Ecological In/congruence: Becoming Sensitised to Nature in Video Games through Humanistic First-Person Research

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ABSTRACT

The ongoing ecological crisis is the current biggest threat for our species. As we attempt to address the situation through policy, interventions, and education, we urgently need to understand how people encounter and relate to nature: As it is, in the world, and portrayed through different media. As an exemplary medium facilitating digital nature, this paper focuses on video games. Using first-person research methods, we report on the first author *sensitising* themselves to nature as a ubiquitous feature, theme, and actor in video games. They played eight nature-focused games for three months. Through auto-ethnography, close reading and *"noticing"* (after Tsing), we make sense of their experiences using the humanistic concept of ecological (in)congruence: We draw out the relational gap and potential meanings between real nature and its virtual equivalent. Based on these insights, we outline two design impulses for how the HCI community might approach nature—within games and beyond.

CCS CONCEPTS

• **Human-centered computing** → **Empirical studies in HCI**.

KEYWORDS

humanistic psychology, human-nature interaction, video games, auto ethnography, first-person-research, ecology, sustainability

1 INTRODUCTION

The ecological collapse of our planet looms on the horizon [53], and it paints a clear picture of suffering and death, now and in the future [35]: We face pollution [150], climate change [88] and a tremendous, ongoing loss of biodiversity, with other species are dying out en masse [52].

Living through the current times—the *Anthropocene* [37]—requires us to realise how much human-centred design has shaped the world around us: Often, with little to no regard for its destabilising, disruptive effects on (non-)human life on Earth [89, 139].

Despite individual, collective and governmental efforts to maintain a liveable planet, our current rapport with(in) nature is more than complicated [144]: How we understand nature is not neutral, but influenced by all facets of everyday life. Within this context, technology and media have always been mediators of humankind's understandings of nature: As cultural happenings, they reveal currents trends of how humankind sees, thinks and feels about nature. Beyond showcasing current understandings, technology and media can also heavily shape how people understand nature [48]: Prominent examples here include (paper) maps [157] and GPS-guided navigational tools like Google Maps [98], but also travel-writing, nature prose [72], documentaries [8, 77], tourism campaigns on social media platforms like Instagram [133] or generated landscapes in video games [26, 27].

This paper zooms in on the latter: Video games are a digital, creative medium with a rich history of portraying and featuring nature [27]. As a mediator of make-believe, games can reach deeply into someone's personal life: Games can make people feel, act and respond across the whole spectrum of human expression—including positive and negative affect [16]. This potential can be used for affective meaning-making, human flourishing [79] and self-care [137].

The interactive capabilities and affective affordances of games set the frame for portraying nature in them. These representations can take on very different forms, all with their own implications: Nature can be used a prop for environmental storytelling, it can featured as an aesthetic backdrop to signpost the edges of the game world, or it can be a core tenet of the game's theme [3, 27, 104]. Games can also allow us to experience and relate to scenarios, situations and characters that may not be possible or accessible for us in real-life—including flora, fauna and other non-humans, that escape an easy, binary categorisation, like mushrooms [26–28].

As cultural products that are firmly established in the main stream, video games are at the forefront of *digital ecologies* through their possibilities and dimensions [149]: They are becoming a fundamental source of inspiration for shaping what the canon for digitised nature *in general* might look like.

Given the likely degradation of our shared planet, digitised nature is on the track to gain profound importance, and relevance: It might be used as a tool to archive still existing biodiversity, within the spirit of conservation and preservation [118, 155]. It could also be leveraged as an escapist medium to experience the natural world

virtually [26, 27], or as a frame for education, to make people reflect on climate change [3, 54].

A poignant, current example for games-aligned, digitised nature can be found in the island nation of Tuvalu: As sea levels rise, the island will cease to exist. To preserve its history, the island nation plans on hosting a digital copy of itself within the metaverse [119].

These mediated nature portrayals are not neutral. Instead, they often reflect and reproduce current cultural ideas about how human beings relate to nature in the first place: Do we consider ourselves authoritative *dominators over* nature, that treat it like an *"other"*, only to be exploited (for its resources) [99, 100]? Do we take on the role of being seemingly rational *managers* or *stewards of* nature [63, 123]? Do we feel disconnected and distant from nature [48]? Or do we adopt the stance of being *kin to* nature [124], or as belonging to it ourselves [154]?

How we conceptualise our relationship with(in) nature, and how connected we feel to it, is a critical matter that reaches far beyond personal preference—including how we conceptualise, portray and treat nature within personal, cultural, societal and technological discourses [43, 45, 83, 118, 138, 142, 149, 155].

How can we investigate, and understand these rich assemblages of personal, socio-political and cultural symbols, preferences and values within digital nature portrayals? As human action and nature are undoubtedly intertwined [48], we may ask provocatively: *How do we deconstruct portrayals of what we are already a part of?*

This paper proposes becoming *sensitised* to nature in video games, as an experiential, *phenomenological-situated* research endeavour: We seek to attune to the mundane *nature* of nature in games, and to actively acknowledge and map it. We conceptualise *sensitisation* as a conscious sense-making activity that 1) confronts us with our own understanding of nature (and others' conceptualisations), and 2) challenges us to investigate how we actively constitute ourselves as a an actor within, between or outside of nature.

Here, we draw from two specific domains: *First,* we turn to humanistic psychology [64, 121, 127]. As a branch of psychology concerned with how people make sense of the world, it offers a concept to map our relationality with nature: *Ecological (in)congruence* (EC) [11, 87, 108]. EC describes how much we consider ourselves to be part of the wider world, and how attuned we are to our personal environments. Do we see nature *congruently* as an other to recognise and *"befriend"*, as described by Bazzano [11]? Or do we approach it *incongruently*, as a something to avoid and disconnect from [11, 87, 108]?

Second, we lean on the *more-than-human* turn (MtH) in HCI as a frame for our inquiry. A MtH lens seeks to decentre, contest and trouble the human being as the presumed most important actor in the world [34, 36, 39, 40]. Instead, it invites us to *"notice"* [148] the relational interplay of the human and the non-human: To become aware of what Livio and Devendorf describe as an *"increasingly complex boundary between humans, the more-than-human world, and human-designed technologies"* [92]. Within this context, MtH research invites experiential, affective and embodied ways of knowing [5, 40]: To work with, and through ourselves, as a part of complex, relational and interlinked systems [39, 40].

