4], and more complex, downloadable video games. However, the most important criterion when selecting a case is its relevance for the research objective (George & Bennett 2005; Bleijenbergh 2010: 61). The research objective of this thesis asks whether video games can contribute to psycho-social transformation. As illustrated in Chapter 2, *Eco* offers a useful point of departure for exploring the transformative potential of virtual sustainability games. In this subsection, I will provide the rationale for how I selected *Eco* as the case for the study.

Although the use of a multiple case study could have provided "a broader basis for exploring [the] theoretical concepts" (Baxter 2016: 138), I chose to conduct a single case study. The usefulness of single case studies in generating theory has been heavily debated. However, Dyer & Wilkins (1991: 614) argue that the single case study represents the very essence of case study

[4] Browser games are video games that can be accessed through a webpage rather than downloaded to a computer.

research as it "leads researchers to see new theoretical relationships and question old ones." Moreover, as there is no guarantee for "rich theoretical insights" in neither the single nor the multiple case study (Dyer & Wilkins 1991: 618), measuring the value of case studies based on the number of cases included makes little sense. Instead, it is up to the researcher to design a case study that includes relevant properties to the question at hand.

Because the choice of case will affect the results that are produced, "the importance of case selection can hardly be overrated" (Leuffen 2007: 158). As demonstrated above, the selection process in this study was non-random and intentional, as is typical for small-n research (Leuffen 2007). Leuffen (2007: 145) argues that this kind of selection is more likely to be affected by selection bias, which refers to "a faulty inference that wrongly attributes the properties of the scrutinized cases to the larger universe of cases." While I acknowledge that the selected case was guided by my theoretical interest and hence might contain more of the properties relevant to the research objective than similarly themed video games, the non-random selection was important to ensure that the chosen case could address the research questions at hand. Besides, all stages of the research process are inspired by theory (Cresswell 2013: 5). I have therefore focused on transparency by providing the reader with the rationale for selecting *Eco* as the case. I have also been cautious in making any claims about the degree to which the findings from this single case study can be inferred to other games. Ultimately, intentional case selection combined with reflexivity allowed me to pick the most relevant case to the research objective.

In addition to relevance, access to the case is key; "we need to pick cases which are […] hospitable to our inquiry" (Stake 1995: 4). After I had established that *Eco* was relevant to the project, I contacted game founder John Krajewski to present my research idea and inquire for assistance with the project. Krajewski's team provided all participants that were new to *Eco* free access to the game. I also relied on the game developers for the survey, as the survey was aimed at individuals already playing *Eco*. Specifically, they helped me recruit participants by distributing the survey through their social media channels. Since these are broad, public channels, there is little chance that the developers could have deliberately influenced recruitment. Importantly, the game developers did not see the results before submission and did not influence the outcome of the study, except as participants through interviews. As such, there is little chance of a conflict of interest.

4.2 Data Construction

The research conducted in this thesis relates to whether virtual sustainability games can renew how individuals understand and relate to their selves and their surroundings. Such change is first and foremost of an internal character. When we wish to study changes within a person, data must be gathered for a longer period of time (Bartlett & Milligan 2015: 8). However, the need for participants to familiarize themselves with the contents of *Eco* and to have authentic experiences within the game had to be balanced with my resource constraints, the limited scope of the thesis, and realistic expectations in regards to the participants. Based on these considerations, I decided to conduct a 30-day experiential study, which also allowed participants to experience a complete cycle in *Eco*. This part of the study was conducted from the 13th of September to the 12th of October 2019.

As reflected by the research objective, this study does not revolve around the participants themselves but rather the experiences that virtual sustainability games can elucidate. According to Jackson & Bazeley (2019: 2), qualitative methods can create detailed data about experience. It can also illuminate what factors produce changes in actors and provide grounds for understanding how people experience processes differently (Stratford & Bradshaw 2016: 120). Hence, if I register a change in participants during the experiential study, applying qualitative methods can help me understand what factors contributed to produce that change.

Case studies typically use multiple methods to collect data (Baxter 2016). In the initial research design, I planned to collect data using solicited diaries during the experiential study, followed by interviews upon completion. However, due to the emergent and non-linear nature of research, "the formulation of the design is likely to remain imperfect" (George & Bennett 2005: 88). This is particularly the case with social science research, in which subjects are dynamic and hence highly unpredictable. In this study, 14 out of the 18 participants did not complete their diaries. While in qualitative research, the number of respondents is secondary to the quality of who is involved and how the research is conducted (Stratford & Bradshaw 2016: 117), the amount of data I was left with made it hard to explore the research objective.

Due to the unfortunately limited data in this first phase, I decided to conduct interviews with the participants that had finalized the study. I also interviewed the participants that had dropped out along the way to discover potential patterns of non-completion. Finally, I developed a survey to collect more data on potentially transformative experiences with *Eco*. Figure 5 shows

an overview of all the methods that were applied. I describe and discuss the use of the selected methods below.

Method for data collection	Number of participants	Type of data	Phase
Diary	4	Primary qualitative data	1
Interview	8	Primary qualitative data	2
Survey	30	Primary qualitative data	3

Figure 5: *Overview of the Data Collection Methods*

4.2.1 Phase 1 – Participants Engage in Gameplay and Complete a Diary

In order to address the research objective, I had to apply a method that could provide access to psychological and hence largely invisible information. I was also interested in tracking the potential impact of playing *Eco* over time. Finally, the method had to be appropriate for online research. According to Bartlett & Milligan (2015: 30), solicited diary methods can engender "an understanding of within-person change over time." This is because it can provide access to "an individual's thoughts, feelings, experiences, embodied actions and reactions […] to phenomena of interest" (Bartlett & Milligan 2015: 30). Such data is referred to as process data and can reveal what occurs during the implementation of a program and provide an understanding of how participants make sense of these occurrences (Bashan & Holsblat 2017: 4). While process data might be highly personal, the nature of the diary method data makes it possible to elicit such data "in an unobtrusive way" (Bartlett & Milligan 2015: 5). The method is also fit for online research as it is individually produced and does not rely on any physical interaction. Ultimately, the flexible nature combined with the access to process data is what led me to implement solicited diaries.

A solicited diary is simply a diary that someone has been asked to keep for a specific reason (Milligan & Bartlett 2019: 1449). In this study, participants were asked to keep diaries to create data that could 1) help me understand how individuals engaged with and experienced *Eco* and 2) elucidate potentially transformative elements of that experience. The first decision I had to make was regarding the frequency of diary entries (Bartlett & Milligan 2015: 16). This was challenging as I had no way of predicting how much data each participant would produce. I also had to balance the need to produce sufficient amounts of data without burdening the

participants with a time-consuming task – or myself with an insurmountable amount of data to be analyzed. I decided to set a minimum of seven entries, but without a specific number of words. This was to provide potentially enthusiastic participants the opportunity to share more.

As the function of the diary was to elicit participants' thoughts, feelings and experiences in relation to gameplay, I chose to apply a semi-structured format (Milligan & Bartlett 2019). This format shares many of the features and advantages of a semi-structured interview. In addition to a set of guidelines on how to complete the diary, participants were given a set of prompts linked to the research objectives and were encouraged to record their experiences in relation to those prompts (Milligan & Bartlett 2019: 1453). However, participants were free to record other issues that felt important to them (Milligan & Bartlett 2019: 1453). Ultimately, the semi-structured format resulted in very different styles of writing. For example, two of the participants wrote about half a page per entry, the third produced several pages, and the fourth used bullet points. Rather than consider this variation a limitation, I think it illuminates an empowering aspect of the diary method as participants are in charge of producing content that is meaningful to them (Milligan & Bartlett 2019: 1455).

There are several benefits of applying solicited diary methods. First, the participant is in charge of both the time and place of writing. This spatiotemporal freedom allows participants to consider questions in private (Milligan & Bartlett 2019: 1458). Second, the absence of the researcher might make participants more relaxed and honest, which may alleviate the problem of participants saying or writing what they think is expected of them (Bartlett & Milligan 2015: 15). Diaries can also make it easier for participants to express thoughts and feelings that are harder to communicate face-to-face (Milligan & Bartlett 2019: 1458). Finally, while traditional face-to-face methods like interviews may see participants forget details or recount them inaccurately, real-time recording tends to reduce such recall bias (Bartlett & Milligan 2015: 5; Milligan & Bartlett 2019: 1450). In sum, the solicited diary is a flexible method that can help elicit and preserve details that are important to understand processes of mental change.

However, the use of diaries does also introduce some limitations. First, researchers might not be able to access the detailed data that the method aims to elicit. This could be due to a lack of motivation or time on behalf of the participant. Indeed, one common issue relates to "the participant's ability and motivation to complete the diary" (Milligan & Bartlett 2019: 1459). While all methods depend on participants' willingness to contribute, the use of diaries "require

the researcher to relinquish control of part of the research process, offering less opportunity for the researcher to check on, and direct, the form and follow of data emerging or to probe interesting issues raised by diarists" (Milligan & Bartlett 2019: 1459). With this in mind, I tried to reinforce data recording by sending out a weekly e-mail where I would encourage participants to submit their writing without overthinking the task. According to Bartlett & Milligan (2015: 93), such regular contact can help reduce instances of noncompletion. However, to avoid reintroducing a feeling that their responses were being "monitored," I did not provide participants with any personalized feedback.

Within the diary format, participants might also go back and edit out excerpts that could have been interesting to the research. As such, diary methods can be understood as "both a reportage of events […] and a performance" (Milligan & Bartlett 2019: 1453). However, the problem of withholding is not limited to diaries but a problem associated with research in general. While this limitation cannot be completely offset, I encouraged participants to consider the diary as an invitation to reflect and an opportunity to express themselves freely. In the end, my overall impression was that the participants felt comfortable with openly sharing what was important to them.

Finally, written solicited diaries rely on literacy skills (Bartlett & Milligan 2015: 18). To offset this limitation, I offered participants the opportunity to submit voice records. However, none of the participants inquired about this option. Regrettably, this might be a direct consequence of the fact that the single tool[5] approved for the purposes described here was available only in Norwegian. As the use of remote research increases – and particularly in contexts of global pandemics such as the current COVID-19 – institutions would do well to invest in technologies that better facilitate such endeavors.

In sum, the use of the solicited diary method allowed me to access participants' feelings and experiences in a more direct and intimate manner. However, while the semi-structured format opened up for a more authentic style of writing, it also resulted in some data that was irrelevant to the research objective. Moreover, 14 out of the 18 participants did not complete their diaries. Among these 14 participants, 12 did not submit any entries, while the final two submitted one

[5] At the time, the only tool authorized for remote research recording was an app developed by the University of Oslo called *UiO Diktafon*. In addition to being available only in Norwegian, users could neither listen to nor edit recordings before submission.

and two entries, respectively. To gain an understanding of why participants did not complete the experiential study, and to verify any tentative conclusions that I had made on behalf of those that had completed, I decided to conduct follow-up interviews. This allowed me "to probe interesting issues raised by diarists" (Milligan & Bartlett 2019: 1459) and to check for potential misunderstandings.

4.2.2 Phase 2 – Interviews

Interviews can be defined as 'conversations with a purpose' (Clark et al. 2008: 149) that are conducted to access information that cannot be directly observed (Patton 2002: 340). I conducted three kinds of interviews with distinctive purposes. First, I conducted follow-up interviews with five out of the 14 participants that did not complete their diaries to gain a better understanding of the barriers for completion. Second, I conducted follow-up interviews with three out of the four participants that completed the study to clarify and expand on the data from their diaries. Lastly, I interviewed a community manager in *Strange Loop Games* to gain a deeper understanding of their vision of and intentions behind *Eco*. This interview was conducted in two rounds, as follow-up questions and need for clarification arose from the responses received in the first round. Without any direct access to the participants, all interviews were conducted online. All participants were interviewed in Skype Business, seven of which were oral and one written. I describe the interviews in detail below.

Mapping the Barriers to Completion

Out of the 14 individuals that engaged very little with *Eco* and did not complete their diaries, five agreed to be interviewed. Each interview lasted for approximately 20 minutes. The main purpose of interviewing was to map the different barriers to completion. While some had already informed me that it was a time-related issue, I was curious about what other factors had influenced their decision to not complete the study. Such data could also help inform future studies. Since I wanted to learn more about participants' experiences and opinions, I decided to conduct interviews (Dunn 2016: 150). While I did deploy the same interview guide in all five interviews to detect potential patterns in their responses, I also considered it important to allow flexibility for unexpected themes to emerge. The interviews were therefore of a semi-structured format (Dunn 2016).

As mentioned, one main factor that affected participant's decision to drop out was limited time to play the game. Over the period of 30 days, one played for about five hours, the others for

about an hour or less. This was an issue described both by participants who did and did not partake in the follow-up interviews. For example, one participant stated that "this period of time was quite stressful for me," another admitted that he "completely underestimated the amount of work that I was going to be doing," a third participant explained that it was at the start of the term and that he "didn't have it as a priority because I had other things going on," and a fourth said that "many times I try to take more time, but many times I must work." While the study was indeed time-consuming, I made sure to communicate the level of effort that was expected from participants, both in the online advertisement and again before they signed the informed consent. I did also not specify a certain amount of required gameplay in order to make the study less demanding.

Another main factor that affected their decision to withdraw from the project was related to the complexity of the game. Indeed, three out of the five interviewees described the game as complicated. Key words that came up were "confusing," "overwhelming," "intimidating" and "non-intuitive." Two out of the five interviewees further commented on the gap in levels between themselves and the other players on the server. As defined in Chapter 2, 'server' simply refers to the shared virtual space, or world, that players enter when they play multiplayer games. In this study, all participants were instructed to join an official server. This decision was based on an informed discussion with both game developers and supervisors regarding what experience would create the best premises for a remote study. However, one of the interviewees described feeling confused when he saw that "the other players all had their own houses and everything already and found it much easier [to play]." All the participants that completed the experiential study wrote about similar experiences in their diaries. Since some of these were familiar with *Eco*, my initial assumption was that the choice of server had limited the study.

However, another study that investigated the educational potential of *Eco* also experienced high levels of non-completion (Fjællingsdal & Klöckner 2019). Fjællingsdal & Klöckner (2019: 9) describe that "[t]he majority of our respondents did not engage with the game" and "a significant amount of respondents [52 out of 59] declined to participate in post-gameplay interviews." According to the authors, the main reasons for the apparent lack of motivation and low response rate was complex and unfinished game-mechanics, a demanding time-frame on behalf of participants, and that the timing of the project interfered with other study-related obligations such as the need to study for finals. For future studies to be more successful, the authors emphasize the need for studies to be well-planned and participants to be well-informed.

The importance of brief and well-defined guidelines can hardly be overestimated, particularly in the context of remote research. In future studies, researchers should carefully consider what measures can be implemented to make it easier for novice gamers to participate from afar. Guided gaming in a local context could be another alternative. This could include debriefings to help clear up any misconceptions, and serve to stimulate further discussion of the contents of the game (Fjællingsdal & Klöckner 2019: 10). Finally, I would recommend having a stable access to technical expertise, as I often had to spend several days waiting for help from different institutions. This impacted on the process of data collection and tended to complicate communication with participants. Part of this limitation could have been offset with better access to technical skill. In cases where such knowledge is absent, researchers need to make sure that they account for potential delays in their project schedule.

Verifying Tentative Conclusions

Three out of the four participants that completed the study agreed to be interviewed. Each interview lasted for about 60 minutes. The purpose of these interviews was to clarify potential misunderstandings in my interpretation of their experience but also to have the participants elaborate on specific events that were interesting to the research objective. Interviewing was a well-suited method in this regard, as it allowed me to check and verify any tentative conclusions and disclose potential misunderstandings in my interpretation of their entries (Dunn 2016: 151).

All three interview guides began with standardized questions that were descriptive in nature, as suggested by Patton (2002: 352). For example, I would ask the participants how they became aware of the study and inquire about their decision to participate. I continued by asking the three participants different questions related to their diary content. I would often read out excerpts to help the respondent remember the experience, which is recommended to elicit more grounded and meaningful responses (Patton 2002: 352). While I had outlined a fairly detailed set of questions related to the topics of interest, the specific sequence and wording was decided in the course of the interview (Patton 2002: 349). The semi-structured format helped the interview stay focused yet also made room for "dramaturgical spontaneity" (Clark et al. 2008: 152), which ultimately allowed for "individual perspectives and experiences to emerge" (Patton 2002: 344).

The Systemized Expert Interview

Finally, I interviewed one of the game developers behind *Eco*. This interview can be classified as a systemized expert interview (Bogner & Menz 2009). In systemized expert interviews, "it is not the experts themselves who are the object of investigation; their function is rather that of informants who provide information about the real objects being investigated" (Bogner & Menz 2009: 47). Indeed, the purpose of the process was not to learn about the game developer per se but rather to access certain background information about the game that was not publicly available and to gain a deeper understanding of *Strange Loop Games*' intentions behind making the game. The use of a semi-structured format let me both ask the specific questions I had prepared and provided the flexibility to probe for more information. However, a typical limitation in regard to expert interviews is a lack of time on behalf of the interviewee (Bogner & Menz 2009: 59), which was also the case here. We therefore agreed to interact through e-mail so that he could respond at his own pace.

Establishing Rapport

Rapport refers to "[a] productive interpersonal climate between informant and researcher" in which "the informant […] feel[s] comfortable or confident enough to offer comprehensive answers to questions" (Hay 2016: 453). The use of the online format and concurrent loss of physical presence made me reflect on what extra steps I could take to establish rapport with the interviewees. I was particularly concerned with reinforcement and providing sufficient feedback to participants.

First, I decided to record all interviews. This was to avoid having to take extensive notes and allowed for a more attentive conversational style. However, I did jot down key words to demonstrate my interest in their accounts and to encourage them to continue sharing. Additionally, the note-taking helped me stay focused and inspired relevant follow-up questions, which resulted in a more emergent conversation. Second, I used different types of prompts as suggested by Dunn (2016: 157). For example, I would clarify and retell what the interviewee had told me. I also made sure to nod, smile, and use affirmative sentences to help make up for the loss of other body language. Finally, the achievement of rapport is influenced by location (Clark et al. 2008: 157-158). Due to the online nature of the interviews, participants were free to pick a location of their own choosing. These familiar and more informal settings helped produce a space in which interviewees felt relaxed. I also made sure to thank all interviewees at the end of the interview for their time and confirmed that the information they had provided

was useful (Dunn 2016: 167). In sum, the implemented measures helped me overcome the challenges of establishing rapport in the context of virtual interviewing.

4.2.3 Phase 3 – Survey

To further supplement the data from the experiential study, I decided to conduct a survey. Notably, the survey participants were not part of the experiential study, but *Eco* gamers nonetheless. Payne & Payne (2004: 219) define the survey as a tool for gathering "data from […] samples of people, by means of their verbal responses to uniform sets of systematic, structured questions." Cullen (2020: 8) further describes it as "one of the most powerful tools a geographer has for obtaining original data under remote research conditions." The survey was certainly practical as it helped me generate a significant amount of data in a short amount of time. It was created in *UiO Nettskjema* and was distributed approximately a month after the experiential study was finished, from the 8th to the 10th of November 2019. I monitored the responses to make sure that all of the participants in the final sample had addressed all of the questions in the survey. This helped me avoid including responses that suffered from item non-response error, in which respondents "fail to complete an individual item within the survey" (Toepoel 2016: 9).

Following a similar logic as that for interviews, it is recommended to open the survey with questions that require less energy on the part of the participant. The first five questions were therefore purely descriptive, asking for background information like number of hours played and country of residence. The main survey then consisted of 13 items that I developed through reflective discussion with the supervisors. Some of the 13 items were based on the findings from the diary data and the interviews. The discussions helped me reformulate questions that were ambiguous or complex, which not only made the survey more user-friendly but also reduced the potential of the survey becoming a source of error (Toepoel 2016: 8). Furthermore, participants were free to move back and forth between the questions which allowed them to postpone specific questions and to edit former responses.

Because all questions were open-ended, participants were free to answer in their own words without restrictions. This resulted in "chunks of text" (Clark et al. 2008: 135) that could be coded and interpreted, which made the data fit for a thematic analysis. However, while open-ended questions tend to elicit more detail (Cullen 2020: 8), several participants left short responses. Furthermore, certain individuals may be more conducive to participate in research

than others. In this survey, factors like time, interest and comfortability with the written format are likely to have affected the decision to participate. In addition, some individuals may simply not have considered their experiences as relevant to the project. Due to these shortcomings, it is not possible to draw any conclusions regarding the representativeness of the sample. However, the items did enable an exploration of the extent to which individuals without any prior connection to the study shared experiences similar to those that had participated in the experiential part of the study. Finally, the survey acted as a tool for triangulation, and the data that was produced resonated with that of the other methods. A copy of the survey is appended (Appendix A).

4.2.4 Participant Selection

To achieve a geographically diverse sample, I posted information about the experiential study on a website named Call for Participants (CFP). CFP is an online bulletin board where researchers can recruit participants to join their projects. While some individuals registered directly through this webpage, others followed a hyperlink that both the game developers and I had shared on social media (Facebook and Twitter). The plan was to recruit 30 individuals based on their level of familiarity with the game. This was to account for whether the amount of time played might impact on their potentially transformative experience. However, the total number of people that signed the informed consent and hence agreed to participate upon the start of the experiential study was 18. I divided participants into three groups based on their experience, with six beginners (individuals that were new to *Eco*), six intermediates (individuals that had played for one month or less) and six advanced (individuals that had played *Eco* for several months).

Out of the 18 people that were recruited, five (27.7%) were female. Although it is not required that samples in qualitative research are representative (Stratford & Bradshaw 2016: 124), this gender distribution is slightly higher than the average women-to-men ratio (14-22%) found in games classified as open world, sandbox and city building (Quantic Foundry 2017). Furthermore, the sample was geographically diverse, with participants from England (6), USA (5), Austria (2), Norway (2), Switzerland (1), Nepal (1) and Spain (1). Finally, the age distribution ranged from 16-46, with a mean age of 28,5. However, 14 out of the 18 participants did not complete the experiential study. As described throughout this chapter, the level of non-completion led me to include other methods. While the interviewees for the follow-up

interviews were recruited through e-mail, a new process of participant recruitment was initiated for the survey.

For the survey, I applied a non-probability sample design (Clark et al. 2008: 145). This was to select individuals that conformed to the criteria set, defined as individuals between the age of 16-100 playing *Eco*. This population was easy to reach with the help of the game developers, who shared the hyperlink to the survey in their social media channels (Facebook and Twitter). The final sample consisted of a total of 30 participants, of which 27 were male and 3 were female. The sample was geographically diverse, with participants from USA (11), Canada (3), Australia (3), Spain (2), Argentina (2), Germany (2), Sweden (2), France (1), Austria (1), Cyprus (1), Denmark (1), and Norway (1). 29 out of the 30 participants specified their age, with an age distribution ranging from 16-38, resulting in a mean age of 26,75. An overview of participant's attributes is appended (Appendix B). All participants were given pseudonyms. References to data from participant's diaries, surveys and interviews will be indicated with pseudonym and method, e.g., "(Cecilia, diary)".

4.3 Data Analysis

The use of the three different methods resulted in the acquisition of both oral and written data. I began by transcribing all oral data from the recorded interviews. Next, to make sense of the collected data and to ensure a rigorous analytical process, I had to apply techniques that would enable me to "systematically [interpret] their interpretations" (Riessman 1993: 5) of the participants. Once again, the choice of analytic method should be driven by the research questions and broader theoretical assumptions. Because this thesis is exploratory in nature, I decided to conduct a thematic analysis. The thematic analysis enables the researcher to summarize key features of and identify similarities and differences across the data set (Braun & Clarke 2006). Furthermore, it is a flexible method that allows for social as well as psychological interpretations of data (Braun & Clarke 2006: 97). Taken together, this set of properties makes the thematic analysis a fitting tool for exploring psycho-social transformation.

Braun & Clarke (2006: 79) define thematic analysis as "a method for identifying, analysing and reporting patterns (themes) within data", where "[a] theme captures something important about the data in relation to the research question" (Braun & Clarke 2006: 82). The process of coding and identifying themes is a commonly used method to organize and analyze data in human

geography (Cope 2016). For the thematic analysis, I used the approach developed by Braun & Clarke (2006), who offer a detailed six-step guideline. Below, I will provide a detailed presentation of the first five steps. I organize the five steps of my analysis around those indicated by Braun & Clarke (2006), while building on this approach with additional insights from additional qualitative methods literature. Step six, which is the writing up of the results, will be presented in the analytical chapters.

Data Familiarization

The first step is dedicated to *data familiarization*. I thus began by familiarizing myself with the content through active and repeated reading of the data (Nowell et al. 2017: 5). I began by reading through the data sets from the diaries. This helped me develop questions for the in-depth interviews with the participants that had completed the experiential study. Next, I re-read the data collected from the diaries and read through the data from the interviews to develop relevant items for the survey. By the time the survey responses were collected, I was already familiar with the data sets from the previous two methods. The final round of familiarization was therefore restricted to the survey. At the end of step one, I was well acquainted with the body of data and had some preliminary ideas for the next step of coding.

Coding

Coding refers to the process of labeling extracted sections of text "as they relate to a theme or issue in the data" (Nowell et al. 2017: 6). The purpose is to gain an understanding of what kind of information the data contains and to organize the data into meaningful groups (Nowell et al. 2017: 6; Braun & Clarke 2006). While specialized software is available, I found it more practical to code manually using *Microsoft Word*. The data was coded in several rounds, which reflects the iterative nature of the coding process. In the first round, I worked through the three data sets and coded all text that to differing extents seemed relevant to the research questions. Some of the data received several codes. At this point, I was less concerned with finding the "right" codes and more focused on jotting down what was in the data and with identifying interesting aspects. This approach helped me establish an overview of participants' accounts that would later function as a more authentic foundation for interpretation. In other words, it helped me anchor the themes in the actual data.

While it is generally advised that the researcher code, compare, and organize the data until no new themes emerge, "equal attention to all data is not a civil right" (Stake 1995: 84). Indeed,

selectivity is an important part of the process and necessary to reach the research objective. I therefore stopped coding when no new themes that were *relevant to the topic* emerged. The codes were collated into a code book with an overview that defined the meaning of each code. The process of defining the code contents helped me identify what codes were interchangeable or redundant and which codes had to be modified, resulting in a set of codes with "quite explicit boundaries" (Nowell et al. 2017: 6). Finally, all data extracts were matched with and collated within the identified codes. In cases where extracts did not fit any of the identified codes, new codes were generated.

Searching for Themes

In step three, I continued analyzing the identified codes and experimented with combining them into overarching themes. A theme can be defined as "an abstract entity that brings meaning and identity to a recurrent experience and its variant manifestations" (DeSantis & Ugarriza 2000: 362). Braun & Clarke (2006) distinguish between an inductive and deductive approach to the process of identifying themes. While it might be tempting to define one's research as either or, in practice it will always come down to a back and forth between the two approaches – what the researcher wants to find out as reflected in the research questions, and what people are trying to disclose in the data that has been collected. Thus, while the identified themes and sub-themes were grounded in the data, the bottom-up search for codes was always guided by theory. Indeed, one role of theory is "to filter and organize the data received" (Harling 2012: 3). Hence, while I have strived to code and identify themes "with an open and discerning mind" (McAdams 2012: 18), I acknowledge that my theoretical interest has affected the process of interpretation and that no codes or themes simply "emerged" from the records (Braun & Clarke 2006). However, most of the literature that was relevant to understand and explain the data was found during and after the process of coding. Not only did this help me see what was actually present in the data, but it also helped me "prevent existing theory from predetermining the result" (Harling 2012: 3). Consequently, the theory chapter was written alongside the analysis and the final research questions were reinterpreted and clarified in light of the analysis.

Throughout step three I used a table to sort the codes into different themes, before I collated all the relevant coded data extracts within the identified themes. I also created a mind-map to help me "zoom out" and see how the different codes, themes, and level of themes related to each other. This resulted in a collection of candidate themes and sub-themes with associated data extracts that seemed to say something specific about the research questions.

Reviewing Themes

Step four is dedicated to refinement of the themes and should result in "themes that are specific enough to be discrete and broad enough to capture a set of ideas contained in numerous text segments" (Nowell et al. 2017: 9-10). This process is guided by the principles of internal homogeneity and external heterogeneity (Braun & Clarke 2006: 91). To check for the former – that the data within themes meaningfully cohere – I began by reviewing the selected data extracts for each theme. More specifically, I tried to identify what common story or pattern the different extracts in each theme tried to tell. In addition to help me gain an understanding of the essence of each theme, this process enabled me to discover what information ran counter to the main themes (Braun & Clarke 2006). It also helped me identify excerpts that were irrelevant to the research objective. However, in some cases the theme itself was problematic, and in those cases I either reworked the current theme or created a new one. Once I had an overview of all the themes and what aspects of data they captured, I checked for external heterogeneity to ensure that all themes were clear and distinguishable.

Defining and Naming Themes

In step five, I produced a detailed analysis for all themes. Similar to the first round of coding, I reflected on what aspects the themes captured and in what ways they were relevant to the research objective (Nowell et al. 2017: 10). Analytical memos with reflections from previous stages were helpful in this process. After having identified the 'essence' in each theme (Braun & Clarke 2006: 92), I "zoomed out" to have a final look at how the themes related to each other and to ensure that there was not too much overlap between them. Finally, the themes were labelled in ways that reflected the raw data. The 10 themes will be presented in the three results chapters (Chapters 5, 6, and 7).

4.4 Advantages and Limitations of Online Research

The main incentive for conducting the research online was to achieve a geographically diverse sample. The remote approach was enabled by the digital nature of the video game together with the online data collection services offered by the *University of Oslo*. In addition to a relatively wide geographic reach, the online format made it easy to attract a large number of participants to the study. It is likely that the ease with which I could recruit participants was due to the convenience of the format. Indeed, online research makes it easier for individuals to participate on their own terms, pace and preferences (Dunn 2016: 180). Combined with my physical

absence, it is possible that participants felt more comfortable and hence provided more authentic accounts (Bartlett & Milligan 2015: 15). In short, the digital nature of the study helped make the sample more diverse, and might have elicited responses that analog methods would not. It is also worth noting that, in the context of a global pandemic, online research is all the more relevant as researchers have been forced to work remotely. However, the data presented in this thesis was collected before the COVID-19 outbreak.

While the remote nature of the study made it possible for participants to partake from their local context and to consider questions in private, this was at the expense of any physical meetings with the participants. Despite my efforts to be available at all times and keep one-on-one contact with each subject, the lack of in person meetings may have made it easier for people to drop out. It was especially difficult when participants took long to respond to e-mails as I had no way of knowing whether they simply did not check their e-mail or if they had decided to leave the study. Some even stopped responding altogether. One limitation therefore relates to the spatial distance between the participants and me.

Another limitation relates to access. While gaming might no longer be "held back by geography, or limited to high-income countries" (Patterson & Barratt 2019: 6), there are still socioeconomic, geographic and demographic factors that cause a significant and "uneven distribution in access to computing devices and the Internet" globally (Fox undated, unpaged). For example, numbers from 2016 show that only 1.18% of the population in Eritrea used the Internet compared to 97.3% of the population in Norway (Ritchie & Roser 2017). This phenomenon is referred to as 'the digital divide' and ultimately served to limit the geographical reach of the study. Furthermore, most of the people who registered through CFP lives in England, which points to a potential limitation of using a British-based website for participant recruitment.

While I acknowledge that a limited geographical reach can be problematic to the extent that "the demographic groups that do not have access to the Internet can differ substantially from the groups of people who do have access" (Toepoel 2016: 10), it was more relevant for the purposes of this study to reach individuals living in high-emission countries as these are more likely to engage with highly materialistic and hence disconnected lifestyles (Ripple et al. 2020). The final samples were also relatively diverse. Thus, despite the inherent exclusionary nature

of the digital approach I do not consider the design nor the recruitment through CFP to have negatively impacted on the sampling process.

Because of the remote approach and my physical absence, it felt important to demonstrate that I appreciated participants' time. While the use and value of incentives is debated, I chose to distribute them for the sake of reciprocity; to give participants something in return for their time (Patton 2002: 415). Patton (2002: 413) has also argued that it can "increase response rates to ensure an adequate sample size." In this project, all participants who completed the experiential study (i.e., uploaded seven diary entries) received a 30$ Amazon gift card. The participants who did not complete the 30-day study yet agreed to be interviewed also received such reimbursements. Finally, all participants who completed the survey in a satisfactory manner (i.e., responses without any item non-response error and without monosyllable responses) received a 15$ gift-card. The gift-cards were financed by the research project AdaptationCONNECTS.

4.5 Validity, Reliability, and Ethical Considerations

Throughout this chapter, I have described and discussed the methodological decisions that were made through the course of the project. However, some important points are left to be addressed. In this final subchapter, I will discuss the concepts of validity and reliability, along with a description of the ethical aspects that were taken into consideration.

Validity

Validity and reliability are two standard assessment criteria used to judge the quality of research (Nowell et al. 2017: 3). "While reliability is concerned with the replicability of scientific findings, validity is concerned with the accuracy of scientific findings" (LeCompte & Goetz 1982: 32). Both concepts have internal and external dimensions (Le Compte & Goetz 1982). However, the quantitative roots of both concepts have led some to argue that there is need for a new terminology that is attuned to, and anchored in, a qualitatively oriented paradigm (Dalen 2011: 92-93). As a result, some re-conceptualizations have been suggested. For example, Bailey, White & Pain (1999: 171-172) argues that validity in qualitative research should be approached through a "reflexive management of the research process." To be reflexive means to acknowledge that we as humans bring with us our subjectivity – our values, perspectives, interests and experiences – into the research process, and that we affect it from beginning to

end (Weber 2004; Dowling 2016; Stratford 2016). As philosopher and psychologist John Dewey put it:

> The painter did not approach the scene with an empty mind, but with a background of experiences […]. He comes with a mind waiting, patient, willing to be impressed and yet not without bias and tendency in vision. Hence lines and color crystallize in this harmony rather than in that. This especial mode of harmonization is not the exclusive result of the lines and colors. It is a function of what is in the actual scene in its interaction with what the beholder brings with him. (Dewey 2005: 91)

Reflexive management therefore means acknowledging the subjective nature of research. It also means to reflect on the research process and to have the ability to adjust and modify where appropriate (Dowling 2016: 37). As the author of this thesis, I have had the privilege of communicating participants' experiences. Importantly, I have only illuminated certain aspects of their experiences; aspects that *I* have found meaningful. Through this process of "attending to experience", I have made "certain phenomena meaningful" at the expense of others (Riessman 1993: 9). While the research questions helped me navigate the data and indicated what was relevant to the thesis throughout, I experienced the constant need to be selective to be the most challenging part of the research process. For example, during the process of coding I would encounter data that were interesting yet did not address the research questions posed in the thesis. To adhere to the principles of focused research (Ragin & Amoroso 2011) I had to leave such data behind. The responsibility of choosing what to exclude and what to pursue was sometimes burdening and I would often reflect on my authority to make these decisions. Nevertheless, as the project progressed, I learned to appreciate that it was the ability to make these decisions that would let me address the research objective, while bringing something of the participants' experiences to light.

While I have struggled to be reflexive throughout the research process, I was especially concerned with posing critical questions during the analysis. This is because, as economist Ronald Coase (1994: 27) once said, "if you torture the data enough, nature will always confess." Coase's words point to the malleable nature of research and emphasize the importance of integrity during the process of interpretation. For example, one step I took to cross-check my findings was to conduct interviews. This gave participants the opportunity to verify or refute what I had interpreted from their journals (Dowling 2016: 36). Afterwards, all interviewees were offered a copy of the transcript for vetting. Taken together, the cultivation of a critically

reflexive attitude combined with the measures that verified my interpretations helped me produce a transparent and meaningful analysis that stayed true to participants' narratives and to avoid "seeing what *I* want to see" (Bailey, White & Pain 1999: 172, emphasis in original). Because the results are valid for the sample that was studied, the study is internally valid (LeCompte & Goetz 1982: 32).

In addition to the focus on reflexivity, I took two specific steps to increase the study's level of validity. The first step was to include and discuss contradicting information (Creswell & Creswell 2018: 201). Importantly, the purpose of this study is not to prove that *Eco* is transformative but rather to explore its transformative potential. At the core of this exploratory approach is an inherent openness not only to the existence of potential but also to the lack thereof. I made sure to communicate this openness to differing perspectives in all project descriptions and information letters. This was to establish positional transparency with the participants and to avoid biasing their testimonies. Ultimately, the adherence to non-normativity served to reduce research bias by widening the spectrum of the study. For example, it allowed me to include information that ran counter to the main themes. As such, it served to make the study more valid.

Finally, the use of the three different methods for data collection resulted in multiple data sets. Multiple data sets enable data triangulation which means comparison across sources of data. Creswell & Creswell (2018: 200) argues that when themes – or, the findings and associated interpretations – are based on converging data from different sources, it increases the validity of the study. It was useful to see whether the data that was collected from one source supported or challenged the data that was collected from another. The findings from the three different data sets produced somewhat congruent results, which indicates a higher level of validity.

While the two aforementioned steps helped ensure internal validity, external validity refers to the extent to which the results can be applied across samples (LeCompte & Goetz 1982: 32). This is also known as analytical transferability, and "is accomplished by (1) carefully selecting cases and (2) creating useful theory that is neither too abstract nor too case specific" (Baxter 2016: 142-143). Regarding the former, I have already provided a detailed rationale for selecting *Eco* as a case (see Subsection 3.1.2). Concerning the development of useful theory, I consider this to be achieved by anchoring new findings in already existing literature, but also by

producing theory that is relevant (i.e., applicable) to other cases and contexts, and that can further the development of existing theory.

By extending the area of research to virtual space, I move beyond literature on embodied practice in transformations to include alternative platforms in which such practices can be engendered. Hence, while I study embodied practice for sustainable transformations through new media, the results and discussions regarding the role of embodied practice in engendering subjectivities can be transferred to other contexts of both virtual and non-virtual nature. As such, the study can be said to be analytically transferrable.

Reliability

LeCompte & Goetz (1982: 32) argue that in qualitative research, "[e]xternal reliability addresses the issue of whether independent researchers would discover the same phenomena or generate the same constructs in the same or similar settings." This definition seems similar to that used in quantitative research, where "reliability refers to exact replicability of the processes and the results" (Leung 2015: 326). In a thesis that has emphasized the subjective nature of research, definitions relying on replicability and uniformity would not make much sense. As Stake (1995: 113) points out, "no two investigators ever interpret things entirely the same." In fact, even if the same researcher were to conduct the same project with the same participants at a different point in time, the social nature of both parties would have seen both researcher and participants change, making it impossible to create any exact replication. However, reproducibility is not required in qualitative endeavors. As Schofield (2000: 71, emphasis in original) argues, in qualitative research

> [t]he goal is *not* to produce a standardized set of results that any other careful researcher in the same situation or studying the same issue would have produced. Rather it is to produce a coherent and illuminating description of and perspective on a situation that is based on and consistent with detailed study of that situation.