Drawing from both EC and the MtH, this paper seeks to showcase an experiential inquiry into nature portrayals in video games:

We seek to illuminate their impact on our own conceptualisations of nature, as a mediator of the previously mentioned interplay between nature, people and technology. Concretely, this paper showcases the first author, VS, playing eight games that prominently feature nature to become *sensitised* to it. We make sense of their experiences through first-person research methods and practices—*auto-ethnography* [51] and *close reading* of video games [14]. This paper switches between *"I"*, referring to VS and *"we"*, referring to all authors.

Expressed as research questions (RQs), we ask:

(1) *What can I learn from the process of becoming sensitised to current portrayals of nature in games?*
(2) *Which insights can we, as a team of scholars, construct out of my experiences?*

We contextualise our work within existing research that 1) concerns itself with deconstructing portrayals of nature, and 2) bridges games and nature, and 3) establishes how contact with nature (or the lack thereof) can be understood through a humanistic lens. After establishing this overview, we describe how I *sensitised* myself to nature in games through experiential *auto-ethnography* and *close reading* of games. We provide context for our positionalities, by describing our relationships with games and nature. After outlining the selection process of games, data collection and thematic analysis, we head into our findings. Here, we describe our sense-making process throughout three sections: *First,* we present an inductively-created theme, *"Incongruence"*. It describes my struggles to connect to nature in games. *Second,* we outline an interim section that describes how these preliminary findings led us to change the course of the study. *Third,* we showcase a deductively-constructed theme, *"Congruence"*, where we explore positive moments of myself relating to nature. After unpacking these insights, we discuss the work as a whole: We outline a set of two design impulses to guide others through the sensitisation process of becoming aware of nature in games.

2 BACKGROUND

2.1 Conceptualising and Relating to Nature

Defining nature is a tricky undertaking. As a fundamental important part of (non-)human life [62, 73], it is subject to a wide variety of different understandings and treatments: Nature is a socially-constructed, relational concept [48].

A **current, common definition** of nature describes it as the physical world that surrounds us: The natural environment, made up of green and blue spaces—including its (non-)human lifeforms like animals, plants or mushrooms within it [48]. This definition positions nature as essential to humankind's survival in pragmatic, yet holistic terms: It is a concept and space for matters of *"human flourishing"* [65, 66], too. Our affective *"nature experiences"* [17] are a great influence on our cognitive, behavioural and emotional wellbeing [24, 117], a source of creative inspiration [113] and a tool for (spiritual) meaning-making [76].

While this definition of nature has positive connotations, it can be interpreted as being reductionist, and overly human-centred: If nature's value comes from serving human needs, then we position human actions as existing outside of nature, or beyond it [48]. This

can result in people not considering themselves as part of nature, despite undoubtedly belonging to the natural world.

Here, another current definition of nature challenges this one-sided relationship: By leaning on (more-than) human geography, nature can be understood as a part of our everyday lives, and human-made culture in itself: This definition understands ourselves as existing within *"nature-society"* or *"natureculture"* [96, 97]—and conceptualisations beyond [29]. Within this frame, nature is a negotiated, relational concept that connects us to the wider world: From the micro (e.g., bacteria), all the way to the macro (e.g., considering all of planet Earth). However, as a concept with authority and weight behind it, it can also be operationalised to make oppressive, reactionary ideologies more palpable: Referring to Alaimo [6], Paszkiewicz outlines how *"[...] 'nature' should always be approached with suspicion, given that 'it has long been enlisted to support racism, sexism, colonialism, homophobia, and essentialisms'"* [109, p. 6].

Humanistic psychology (HP) offers a concept that can help us to map our tense connection with(in) nature: *Ecological (in)congruence.* HP is a branch of psychology concerned with recognising the experientiality of each person's life in holistic terms, by placing importance on their environment, life experiences and contexts [129]. HP posits that people have an innate drive to self-actualise and become an *"authentic person"* that is in touch with the world around them [121]. However, this process is often disrupted or made difficult—through a plethora of personal, cultural, societal and/or environmental factors [38, 41, 42, 122]. The result of this mismatch is *incongruence*: It is the felt, often distressing, discrepancy between the self someone currently is or has to be, and the self that they *genuinely* could be, or seek to be [15, 120]. However, this does not mean that being *congruent* is *only* based on experiencing positive, joyful emotions: Feeling connected to one's self and others draws from the full spectrum of human expression and emotion, for example, making sense of grief with others [71]. Turning towards nature, *ecologically congruent* encounters with the natural world positions it an relational *other* to *"befriend"*, as described by Bazzano, and see eye to eye with—whereas incongruence may evoke feelings of disconnection through disgust, distance and disdain [11]. As a consequence of this *attuned* relationality, EC directly influences how strongly we might feel to act in sustainable, caring ways towards nature: Our *"ecological sensitivity"*, as coined by Ottiger and Joseph [108], influences how congruent we are with(in) ourselves, and how *"sensitive"* we are to the *"rhythm of nature"* [108].

2.2 (More-than-)Human-Nature Interaction

This *"ecological sensitivity"* is also felt within the HCI community: Scholars have already begun to unpack some of these complicated human-nature configurations. There is a plethora of methods and approaches that engage with ecological or nature-centric matters on a conceptual, hardware and practical level [44, 45, 68, 111, 138, 155].

Further examples for working with, through and in nature include *material and speculative explorations*: Søndergaard and Campo Woytuk explore menstruation as a process connected to the wider world: They trouble common views of understanding the body as a mechanistic assemblage, e.g., by highlighting the nutritious quality of people's menstrual fluids and tissue [135]. Other examples in this area include Ofer and Alistar or Bell et al., who work with

SCOBYs: These symbiotic colonies of yeast and bacteria are used for making the fermented drink Kombucha [12, 106]. Another example is Genç et al., who explore mushroom mycelium as a material for interactive, electronic prototyping [59].

HCI scholarship also engages with nature-attuned *methodological investigations*, e.g., Pollastri et al. who investigate the potential of multispecies wellbeing in cities and urban environments as a guide for MtH design [115], or Höök, who leverages horse-riding as a contextual, experiential and inspirational practise for designing technology with and for embodiment [74]. Another example here is the work of Liu et al., who investigate human-fungi relationships as spaces for design- and meaning-making. They articulate how our *"collaborative survival"* with non-human life requires outlining, and manifesting alternative environmental futures to the current status quo [90].