Indeed, "[t]he quality and utility of the research is *not based on its reproducibility* but on whether or not the meanings generated […] are valued" (Stake 1995: 135, emphasis added). Based on these accounts, I have come to understand external reliability (in qualitative research) as *the production of meaningful (i.e., coherent) arguments*. I have aspired to produce such arguments in three main ways.

First, I have provided the reader with detailed documentation of all the methodological procedures that were conducted in the project. I have also made the assumptions that informed my choice of methodologies transparent, which allows readers to critically assess the selections that were made. Second, I have distinguished the description of the findings from my discussion of them. Combined with thorough discussion of the arguments put forth, this should help the reader trace the development of each argument back to its roots, ultimately allowing him or her to judge its coherence. Finally, all codes, themes and arguments have been connected to existing theory in the field. By contextualizing my findings, the reader is better positioned to fairly judge the value of my contributions. In sum, the use of a transparent approach enables other researchers to use the concepts and analyze the data in the same way I did. This process has not only ensured the production of coherent arguments and, thus, external validity, but has also contributed to make the study internally reliable, when internal reliability is understood as "the degree to which other researchers, given a set of previously generated constructs, would [or at least, from a subjective perspective, could] match them with data in the same way as did the original researcher" LeCompte & Goetz (1982: 32).

Ethical Considerations

The project was approved by The Norwegian Centre for Research Data (NSD) on the 15th of August 2019. Sensitive data was stored and processed in Tjenester for Sensitive Data (TSD), a service provided by the University of Oslo, to ensure that the data was handled in compliance with the Norwegian *Personal Data Act*. All participants were informed about the purposes of the study, the conditions for participating, and the opportunity to withdraw from the project. This information was provided again both in advance of and during the introduction to the follow-up interviews, as suggested by Patton (2002: 407). Participants who agreed with the terms of the project had to provide their informed consent. A copy of the request to participate in the experiential study is appended (Appendix C). To further protect participants' privacy, all names and usernames have been anonymized and replaced with pseudonyms.

Editing of Participant Responses

Ellipsis in brackets '[…]' indicates cut text. Ellipsis without brackets '…' indicate that they are the participants. The exception is in quotes from interviews, where I have inserted ellipsis without brackets '…' to indicate that the participant was pausing to think. In order to stay true to participants' narratives, I did generally not correct their grammatical errors. I did, however,

correct typos that could lead to confusion – such as ‘princes’ instead of ‘prices’. Corrections and additions are both put in brackets ‘[prices]’.

Concluding Remarks

In this chapter, I have demonstrated and argued the relevance of my methodological choices. I have also demonstrated how the level of non-completion in the experiential part of the study led me to modify the original research design and to include additional methods. Ultimately, this resulted in a richer thesis both in terms of data quality and personal learning output. Indeed, the level of flexibility and creative problem-solving that these challenges required taught me a broader set of specific data collection and analysis skills and broader lessons about the research process. However, the main lesson has been to accept the emergent nature of research and continue practicing flexibility as challenges arise. If I were to repeat this study or conduct another study of a remote nature, I would implement the lessons learned from these experiences to create a more robust design. In the case of *Eco*, I would choose another server that is more suited for beginners. However, considering the general level of difficulty of the game, it might be better to restrict studies that include non-gamers to local contexts with access to play guides. It could also be interesting to incorporate virtual ethnography to observe the participants and gain a more contextualized understanding of their experience.

5. Identifying Transformative Qualities

Can virtual sustainability games enhance players' feelings that they "matter" in relation to transformations to sustainability, and if so, how?

There are, in total, three results chapters that each include analysis, discussion, and conclusion. In this chapter, I explore the virtual space of *Eco*, and how it differs from that of the material world; in Chapter 6, I study what kind of virtual embodied experience, and concurrent subjectivities, *Eco* engenders; an in Chapter 7, I discuss to what extent the experiences in *Eco* have impacted on participants' material-world subjectivities.

In all three chapters, I first analyze the data in terms of themes, before I move on to discuss the data in light of the theory presented in Chapter 3. This is in the attempt to be faithful to the voices and perspectives of the participants, rather than trying to force the data to fit the theoretical concepts too soon. As I do so, to grapple with the complex nature of the qualitative data, I introduce a few additional literature references that help bring understanding to this data. Finally, in the conclusions, I will evaluate to what degree the four qualities developed in the theory chapter really correspond to the themes expressed by participants. In this way, I am attempting to remain "true to the data," while confronting these with the theoretically-derived concepts, thereby interrogating their relevance in the face of empirical scrutiny.

This chapter consists of three parts. In Section 5.1, I present and analyze the three themes that describe the virtual space of *Eco*. In Section 5.2, I discuss the three themes in relation to the theory presented in Chapter 3. However, as stated, I also introduce a few additional literature references that help bring understanding to the data. Finally, in Section 5.3, I examine to what degree the three theoretically-derived qualities of self-efficacy, embodied experience and atypical experience correspond to the empirically generated themes.

5.1 Spaces Made of 1s and 0s

In this section, I will present and analyze the three themes that emerged from the survey, diary, and interview data. The first theme illuminates how *Eco* is experienced as an enabling space in which participants have agency. The second theme reveals how *Eco* is characterized by a space-time compression that downscales the complexity of the material world, which enables engagement with issues otherwise perceived as too complex or intangible. Finally, the third

theme demonstrates how *Eco* makes impact tangible, and how this tangible experience for some participants translates into empowerment. How the three themes relate to the theoretically-derived qualities of self-efficacy, embodied experience, and atypical experience will be discussed in Section 5.3.

5.1.1 "It's Very Satisfying to See a Healthy Environment"

Many participants described virtual worlds in general as spaces in which they experience agency. "Opportunity," "ability," "allow," "freedom," "possibilities," and "potential" are just some of the words participants used to describe their experiences. For *Eco* in particular, one participant shared that

> I love creating things with others. In Eco, you do just that when creating a town or community. […] [B]uilding a society is more than just building a bunch of houses and streets next to each other. There's an economy, laws, politics and reputation and all of it combined creates a unique server[6]. (Melissa, survey)

Here, *Eco* is portrayed as a space in which players can embrace their creativity and contribute to shape the system that they depend on. As such, it represents a space of "healthy human agency" (Ziervogel, Cowen & Ziniades 2016: 8-9). Several participants also expressed feeling (more) influential in *Eco*. For example, one participant stated that the game provides him with the "liberty […] to decide the [fate] of the world" (Adriel, survey). Another participant made an explicit comparison to the real world: "ECO gives me far more agency and control than my role in real life" (Sarah, survey). One illustrative example of influence was provided by a participant who described enacting a law in his community:

> I enjoy hunting and I was looking for elk and I couldn't find any I checked the map and saw that there were only a few left so I pushed for a law to stop elk hunting it passed then a few months passed and the numbers had came back it was actually pretty awesome to stop an animal from going away. (Jamie, survey)

By utilizing the available tools – in this case, a map that provided an overview of the elk population, and access to endorse the law proposal system – a regular citizen had sufficient agency to prevent an animal from going extinct. Another participant shared that

[6] As explained in Chapter 2, 'server' refers to a shared world that players enter when they play multiplayer games. "A unique server" therefore means a unique world.

> I am a very environmentally conscious person. With Eco I have the possibility to live that out. Everything what goes wrong in the real world you can improve in Eco when you build up your own world. It's very satisfying to see a healthy environment. Eco makes me feel there is still hope in the world. (Vilhelm, survey)

In this excerpt, *Eco* is portrayed as a space in which individuals can live in accordance with their values. It is a space where one has the power to decide and influence, and that enables the kind of agency that might be experienced as out of reach in the material world due to circumstances or a lack of influence. In sum, the references demonstrate how *Eco* is experienced as an enabling space that offer participants the agency to co-create the place that they desire.

5.1.2 "Unknown Variables and Too Much Noise"

In contrast to virtual worlds, the material world is experienced as *disenabling*, meaning that it is characterized by a level of complexity that makes it harder for people to engage with it effectively. Only one out of the 30 participants in the survey described the material world as more enabling. "Messier," "invisible," "varied," "conflicting," and "multidimensional" were some of the words that participants used to describe their experiences in the material world. For example, one participant wrote that "[i]n real life there are a lot of unknown variables and too much noise from the people talking contradictory things" (Matias, survey). In this account, the material world sounds like a chaotic and ambiguous space that by its very nature introduces obstacles to change. Another participant wrote that

> In games problems are pretty straight forward. Usually there are only a couple of possible solutions and you know ahead of time what the outcomes of most are. The real world is messier. There are a nearly unlimited number of ways to handle a real problem and with most approaches you could find out days or years later you choose wrong. (Ryan, survey)

Here, virtual worlds are presented as spaces that enable engagement with issues. Specifically, game mechanics seem to impose limitations that frees up headspace to deal with problems that are perceived as too complex or intangible in the material world. By reducing the chaos created from an overwhelming number of options and delayed feedback, virtual worlds downscale and simplify problems, which makes them comprehensible. In this context, it is worth remembering that games such as *Eco* are rather complex and with many possible courses of action compared to highly restricted games such as Pac-Man or Tic-Tac-Toe. However, as one participant pointed out, in *Eco*

> you can at least point to that one particular player doing that one wrong thing. But in like, the real world […] there's all these things putting into that equation. How can you point to this one particular thing and say, this is the thing that's doing it wrong? (Cecilia, interview)

Thus, while *Eco* is certainly a complex game, it still downscales the number of factors involved and visualizes the inter-relations between them. This experience contrasts that of the material world in which there is a multiplicity of factors making it difficult to point out cause-effect relationships. Another participant pointed to diverse objectives as a factor that separates problem-solving in *Eco* from problem-solving in the material world:

> [T]he motivations for solving the problems may be very different ingame than in real life, as the game sets up an environment for competition [within] collaboration and that makes it so that there is a common goal of "winning the game" while in reality, people's goals may be very varied and conflicting. (Mats, survey)

Varied and conflicting goals are indeed a challenge in the material world. Despite scientific consensus that climate change is a bi-product of human behavior, policy recommendations regarding what measures to implement, and the making of international agreements to ratify those measures, "various governments pursue different, if not opposing policies" (Grundmann 2007: 414). In games, however, there is that common, overarching goal of winning the game. There is a shared interest. Furthermore, space-time compression lets individuals enter worlds in which problems are downscaled and graspable. As such, *Eco* is experienced as a space in which one can overcome the inherent complexities of the material world.

5.1.3 "I Can See the Grass Die and the Trees Disappear"

In addition to enabling agency and downscaling the complexity of the material world, *Eco* makes impact tangible. Through simulation, the game manages to make what is otherwise abstract and intangible, visible and experience-able: "[Y]ou can see and feel the consequences of your actions on the world" (Wade, survey). Several participants reflected on how their first-hand experiences in *Eco* brought socio-environmental issues closer in space and time. For some, this was triggered through interaction with trees. For example, one participant explained that "[b]efore they were more abstract concepts, but in the game I could really feel it sometimes, uhm … That I'm taking away this tree" (Simon, interview). The participant later added that

> I was going into the game already concerned, and maybe also a bit pessimistic about climate change and all those issues, but … the game really made them more real to me, personally. (Simon, interview)

In this excerpt, Simon describes how socio-environmental issues have attained a new status through his virtual interaction with a tree. Specifically, the issues have moved from abstract concepts to embodied experience. While he was already aware and concerned, the game somehow made the issues "more real". This indicates that the virtual experience communicates something that other mediums do not – possibly the same "message", but in an alternative way. Indeed, "I'm taking away this tree" suggests that it is the personal experience of doing that made the difference and is what led to the increased awareness. It is noteworthy how virtual experience makes a material-world phenomenon more "real". On a somewhat similar note, another participant wrote that

> I bought a chainsaw and started deforestation. I am doing no worse than others who are moving like 5,000 logs a day, but it makes me realize just how fast an area can become barren and void of trees. […] It was also a little scary to see just how fast the ecosystem changes when i continually cut down trees. (Seth, diary)

He expanded on these notes in the follow-up interview:

> I think the scary part about it was just how easy it was to do it, uh, quickly, and then how long it took for trees to grow back after that. And, like, I knew that in real life, that, you know, it's really quick to cut down a tree and they take a long time to grow, but … I think doing it just kind of made it more personal than it does when you just kind of see it on the nightly news or scrolling through Facebook … (Seth, interview)

As in the case of Simon, Seth was already aware that it takes a long time for trees to grow, but the virtual act of cutting them down still brought the issue closer. It also made him realize how fast the woods can disappear. Taken together, these excerpts demonstrate that *Eco* is a place in which one can experience the intricate ties between the human and the non-human. As such, *Eco* seems to address the dimension of climate change transformations processes that links "cultural systems with social-ecological change" (Galafassi et al. 2018: 74). Like art, *Eco* seems able to "[r]eveal materially and directly what is happening in social-ecological systems" (Galafassi et al. 2018: 74). By simulating cause-effect relationships, participants can experience how their actions affect the environment. Access to such experience is further enabled by a

space-time compression which allows players to experience the impact of their actions shortly after they have been executed.

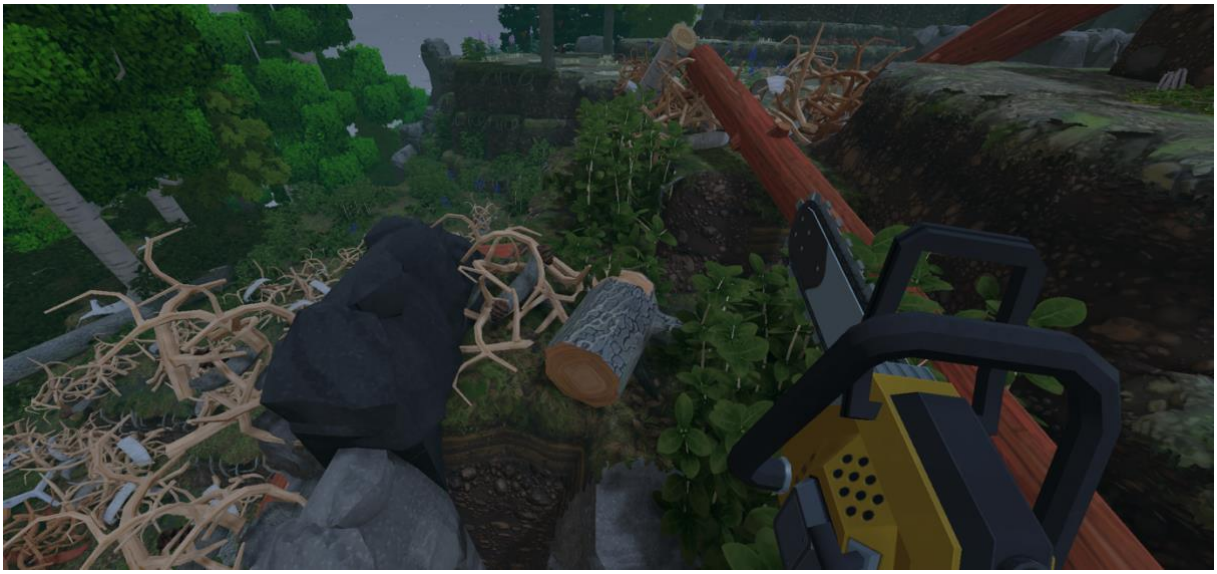

Figure 6 *Example of a player felling trees with a chainsaw. Image used with permission.*

Both excerpts suggest that there are benefits to experiencing the information as opposed to merely consuming it. In the former, "I could really feel it" signals that the experience is not confined to the mind but reaches the heart through the hand. It is *felt*, embodied. In the latter, Seth starts reflecting as he witnesses the consequences of his actions. Some participants described this kind of first-hand experience as fueling a sense of self-efficacy, meaning that it generated feelings of mattering. For example, one respondent wrote that

> I honestly feel like what i do in real life matters less than what i do in eco, as i get strong feedback about my actions in the game and not in real life. In Eco if i pollute, i see the reaction in the tables on the webpage, i can see the grass die and the trees disappear. In real life there is a large disconnect between actions and consequences when it comes to the environment especially. (Samuel, survey)

It is clear from this excerpt that Samuel's feelings of mattering are intimately tied to the simulation of interconnections: conducting action creates a tangible response, which the material world does not. Hence, receiving feedback to actions is described as a source of self-efficacy, while a lack of such feedback generates in-efficacy beliefs. There is a certain irony to the fact that actions conducted in a virtual world are experienced as more meaningful than those in the material world. However, the data corresponds with psychological research, which shows that abstract and concrete information is experienced differently and that "[s]mall-but-concrete

events can have powerful effects" (Van Lange & Bastian 2019: unpaged). Another participant shared that

> The world seems big to me and I feel so small. Even when it comes to climate change stuff, I often feel like I have very little power. ECO bumps me up at times. When I am feeling down it gives me a sense of power because I can often see immediate effects. I can build something that people want. I can provide them with food or shelter or resources that let them do something really cool […] [P]laying ECO […] has kind of helped me to look at those little things I do as potentially contributing to the greater whole further down the line. (Brandon, survey)

Here, Brandon expresses feelings of overwhelm and insignificance in the material world. As was the case for Samuel, Brandon feels that he matters more in a world that visualizes his impact. Brandon also expresses feelings of self-efficacy in *Eco* as he can be of use to, and enable, others. Another participant wrote that

> As an individual on earth out of 7.7 billion it doesn't feel like what i do matters at all. it take a large collective force to move a mountain. one person cant do it alone. Eco is different you have a lot less people to help and manage the economy. one persons actions can affect everyone. (Dean, survey)

Like Brandon, Dean expresses feelings of disempowerment related to scale, specifically due to the number of people in the world. He does not experience that his efforts are valuable in meeting with a global-scale problem. In *Eco*, however, the world is downscaled, the number of people is heavily reduced and, as a result, individual actions feel more impactful. In all three cases, feelings of self-efficacy in *Eco* starkly contrasts participants' experiences in the real world. In the two latter excerpts, downscaling seems to be the key mechanism for self-efficacy; in a world consisting of fewer people, it is easier to have a meaningful impact – or at least experience it as such. In general, the self-efficacy seems to emanate from the first-hand experience that allows participants to witness their personal impact on their surroundings. Thus, experiencing one's impact fuels feelings of self-efficacy.

While most participants (18 out of the 30 participants in the survey) stated, to differing extents, that they feel that they matter in the material world, several mentioned excerpts demonstrate how tangibility can enhance a feeling of self-efficacy in the virtual world. These participants tended to contrast this experience with inefficacy beliefs in the real world. As one participant explained,

> IRL [in the real world] es dificult to make dimension of all the people affected by my actions. I try to make as litle garbage as posible and recicle when I can't avoid it [but] I live in a city full of people that don't and [to] be the only one is hard. […] And I'm trying to vote green parties but the needs of the people in my country are much urgent than the environment. (Matias, survey)

In this excerpt, the participant discusses his sphere of influence. While Matias is clearly conscious of minimizing his impact and participating politically, he seems to question the significance of this engagement in a context where other people are perceived to be careless or preoccupied with other, more prominent issues. Again, the narrative is dominated by inefficacy beliefs. Taken together, the data in this subsection suggest that, in the virtual world of *Eco*, tangibility translates into self-efficacy, whereas the material world is used as a point of contrast that generates inefficacy beliefs.