A prominent practise to attune to MtH perspectives is *"noticing"*, as coined by feminist anthropologist Tsing [148]. It is an active act of *relating* to nature, by experiencing it as part of our everyday life: Leaning on her theorising, Rosén, Normark and Wiberg describe *"noticing"* as *"[...] to become aware of and to treat something as worthy of recognition"* [114, p. 21]. Articulated by Lu et al. *"noticing"* *"commits to stepping out of familiar reference frameworks while attending to oft-neglected actors, relations, and ways of knowing"* [93, p. 2489]. *"Noticing"* recognises the *situated* nature of nature and non-humans as existing (inter)dependently within human-made structures: Touching on and being constructed out of personal, cultural, societal, political and technological dimensions (and beyond), as theorised by feminist scholar Haraway [69]. Within HCI research, a MtH lens and *"noticing"* have been used for bird-watching, as an activity to develop understandings of MtH design [13], or to articulate new design research methods [91].

HCI scholars also explore *ontological reconfigurations* that include nature in their conceptualisations, e.g., *entanglement*, which highlights the *relational* interconnectedness of people within wider discourses, environments, contexts and tensions and knowledges [57]. Another example here can be found in Hansson et al., who problematise how designers might approach non-human others in and through their design, by making the interplay of different factors in the design space visible: *How do researchers seek to cooperate, collaborate or use nature, and non-human lifeforms in their work [67]?*

It becomes clear that researching and designing with nature leads to a contested, yet rich space: Technology is not only mediating our relationship with nature and other (non-human) lifeforms, but it also dictates and shapes it on a fundamental level [45, 138, 155].

2.3 Nature in Games

Scholarship paints a contested, complicated picture of how differently we can see nature through an interactive medium like video games—e.g., Willis explores the tension between simulating *"real"* and creating *"virtual"* nature [156], Shaw et al. engage with environments in video games through a humanistic geography lens, as virtual spatialities [130] or Chang, who approaches video games as experiential, ecology-informed media to encounter nature with(in) and through [27].

On the one hand, games can facilitate joyous, meaningful encounters with nature [27]: They can offer refuge, escapism and access to

natural environments [26]. Within the spirit of virtual conservation, video games can simulate environments that are inaccessible to people in the real world—whether that is a walk across the polar circle or not wanting to disturb the Grand Canyon further [149]. Video games can be a serious, meaningful vehicle for connecting and learning about ecology, as embedded within sustainability- or climate change-focused education [3, 54, 55]. They can also offer a provocative space for exploring speculative, fictional nature that deviates from planet Earth completely [4, 28].

On the other hand, like all cultural media, video games can also perpetuate problematic, hegemonic, and/or ethically-questionable narratives and assumptions [110, 116]: Games can present nature as an *"untouched"*, pristine environment to be shaped by the player (or in their image), in which the native wilderness needs to be (forcefully) tamed, and subjugated [4]. Such portrayals can echo overly romanticised and sanitised presentations of colonisation as *"mere"* discovery, without engaging with its inherent violence [9, 147].

All of the aforementioned portrayals necessarily need to implement and imply a certain outlook and configuration of our relationship with nature—across and beyond previously definitions (see 2.1): Here, human-nature entanglements can span across modes of *domination, management, kinship or belonging to nature (or beyond)* [138, 155].

3 METHODOLOGY

The section introduces how I, the first author, made sense of nature in games: We showcase *1) auto-ethnography* and *2) close-reading of games* as methods to understand an individual person's experience through, and their experience of games in particular.

3.1 First-Person Method: Auto-Ethnography

Auto-ethnography is a qualitative, personal, and researcher-centred way of conducting research. Ellis et al. provide the following definition: *"[It] is an approach to research and writing that seeks to describe and systematically analyze (graphy) personal experience (auto) in order to understand cultural experience (ethno)"* [51]. Instead of studying others, the researcher focuses on themselves: Through capturing their thoughts, applying critical self-reflection and then contextualising their findings, they hope to *"make personal experience meaningful and cultural experience engaging"* [51]. The reason for this approach is political in its nature, as Ellis et al. explain: *"Autoethnographers view research and writing as socially-just acts; rather than a preoccupation with accuracy, the goal is to produce analytical, accessible texts that change us and the world we live in for the better"* [51]. Beyond journaling and producing textual data, auto-ethnography can also be *"artful"* [13], and include the creation of other materials to illustrate and deepen the personal understanding of the author: Examples for such making-based practises include taking photos, drawing and sketching or creating artefacts [13, 30, 126]. These creative practices, especially within HCI, support capturing and formalising ideas [86, 141].

This conscious embrace of allowing subjectivity and the personal to manifest within research might seem strange, perhaps even unscientific at a first glance. However, different approaches and epistemologies can co-exist, as Lucero et al. describe: *"Offering*

an alternative to HCI's epistemological commitments (i.e., objective, third-party knowledge), first-person research continues to become a viable addition to more traditional HCI methods" [95]. The merit of reporting, responding and conceptualising *"the particular, the micro, and the situated elements of the lives"*, as Jones et al. outline [80], is evidenced in a variety of other HCI-minded auto-ethnographic studies: Lucero reflects on *"living without a mobile phone"* [94], O'Kane et al. investigate wearing a *"wrist blood pressure monitor"* [107], Chamberlain et al. use *"autoethnography as a method for soundscape design [...]"* [25] and of particular relevance to this paper, Biggs et al. explore bird-watching as a practise to explore (post-human) ecology, and intimacy [13]. We can assume that reading auto-ethnographic work may be very different from reading other academic pieces of text; it is personal, (self-)revealing and subjective. To this end, Adams positions readers of auto-ethnographies *"not [as] passive receivers of text"*, but as *"active participants"* that *"witness"*: Jones et al. outline this orientation further: *"Cultivating reciprocity with and expecting a response from audiences thus becomes the means by which our auto-ethnographies embrace vulnerability with purpose, make contributions to existing scholarship, and comment on/critique culture and cultural practises"* [80]. Informed by Duncan [49], Ellis et al. [51] and Schultze [128], Lucero defines a successful auto-ethnography [94] as one that is reported in a transparent, authentic, plausible, critical, honest and self-revealing, personal, and relatable manner.

3.2 "Close Readings" of Video Games

For the purpose of this study, I also draw from the practice of *close reading* video games. *Close reading* builds on the literary practice of investigating and interacting with texts on a deep, relational level. Instead of reading a text to gain information, close reading requires an affective engagement, and treating the text as a a layered medium imbued with values [14]. Soderman points to Sontag [136] to draw out how close reading is *more* than just interpreting texts: *Close reading* involves *"[letting] an artwork provoke our 'sensual capabilities' and fill us with affect"* [134]. As both a process of deconstruction and sense-making, *close reading* seeks to draw out the personal, cultural and societal meanings that can be constructed through reading and engaging with a text [47, 132]. As an interactive audio-visual medium, *close reading* a video game involves carefully playing the game in question, in a self-aware and self-reflexive way [14]. Bizzocchi and Tanenbaum describe this process as taking on an *"oscillating"* role between being the naive player engaging in pleasure-filled play, and the distanced researcher engaging with the game critically [14]. Examples of close readings of video games include Smethurst and Craps, who explore embodiment, trauma and empathy in the zombie-focused action adventure game *The Walking Dead: Season One* [131], Saraswati et al. who investigate loneliness, and the presentation of lonely people in the role-playing game *Finding Paradise* [125] or Soderman who deconstructs *Every Day the Same Dream*, a 2D art game, to draw out its potential, layered political meanings [134].

3.3 Epistemology: Humanistic, "Phenomenologically-Situated" Sensitisation

For further transparency and ways of reading this paper, we use this section to outline our epistemology. Engaging with first-person research like *auto-ethnography* and *close reading* is a personal, subjective and contextualised practise [7, 51, 95]. Therefore, instead of attempting to construct objective, generalisable knowledge, this paper presents *"phenomenologically-situated"* knowledge [70]. We unpack this term in the following section, beginning with *"phenomenologically"* in *"phenomenologically-situated"*. Flood describes *"phenomenology"* as a *"philosophic attitude and research approach"* that centres a person's *"inner subjectivity"* as a tool to engage and construct *"truths"* [56]. This *"inner subjectivity"* [56] is all-encompassing and touches on all aspects of how people make sense of the world around them: *"Phenomenology also focuses on humans as embodied beings, meaning they experience life through their physical bodies"*, as described by Connelly [33]. By proxy, this means that research is also accessed and undertaken through the subjective reality that each researcher constructs for themselves. *"Situated"* in *"phenomenologically-situated"* refers to feminist scholar and writer Haraway's concept of *"situated knowledges"*: It is the expression of an understanding that *doing* science is embedded and intertwined within personal, cultural and societal discourses and tensions [69]. The act of situating knowledges asks for sensitivity and sensibility to contextualise knowledge not as value-neutral, but to also see it as a negotiation of power dynamics, dominant discourses and (marginalised) perspectives [140]. To this end, we position ourselves as sitting within the *"third paradigm"* in HCI, as defined by Harrison et al., *"which [epistemologically] treats interaction as a form of embodied meaning-making in which the artifact, its context, and its study are mutually defining and subject to multiple interpretations"* [70]. To support and encourage these *"multiple interpretations"*, we also position our paper as a piece of work to provoke, challenge and inspire you, the reader, in the tradition of the humanistic essay; for this text to reach you and resonate with you—in pluralistic, *relational* ways [10].

With our epistemology and methodology outlined, we position the process of becoming sensitised to nature in video games within these negotiated, entangled relations. As a practice, we define it as combining affective attunement to nature—like *"noticing"*—with first-person methods, within a self-reflective *phenomenologically-situated* context. We see sensitisation as an experiential undertaking to become aware of the boundaries of one's relationship with nature, including how we might relate to portrayals of nature. Within this context, sensitisation becomes a practice and process to map my (our, your) relationship with nature across a spectrum of ecological (in)congruence: *Where do I feel like I am part of it, as existing congruently? When do I see it as an "other", distant from myself?*

3.3.1 Positionalities. In the following sections, we outline our positionalities as researchers, followed by a showcase of how I understand nature and games as central tenets for the work presented in this paper. While the resulting profiles are not an all-encompassing representation, they seek to communicate important key points in (1) backgrounds, (2) our understandings of nature and (3) relationship with (video) games.

VS (1) is a white, non-binary person from Germany in their early thirties, with a background in design and HCI. I work as a post-doctoral researcher at Tampere University, where I spend my days investigating the relational overlaps between care, nature and games. (2) I see nature as a complex, chaotic web of interconnected systems, spaces, processes, and lifeforms interacting with each other. From an early age on and throughout my life, I have been fortunate to encounter a lot of *green* and *blue spaces*, like forests, swamps, meadows and lakes through walking, hiking or swimming. Being with nature makes me feel small and meaningless in a joyful way; it makes me treasure my existence as a lucky *blip* in the vast randomness of the universe. (3) Video games are my favourite interactive medium. They have influenced my life in profound ways: As a meaningful leisure activity, as spaces for personal exploration, and as part of my everyday work. One of my most formative gaming experiences was coming across *"No Wrong Way to Play"*, a Tumblr blog by Burch that collects descriptions, articles and screenshots of people playing games differently than intended [22]—examples for such reconfigurations include a player reaching the level cap without leaving the starting zone of *"World of Warcraft"*, by picking flowers [20, 101], or making a nature documentary about marine animals in *"Grand Theft Auto V"* [21]. Engaging with this blog radically shifted how I approach games, and the potential I see in them as toolboxes for creative expression.

OB (1) is a scholar working on gameful/playful technologies including technologies for engaging with nature. He is an able-bodied Turkish man in his thirties, but he has been living in a Nordic country for the last five and a half years. (2) Although being in nature is not a daily habit for OB, he enjoys spending time with nature. He has been more engaged with nature and going to natural places since he moved to the Nordic country due to culture, and its accessibility. He takes regular trips to cottage houses almost every month which are situated in forests or lake sides. (3) He considers himself to be an avid gamer, spending a considerable amount of time playing single-player role-playing, action, and adventure games. He is very curious about the player experience when it comes to his micro interactions with games, rather than other common experiences such as immersion, cognitive absorption, or flow.