5.2 Discussion: Making Space for a Different Place

The data presented in the previous section suggest that *Eco* is a space in which participants experience agency and self-efficacy. First, participants describe having the capacity to act in line with their preferences. Indeed, *Eco* offers individuals the freedom and power to decide what the world should look like. As such, *Eco* offer players agency. Second, *Eco* is a transparent space as it simulates interconnections between action and consequence. Through space-time compression, *Eco* makes visible and tangible what is abstract and intangible in the material world. Furthermore, it seems that acting and then experiencing the impact of those actions elicits emotions and realizations not previously felt or apprehended. Indeed, some participants describe that performing the actions generates feelings of mattering, which indicate that they fuel self-efficacy beliefs. These accounts starkly contrast some participants' offline experiences, which are characterized by feelings of insignificance. Complexity and intangibility seems to be what creates this disempowerment back in the material world.

In Chapter 3, I argued that, because humans make meaning based on experience, what kind of experiences we have is of great importance. In the data presented in this chapter, *Eco* seems to generate (embodied) experiences that the material world does not, such as 'I affect', 'I matter,' and 'I sense.' Indeed, *Eco* seems to make space for an alternative place in which one has the ability to act on one's will and, thus, experience agency; a place in which one can experience one's impact, which fuels a sense of self-efficacy; and a place in which one can "sense" human–

non-human interconnections. In this section, I will explore these three experiential dimensions in relation to the literature presented in Chapter 3, and a few additional references that help bring understanding to the data.

5.2.1 'I Affect': Gaining a Relational Understanding of Space

As stated in the introduction, we – or most humans today – are disconnected from "the life systems that sustain us" (Singleton 2015: 8), and as stated in Chapter 3, according to Ziervogel, Cowen & Ziniades (2016), reconnecting with these systems is necessary to build transformative capacities. In the material world, the systems – the interconnections between humans and non-humans – are largely intangible. This intangibility represents an obstacle to processes of reconnection. It also helps explain why socio-environmental issues are "difficult to comprehend and seem remote in time and space" (Galafassi et al. 2018: 75). Indeed, when the impacts of actions are not directly experienceable, individuals tend to experience the issues as psychologically distant (Amel et al. 2017: 276). Researchers therefore argue for the need to highlight harm to nature in more tangible ways (Van Lange & Bastian 2019: unpaged). In general, to attain awareness and to reconnect with our entangled truth, the systems must be made visible (Ziervogel, Cowen & Ziniades 2016). Looking at the data presented in this chapter, *Eco* emerges as a space that can make visible the interconnections between humans and non-humans. In this section, I argue that such transparency has the potential to see individuals reconnect with their relational and agential truth, and as such, change individuals understanding of, and relation to, selves and surroundings.

In *Eco*, participants conduct actions and then experience the impact of those actions. This is evident in accounts such as "if I pollute […] I can see the grass die and the trees disappear" and "how fast the ecosystem changes when I continually cut down trees." The opportunity to act and experience impact is made possible by several conditions. Agency provides the possibility to act (Chapter 3); the interactive nature sees the environment respond to actions; and simulation, together with statistics, visualizes the impact of actions. Importantly, the simulated impact is a result of the space-time compression. In *Eco*, space-time compression is expressed in at least two ways. First, by downscaling the geographical size of the world and the number of inhabitants, the global is simultaneously experienced as local. All actions, therefore, have a visible and crucial impact. Second, the space-time compression circumvents the time-lag between action and consequence that characterizes the material world. By providing players

with a more immediate response to their actions, *Eco* makes it easier to detect what might have caused the environmental reaction(s).

Interplay is "not easy to grasp through conventional, linear […] approaches" (Mendler de Suarez et al. 2012: 7). Video games, however, are interactive and therefore non-linear. Indeed, "the revolution offered by video games is that we can play some characters ourselves, and that other characters will react to us and do things that we can respond to" (Egenfeldt-Nielsen, Smith & Tosca 2016: 209). Researchers argue that this interactive quality makes video games more "ideal for exploring the interactions and interdependencies between human beings and their environment" (Kelly & Nardi 2014: unpaged). For example, in his book on video games and empowerment, Gee (2005: 85) argues that the game *Deus Ex: Invisible War* can engender an "empathetic understanding of the ways in which our own abilities and the seemingly "outside" world are married." While this game is very different from *Eco*, the argument still holds. Indeed, I want to argue that, because *Eco* (like *Deus Ex*) demonstrates that "how the world acts back on us are, in part, products of our actions and abilities" (Gee 2005: 85, it can help us move from seeing the world as consisting of "static individual entities", to seeing "an interactive relationship" (Gee 2005: 85). This argument aligns with Fjællingsdal & Klöckner's (2019: 9) findings, which showed that *Eco* "allows its players to comprehend and conceptualize the interconnectivity and balance that exist in nature", including the fact "that actions have consequences." Two inferences can be drawn from this.

First, suppose *Eco* can bring awareness to our interrelated nature. In that case, it would have the potential to help build a relational understanding of space, in which space is understood to be a "product of interrelations" (Massey 2005: 9). Such relational awareness is necessary for the development of social consciousness (Schlitz, Vieten & Miller 2010) and caring relations (Tschakert & St. Clair 2013). Thus, *Eco* might represent a tool that could help us create the necessary foundation for new values and alternative ways of relating. It could also help foster an ecological self-concept, "in which a person understands their direct interdependence with the planet" (Weaver: 5). Second, in *Eco*, players experience that their actions affect the environment. Indeed, players experience in a very tangible way that they are "agents of change" (O'Brien 2018). This, I would argue, could help us embrace our agency and "role as creators and shapers of reality" (Tuan 1984: 173) in the material world. Indeed, it could help challenge the notion that "natural events" are instead intimately tied to human activities and, thus, that biophysical changes concern us.

Video games have also been conceptualized as providing a space in which "players can experiment with conceptual understandings and learn from the impact of unproductive choices" (Barab, Gresalfi & Ingram-Goble 2011: 526). In *Eco*, such experimentation with interconnections and outcomes is made possible by the aforementioned conditions of agency, interaction, simulation and space-time compression. These conditions allow individuals to safely experience impacts first-hand, circumventing both material and immaterial costs that would otherwise accompany experience with socio-environmental issues in the material world (IFRC 2019). It is important to mention here that, while the space-time compression implies that the virtual world of *Eco* is a simplified version of the material world, no scientific or theoretical model fully replicates reality. Thus, rather than viewing the space-time compression in *Eco* as a weakness, it should be regarded as something that allows the opening up of a space in which we can practice dealing with otherwise intangible problems. As such, I want to argue that *Eco*, like art, can function as a "[site] of active experimentation" (Galafassi et al. 2018: 77) in which players can familiarize themselves with interconnections as they play around with different (inter)actions.

In sum, *Eco* represents a potential means to reconnect with self and surroundings. As such, it could have the potential to nurture both the first and second dimension of transformative capacity (Chapter 3). Specifically, I have argued that *Eco* might help us 1) reconnect with our relational truth by having us realize and experience the fact that we are part of a larger whole, and, building on the first, 2) reconnect with our agential truth, as it demonstrates that our ways of being and doing affect a larger whole. Because *Eco* has the potential to change how we understand and relate to ourselves and our surroundings, it also has the potential to engender processes of psycho-social transformation. This potential will be further explored in chapter 7.

5.2.2 'I Matter': Doing, Feeling and *then* Seeing, is Believing

In the preceding subsection, I argued that *Eco* visualizes players' impact on their surroundings. Through simulation and charts, the game makes visible and tangible what is otherwise abstract and intangible. As such, *Eco* makes impact experience-able. Participants describe experiences of having the power to change their circumstances and affect other people around them – that they have the agency to 'condition' and 'ameliorate' (Dujardin 2019: 1065). Interestingly, for some participants, these experiences seem to further generate feelings of self-efficacy. As such, there seems to be a correlation between *tangibility* – understood as access to concrete, first-hand experience with cause-and-effect relationships – and *self-efficacy*. *Experiencing* that I

matter makes me *feel* that I matter. Note that this goes one step beyond what I discussed in the previous subsection. There, I discussed how participants realize that their actions have repercussions beyond themselves and, thus, that they are part of a larger whole. Here, I focus on how that experience of impact further generates the feeling that 'I matter.'

In *Eco*, all actions have a visible and crucial impact. This impact sees some participants describe their roles in the virtual world as more critical and, as a result, more significant. For example, one participant described that *Eco* "gives me a sense of power because I can often see immediate effects." This experience contrasts that of the material world. In the material world, "[t]here are no handy direct mechanisms by which people can exercise reciprocal influence on transnational systems that affect their daily lives" (Bandura 1982: 144). As a result, some participants describe the material world as a space in which it is harder to experience impact and hence harder to experience self-efficacy. The dominant narrative among these participants seems to be that individuals are insignificant – too small, powerless, and dependent upon others to make a meaningful difference. In short, the lack of experience and proof of impact in the material world is experienced as disempowering and leaves individuals feeling insufficient.

As discussed in Chapter 3, in the context of socio-environmental issues, self-efficacy is needed for people to join efforts and not retreat into denial. Indeed, "[i]f people are to nurture their souls, they […] need to feel that they matter and that they have mattered in other people's stories" (Gee 2005: 4). As presented in Chapter 2, according to Gee (2005), video games can generate such feelings of mattering. Specifically, Gee (2005: 4) argues that video games can produce pleasurable experiences "connected to control, agency, and meaningfulness." The data presented in this chapter seem to support this argument. For example, participants described gratifying experiences of creating a healthy environment and having the power to prevent an animal species from going extinct. Thus, by visualizing human–non-human interconnections and participants' impact, player can experience in a very tangible way "the power to change what's going on" (Scholz, personal communication). Consequently, *Eco* "shows people [that] they do matter" (Scholz, personal communication).

It seems, then, that *Eco* does not only represent a means to reconnect with our relational (I am part) and agential (I affect) truth, but can also be a means to reconnect with the truth that 'being matter, matters'; *I affect; therefore, I matter*. This finding supports the notion that "[p]eople are empowered by understanding the interconnection of self with others" (Weaver 2015: 4). Since

this can also be understood as a change in how we understand and relate to ourselves and our surroundings, it further supports the notion of *Eco* as a tool that can engender processes of psycho-social transformation. Furthermore, because it is the feedback from other humans and non-human parts of the system that engenders the feelings of mattering, (certain) interactions in *Eco* could be conceptualized as "transformative encounters" (Nieto-Romero et al. 2019: 113).

5.2.3 'I Sense': Adding an Embodied Layer of Awareness

Another finding is that the activation of the psychomotor domain, enabled through the interactive quality of the game, seems to elicit a novel response. For example, even though Simon and Seth were aware of socio-environmental issues before playing *Eco*, both participants reported that cutting down trees made the issues "more real" and "more personal." These descriptions indicate that the "physical" act of cutting trees somehow brought socio-environmental issues closer in space and time. The engagement of the hands – the 'doing' – triggered a new and embodied understanding. Having a "personal, agentic, and consequential role" (Barab, Gresalfi & Ingram-Goble 2011: 525) added a new layer of awareness – an *embodied understanding*. This suggests that 'doing' generates something that other kinds of experiences, such as watching "the nightly news or scrolling through Facebook," do not. Thus, the data suggest that performing and experiencing the impact of actions in *Eco* reduces the perceived distance between humans and "environmental" issues. This finding aligns with literature arguing that

> universals such as deforestation, biodiversity, global warming, pollution, and so on, are more likely to resonate when they are expressed through lived particulars in their (non-universal) local terms. (Macnaghten 2003: 81)

Hence, similar to art, *Eco* seems able to provide "an accessible channel to connect with phenomena that are unpredictable, often difficult to comprehend and seem remote in time and space" (Galafassi et al. 2018: 75). It makes it possible to "feel and experience what it is we are talking about […] in a way that registers in our minds and bodies" (Milkoreit 2016: 175). Because it is the doing that increases the awareness, the data illustrates the importance of attending to the psychomotor domain (Chapter 3). It is also worth noting that both Seth and Simon had previous experience with virtual worlds. While Harmon (2011: 30) suggested that individuals who are experienced with virtual worlds may be less likely to experience the

disorienting dilemma, the findings presented here indicate that even people who are not new to games can be impacted by the experience.

5.3 Conclusion

In this chapter, I have presented and analyzed three identified themes from the survey, diary, and interview data. First, I found that *Eco* is experienced as an enabling space that offer participants the agency to co-create the place that they desire. Next, due to a space-time compression, *Eco* is experienced as a space in which participants can overcome the inherent complexities of the material world and experience their impact. Finally, for some participants, the tangible experience that *Eco* provides seems to translate into empowerment. This empowerment contrasts their disempowering experiences in the material world. Based on the findings, I suggested that *Eco* 'makes space for an alternative place' in which life systems (human–non-human interconnections) are made experienceable, which allows players to experience their environmental impact, and that this tangible experience can further generate feelings of self-efficacy.

In reference to the first quality formulated in Chapter 3 related to self-efficacy, the data suggests that feelings of self-efficacy are generated through tangible, hands-on experience with personal impact. Indeed, as participants' accounts reflect a belief in own power to affect the surroundings (Chapter 3), *Eco* emerges as a space that can engender a sense of efficacy – at least in-game. The understanding that tangibility can fuel feelings of self-efficacy supports the idea that we as humans are "empowered by understanding the interconnection of self with others" (Weaver 2015: 4). As a foundational element of empowerment and agency (Chapter 3), it would be interesting to study whether the in-game experiences of self-efficacy translates into feelings of empowerment or actions in the material world. I will explore this in Chapter 7.

In reference to the second and fourth qualities formulated in Chapter 3 – related to embodied and atypical experience – some data suggests that activation of the psychomotor domain elicits a new type of response, an embodied understanding, that expands participants' awareness. First, this points to the value of (virtual) embodied experience in work on social transformations, and suggests that approaches that include the body have potential to inspire new processes of meaning-making. Second, it points to the value of atypical experience, here in the form of direct, virtual experience of agency and impact. Indeed, through *Eco*'s tangible nature,

participants experience self-efficacy and gain embodied understandings. In sum, I want to argue that *Eco* and, by extension, virtual sustainability games that make interconnections experienceable, could have transformative potential, i.e., see individuals reconnect with their relational and agential truth, and engender self-efficacy.

6. Embodying Alternative Subjectivities

If embodied experience is understood to have transformative potential, can 'virtual embodied experience' through sustainability games hold similar potential, and if so, how?

In video games, as argued in Chapter 3, participants can access *atypical experience*. To recall that discussion, atypical experience can be defined as "experience outside the normal bounds of a learner's experience" (Harmon 2011: 31), and these play an important role in transformative learning (Chapter 3). In *Eco*, typical everyday-like activities include hewing logs and mining materials, logistics and scaffolding, making tools and constructing buildings, and planting and harvesting crops. Such undertakings are certainly outside many people's normal bounds, at least in the Global North. In addition to these activities, there are other even more atypical experiences available in *Eco*. For example, participants can run for elections to become world leaders. Participants can also experience post-meteor worlds in which they will need to nurture the world back to health, or experience being poor, with the constraints and hardship that entails. By letting us temporarily inhabit other social roles and contexts, *Eco* provides access to atypical experience that has the potential to broaden our horizons.

In Chapter 5, I argued that *Eco* makes space for another place in which participants can reconnect with their relational and agential truth. Importantly, the three identified experiential dimensions of 'I affect,' 'I matter' and 'I sense' open up for alternative ways of 'being' and 'doing'. In this chapter, I study these ways of being and doing, or participants' in-game subjectivities. Out-of-game subjectivities will be treated in Chapter 7.

The chapter consists of three parts. In Section 6.1, I present and analyze the four identified themes. In Section 6.2, I discuss the themes in relation to the theory presented in chapter 3. Finally, in Section 6.3, I examine to what degree the three theoretically-derived qualities of alternative subjectivities, embodied experience and atypical experience correspond to the empirically-anchored themes.

6.1 Being-In-Common

In this section, I will present and analyze the four themes that emerged from the survey, diary, and interview data. The first theme addresses how participants relate to themselves, in relation to the environment. The second theme demonstrates that participants act in ways that take the

environment into account. The third theme reveals how virtual experience establishes emotional connections between participants and the non-human, and finally, the fourth theme illustrates how participants co-create societies that offer a sense of community. How these four themes can be related to the theoretically-derived qualities of embodied experience, alternative subjectivities and atypical experience (Chapter 3) will be discussed in Section 6.3.

6.1.1 "How Big Is My Negative Impact?"

In *Eco*, human–non-human engagement is an essential part of the gameplay. In order to reach the game objective, this engagement needs to be of a sustainable kind. Specifically, players need to cooperate and develop a conscientious relationship with the natural world in order not to destroy it. As one participant stated, "you have to think about every action you do in this world, not just loot[7] until the end" (Damien, survey). Consequently, players have to actively engage with the future; "you have to think further and further down the road when you plan out cities and roads" (Brandon, survey). This conscientious way of being differs from that which is encouraged in many other video games, where players tend to freely gather objects without it having any repercussions. Some participants shared how they became aware of the need for taking the environment into account. For example, one participant wrote the following in his diary: "Reflection VI. Sunday the 29th of September. Collecting resources (How big is my negative impact?)" (Simon, diary). In the follow-up interview, Simon expanded that:

> [T]here was this, uhm, this forest preservation law that made me very aware that, if I consume resources then, maybe something bad will happen […] And that made me also think, uh, about the other resources in the game and how finite they were. […] [T]he world also felt quite big, but uh … there also was this fear of there not being enough of resources. (Simon, interview)

Here, Simon describes becoming aware of the consequences of consumption through interacting with a law. The preservation law communicated that the resource was finite and therefore needed to be handled with care, which triggered him to reflect about his personal consumption of the common resource, and other resources in the game. Two additional participants provided similar accounts:

> Producing things always generates waste products that need to be stored or traded. Over producing has negative consequences for everyone. (I learned this the very first time I

[7] In games, loot or looting does not refer to stealing, but to the act of gathering objects from the immediate environment – often without repercussions.

> played when I thought I was "helping" [by] cutting down an entire forest while everyone was asleep and processing it into lumber. They were not happy, but they also didn't know it was me! I just whistled in the corner and didn't comment). (Cecilia, diary)

> [A] comparison that I made at first was "It's like Minecraft[8] but more realistic" I went taking resources and building and then, I started generating waste from making steel or things like that and I realized. "This has nothing to do with Minecraft, this is far away from that" I needed to take care of everything I was doing to not ruin my world. (Adriel, survey)

In both cases, the participants 'learned by doing' that resource-consumption produces waste. This insight further led them to adjust their ways of being in the world. While Cecilia was reprimanded by other citizens, Adriel became aware through first-hand experience with resource-consumption. Because the participants describe becoming aware of their personal impact on the world, interacting with *Eco* seems to increase their social consciousness and lead to an in-game worldview "in which the self is experienced as an integral part of a larger whole" (Schlitz, Vieten & Miller 2010: 22). As such, these findings relate to those presented in Subsection 5.2.1, where I argued that participants realize that they are part of, and affect, the world at large.