JH (1) is a white, able-bodied person in their late thirties. [Third author] is holistically involved in research related to the relationship between humans and tech, especially in relation to leisure and motivational uses. (2) Currently, JH is enthusiastic about different developments, practices, and cultures in which technology and nature come together. (3) After a childhood where the main stage of everyday life and play took place in forests and nature, JH has primarily been interested in crafted experiences (chiefly games) and technology.

4 STUDY SETUP

The following section outlines how I prepared for this study—from finding and choosing games, to developing protocols to document my experience with.

4.1 Finding Games to Play

We approached finding games for this study in a naturalistic way; informed by how we might research games for private, personal play:

(1) **... Consulting games media outlets:** I investigated popular gaming outlets–*Kotaku* [60], *PCGamer* [58], *Screenrant* [151], *Polygon* [153]–to find reviews, essays and opinion pieces about nature-centric games and/or games where nature played an important part.

(2) **... Checking out gaming communities:** To get a sense of what gaming fandoms and communities considered as games with impactful nature, I searched through Reddit's major gaming communities—*r/gaming*, *r/pcgaming* and *r/games*— to identify posts, comments and videos that may lead me to potential games to play.

(3) **... Browsing game stores:** I looked through the storefronts of GOG [61], Steam [152] and Humble Bundle [78] to identify further games.

(4) **... Considering my personal knowledge and network:** I made a list out of all games that I have played or I have heard of that feature nature prominently. I also asked family, friends, and colleagues for potential titles that I could play.

Before settling on a final set of keywords to search, we undertook extensive pilot searches in the aforementioned outlets: We begun by searching for *"nature"* in each of them, and let the search results inform my next keyword choices. It became quickly visible that games, games media and store fronts tended to use the current, common definition of nature as a descriptor for the natural environment *(see 2.1)*. As we were interested in what we could learn from attuning to current portrayals of nature in games *(see RQs)*, we chose to lean into this definition: We compiled potential keywords that describe the natural environment, drawing from relevant research fields (e.g., botany, zoology, geology, ecology) and taxonomies (e.g., climate zones, biomes).

The news outlets, magazines, social media and storefronts we consulted are all not optimised for reproducible searching. Instead, they seek to present an often highly personalised, curated set of information to encourage engagement, or purchases. Specific or explicit descriptors seemed to be featured more for games where nature is a theme (e.g., a zoo simulation game), an active actor (e.g., the game's protagonist is a non-human animal), or engagements with it are part of the core gameplay (e.g., farming). This non-specificity meant that we were faced with a dilemma: Either, we could decide to make the list of potential games very themed, targeted and specific, e.g., focusing on games with specific lifeforms or geographic areas, or we could focus on a few umbrella terms that did return more relevant results.

In the end, we compiled a set of nature-centric keywords that led to the widest variety of relevant titles across all platforms: *"nature"*, *"forest"*, *"meadow"*, *"grass"*, *"garden"*, *"farm"* and *"environment"*. All searches were undertaken in February 2022, in Finland. The list of keywords is not inclusive, as it is based on *Global-North*-heavy and land-centric terms: It presents a hegemonic, common and narrow view of nature *(see 2.1)* on purpose, as echoed by the games and store fronts themselves.

4.1.1 In- and Exclusion Criteria. As I do not tend to play games on consoles, I looked for games on platforms that I was familiar with, which meant focusing on *PC* and *phone* games. I excluded games that had nature as a theme *only*, without any deeper, interactive, or spatial engagements, e.g., forest-themed puzzle games were excluded. This study is not a systematic review of games that feature nature, but it uses them as a means for sensitisation. As such, the following list is based on the collective discussion of all authors and VS' personal game preferences. In concrete terms, I spend an hour looking through each of the above-described categories, using both forward and backwards search strategies, such as following links in comment threads in Reddit, or clicking on recommended games in store fronts.

I assessed each game that I came across in the same fashion:

(1) **Gathering Information:** I read the game's description, watched its trailer, and looked at in-game screenshots to get a general sense of it.

(2) **Consulting Reviews:** I looked up reviews about the game, to learn more about its setting, plot, characters and game mechanics.

(3) **Watching Gameplay:** I watched some gameplay of the game on YouTube, to learn about each game's interface and general atmosphere.

Based on this information, I compiled a list of potential game candidates that I discussed with OB and JH over the course of two months to ensure that I would engage with a diverse set of games.

4.2 Data Collection

In this section, I will elaborate on how I collected data for my auto-ethnography; including how I chose which games to play, how I captured my thoughts, feelings, and reflections before, during and after playing games.

4.2.1 Overview of Played Games. I played the following games over a duration of three months, from March to July 2022.

- **Death Stranding**, by Kojima Productions [85], is an action-adventure game game, in which the player embodies Sam, a courier tasked with delivering cargo across a futuristic, dystopian USA [82].
- **Minecraft**, by Mojang Studios [2], is a procedurally-generated open world game in which players can gather and build with resources in the shape of blocks [50].

I played the following games only during the last month of the study:

- In **Flower**, by thatgamecompany [145], the player takes on the role of *"wind"* that guides a flower petal. Flying over other flowers *"rejuvenates"* the environments presented in-game [46].
- **Horizon Zero Dawn**, by Guerrilla Games [1], is an action-adventure game in which the player takes on the role of Aloy, a huntress living in a post-apocalyptic world that has been taken over by machine animals [32].
- **Stardew Valley**, by ConcernedApe [31], is role-playing game, in which the player inherits a farm from their grandfather, and moves out to a rural town to take care of it [143].

- **Shelter**, by Might and Delight [103], is an action-adventure game, in which the player needs to navigate and survive in a hostile environment as a badger mother, who looks after her children [102].
- **Dear Esther**, by The Chinese Room [146], is an adventure game, in which the player finds themselves on an deserted island. Exploring the island reveals narrative fragments that the player can piece together, and interpret [112].
- **Firewatch**, by Campo Santo [23], is an exploratory adventure game, in which the player embodies Henry, a man who has taking on ranger duties in the Shoshone National Forest park to escape the troubles of his former life [81].

I started out exclusively playing *Minecraft* and *Death Stranding* in the first two months, to develop my sensibilities, and to begin constructing my personal understandings of nature in games. I had to calibrate myself to not engage in reviewing, or evaluating my gameplay, but to be able to *"oscillate"* between naive enjoyment and critical relating [14].

4.2.2 Process of Capturing My Experience. To capture the richness of my experience of playing games, I sought out to capture multiple streams of data. For this purpose, I developed a set of diary templates which would guide the process of capturing my thoughts in a comprehensive, and comparable way. I journaled about my thoughts before, during and after playing games; often revisiting diary entries to compare. I organised them into four distinct categories, to ensure consistency between journal entries.

(1) **Expectations before Play:** I prepared a set of question to answer before I engaged with a game for the first time: *"Have I played this game before?", "Have I seen this game before? If yes, where?", "Have I read about this game? If yes, where/how?", "What do I know about this game, e.g. through media or other pieces of media?", "What do I think will happen in the game?"* and *"What are my expectations?"*.
(2) **First Impressions:** After playing each game for the first time, I journaled about my immediate thoughts; this included 1) revisiting my previous expectations and assumptions, 2) a general description of how I perceived and felt about the game, and 3) my first impressions about the portrayal and 4) inclusion of nature within the game.
(3) **After Play:** I prepared a set of prompts and questions to document my game play sessions from a variety of different angles; to guide my journaling and note-taking.
   - **Thoughts and Feelings:** I documented my thoughts, feelings and perception of each play session, by asking *"What did I think about while playing the game?", "Which situation or aspect stood out the most to me?"* or *"how did playing the game make me feel?"*
   - **Activities In-Game:** I outlined what I did during each play session, and noted down what I spend the most time on.
   - **Links to Previous Sessions:** Whenever I saw connections to previous play sessions, I noted them down—including recurring themes in my writing, or thoughts circling back to similar topics.

- **Reflections on Nature:** I describe how I perceived nature in each game, by considering its aesthetics, narrative framing and use within the game.
(4) **Weekly Summaries:** Each week, I reflected on the games I played throughout it, and captured my overarching thoughts. This template also included the documentation of contextualising information—such as date, time, location, or other external factors that may have influenced the state of mind at the time.

I captured screenshots of the games whenever I felt like they could illustrate a meaningful thought, or support me to revisit a game play session in writing. Throughout my auto-ethnographic exploration, I used my notes, and captured screenshots of my gameplay to talk about my experiences with colleagues, friends, and family. While I pilot-tested recording gameplay sessions in full, I realised that recording led me to *"perform"* as a streamer—we decided to forgo recording in favour of myself playing the game as *"normally"* as I could.

4.3 Data Analysis

After collecting all data, I organised it as one continuous document that was analysed thematically: First, through an *inductive* process by letting the data guide us for the first theme, and then *deductively*, with the concept of *ecological congruence* as a frame in mind for the second theme. Both themes were created through Braun and Clarke's six-step self-reflexive process [18, 19]: I began by familiarising myself with the data *(Step 1)*, which involved carefully reading, annotating and revisiting my notes and screenshots. Based on this exploration, I created an initial set of codes to investigate the data with *(Step 2)*, to begin outlining potential themes *(Step 3)*. I iteratively refined the codes and potential themes *(Step 4-5)*, and finalised them together with OB and JH. Finally, we report on the analysis in this paper *(Step 6)*.

Throughout all steps for both themes, I closely collaborated with OB and JH as my sounding boards, to develop and clarify my insights, and to move from a collection of thoughts, feelings, and reflections to specific insights. This process of concretisation happened over the course of several months, up to the point of finalising this paper, through talking, discussing my data, written communications and engaging in artful auto-ethnographic practices, e.g., drawing sketches, and creating video game concepts *(see 3)*.

OB in particular adopted the position of an empathetic listener that would ask me questions to understand my experiences better, and also as a keen observer that would highlight recurring patterns in my reporting, e.g., by drawing my attention to how I talked about auto-ethnography *in itself*. The process of analysing data that I have produced myself, about myself, resulted in a strong self-reflexive feedback loop. Throughout the analysis, I re-contextualised my previous data points through additional notes and comments, reflected on them, and constructed insights based on the analysis process in itself. I outline and signpost these additional *"meta"* insights as such.

5 FINDINGS: MAKING SENSE OF MY NATURE-IN-GAMES EXPERIENCE

This section showcases the themes that were constructed throughout our analysis. Excerpts from my auto-ethnographic data are shown to illustrate the themes, followed by an explication to unpack them. The showcased data is a mix of personal thoughts, introspection, and in-game observations. The section is structured as follows: *First,* we showcase an inductive theme—*"Incongruence"*—that was constructed by letting the data guide us. Second, we outline an interim section to contextualise the last theme, and to describe how the study changed over time. Third, we present a deductive theme—*"Congruence"*—that was created by revisiting the data set to identify moments and opportunities where the first author related to nature (or could relate to).

5.1 Signposting and Primer

Before letting you, the reader, head into our findings, we wish to outline several priming points, to set and manage your expectations as transparently as possible: I did not have a joyful time during my auto-ethnography. It is very important to me that my quotes should not be seen as quality indicators or (partial) reviews of the games I played; not for them as a whole, nor for their individual genres, mechanics, characters or narratives (or any other elements). I would like to reaffirm that I used the games to sensitise myself to nature, and to explore what this process might entail in an open-ended way. As such, I played each game when and how I felt drawn to it, for as long or as little as made sense to me at that moment, without rushing to finish any of them. While the quotes to follow are full of negative observations and uncomfortable descriptions, I encourage you, the reader, to not view them as complaints about the game's contents, but as momentary snapshots describing my relational struggles, breakdowns and potentials for nature in games.

5.2 Inductive Theme: Incongruence

The first theme outlines how paying close attention to nature-in-games throughout this study made me feel *disconnected* from the very nature presented within them. Here, we invoke the concept of *"ecological incongruence"* (EI), as informed by humanistic psychology [120]. As previously described in the introduction—*see 1*—EI is the distressing mismatch between the self and nature I am currently (in), and the self and nature I *genuinely* seek to be (in). The result is a *relational* gap between my real-life and in-game nature experiences.