6.1.2 "I Am Trying to Be the Least Impactful"

In *Eco*, many participants demonstrate environmentally friendly action. They are being and doing in a way that takes the non-human into account. For example, two participants described taking care of nature as the most natural thing to do: "Yes, of course. Normally I'm the timber guy. Replanting, expanding the forest and owning critical areas to protect are a big concern to me" (Matias, survey). The other participant stated that both online and offline, "it is simply respect to be careful not to degrade our environment .. (as we says in France "c'est du savoir vivre")" (Damien, survey). In this latter case, it is very clear that it is not the end goal of *Eco* that dictates Damien's behavior, but rather his material-world subjectivity. Another participant described maximizing his effort to minimize his impact:

> I have about half of a road built and i am trying to be the least impactful as possible to the environment on my route and I am only using the dirt I clear to build ramps instead of just mining it from wherever I want. (Seth, diary)

[8] As explained in Chapter 2, *Minecraft* is a flexible building game in which resources are technically infinite, and extraction does not negatively impact the environment.

In the follow-up interview, Seth went on to explain that

> In sandbox games like this I like to be the least impactful on the environment that I can. […] I'll always try to shape my world around what's already existing. And I think that goes back to, uhm … It probably goes back to when I was in Boy Scouts and 'leave no trace' was like the main rule. […] To only take what we need in order to keep, uh, to keep nature beautiful. (Seth, interview)

As with Damien, Seth displays an ingenuity that seems to spring out of his material-world subjectivity, and not because the game compels him to do so. Hence, both Damien and Seth demonstrate how out-of-game subjectivities, including identity, values, customs and perspectives, can affect in-game subjectivities. Another participant also described her conscious relationship with resources:

> It is a wonder why we would be wasting or dumping any mineral products at all, as only biological material (e.g. food/wood) is renewable and sustainable. This is why I always play carpenter/tailor […]. However, I realize that without exploiting finite resources, our society would not advance much past the Neolithic age. Hence, I am conscientious when choosing my profession, or watch my consumption patterns with products that are limited in deposit and become especially conscientious about its recycling. (Sarah, survey)

As with the two preceding accounts, Sarah's values come to the surface. She bases her choice of profession on its degree of sustainability and is acting caring and in-common with the non-human, displaying a responsible and respectful attitude towards the world. Another participant described the time-consuming process of burying tailings:

> While you're in the mine, slowly digging out ores, your friend is nearby, bringing everything mined to the surface, where it's processed. The tailings are buried underground. A slow process, but one that saves the environment, allowing the planet to continue functioning. (Skylar, survey)

While the process is time-consuming, Skylar describes it as worthwhile as it ensures a healthy planet. It is notable that people are willing to engage with time-consuming and repetitive tasks to save a virtual environment. It is also notable that the participant is talking in terms of the planet as a whole. As noted in Subsection 5.2.1, this global perspective is made more accessible in *Eco* as people are constantly dealing with a world that is both local and global at the same time. Another participant initiates removing pollution:

> Looking at the world we can see that there is a ton of pollution and I'd like to find a way to clean it up as it has really destroyed most of the desert area. I might petition the government for funds to help create a deep mine trash disposal area to help alleviate the various waste points around the world. (Adam, diary)

Adam's account provides an illustrative example of the kind of engagement and thought processes *Eco* can fuel. Like the other participants, he demonstrates taking responsible action. The accounts included here are reflective of the general view of participants, as the majority of the participants in the study described displaying action that is in-common with their surroundings. In sum, participants' accounts demonstrate actions that take the environment into account.

6.1.3 "I Was Kind of Connected with That Tree"

Participants reported experiencing an array of emotions during gameplay. Participants described emotions both of a "positive" and "negative" character, resulting in a wide range of emotional engagement. While the enjoyable experiences frequently related to collaboration, the unpleasant emotions often related to competitive behavior and environmental destruction. Figure 7 captures all the emotions reported by the survey participants in response to question number eight (Appendix A).

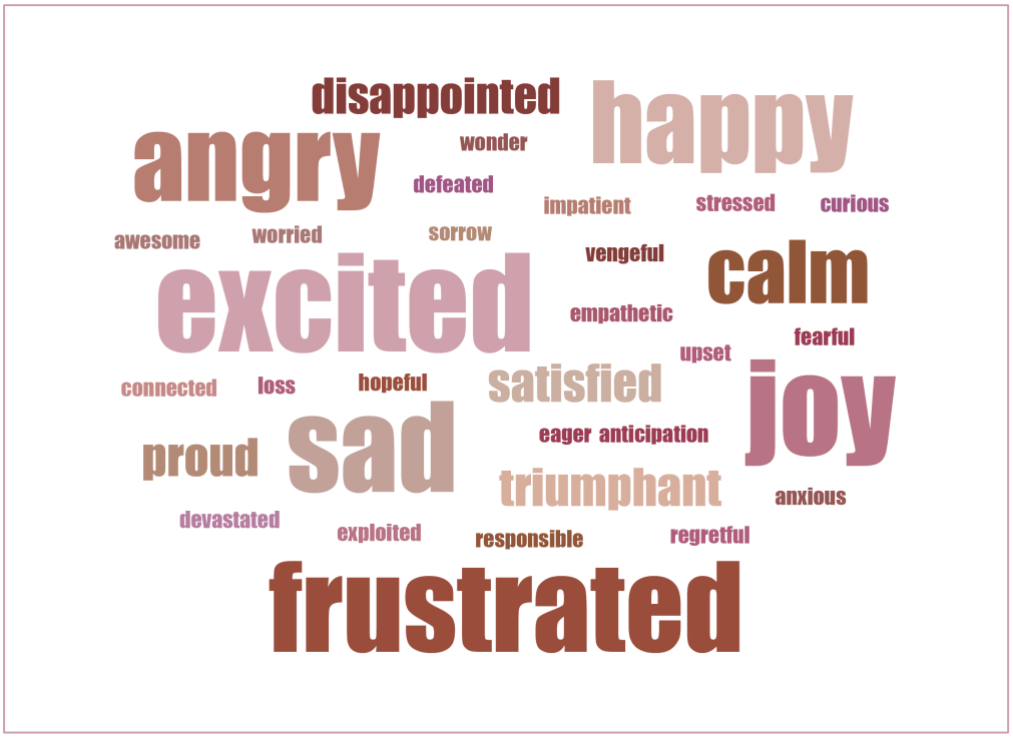

Figure 7 *Feelings reported by survey participants. Words that are larger in size were reported by more participants.*

Several excerpts clearly demonstrate emotional engagement. First, two participants described emotional highs and lows as they experienced the consequences of progress:

> I've felt great triumphs and sorrow while playing Eco. Whether it was cultivating my first field of a variety of crops or the time I first witnessed the sea level rising that destroyed that same field. I've watched plenty of Environmentally focused documentaries, and in some way it was similar to seeing the impacts we are making in real life. (William, survey)

> The first hours when i chop down trees i see how many influence i have of the swamp / jungle Biome,… that was terrible and beautiful at the same time. It was great to see that i build my wood mansion and mine my cellar but the environment changed completely and [suffered] from my actions… that was sad to look at. (Rashid, survey)

William's reaction and choice of language shows that he relates to the virtual crops as if they were existent in the material world. He sounds like a material-world farmer who describes investing hard work into a field, feeling emotionally connected to it, and then experiencing sorrow as climate change washes it away. This experience certainly has its material-world parallels; effects of climate change are clearly visible on the agricultural sector (Arora 2019: 95), where farmers are losing their crops to droughts, floods and other changes in the weather. Thus, because this is an experience for many farmers in the material world, providing non-farmers with access to such experience might not only strengthen our connection to the process of producing food, but also to other humans' experiences with loss of livelihood. In the second excerpt, Rashid describes having first-hand experience with both the pros and cons of progress. In real life, we often only experience the personal costs and benefit of building and increasing our material wealth, while we are detached from the environmental impacts. In *Eco*, you can directly experience the connection between action and true cost. Other participants described feeling connected with trees:

> [S]ometime I tend to connect with things in eco even though practically they are bits and bytes. Recently I wanted to pave a road for my truck to pass in eco [and] in the middle there was a tree that was there from the start of the game. So even though I should had cut the tree to pass the road I ended up passing the road around it as I was kind of connected with that tree. (Michael, survey)

In this case, Michael did the "least rational" thing in order to safeguard a tree. He was acting-in-common and did not consider it an obstacle to be surpassed. It is very interesting to see how he is both so aware of how the tree is virtual, yet still enters into a meaningful and affective

relation with it. A sentimental connection is created as he *feels* connected to it. Another participant wrote that "I had a whole old redwood disappear from the middle of my home due to tailings underground, which made me a bit sad as i liked the tree being there" (Samuel, survey). In this excerpt, Samuel describes not only how mineral waste had his tree dissolve, but also reveals that he built his home around it rather than cutting it down, which is the same kind of "least rational" act that Michael performed. I also find it interesting that a gamer, which is stereotypically thought of as violent and lazy (Lavandier 2016), experienced sadness when a tree disappeared. Finally, one participant described her strong emotional reaction to accidentally killing a deer:

> An experience while playing that I had a strong emotional reaction to was when I accidentally killed a deer. Whenever I play video games, I refuse to kill animals and instead always follow a [plant] based diet. In the game, I had my axe in hand and was in the process of cutting down a tree when a deer ran between my character and the tree, thus getting hit by my axe and dying. In real life, I cried and cried for almost an hour because I felt so horrible for killing an innocent animal. (Anna, survey)

Again, while the participant is aware of the action not being real in the material sense, her body responds as if it was. While she does not state being a vegetarian in real life, it is plausible to assume that her choice of following plant-based diets in video games is inspired by her way of being in the material world. The account illustrates how her subjectivity is brought into the game, and how the virtual avatar becomes an extension of her material-world subjectivity (Chapter 3). As she brings her values and ways of being into the virtual world, she clearly blends with the character she is playing, to the point where killing a virtual animal, consisting of bits and bytes, causes her emotional pain. The account further underlines how emotional responses often do not discern between 'virtual' and 'non-virtual' (Chapter 3). In sum, the presented excerpts point to the power of virtual experience to re-connect us with the non-human, whether that is animals, crops or forests.

6.1.4 "It's Kind of Like Sending Out an Olive Branch"

In Chapter 2, *Eco* was described as a society simulator – as a world that encourages different modes of social interaction and to which people bring their individual motivations. Despite such social complexity, most players seem to co-create societies that offer citizens a strong *sense of community*, meaning a sense of belonging and connectedness to the other players that permeates their gaming experience. For example, one participant explicitly stated that "I'm part of a

community in Eco" (Melissa, survey). Another participant wrote that "I don't need to play directly with everyone [on] the server, to enjoy the [sense] of community and shared accomplishment as a whole." (Cecilia, diary). This sense of community further feeds responsible, caring and cooperative behavior. As one participant put it, "you don't want to let your group down" (Rune, survey). In what is described as an "incredible community of kindness" (Damien, survey), people are "helping each other out teaching each other" (Jamie, survey). One participant described his in-common behavior this way:

> In game I try to be nice and stick to my plot of land without causing much trouble. If I produce something bad for the environment then I try to make it into the less possible carbon fingerprint. I also try to make roads for people or plant food. (Neal, survey)

This player demonstrates a holistic way of being. Based on his awareness of being part of a larger whole, Neal makes an effort to be easy-going, minimize his impact, and positively contribute to the community. Another participant wrote that "[y]ou have to be careful to not remove all of a plant from an area or even better replant some of them so others can access the resources too" (Ryan, survey). This also demonstrates an in-common behavior that takes others needs and interests into account. Another participant described how the process of constructing roads can bring a community together:

> Oh, one more thing that I really enjoy doing is building roads. […] Cause' you're not just building a road for yourself, you're building it for everyone else who wants to use it. […] [W]hen I build a road to my neighbor … now, maybe that neighbor wouldn't have interacted with me otherwise, and … it's kind of like sending out an olive branch. But even if they don't end up becoming my like, best friends, they'll still come by and trade with me. And you do enough of that you get like a whole community together. (Cecilia, interview)

In this excerpt, Cecilia describes a willingness to invest time and energy in an activity that benefits not only her but the community as a whole. Road construction, according to Cecilia, is an invitation to interact – a way of connecting with the other players. Thus, constructing a road is constructing community. This kind of gameplay opposes the stereotypic image of gaming as a solitary pastime and instead reflects a space in which you can be of help to and connect with others, creating a sense of community.

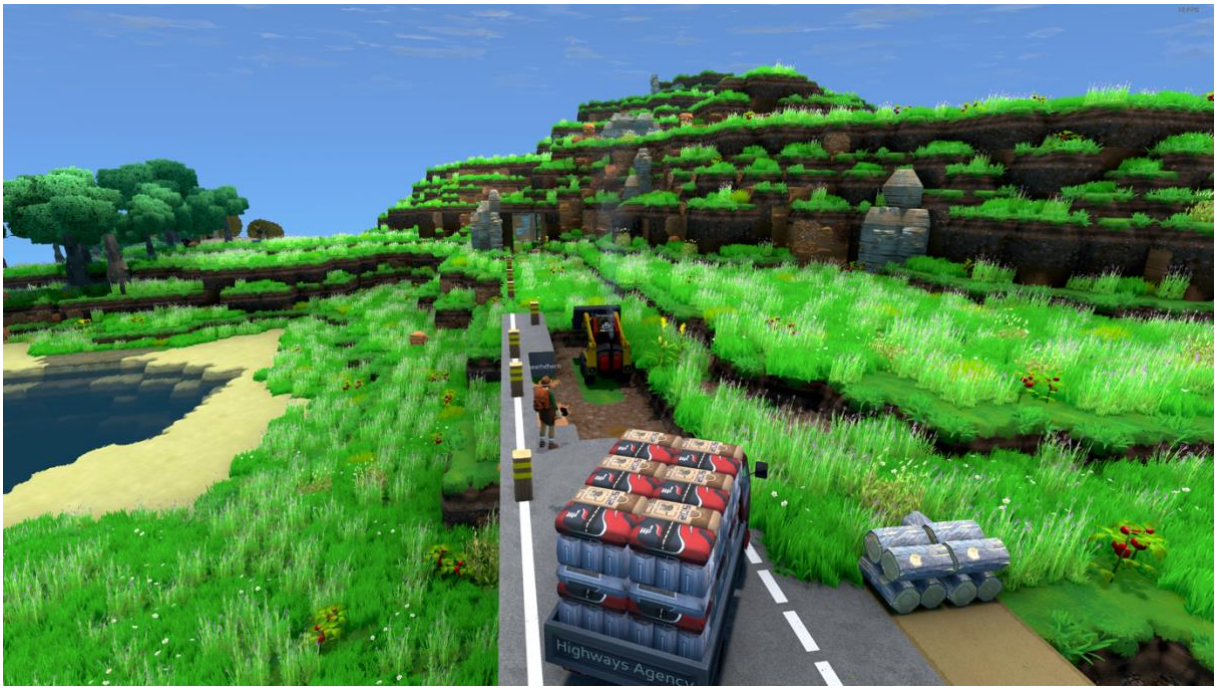

Figure 8 *Example of players cooperating to construct a road. Image used with permission.*

This sense of community starkly contrasts some of the other participants' experiences in the material world. For example, one participant wrote that

> It's different from the real world. The players in Eco cooperate much more than the people in the real world Even if they do not know each other. I think it's because you feel lonely in the real world and the community do not need you. In Eco you know that you are part of something bigger. (Vilhelm, survey)

While in the material world Vilhelm does not experience being part of a larger whole – no binding component or a general feeling of community – in *Eco*, he experiences the complete opposite – even with strangers. Another participant wrote that in *Eco*, "everything I do, I try to do with everyone's interests in mind. […] In the real world, people do not necessarily think as much about each other as they would in ECO" (Matthew, survey). Thus, based on an awareness of his personal impact on the rest of the community, Matthew deliberately acts in-common. He then contrasts this way of being with ways of being in the material world, which he describes as a space in which people take less account of other's needs.

Taken together, in these excerpts, *Eco* is presented as a collaborative space in which people take each other into account – act in-common – and co-construct a sense of community, while the material world is a disconnected space characterized by individuality, a lack of belonging, and an absence of clear role distribution.

6.2 Discussion: The Transformative Potential of Embodied Care

The four themes identified in this chapter illustrate that the participants develop subjectivities that are being-in-common with both human and non-human beings. First, I found that participants subject themselves to constraint to adhere to the social norms that dominate the virtual societies. Indeed, participants change their ways of being and doing in relation to the environment, based on the feedback from that environment, which demonstrates the processual nature of subjectivity. Next, I found that many participants demonstrate environmentally friendly action, i.e., they are being and doing in a way that takes non-human well-being into account. Third, participants reported experiencing an array of emotions during gameplay, and forging affective ties with the non-human beings in the world. Finally, the fourth theme revealed that *Eco* is experienced as a collaborative space in which players take each other into account and feel a sense of community. This was contrasted with participants' experiences in the material world.

This section consists of two parts. In the first part, I discuss how participants come to forge intimate ties with the non-human beings in *Eco*. By applying Wright's (2015) concept of performative belonging and Singh's (2013, 2017) concept of processual subjectivity, I argue that human–non-human caring interaction might explain why the former feels connected to the latter. I further discuss what motivates participants to act in such caring ways. Building on the findings from Chapter 5, I suggest that relational awareness might be what triggers participants' engagement with environmental care practices.

In the second part of the section, I discuss what might fuel the sense of community that participants report to experience. Applying the perspectives of Ziervogel, Cowen & Ziniades (2016) and Singh (2013/2017), the sense of community emerges as a bi-product of the environmental practices described in the first part of the chapter. However, according to the IKEA-effect, belonging can also be an outcome of the other non-caring yet creative practices participants engage with, such as those related to material progress. Nevertheless, (inter)action emerges as a key contributor to both findings. As such, they respond to the second theoretically-derived quality formulated in Chapter 3, related to embodied experience. How the findings relate to this quality, and the qualities of alternative subjectivities and atypical experience, will be discussed in Section 6.3.

6.2.1 A 'Conduit for Care and Connection'

In all four results sections, participants describe behaving in ways that consider the needs and interests of both other humans and non-humans – or becoming aware of the need to do so. As such, they are displaying subjectivities that are being-in-common. In a world where players have to "think about every action", participants engage in forest conservation, reuse and recycle materials, bury tailings, clean up pollution, pave roads and build homes around trees, and follow a plant-based diet. Because these actions serve to take care of the nature in *Eco* (albeit to different extents), I want to argue that they qualify as virtual versions of 'environmental care practices' (Singh 2013: 189), or 'embodied practices of caring' (Singh 2017:751). By conceptualizing *Eco* as a space in which people can engage with embodied practices of care, I propose that *Eco* can do more than provide its players with conceptual knowledge (Stanitsas, Kirytopoulos & Vareilles 2019). Specifically, I want to argue that *Eco* can function as a 'conduit for care and connection' (Galafassi et al. 2018: 73).

Looking at the data presented in this chapter, and particularly Subsection 6.1.3, it is clear that the participants are "actively *connecting* with the more than human, rather than simply *seeing* connection" (Gibson-Graham 2011: 2, emphasis in original). Indeed, several accounts reveal emotional connection between participants and the non-human beings in *Eco* despite their virtual nature. For example, participants described feelings of sadness in relation to in-game events: William, who experienced his field being flooded and destroyed; Rashid, who experienced the negative impact of his progress on the environment; and Samuel, who experienced the loss of an old redwood. These descriptions of pain in relation to changes in the environment testifies to emotional connection. Such connection is further reflected in more-than-rational acts, such as the participants who described building their house or paving their road around trees for the sake of conservation. How do participants become emotionally attached to a virtual world?

According to Wright (2015: 398), "[c]onnectivity is generated through proximity" and "comes about through the zone of contact." Wright's (2015) approach builds on a performative understanding of belonging. From such a perspective,

> belonging is relational, performative and more-than-human. It is not pre-determined but comes into being through affective encounters, through doing, being, knowing and becoming in careful, responsive ways. It is deeply implicated in notions of care and responsibility that stem from a recognition of the essential co-constitution of people

> with the beings (other people, non-human animals, plants, processes, affects and all that is tangible and intangible) with whom they belong. (Wright 2015: 404)

This kind of understanding where connection is thought to develop from interaction aligns with Singh's (2013/2017) findings from Odisha, India (Chapter 3). In her studies, Singh (2017: 757) concluded that the villagers had "forged intimate relations with the forests in the process of taking care of them." Thus, following the logic of Wright's (2015) performative understanding of belonging and Singh's (2013, 2017) processual understanding of subjectivity, participants in *Eco* might emotionally connect due to their engagement with environmental care practices. Indeed, in Chapter 3, the idea of affective relations was discussed within the idea of embodied experience. This further aligns with Barab, Gresalfi & Ingram-Goble's (2011: 525) theory of transformational play, which says that having a "personal, agentic, and consequential role" can create affiliation. Through active participation, participants become "involved and invested" (Singleton 2015: 9). By activating the psychomotor domain, emotions can arise, allowing the experience to 'reach the heart through the hands.' By hands, I refer both to the player's physical body in the material world and the virtual body of the avatar through which the player experiences the game. As discussed in Chapter 3, this makes sense to the extent that avatars can be considered extensions of ourselves, allowing virtual experiences to be embodied in the same way as experiences in the material world.

Based on the "intimate relations" participants report to have developed with the non-human environment in *Eco*, I want to extend Wright's (2015) and Singh's (2013/2017) interactional conceptualization of belonging and affect to virtual worlds. Specifically, I want to argue that virtual environmental care practices in particular, and interaction between physical humans and virtual non-humans more broadly, can see the former develop emotional ties to the latter. However, while the care-taking behavior might explain the development of emotional connection, it does not elucidate what initially fuels this way of being-in-common. A next step would therefore be to ask what motivates participants to engage with these ways of being and doing. Based on psychological research, part of the reason may be found in *Eco*'s tangible quality (Chapter 5). In their comparison of abstract and concrete information, Van Lange & Bastian (2019: unpaged) explain that

> [a]bstract information often leads to wondering and thinking, but no action. Concrete information tends to convey greater urgency, triggering the belief that "we need to act now." Concrete information is also more likely to activate strong emotions such as joy,

> frustration, or empathy. […] And concrete experiences often trigger changes in our behavior.

From this understanding, it might be that the concrete nature of *Eco* is what triggers the caring behavior. Indeed, if care is "located […] in the recognition of our intersubjective being" (Popke 2006: 507), and people gain such relational awareness in *Eco* due to the tangible quality, it might well be that the concrete actions and concurrent awareness is what triggers participants' way of being-in-common. This corresponds with the holistic approach of the Head, Heart and Hands model.

In Chapter 3, I stated that the three elements of the Head, Hands and Heart model are interdependent, such that what we perceive, affects what we value and do. Then, in Chapter 5, I found that the participants perceive that they affect and that they matter. Thus, following the interdependent logic of the Head, Hands and Heart model, it might be that the participants engage with environmental care practices because they perceive themselves to be part of a larger whole that they affect. Indeed, as we experience being part of a larger whole and hence expand our social consciousness, we might "begin to work with others to co-create or shape the social environment" (Schlitz, Vieten & Miller 2010: 23) and become "more compassionate and service-oriented, and inspired to act as agents for positive change" (Schlitz, Vieten & Miller 2010: 22). Furthermore, if what we do affects what we value and perceive, then the caring practices might fuel a valorization of social bonds, further stimulating the caring behavior. Taken together, the relational awareness that participants described gaining in Chapter 5 might be what prompts individuals to engage with environmental care practices, which further leads to the development of affiliation between participants and the virtual environment in *Eco*.

The fact that *Eco* activates strong emotions has several implications. First, it means that the experience is registered in both body and mind (Chapter 3). This reinforces the argument I made in Chapter 5, where I reasoned that the virtual experience in *Eco* can qualify as embodied experience. Indeed, the emotional engagement together with their referral to the avatars as 'I' suggests that players perceive of the avatars as alternate manifestation of their selves. Second, emotional connection is, as previously discussed, a precondition for reflection. The fact that *Eco* triggers emotions might therefore indicate that *Eco* can trigger reflection in players. I will explore this potential in Chapter 7. Finally, the deep emotional engagement combined with the alternative experiences that *Eco* offers means that *Eco* satisfies both of Harmon's (2011) criteria

for atypical experience. As such, *Eco* might have the potential to facilitate transformative events that can jolt people into reflection.

I have previously (Chapter 3) defined and discussed atypical experience as experiences that are outside one's normal bounds (Harmon 2011). *Eco* offer such atypical experience in at least three ways. First, as demonstrated by the data in this chapter, *Eco* is a place in which people cultivate fields, engage in forest conservation, bury tailings and clean up pollution. Such undertakings are certainly outside many people's normal bounds, and exposes players to new agencies (Nguyen 2019). Second, players in *Eco* live in proximity to forests and fields and frequently interact with non-human beings. For many people, especially in urban contexts, such closeness to nature is atypical. Third, akin to the material world, *Eco* presents its players with a lively natural world that is affected by human action. However, in *Eco* there are alternative qualities and possibilities, such as the opportunity to directly experience one's impact (Chapter 5). Consequently, *Eco* emerges as a space with geographies that resemble those of the material world, but with conditions that enable other ways of being, doing, and relating to these geographies. Thus, through their avatars, people can temporarily inhabit and explore *alternative subjectivities*, which was the third quality identified and discussed in Chapter 3.

I further argued that, if atypical experience is to trigger transformation, it must be deeply engaging. In the data presented here, participants document experiencing a wide spectrum of emotions: from joy, hope and excitement, to frustration, anger and sadness. This signifies that the virtual experience is embodied, meaning that their bodies are connected to the world and the experiences that take place within it. As such, it satisfies Harmon's (2011) criteria of deep emotional engagement, which I discussed in relationship to the quality of embodied experience (Chapter 3). Because *Eco* is a world in which players can both access atypical experience, and because engagement with *Eco* engages participants on an emotional and embodied level, I argue that it qualifies as a potential source of transformative trigger events.

In this subsection, I first discussed how participants gain awareness of the need to take care of the world through the world's response to their actions, and how this awareness further prompts them to adjust their behavior. This data supports Singh's (2013, 2017) processual approach to subjectivity, in which interaction is thought to shape human ways of being and doing (Chapter 3). I also argued that, as the interaction functions as a source of reorientation, it represents a "transformative encounter" (Nieto-Romero et al. 2019: 113) between humans and non-humans.

Next, I argued that as participants conduct actions that serve to take care of nature and display subjectivities that are being-in-common, they engage with virtual versions of environmental care practices. Based on this argument, I suggested that *Eco* can move beyond providing its users with theoretical knowledge, to function as a 'conduit for care and connection'. Indeed, participants enter into affective relations with the non-human through careful and responsive engagement (Chapter 3). This again underlines the importance of (embodied and tangible) experience. Finally, I argued that as *Eco* both provides players with alternate manifestations of their selves and satisfies Harmon's (2011) criteria for atypical experience, it has the potential to facilitate trigger events that can jolt people into reflection. Based on the discussion in this subchapter, *Eco* appears to demonstrate the theoretically-derived qualities of embodied experience, alternative subjectivities, and atypical experience.

6.2.2 'I Belong': Experiencing a Sense of Community

While above, the idea of belonging was explored in relationship to care and being-in-common with the non-human, here I want to explore a distinct aspect which relates to human cooperation and a concurrent sense of community. Indeed, in participants' accounts, *Eco* emerged as a place to which people feel that they belong. For example, participants stated that "I'm part of a community in Eco" and "you don't want to let your group down." Indeed, in the survey, the social dimension was rated as the main motivation for playing *Eco*. Thus, while all players bring their motivations to the game (as discussed in Chapter 2), most players seem to create societies that offer a strong sense of community. This finding supports Ostrom's (1990) argument that people can come together and avoid the "unavoidable" tragedy of the commons. Instead, people co-create societies in which they take care of both human and non-human others, and that provide a feeling of belonging. This experience contrasts some of the participants' experiences in the material world, which were described as "lonely" and less considerate. How can a video game forge stronger bonds and a coming togetherness, than real life does?

While it might certainly help to have a common goal from the outset (which, in the case of *Eco*, is to shoot down a meteor without destroying the environment in the process), all players still bring their motivations to the game. Hence, there must be something in addition to the game objective that motivates their way of being-in-common – especially when participants move

beyond a ‘cooperative spirit’ to feelings of belonging and a sense of community. In their paper, Ziervogel, Cowen & Ziniades (2016: 9) argue that

> [o]ne of the more palpable practices that build social cohesion is the process of humans organising themselves to create something together, to learn something new together, to struggle and overcome adversity together.

From this perspective, social cohesion is thought to be a bi-product of individuals’ cooperative behavior. Individuals “come together” (Singh 2013: 192) in the process of co-creating their world and reaching the common goal. This understanding aligns with Singh’s (2013; 2017) concept of “affective sociality”, in which connection between individuals is conceptualized as a non-material output of the affective labor that they conduct. According to Singh (2013: 192), “affective labor […] builds community.” Thus, just like the villagers in Odisha, participants in *Eco* might be growing “their sense of community and ‘being-in-common’ […] with each other” (Singh 2017: 757) through their engagement with environmental care practices. This engagement constitutes a large part of the gameplay in Eco. Thus, the virtual world of *Eco,* like the forests in Odisha, functions as “a site for building and strengthening communities” (Singh 2013: 195).

The logic in both Ziervogel, Cowen & Ziniades’ (2016) and Singh’s (2013/2017) approach is that individuals create a sense of community through cooperation. In taking care of the world, individuals work together to preserve their common interest, which, in the case of *Eco,* is a healthy environment. As Singh (2013) noted, this is in line with the logic of the IKEA-effect, which states that “people love what they create, especially when their labour leads to successful completion of tasks” (Norton et al., cited in Singh 2017: 758). In *Eco,* individuals collectively shape, create and decide the content of the world. Both soft and hard features, such as laws, infrastructure and the physical design, are created by the players. Furthermore, video games are all about the “successful completion of tasks.” Thus, following the logic of the IKEA effect, co-creating and completing tasks might help explain why gamers feel that they belong to *Eco*. This understanding again emphasizes the psychomotor ‘doing’, the crafting of a shared world. Through creative and affective labor together, participants invest (time, energy, themselves) in the world, which further fuels connection. Participants feel connection to each other and the world because they spend time together with and in it. The ‘doing’ fuels a sense of community. Furthermore, and as argued in the previous subsection, if what we value and perceive is intimately tied to what we do, then the cooperative behavior in *Eco* might fuel a valorization of

social bonds that further stimulates the cooperative behavior, and strengthens the overall sense of community.

According to Ziervogel, Cowen & Ziniades (2016), a strong sense of social cohesion is necessary to build transformative capacity (Chapter 3). In *Eco*, people report experiencing such a strong sense of community. In this section, I have discussed what might fuel these feelings of belonging. Having applied the perspectives of Ziervogel, Cowen & Ziniades (2016) and Singh (2013/2017), the sense of community emerges as a bi-product of the environmental practices described in the foregoing subsection. Indeed, the connection between players can be understood as a non-material output of the affective labor (Singh 2013: 191) that players perform in the game. However, following the logic of the IKEA-effect, it can also be related to other non-caring, yet creative practices such as those related to material progress. From both perspectives, action emerges as the central aspect. As such, the findings in this section align both with the theoretical discussion of embodiment in Chapter 3, and the empirical discussion of reconnection in Chapter 5, where I argued that the body plays a central role in players reconnection with their relational and agential truth.

6.3 Conclusion

In this chapter, I have presented and analyzed themes from the survey, diary, and interview data. First, I found that participants' interaction with the environment shapes their subjectivities. Second, I found that participants engage with environmental care practices, and that they are being and doing in ways that take the well-being of the non-human into account. Third, I found that participants forge affective ties with the non-human. Finally, I found that participants experience a sense of community in *Eco*. Based on the findings, I argued that *Eco* represents a more-than-rational place in which participants forge affective ties with both humans and non-humans.

Throughout this thesis, I have argued that we need to reconnect with our relational truth and develop subjectivities that are being-in-common with both human and non-human others. In this chapter, I have demonstrated that *Eco* engenders such subjectivities. Through environmental care practices and cooperation with other citizens, players do not only improve the health of the virtual environment but also forge affective ties with their surroundings – both human and non-human beings. As such, the in-game experience transcends the boundaries of

the virtual world and engages the psychomotor body of the player (Chapter 3). On this basis, I have argued that *Eco* functions as a 'conduit for care and connection' that provides players with both conceptual knowledge of interconnections, *and* embodied experience, which I in Chapter 3 described as a missing link in communication on socio-environmental issues. Furthermore, because the participants consider the avatars as alternate manifestations of themselves, and because the experience *Eco* offers can be classified as atypical, I have argued that their in-game experience of being-in-common can trigger valuable reflection for their out-game subjectivities. Indeed, if experience constitutes the foundation for reflection, and *Eco* can fuel other types of experiences, then there is potential for *Eco* to fuel new types of reflection. I will discuss this potential in Chapter 7.

In sum, the theoretically-derived qualities of embodied experience, alternative subjectivities, and atypical experience correspond to the themes expressed in the data. I will therefore argue that virtual embodied experience through *Eco*, and possibly through virtual sustainability games more broadly, holds potential for transformation, as it can engage the psychomotor dimension in the same way material-world experience does (Chapter 3).

7. Triggering New Subjectivities in the Material World

Are the virtual experiences transferred to, and hence affecting players' subjectivities in, the material world? If so, how?

In Chapter 5, I found that *Eco* engenders in-game relational and agential awareness and feelings of self-efficacy, and in Chapter 6, I found that participants forge affective ties to the world and display in-game subjectivities that are being-in-common. Importantly, both awareness and emotional connection is necessary for sustainable values to develop (Singleton 2015). However, it remains to be seen whether the relational awareness and connection in-game translates to awareness and connection, or subjectivities that are being-in-common, out-game. Thus, while the two preceding chapters focused exclusively on experiences in *Eco*, this third and final chapter will escort the reader back into the offline world. Here, I will explore how participants' material-world subjectivities might have been affected through their engagement with *Eco*.

Importantly, transformation is a "qualitative phenomenon [that] is difficult to measure and explain" (Singleton 2015: 10). Indeed, because change is processual and constant, there is no definite 'before' and 'after'. However, through careful examination of participants' accounts we can at least gain some insight into what participants experienced, thought, and felt based on their interaction with the game, and consider how this compares to their perceptions and perspectives before playing. The chapter consists of three parts. In Section 7.1, I present and analyze the three identified themes. In Section 7.2, I discuss the themes in relation to the theory presented in Chapter 3. Finally, in Section 7.3, I examine to what degree the four theoretically-derived qualities of self-efficacy, embodied experience, alternative subjectivities and atypical experience correspond to the empirically-anchored themes.

7.1 Virtual-Material Transactions

In this section, I will present and analyze the three themes that emerged from the survey, diary, and interview data. The first theme illustrates how *Eco* triggers reflection and insights. The second theme illuminates how *Eco* inspires behavioral change. Finally, the third theme illustrates how some participants were left unaffected. How the three themes relate to the four theoretically-derived qualities of self-efficacy, embodied experience, alternative subjectivities, and atypical experience (Chapter 3) will be discussed in Section 7.3.

7.1.1 Reflection – "Small Things Can Make a World of Difference"

When participants play *Eco*, they connect these experiences to the material world through reflection. They reflect on their selves, their communities, and the wider ecosystem. For example, one participant stated that "I think about my impact on earth a lot more" (Walker, survey). This might indicate that he identifies as part of the problem and reflects feelings of responsibility. Playing *Eco* led him to reflect on his behavior, which might indicate a new relationship both to Earth and himself. Another participant similarly stated that *Eco* has "acted as a gateway to environmental consciousness. The actions that I take in the game, have […] made me question some of the decisions I make in daily life" (William, survey). Here, William explicitly connects his in-game experiences to his out-game subjectivity. As for Walker, the reflection indicates a somewhat changed relationship to self and surroundings.

Another participant contemplated how a disaster might affect her local community: "I do think about what would happen in our town if we had a real life disaster. I don't really think people would be the same. I think it'd be more chaotic and dark" (Melissa, survey). Here, experiencing a post-meteor context in-game generated thoughts about what such a scenario could look like out-game. As the experience triggered the participant to draw lines between virtual and material experience, it illustrates the potential of virtual experience to generate reflection and futures thinking. Another participant explained how *Eco* generates both economic and environmental topics of discussion:

> When I tell people about how thing are evolving with the player in ECO it usualy is a good start to think about how things are in the real world. Like when making money inflate the [prices] or when the rise of some animal product endanger the species and force the comunity to act[,] changing [or] moderating the demand. (Matias, survey)

In this excerpt, the participant describes discussing in-game experiences of inflation and endangered species with other people, which triggers reflection on such processes in the material world. The fact that Matias discusses his experiences with other people – and perhaps individuals outside of the game – might lead even more people to reflect, indicating potential ripple effects. In sum, playing *Eco* introduces participants to experiences that are either thought through alone or discussed with others. Such reflection illustrates how players connect their in-game experiences to the material world, and indicates a potential to influence players' relations to self and surroundings back in the material world.

Furthermore, *Eco* facilitates insights that seem to expand players' social consciousness. Specifically, participants report gaining understanding of natural processes and becoming aware of having agency. For example, one participant realized that "[t]rees take a very long time to grow up" (Neal, survey), indicating a new perception of the time-consuming process of reforestation. Another participant realized the value of preservation:

> The games i played we managed everything pretty well except wild life. in one game we had about 8 or so go extinct from over hunting before we could get laws in place to protect them. it goes to show how quickly a species can be wiped from the planet if not properly managed. (Dean, survey)

When a species was not taken into account, *Eco* responded with extinction, which communicated the message that what is not well-looked-after will be lost. Hence, dealing with extinction in-game lead to the recognition of the importance of conservation efforts out-game. Another participant recognized the negative impacts of construction:

> The experiences that I've had in the game have […] revealed to me how fragile our local communities are. Living in a rural area, increased housing and road development has degraded surrounding soil quality and washed out topsoil. (William, survey)

Here, William describes how in-game experiences led to a new perception of out-game geographies. Specifically, there seems to be an increased perception of socio-ecological complexity, as specific types of human action are connected to impacts on nature. Other participants reported realizing that they matter, not only in-game (as discussed in Chapter 5) but out-game as well. Through gameplay, they realize that their individual choices in the material world have a larger impact. While one wrote that "Eco has shown me that even smaller roles have an impact" (Melissa, survey), another shared the following insights:

> Although I know that climate change is a pressing issue in the real world, I have always felt a kind of disconnect from it, like a feeling that there is nothing that I as an individual can do about it. Through playing the game, my eyes were opened to how even small things, such as clearing grass and bushes, can have a large impact on the environment, even in the real world. The game showed me that even if it is a small impact, the things I do can make a difference. (Anna, survey)

In response to another question in the survey, Anna added that,

> before I played, everything seemed hopeless and it didn't seem like there was a point in trying to change what I did because it wouldn't make a difference anyways. Playing Eco showed me that even just small things can make a world of difference in the grand scheme of things. (Anna, survey)

In her accounts, Anna describes moving from hopeless and disempowered, to hopeful and empowered. As a result, she now considers her individual efforts to be meaningful and part of a bigger picture. This realization came through the practical experience of doing. For both Melissa and Anna, engagement with *Eco* revealed that despite their beliefs, their actions matter. As such, the feelings of self-efficacy and, thus, new relations to self and surroundings generated in *Eco* (as described in Chapters 5 and 6, respectively) have, at least for these two participants, been bridged back to the material world. In sum, it seems that performing actions and receiving feedback to those is what generates participants' insights. The insights further widen players' social consciousness, or their understanding of themselves and their surroundings.