The *first quote* in this theme engages with a sense of meaninglessness that permeated many of play sessions:

> **Quote 1**: *"Nature in [Death Stranding] restores itself, as far as I can tell: Whatever tools are given to me are not capable of changing the environment, but only affect enemies, before they despawn. Everything that I can bring into the game world, both by building or triggering an enemy attack, is additive. Nothing has a lasting impact. As if you could hose it down with soapy water at the end of the day, like a wet room, it all slides right off. Like bringing Lego bricks into a forest."* (Death Stranding, *see 4.2.1*, journal excerpt)

Players in DS can add structures like bridges in designated areas, and convenience- or travelling tools like ladders or ropes in most places. When played online, these structures are shared between players' worlds, as a form of asynchronous multiplayer. This excerpt showcases my struggle to feel any mutuality, or reciprocity between my impact as a player on the world and the world of DS in itself (*"everything [...] is additive"*). What matters here is not *just* being able to build and craft things: What I or others choose to place into DS does not enter into any real relationship with its characters or environment (*"it all slides right off"*): Interfacing with these objects is entirely player-oriented. Here, I invoke a description of these objects being coated, plastic and foreign (*"like bringing Lego bricks into a forest"*). This one-sided experience sits in stark contrast to my engagements with actual nature, where a mutual exchange—whether conscious or subconscious—is a given: I have a sense of belonging, of connection *(see 3.3)*. I compress the soil beneath my feet, I send vibrations through the ground with my steps, and objects I bring into nature are part of this relationship that other people, as well as non-human life, can notice, and respond to.

The next quote expands on this feeling of being surrounded by a *"plastic"* environment:

> **Quote 2**: *"[...] I kept bumping into invisible walls. [...] It made me realise that the trees and greenery are just modular pieces that repeat. They look fine from further away, or when you pass them by quickly, with a goal in mind, but they reveal themselves to be very same-y up close."* (Firewatch, *see 4.2.1*, journal excerpt)

In this excerpt, I outline how my way of wanting to play *Firewatch* in a careful pace made me overly conscious of the seams and limitations in its game world (*"invisible walls"*, *"modular pieces that repeat"*). It becomes clear that I tried to emulate my *normal* mode of interaction with nature in the game, as I try to be present with and conscious of the environment around me *(see 3.3.1)*: Instead of becoming aware of unique details by going slower, I became conscious of being *too* slow, and engaging with the game in a seemingly non-intended way (*"when you pass them [...] with a goal"*). Within the context, I understand nature as being reduced to being a backdrop for me to move from A to B in-game.

The feeling of not being able to relate to nature in games was not just present when moving through game worlds, but it also surfaced when I engaged with other activities, like farming in games:

> **Quote 3**: *"The more I look at these cute pixelated vegetables, the less I feel about them. I put seeds in the grounds, I water them, I go to sleep, rinse and repeat. It doesn't matter what relationship I have with each potato, or the watering can, or the soil they grow in, or whatever, none of it really matters. They always grow at the same speed, always perfect, completely forgettable."* (Stardew Valley, *see 4.2.1*, journal excerpt)

This excerpt showcases that the framing of *Stardew Valley*—its routines and interactions—becomes meaningless to me over time, because of its perfect, repetitive sameness (*"rinse and repeat"*). Even though the game is centred around farming as an activity, I am unable to formulate a specific *"relationship"* with the environment, or the fruits of my labour in-game. This excerpt describes an absence of randomness, challenge or specificity that occurs within

my engagements with real nature, which leads me to understand nature in *Stardew Valley* as a blank, meaningless space that *operationalises* nature as a mere visual theme (*"always perfect, completely forgettable"*).

This context of disconnection also extended to how I conceptualised myself as a player within games, as seen in the next excerpt about *Minecraft*:

> **Quote 4**: *"There is something about being the only person in Minecraft when you play it solo, that almost makes it feel like you have entered purgatory: The environment doesn't need you, you are a foreign element. It does not matter whether you visit three chunks or 5000, there will always be chunks that will never be rendered. A vast meaninglessness haunts this game, in complicated ways. Wherever the player is, the world is active and alive. Wherever the player is not, the world is frozen in time. Pristinely conserved, until you choose to visit again."* (Minecraft, *see 4.2.1*, journal excerpt)

Additional context for this excerpt requires a mention of how *Minecraft*'s environment is separated into sections (*"chunks"*), that are (in)active depending on my chosen view distance, as a game setting, to optimise how the game runs. In this excerpt, I describe being uncomfortable with how firmly *Minecraft* centres me, as the player, without having any sense of belonging to the environment I am in (*"you are a foreign element"*). Precisely, I take issue with how the world is being simulated in a seemingly *"meaningless"* way, with *"active"* and *"inactive"* chunks being dependent on the position of the player. This excerpt reveals how my perception of nature-in-games is informed by aspects beyond the *direct* audio-visual portrayal of it: It includes how I make sense of the game's technical limitations, *"how"* the world works and what that means to me, as a player.

I continued to struggle with (seemingly) being the most important actor in games, as the next excerpt reveals:

> **Quote 5**: *"I started thinking about my farm in spreadsheets, in schematics that are in need of optimisation, in timed cycles for maximum harvest. It seems like the only meaningful thing I can bring to this world is domestication, the removal of wilderness. What came before me doesn't matter, and there will be no 'after me'."* (Stardew Valley, *see 4.2.1*, journal excerpt)

Growth, and optimisation play an important part in this excerpt: It showcases how my focus in *Stardew Valley* shifts from *"my farm"* to being about numbers (*"spreadsheets"*). Optimising for *"maximum harvest"* requires that I, as a player, even out my farm plane, and minimise disrupting *organic* factors. This process of *"domestication"* is a necessary evil to enable this way of playing the game, as I understand it as a omnipresent affordance of the game. Without limits, this mode of engagement is entirely focused on the present, without any need to care for the future, or the ecosystems of the past (*"no 'after me'"*)—which clashes with my real-world worries about nature being finite on Earth.

5.3 Interim: Reconfiguration

During the second month, I felt like I had to recover from some form of emotional and relational *whiplash*, as showcased in the following excerpt:

> **Quote 6**: *"The unchecked, absolute power I have been given makes me nauseous. The environments need me so profoundly, yet I will never belong to them."* (Weekly round-up, month 2, journal excerpt)

Here, we decided collectively that it would be fruitful for me to revisit the data in a deductive manner at the end of the study to map out concrete potentials for ecological congruence within the data. As part of constructing this *"congruent"* theme, I engaged in the making of three video game concepts as an artful auto-ethnographic practice *(see 3)*: Through making these sketches, 1) I sought to access, illustrate and process my unsettled feelings, and 2) I wished to explore and articulate concrete alternatives to the affordances and interactions that I had identified in the games I played. Here, it is important to repeat that ecological congruence (EC), as coming into one's genuine self and feeling connected to one's environment, is not based on experiencing positive affect towards nature only. Feeling close to nature draws from the whole range of human expression, including feelings that are negatively connoted *(see 1)*.