7.1.2 Behavioral Change – "Less Paper Needed is Less Trees Cut Down"

Another finding was that *Eco* affected participants' behavior. Indeed, several participants described instances where in-game experiences triggered out-game changes, which resulted in new ways of being and doing in the material world. This indicates that virtual experience, or virtual doing, has potential to change material-world-subjectivities. Two participants described how their newfound knowledge about tailings influenced their behavior in real life:

> Before I played Eco, I had not even heard of mining tailings. Since then I have spend a ton of time researching it and spreading what I have read. It really changes how I look at electronics, specifically smart phones. I see the lasting effect they have on the earth even after the device is long gone. (Wyatt, survey)

> I had no idea of tailings before play it. They are a big thing in real world. Since I google tailings I found that minery effluents are a big concern too. The last election here in Argentina I make my vote knowing that. (Matias, survey)

In the first excerpt, Wyatt explains how *Eco* prompted him to research tailings, which not only gave him a new perspective on electronics but also led him to spread his newfound knowledge. For Matias, being introduced to tailings also led to research and awareness, which ultimately

affected his political vote. A third participant was similarly prompted to embrace his political agency, albeit in a slightly different way. The following is an excerpt from Simon's diary:

> Reflection V. Friday the 27th of September. No play session, but I had a dream. It was set in the real world, still very much felt like the Eco game world. We were harvesting and harvesting and finally ran out of ressources. Trees and other plant-based life, mineral resources, animals, etc. all gone. Just a few people left. And there was a strange feeling of "how did that happen?". We were all working mining, collecting and then it just was over. They day before I was debating whether I should join this weeks Earth Strike. I wasn't sure. After the dream I decided to go and some friends joined as well. (Simon, diary)

In the subsequent interview, Simon explained that

> it really […] motivated me to go to the Fridays for Future demo the next day, because … It felt like the right thing to do after the dream and playing the game and all that … [T]hat problem of running out of resources seems very real to me, that is in the game world and also in our world. […] I actually motivated two other people […] or even three, three other ones, to go with me, uh, and also shared that, uh, yes, I was motivated by that game and this dream. (Simon, interview)

In sum, playing *Eco* led to a dream that inspired Simon to embrace his political agency and participate in a demonstration. This is an example of how games can prompt not only conscious reflection, but also subconsciously affect our minds. What we spend our time doing – what we surround ourselves with – deeply affects our mind and imagination (Chapter 3). Furthermore, it led to ripple effects as he brought three friends there. Also, Simon later added that playing *Eco* made him more motivated to participate "in some sort of organized way. To maybe join an organization" (Simon, interview). This indicates that *Eco* can go beyond inducing awareness, to motivate individuals to take action and be part of the change. A fourth participant shared how *Eco* prompted him to foster a more sustainable relationship with resources:

> [I]t has changed my perspective a lot. from ECO I saw how much destruction of the eco system is required to get those resources so now I try to [be] as careful as possible when using them. An example is when I recently made a stand for my aquarium I first thought of doing [it] completely out of wood. After playing eco and considering that this wood will destroy many trees I made a skeleton of iron and dressed it with wood so as to waste as less as possible resources. And generally now when I see something in my life I kind of think of the resources that were required for it to be built. (Michael, survey)

Through *Eco*, Michael became aware of the impacts of resource extraction, indicating an increased perception of socio-ecological complexity. The new perspective further inspired more caring and considerate relations to his surroundings, evident in the aspiration to minimize his impact. This effort does not only testify to changed relations to the world but also to himself, as he constrains his consumption of certain resources in line with the new awareness. Two other participants also changed their relationship to resources, specifically paper:

> [R]educing your impact starts with realizing that you're contributing to the problem. […] Eco has waken me up to my impact in the real world, such as reducing paper product consumption. (William, survey)

Through gameplay, William was made aware of his personal impact, which triggered him to adjust his behavior back in the material world. Thus, the new perception of himself as part of the problem further led to the realization that he is part of the solution. As such, the virtual experience led both to a change in relation to self and to changed relations to his surroundings. In his diary, Seth wrote:

> It's interesting how seeing the sudden decline of trees with a tool i've never had before suddenly makes me conscious of how the ecosystem will be affected. I guess I've never thought about that before, and I feel like it should apply to my life, and I think I will make an effort to reduce my paper consumption at work. […] I'm not doing this for the carbon footprint, as I draft and design steel mills so i mean that i'm sure outways the carbon reduction of paper, but less paper needed is less trees cut down. (Seth, diary)

He expands on this in the interview:

> [I]t made me realize just how much paper I go through at work, uh, so I've been trying to cut that back, because I've realized, uh, how … quickly we can lose a resource, even if it's renewable. […] It brought it closer to home. (Seth, interview)

In the first account, Seth engages in metathinking as he reflects on how it was the tree-felling activity that made him aware of the negative impacts of deforestation. Indeed, in the interview he specified that it was the action of cutting down trees, and then witnessing the concurrent decline of trees, that made him realize something that reading the news had not. Thus, having the chance to act and then experience the impact of those actions – having access to hands-on experience – is what made the difference. The realization further prompted Seth to scrutinize

and change his relation to paper back in the material world. As such, the virtual experience ultimately resulted in a new relationship to self and surroundings.

In sum, the virtual experiences accessed through *Eco* seem to engender awareness in players that further inspires conscious action and behavioral change back in the material world. Some examples of deliberate actions are research, voting, activism, and changed consumption habits. As participants change their ways of being and doing, gameplay triggers participants to enter into a new and more conscious relationship with the world, but also with their selves. Indeed, trough *Eco*, participants realize that they are both part of the problem and part of the solution.

7.1.3 No Perceived Impact – "If the Water Rises We Can Just Build a Wall"

While for many of the participants, playing *Eco* prompted reflections, realizations and engagement back in the material world, some participants did not show any sign of engaging with potentially transformative processes. For example, one participant wrote that "I'm not oblivious, i didn't learn something new and I'm just a dude in a third-world country, i can't do a lot" (Sergio, survey). Here, the use of descriptions such as "I'm just a dude" and "I can't do a lot" reflects inefficacy beliefs, or feelings of disempowerment. While the participant describes being aware, he also perceives his context as an obstacle to significant engagement. This narrative opposes earlier findings where participants reported feeling empowered through gameplay. Another participant shared that

> [b]ecause of religious views, I believe that we are to use the resources on this earth, and that there is no permanent irreparable damage we can do. But I do still enjoy the theme of the game. (Wade, survey)

In this account, socio-environmental issues seem to be reduced to "a theme in a game," as the Earth is viewed as resilient and unable to suffer from any human impact. Other participants describe gaining some awareness, yet do not perceive a need for radical change. For example, one participant wrote that:

> It definitely opened my eyes to how nearly everything affects the environment, which is always interesting to learn. But I have also learned that there's a lot of simple solutions to preventing such harm to the environment. A lot of people in the United States want to jump on the quick "tax everybody and make radical changes to the country" moves to prevent things such as global warming, when in reality such measures aren't necessary. (Matthew, survey)

Here, the downscaling in *Eco* seems to be understood not as a simplification of reality but rather as a depiction of reality itself. This leaves the participant with the understanding that socio-environmental issues can be easily solved, and thus that "radical changes" are unnecessary. Another participant similarly wrote that "[p]rogress will make a mess, just remember to clean up and we'll make it far" (Zacharias, survey). Instead of questioning the notion of progress and avoid making a mess in the first place, Zacharias seems to be left with the impression that any negative impact can later be reversed. A third participant wrote that

> It affects my decisions somewhat, Although in game i tend not to care a whole lot about the environment, If the water rises we can just build a wall around our area. In the real world of course, the environment matters, Although i think some people hype it up too much which stops technology from advancing which is the best way to save the [environment] in my opinion, through technology. (Caleb, survey)

Like Matthew, Caleb communicates that, while the environment does matter, there is no need for radical change. From his perspective, technology is the best tool to address socio-environmental issues. Thus, the in-game attitude of "if the water rises we can just build a wall" seems to apply in both the virtual and material world. In general, the techno-optimist view and the consideration of "radical changes" as unnecessary resonate with the human-centered position of liberal, or shallow, ecology. This position believes that "a managerial approach to environmental problems will be sufficient to solve problems, without fundamental changes in present values or patterns of production and consumption" (Ruggiero 2015: 84).

Finally, three participants explicitly state that *Eco* has not led to any changes in their lives: "Eco did not affect my life because I was already aware of this kind of problem and that, at my scale, I'm careful not to become a problem myself" (Damien, survey); "I haven't had an eye opener because of this game. If anything it amplified what I already was aware of" (Magnus, survey); "[B]y playing the game i've learning more about the ECO system, but have not changed me as a person" (Zacharias, survey). While Damien and Magnus point to pre-game awareness as the reason for no change, Zacharias stated that, although he has gained analytical knowledge, this has not had any transformative effect. These findings oppose previous accounts where participants, including those who were aware pre-gaming, were left with either more analytical knowledge, reflections, or new insights.

In sum, the findings in this subsection demonstrate that several participants did not experience gaining new knowledge, engage with reflection, or change their behavior as a result of playing *Eco*. Thus, where other participants felt inspired to reflect on or change their ways of being and doing in the material world, these players did not. This demonstrates that participants are left with different outcomes and perceive the virtual experiences differently. The findings also illuminate how pre-existing worldviews – such as deeply-held religious beliefs and faith in technology – can shape players' interaction with *Eco*.

7.2 Discussion: A 'Space of Possibilities'

The data presented in this chapter shows that the participants were left with different outcomes from engaging with *Eco*. First, *Eco* prompts reflections and insights. For example, participants reported reflecting on their material-world subjectivities, their impact on the world, and on the functioning of ecosystems. They also reported gaining insight into natural processes and re-connecting with their agential truth. Second, some participants reported altering their behavior based on their interaction with *Eco*. For example, several reported engaging in more conscious resource-use, one participant voted for a green party during the elections, and one participant went to a demonstration. In a few instances people would also spread the word, either directly by sharing their newfound knowledge, or more indirectly through discussing concepts or experiences from *Eco* in conversations with others. Finally, some participants reported not being affected by their interaction with *Eco*. Based on these findings it is clear that *Eco* has potential to affect material-world subjectivities, but that this potential is not always realized. As such, the findings align with Podleschny's (2012: 81) notion of games as "possibility spaces" (Chapter 2), in which "meaning, interpretations and possible transformations are diverse and probably divergent."

This section consists of three subsections. In the first subsection, I discuss participants' reflections and insights. In the second subsection, I discuss the behavioral changes. In the third and final section, I discuss potential limitations of *Eco*.

7.2.1 A Playground to Reflect

Critical reflection represents one of the three shaping factors of transformative learning (Taylor 2007) and refers to a process of "inward contemplation" in which individuals "identify, question and reframe underlying values and beliefs" (Singleton 2015: 7). In the data presented

in Subsection 7.1.1, participants demonstrate such reflexivity as they "step back and reflect" (Bentz & O'Brien 2019: 4) upon their ways of being and doing in the material world. Specifically, participants report becoming aware of their own impact, questioning their everyday decisions, and contemplating the future. Furthermore, participants report gaining an improved understanding of natural processes, consequential interaction, and realizing having agency. As participants engage with critical reflection based on their in-game experiences, *Eco* emerges as a medium that triggers reflection.

The reflections illustrate that the virtual and material worlds are bridged. Thus, experiences taking place in the virtual world can have meaningful implications for material-world subjectivities. Hence, just like physical places can shape our psycho-social nature – "our consciousness, social identities, attitudes and behavior" (Singleton 2015: 5), virtual places in *Eco* can, too. For example, in Melissa's account, an in-game crisis has her contemplate what a crisis might look like in her own local context. Another example is when Matias discusses his in-game experiences of inflation and loss of biodiversity with other people. Furthermore, Anna and Melissa's accounts demonstrate that the two worlds are bridged, as their in-game impact affects their view on impact out-game. Thus, through reflection, in-game experiences are "brought to life", as it is applied to their material worlds. This finding aligns with other research which has argued that video games can engender critical reflection (Harmon 2011; Podleschny 2012; Whitby, Deterding & Iacovides 2019; Yannuzzi & Behrenshausen 2010). Furthermore, it contrasts the findings of Mitgutsch & Weise (2012) and Whitby, Deterding & Iacovides (2019), who, as reviewed in Chapter 2, found that players' reflections were generally not transferred back to the material world. However, this could be explained by the fact that they were examining different kinds of games.

Reflection is necessary to question and break away from our current ways of being and doing (Bentz & O'Brien 2019: 4). As such, it is an essential element of transformation (Singleton 2015: 6-7). In this subsection, I have argued that as *Eco* triggers critical reflection in participants, it has transformative potential. Indeed, as participants contemplate their impact, scrutinize their behavior and imagine the future, the findings seem to support the notion that video games can engender "critical reflection upon the self one chooses to become and the social worlds he/she participates in constructing" (Yannuzzi & Behrenshausen 2010: 14). As such, the findings support the notion that video games can trigger reflection (Whitby, Deterding

& Iacovides 2019). Specifically, *Eco* can engender reflection that can change people's understanding of themselves and their surroundings.

7.2.2 Becoming Agents of Deliberate Change

While reflection is undoubtedly valuable, it is well-established that it is "easier to change minds than to change behaviors" (McGonigal 2011: 186). We are "often more willing to learn something new than we are to actively adapt our lives. Making the transition from theory to practice is difficult" (McGonigal 2011: 186). Indeed, "belief systems […] do not necessarily improve individual behavior" (Sollund 2012: 96). In fact, "People are fully able to act contrary to their beliefs and ethics, because they do not want to make the effort of changing habit(u)s" (Sollund 2012: 99). Yet *Eco* does see some participants act and try out new ways of being and doing in the material world. Indeed, for some, engagement with *Eco* led to changed perspectives on and relationship to electronics, more sustainable relations to resources (paper and wood), and political participation both in terms of voting and activism.

The changed behavior might be reflective of an increased social consciousness and a move towards relational knowing. Because participants reported "to act as agents for positive change" (Schlitz, Vieten & Miller 2010: 22), this might signal a move from a self-centered mode to one in which the self is experienced as an integral part of a larger whole. Indeed, as participants gain an understanding of their impact and take action to make "a difference in some outwardly directed way" (Schlitz, Vieten & Miller 2010: 27), they display social consciousness. Thus, as playing *Eco* inspires changes to current subjectivities, gameplay might be able to create the foundation that is needed for a change in worldviews. Singleton (2015: 5) similarly argues that when we move towards a relational way of knowing, we form new "values and attitudes that are translated into behaviors." Indeed, as stated in Chapter 3, what we value affects what we do. As such, the accounts might suggest that participants have entered into a relational knowing.

7.2.3 Potential Limitations of *Eco*

Despite the evidence presented in Chapters 5 and 6 to suggest that *Eco* exhibits the four identified qualities related to transformative potential, and of the discussion above that these can lead to changes in mindsets and behaviors in the material world, there are certainly some limitations that may be responsible for its limited reach, as evidenced by the participants who reported no impact. Limitations could be linked to *Eco*'s conception of "sustainability" and its

underlying resource- and technology- oriented focus. Indeed, sustainability is a much-debated concept in literature on socio-environmental issues. While proponents of sustainability talk of combining green growth while limiting destruction, opponents argue that the concept is used as a political tool to *sustain what is* – i.e., to implement measures that allow for the continuation of status quo. As such, the idea of sustainability seems to communicate ideas that oppose those of transformation. One example is the view *Eco* communicates of nature as resources. Indeed, in *Eco*, focus is largely on resource management. Gibson-Graham, Hill & Law (2016: 706-707) argue that

> when parts of the environment are represented as 'resources' […] they become completely divorced from the lively ecosystems from which they emerge. At the same time human–non-human interdependence is reduced to utility and stripped of any ethical content.

Thus, rather than "challenging the dominant subjectivities of separateness, [so that] we can go beyond informing ecosystem management" (Nieto-Romero et al. 2019: 114), *Eco* might rather perpetuate these. Indeed, some of the accounts seem to reflect the understanding that humans may "face any challenges that may come" and that "technological innovations and interventions will overcome problems" (Crist 2018: 1242-1243). As such, *Eco* might nurture support for "green growth" and technologically oriented solutions over social transformation. This discussion reinforces the importance of the idea put forth in Chapter 2; that we be critical of "games' lessons, the skills they teach, and the value systems they perpetuate" (Yannuzzi & Behrenshausen 2010: 96). It is also important that game developers are mindful of, and open about, what values they communicate. As new games are developed, other ways of relating to nature that challenges the view of nature as resources should be explored. A focus on stasis rather than growth (Kelly & Nardi 2014) represents one possible approach.

7.3 Conclusion

In this chapter, I have presented and analyzed three identified themes from the survey, diary, and interview data. First, I found that *Eco* prompts reflections and insights. Specifically, participants reported reflecting on their material-world subjectivities and on socio-ecological interconnections, and gaining insight into natural processes and their power to affect. Next, some participants reported changing their ways of being and doing in the material world. And finally, some participants reported to not be affected by their interaction with *Eco*. Based on

the findings, I have suggested that *Eco* has transformative potential, i.e., potential to trigger processes that can facilitate psycho-social transformations.

In Chapter 5, I found that *Eco*, for some participants, engendered in-game self-efficacy beliefs, i.e., participants described experiencing that they matter in the virtual world. In this chapter, it is clear that such beliefs are transported back to the material world, as participants describe both realizing their own power to make a difference and taking action (Chapter 3). Thus, regarding the first theoretically-derived quality formulated in Chapter 3 related to self-efficacy, the findings indicate that the quality does indeed contain transformative potential.

In Chapter 6, I found that participants had 'virtual embodied experience,' as their psychomotor bodies were affected through play (using your "physical" body). In the findings presented in this chapter, the transformative potential of these embodied experiences is evident in accounts such as "The actions that I take in the game, have […] made me question some of the decisions I make in daily life," "The experiences that I've had in the game have […] revealed to me how fragile our local communities are," and "Playing Eco showed me that even just small things can make a world of difference." Indeed, the 'being' and 'doing' in-game triggers reflection and behavioral change out-game. The second theoretically-derived quality of embodied experience thus emerges as a transformatively potent quality. However, so does the third and fourth theoretically-derived qualities of alternative subjectivities and atypical experience, as it is the alternative experience and ways of being and doing that triggers the reflection and behavioral changes out-game.

In sum, participants' accounts reflect that the virtual experiences are transferred to the material world. Indeed, as the gameplay triggers participants to reflect on and alter their material-world subjectivities, in-game experiences are not confined to the virtual world but instead extended to participants' material contexts. *Eco* thus emerges as a source of 'trigger events' that induces reflection, insights, and behavioral change in players. As participants engage with these new thoughts and behaviors, they are experimenting with new relations to their selves and their surroundings, indicating a potential initiation of psycho-social transformation. While it is impossible to conclude from a single case study which factors were key in producing the results, it seems, based on the narratives, likely that the experiences are transferred through the theoretically-derived qualities of self-efficacy, embodied experience, alternative subjectivities, and atypical experience. As such, the theoretically-derived qualities correspond with the

empirically generated themes. As a result, I want to suggest that *Eco*, and by extension, other virtual sustainability games that address the four theoretically-derived qualities, can have transformative potential.

8 Conclusion

The thesis opened with a quote from Tuan (1984) that captures our tendency as humans to deny our influence on the world. Indeed, the quote reflects how we are disconnected both from ourselves and from our surroundings, humans and non-humans alike. In this thesis, I have argued that this disconnect is the ultimate source of 'environmental' issues and, thus, that there is a need for us to reconnect with our agential and relational truth. Importantly, such reconnection does not only entail the acknowledgement that we are the problem, but also the recognition that we are part of the solution, and a reconnection with our own capacities for change. In this thesis, I have argued that, in order to reconnect with our agential and relational truth – in order to deal with the underlying cause of socio-environmental issues – we must engage with psycho-social transformations. However, how to engender such transformations and produce alternative subjectivities remains unclear. It is this gap in knowledge that this thesis has sought to address.

Studies show that experience can stimulate emotions and other bodily processes that can further prompt individuals to revise and reorientate their subjectivities, i.e., their ways of being and doing in the world. However, due to the urgent, irreversible, harmful, and costly nature of socio-environmental issues, it is not desirable to wait for individuals to have hands-on experience in the material world. I have therefore explored the potential of virtual worlds created through sustainability games to engender the psycho-social processes of transformation argued to be necessary for the development of alternative subjectivities. Specifically, the research objective was to explore the (psycho-social) transformative potential of virtual sustainability games in general, and *Eco* in particular. I have explored the objective through three interrelated research questions.

The first research question asked "*can virtual sustainability games enhance players' feelings that they "matter" in relation to transformations to sustainability, and if so, how?*"

In *Eco*, material-world systems are made not only visible but experienceable through the conditions of agency and space-time compression (Chapter 5). While agency is what allows players to implement actions, the space-time compression let them experience the impact of those actions. This allows players to experience "the self as entangled with the rest of the world" (Singh 2017: 764). *Eco* thus 'makes space for an alternative place' in which people can

reconnect with their agential and relational truth as they experience human–non-human interconnections and their environmental impact (Chapter 5). For some participants, this tangible experience of doing further fueled feelings of self-efficacy in the virtual world (Chapter 5). Thus, through tangible, hands-on experience, participants became empowered. Furthermore, in Chapter 7, some participants' accounts' illuminate how the in-game feelings of self-efficacy have been translated to out-game feelings of empowerment. As such, it seems that *Eco* has the potential to fuel feelings of mattering both in- and out-game. To the extent that self-efficacy is necessary for environmental action (Chapter 3), virtual sustainability games that manage to make interconnections tangible and generate similar feelings of mattering could have transformative potential.

Across themes and chapters, the data in the thesis demonstrates the significance of experiencing the impact of our actions. How tangible our impact is – how experience-able the consequences of our actions are – seems to affect how we relate to ourselves and our surroundings. While humans are impactful in both the material world and the virtual world of *Eco*, it is mainly in the latter that some individuals *experience* having an impact. This emphasis on experience is important because while there are certainly differences between the two worlds, *Eco* does not provide its users with super-natural powers. It does, however, provide participants with access to tangible experience, which seems to be what fuels both the feelings of self-efficacy and the added layer of embodied awareness. These findings are consistent with those of Fjællingsdal & Klöckner (2019: 9), who suggested that *Eco*'s "ability to visualize otherwise intangible subjects for its players" might explain the perceived impact on players' environmental consciousness.

The second research question asked "*if embodied experience is understood to have transformative potential, can 'virtual embodied experience' through sustainability games hold similar potential, and if so, how?*

Through participants' accounts it became clear that their virtual experiences were also embodied. First, gameplay was described as emotionally engaging. Actions conducted through the avatar elicited emotions in their material-world bodies (Chapter 6). Second, some accounts seemed to suggest that the 'doing' elicited a new type of response – an embodied understanding of interconnections – that expanded participants' awareness in the material world (Chapter 5). The activation of the psychomotor domain, enabled through the interactive quality of the game, brought socio-environmental issues closer in space and time, ultimately resulting in a new and

embodied understanding of interconnections. Thus, the 'doing', despite it being virtual, triggered new and embodied understandings. Harmon (2011) has suggested that borrowing alternative subjectivities and having atypical experiences can trigger reflection. These findings support this notion. Specifically, it is the embodied experience which effectively engages our cognitive and emotional dimensions, combined with the possibilities of virtual space which can simulate interconnections, that might generate experiences of a transformative nature. Thus, through *Eco*, we are *learning-by-doing* and *changing-through-being*. Because the learning is embodied, the lessons are bridged back to the offline world, where it has the potential to shape our subjectivity, i.e., our ways of being and doing in the world.

The third research question asked "*are the virtual experiences transferred to, and hence affecting players' subjectivities in, the material world, and if so, how?*"

The findings show that for several of the participants in the study, the virtual experience was transferred to the material world (Chapter 7), either through reflection, or in some instances, behavioral change. While it is impossible to conclude from a single case which factors were key in producing the results in Chapter 7 or to assume that the reported experiences can lead to long-term transformation, it seems plausible that the changed mindsets and behaviors that participants report and reflect on after playing *Eco* are related to the way it incorporates the four qualities identified in Chapter 3 and tested and interrogated through Chapters 5, 6, and 7. The findings thus indicate that the four theoretically-derived qualities of self-efficacy, embodied experience, alternative subjectivities and atypical experience have transformative potential. This further implicates that *Eco*, and other virtual sustainability games that incorporate these qualities, can have transformative potential.

In general, the participants described having differing experiences. As discussed in Chapter 7, this was especially evident through participants reports of being left with widely different outcomes. This reinforces the point that was made in Chapter 2, where I suggested that the individual is a co-creator of their own experience and, thus, that no two individuals will share the same experience. Ultimately, then, *Eco* represents a 'possibility space' (Podleschny 2012) in which 'transformative encounters' (Nieto-Romero et al. 2019) has the potential to be engendered. Furthermore, *Eco* makes space for an alternative place in which individuals can access atypical experience. This experience can generally be characterized as atypical as it 1) tangibilizes interconnections; 2) can generate feelings of self-efficacy; 3) tend to engender a

sense of being-in-common; 4) and affectively engages the psychomotor domain. In sum, the virtual experience accessed in *Eco* emerge as *embodied*, *empowered*, and *in-common*.

8.1 Implication of Findings: 'A Role to Play'

The findings seem to support the notion that embodied experience has 'a role to play' in processes of psycho-social transformation, even when that experience is of a virtual nature. As such, the findings support Singh's (2013/2017) processual approach to the development of subjectivities, Wrights' (2015) performative understanding of belonging, and the notion of transformation as a multi-dimensional process in which the psychomotor dimension must be addressed. Indeed, human beings do not come to love other human beings through instruction or conviction. In the same way, people cannot be expected to care for nature simply on the grounds that "they should." Rather, as demonstrated in this thesis, care develops from the combination of an awareness of our intersubjective being, and from embodied engagement with the world (Chapter 6). As such, caring emerges as a performative and embodied phenomenon that must be nurtured through interaction, which sees the psychomotor body emerge as an important medium for communication.

The findings further suggest that virtual sustainability games, through offering virtual embodied experience with human–non-human interconnections, can have 'a role to play' in processes of psycho-social transformation. Indeed, rather than to constitute a distraction from important matters in the material world, *Eco* seem to prompt engagement with them, both in the form of reflection and behavioral change. As such, virtual sustainability games could potentially represent an adaptive tool that enables engagement with otherwise crippling topics (Kelly & Nardi 2014). In short, rather than representing an escape, embodied experience through virtual sustainability games can help us deeply engage with, and deliberately transform, ourselves and the material world. The findings thus suggest that we should be more open towards games as having a role in building transformative capacities.

In sum, the findings suggest that (virtual) embodied experience has a role to play in processes of psycho-social transformation. However, I do not claim that such experience either can or should aim to substitute human–non-human interaction in the material world. I am merely making the argument that, as we are researching tools to help engender the transformation that is called for, virtual embodied experience can represent one such tool. Furthermore, psycho-

social transformations on an individual level must be complemented and supported by transformations in the political and practical sphere.

8.2 Reflections on Contribution to the Research Field

Because worldviews shape our ways of being and doing in the world, worldview transformation is a core geographical matter. However, as stated in the introduction, we do not yet know how to engender the transformations that are called for. In this thesis, I have contributed to addressing this current gap in knowledge. Specifically, I have explored how virtual geographies and virtual embodied experience can help shape our mental and material landscapes in ways that can improve our relations to the non-human and, thus, help us move towards a thriving world. In doing so, I have contributed to the emerging area of research that studies "what new media allow users to do and how that doing transforms social […] geographies and practices" (Winders 2016: 343). Indeed, "human geography is only just beginning to offer its own take on the medium and the practices associated with it" (Ash & Gallacher 2011: 351). The research conducted in this thesis demonstrates the relevance of virtual embodied experience for our material-world subjectivities and, thus, the relevance of continued research on the links between virtual and material worlds for human geography.

8.3 Suggestions for Future Research

While a single case study does not permit generalizations, it can bring forth new concepts and ways of applying them. Based on a broad range of theoretical literature, the thesis has identified and developed four qualities that according to this literature could be relevant for demonstrating transformative potential (Chapter 3). The relevance of these four qualities has been tested through empirical data (Chapters 5, 6, and 7), suggesting some positive results. Further comparative studies would be required to explore how different sustainability-oriented video games (or perhaps other forms of media and art) engage the four theoretically-derived qualities I have explored in this thesis – or others that remain to be identified – and the degree to which these shape their transformative potential and outcomes. This would ideally include longer-term follow up research of participant's ongoing reflections and actions in the material world.

8.4 Concluding Thoughts

Meadows (1999: 14) considered transformation to be "[t]he most stunning thing living systems and social systems can do." I could not agree more. But change is hard. Despite the fact that

change is a natural part of life – "the only constant", as Heraclitus said – the human body deeply resists it. This is because we are 'creatures of habit.' Thus, in addition to awareness and agency, it takes energy, perseverance and courage to deliberately transform. In this thesis, I have argued that temporarily inhabiting alternative subjectivities in virtual worlds can support processes of psycho-social transformation in the material world. Indeed, by exposing our bodies to other ways of being and doing, virtual sustainability games like *Eco* can expand our material-world agency and inspire engagement with what might otherwise be experienced as a daunting matter.

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Appendices

Appendix A: Survey

Appendix B: Overview of Participants' Attributes

Appendix C: Request for Participation and Consent Agreement – Experiential Study

Appendix A: Survey

1. What makes video games (in general) appealing to you?
2. What makes Eco particularly appealing or unappealing?
3. What other games do you play or have you played recently (if any), and how does your experience of playing Eco compare to them?
4. What role would you say Eco plays in your life?
5. Would you say that playing Eco has changed your perspective on the environment or on resources (such as timber, steel etc.)? If so, could you give an example of how these have changed? Feel free to refer to examples from experiences you have had in the game or in real life.
6. In Eco, many actions and choices affect the environment and other players.
   A) Does this influence your decisions in the game? Feel free to give examples.
   B) Is this experience different from, or similar to, how you experience life in the real world? If so, how?
7. Interacting with other players is one part of playing Eco. What is it like to interact with the other players? How would you describe these interactions? For example, cooperative, collaborative, competitive, or some other word, and why?
8. People often experience an array of different feelings related to playing games, before, after, or during gameplay.
   A) Can you tell me about the different kinds of emotions you have experienced in relation to Eco?
   B) Can you describe an experience related to Eco where you had a particularly strong emotional reaction?
9. Do you feel like there is a difference between solving problems in a game, versus solving them in real life? How do they compare?
10. In your real life, do you feel like what you do matters? Do you think playing Eco may have influenced your perspective on this in any way? If so, how?
11. Could you describe one or a few examples of memorable experiences you have had while playing Eco, and what made them memorable?
12. In your real life, do you find that you continue to reflect on the previously mentioned memorable experiences? Have they affected your real life in any way? If so, how?

Appendix B: Overview of Participants'[9] Attributes

Pseudonym	Age	Gender	Country of residence	Method(s)	Amount of time played (hours)[10]
Seth	22	Male	USA	Diary, interview (intermediate)	Ca. 30-40
Simon	29	Male	Austria	Diary, interview (beginner)	20
Cecilia	37	Female	USA	Diary, interview (advanced)	455
Adam	24	Male	USA	Diary (intermediate)	N/A
Walker	24	Male	Canada	Survey	14
Neal	20	Male	Spain	Survey	43
Magnus	37	Male	Norway	Survey	252
Damien	19	Male	France	Survey	139
Adriel	18	Male	Spain	Survey	78
Rune	36	Male	Sweden	Survey	1342
Ryan	36	Male	USA	Survey	301
Melissa	31	Female	USA	Survey	1272
Mats	28	Male	Sweden	Survey	Ca. 200
Wade	26	Male	USA	Survey	4.4[11]
Brandon	33	Male	USA	Survey	352
Jamie	24	Male	Australia	Survey	150
Anna	21	Female	USA	Survey	36
Wyatt	34	Male	USA	Survey	2000
Zacharias	38	Male	Denmark	Survey	2892
Caleb	16	Male	USA	Survey	441
Michael	27	Male	Cyprus	Survey	62
Sergio	26	Male	Argentina	Survey	241
Sarah	32	Female	Canada	Survey	1090
Christopher	18	Male	USA	Survey	287
Rashid	30	Male	Austria	Survey	317
Dean	28	Male	USA	Survey	219
Matias	30	Male	Argentina	Survey	205
William	17	Male	USA	Survey	192
Vilhelm	22	Male	Germany	Survey	583
Samuel	30	Male	Australia	Survey	340
Derek	32	Male	Canada	Survey	1898
Matthew	18	Male	USA	Survey	324
Skylar	N/A	N/A	Australia	Survey	340
Max	25	Male	Germany	Survey	116

[9] The overview does not include the attributes of the five participants who did not complete their diaries.
[10] This data is based solely on participants' personal recordkeeping, and has not been externally confirmed.
[11] Based on the data collected from the participant, 4.4 is likely referring to 4.400 hours.

Appendix C: Request for Participation and Consent Agreement – Survey

Are you interested in taking part in the research project "The Transformative Potential of Video Games?"

This is an inquiry about participation in a research project where the main purpose is to examine whether computer games can be considered an effective tool in work on climate change adaptation and social transformation. In this letter we will give you information about the purpose of the project and what your participation will involve.

Purpose of the project

The purpose of this master's thesis is to study whether – and if so, how – participants experience and relate to themselves and the world differently before and after having played *Eco*, a collaborative and environmental science game. The thesis will investigate the following research questions: 1. *Can videogames where ecosystems need to be managed in a sustainable and cooperative manner contribute to transformation?* 2. *How can we measure the transformative potential or impact of an intervention within a short timeframe?*

Strange Loop Games – the game developers – might use the collected personal data for further research and/or marketing purposes.

Who is responsible for the project?

The University of Oslo is responsible for the project. Strange Loop Games will help recruit participants.

Why are you being asked to participate?

You are being asked to participate because you are 1) currently playing *Eco,* and 2) 16 years of age or older

What does participation involve for you?

Accepting to participate in the survey involves agreement to complete a survey consisting of open-ended questions. I will also need your e-mail address, in-game username, and total hours

of play. Gender, age and country of residence is optional. Your response will be registered electronically through *UiO Nettskjema*.

Note: The $15 Amazon voucher will only be distributed upon successful completion of the study requirements. This means that you will have to answer all 12 questions, including subsets, in a serious manner (i.e., not just enter single word or sentences). When signing this agreement, you agree to the understanding that each participant may only participate once and will receive one voucher only. It is not allowed to create multiple accounts in order to participate more than once in the survey. Due to budget restrictions, the amount of gift cards distributed will not exceed 20. This means that *only the first 20 participants to answer the survey in a serious manner*, will receive the gift card.

Participation is voluntary

Participation in the survey is voluntary. If you choose to participate, you can withdraw your consent at any time without giving a reason. All information about you will then be made anonymous. There will be no negative consequences for you if you choose not to participate or later decide to withdraw.

Your personal privacy – how we will store and use your personal data

We will only use your personal data for the purpose(s) specified in this information letter. We will process your personal data confidentially and in accordance with data protection legislation (the General Data Protection Regulation and Personal Data Act).

- The data, which will be handled through the University of Oslo, will only be accessible to the supervisor, Morgan Scoville-Simonds, and the student, Siri Friberg Gusland. The only exception is your in-game username: this will be shared with Strange Loop Games so that we can collect data regarding the amount of gameplay.
- Information relating to gender or age might be published, but usernames and e-mails will be anonymized to ensure that you will not be recognized in the publication.

What will happen to your personal data at the end of the research project?

The project is scheduled to end on the 20th of February 2020. At the end of the project, the personal data will be deleted and only anonymized data will be retained.

Your rights

So long as you can be identified in the collected data, you have the right to:

- Access the personal data that is being processed about you
- Request that your personal data is deleted
- Request that incorrect personal data about you is corrected/rectified
- Receive a copy of your personal data (data portability), and
- Send a complaint to the Data Protection Officer or The Norwegian Data Protection Authority regarding the processing of your personal data

What gives us the right to process your personal data?

We will process your personal data based on your consent. Based on an agreement with the University of Oslo, NSD – The Norwegian Centre for Research Data AS has assessed that the processing of personal data in this project is in accordance with data protection legislation.

Where can I find out more?

If you have questions about the project, or want to exercise your rights, contact:

- The University of Oslo, Department of Sociology and Human Geography via Siri Friberg Gusland by e-mail sirifg@student.sv.uio.no
- The University of Oslo, Department of Sociology and Human Geography via Morgan Scoville-Simonds by e-mail morgan.scoville-simonds@sosgeo.uio.no
- Our Data Protection Officer: Maren Magnus Voll
- NSD – The Norwegian Centre for Research Data AS, via e-mail: (personverntjenester@nsd.no) or by telephone: +47 55 58 21 17.

Yours sincerely,

Project Leader (Researcher/supervisor) Student

I have received and understood information about the project The Transformative Potential of Games and have been given the opportunity to ask questions. I give consent:

- ☐ To complete a survey related to my experiences with *Eco*
- ☐ To provide the researcher with my chosen in-game username, and allow the researcher to share this information with Strange Loop Games so that information regarding my in-game behavior (e.g., total amount of hours played) can be accessed and used for research purposes
- ☐ To allow the researcher to contact me after survey completion in case of follow-up questions
- ☐ For my personal data to be processed outside the EU
- ☐ For my personal data to be processed until the end date of the project, approximately the 20th of February 2020.
- ☐ I am 16 years of age or older
- ☐ This is the first time that I am involved with this project (The Transformative Potential of Video Games)

(Signed by participant, date)