5.4 Deductive Theme: Congruence

In this section, we present opportunities for ecological congruence that we identified deductively in the data set. These potentials are illustrated through data points: 1) Artful sketches of video game concepts *(see 3)*, and 2) quotes that exemplify the core of each opportunity. I made the artful sketches alongside the theme in itself: The excerpts that the theme is made out of informed the design and making process of the sketches fundamentally. Here, I also engaged in a process of deconstructing, inverting or augmenting incongruent moments to find and develop congruent *alternatives*. We unpack each concept and its quote(s) through explication, and making visible its view and approach towards nature in games.

5.4.1 Congruent Opportunity: Subverting Power. Throughout the games I played, I was uncomfortable with the constant power bestowed upon me as the player: Nature in games seemed only *"alive"* and animated when I was near. The following excerpt illustrates myself wrestling with this circumstance, embedded within an understanding that nature is in a constant state of *flux*, and existing within different temporalities.

> **Quote 7**: *"But there is something about growth, decay, fermenting, microbial processes and ecosystems that I am missing. Trees grow, certainly, but they go from seedling to adult in one go, and stay this way, capping out at a certain height and shape.* **In a sense, once in the world, they are eternal until I choose to interact with them.**" (Minecraft, *see 4.2.1*, journal excerpt, emphasis added)

I am reflecting on nature operating in cycles, that involve both the *micro* (*"microbial processes"*) and the *macro* (*"ecosystems"*). Using trees as an example, I outline how they adopt a finite state in *Minecraft*: Their development means *"eternal"* adulthood, once they have *"capped out"*. Their growth in-game is dependent on the player

being present. This portrayal of growth contrasts with my understanding of nature as a space being in constant flux—regardless of my choices, and/or interactions with it (*"they are eternal"*).

In the following game concept sketch, I explore rejecting this powerful player position by exploring what such a role would really entail, if brought to its logical conclusion: I approached being responsible for an ecosystem flourishing as a single actor as an oppressive, dehumanising burden.

Figure 1: A design sketch of "The Witnesser".

Game Concept: "The Witnesser" *(see Figure 1)*: *In an adventure role-playing game, you take on the role of the "witnesser", a prestigious but gruelling, sacrificial position that forces you to travel around to enable crop-growing and animal herding, as nothing non-human grows or moves if there is not a "witnesser" looking at it. As a player, you can choose to maintain the status quo, or investigate ways to break this tradition.*

Through this sketch, I tried to make sense of people just being one of many parts of nature, as a space and system full of other autonomous actors, all in relationship with each other—whether wanted or not. The design sketch pushes a human-centred stance towards nature to an absolute point: What would it truly feel like to fully control nature, as an outside other? Here, I tried to sketch out congruence by reflecting on the importance of being intertwined with nature as human beings, by showcasing how painful and limiting its absence would be for me.

5.4.2 Congruent Opportunity: Cycle of Life/Death. Throughout playing games, I found myself reflecting on the cyclical nature of life and death: How it is happens in the actual world, and how it is portrayed, and made use of, within games.

The following excerpt exemplifies this complicated sense-making process, as it showcases how I try to understand dying and respawning in *Minecraft*:

> **Quote 8**: *"I realise that there is something about death that is super important for my experiences in and with nature. Being present in my body, being in an environment that moves, lives, breathes. Something about the*

knowledge that if I die in a forest, I would be recycled. In Minecraft, death is comfortable: [...] No corpses, no mess, just the knowledge that that respawning is easy." (Minecraft, *see 4.2.1*, journal excerpt)

In this excerpt, I reflect on how easy and *"comfortable"* death is displayed in *Minecraft*. I contrast this portrayal with the organic messiness of being in actual nature in mindfully-embodied [84] and soma-aesthetic ways [75] (*"present in my body"*). Death being a *"minor inconvenience"* in *Minecraft* also sits in stark contrast to how death in real-life happens: It is an often painful, monumental and uniquely *final* occurrence for people. However, *"if I die in a forest, I would be recycled"* speaks to the generative potential of a human corpse for non-humans, that they can thrive on.

In the following video game sketch, I explore how the cyclical, yet organic nature of life/death could be brought into a game context, by designing with it as the core feature:

Figure 2: A design sketch of *"The body is a vessel"*.

Game Concept: *"The body is a vessel" (see Figure 2)*: *In a exploration-focused walking simulator, you play as a humanoid protagonist. You are given a choice of elements, objects and nutrients to ingest. Then, after having made your choice, you are free to travel around to find a place to "die" in. Your corpse will be digested and decomposed by the environment, supporting it to flourish. After being recycled, you respawn, and get to do it all over again. You can visit previous places you have chosen to die in, and see how the environment responded to your corpse.*

In this sketch, I tried to conceptualise a game that would not change how respawning commonly in game works, but that would imbue the act of it with a different meaning; to make each death unique and impactful. I tried to design for congruence in ways that allow the player to still be an important actor in the world, as dying and leaving your corpse behind actively shapes the game world. However, instead of it being an extractive, precise practice (e.g., removing specific blocks from a hill in Minecraft), it is additive action with an unclear outcome. The player is not a detached, brutalising overseer, but instead they are materially grounded in the world, and

an active part of its organic ecosystem. This design stance speaks to my personal, interconnected nature sensibilities, and my own understanding of being an organic life-form myself *(see 3.3.1)*.

5.4.3   Congruent Opportunity: More-than-Human Perspectives. Throughout my auto-ethnography, I did experience a few moments of genuine connection with nature in games. In the next two excerpts, I reflect on taking on the role of non-human actors, and how that led me to experiencing moments of joyful congruence.

> **Quote 9**: *"The game made me think what existing as sentient wind might be like, as an entity that expresses itself carefully. It felt right to softly sweep over grass, and to see it being pushed to the sides."* (Flower, *see 4.2.1,* journal excerpt)

This excerpt showcases how *Flower* made me think beyond my current physical human form *("what [...] might be like")*, and caused me to engage in play that centred *care*. Even though being wind does not entail having a physical, organic body (which I currently have), the quote showcases that I still felt like I had *tangible* impact on the game world *("sweep over grass", "it felt right")*.

I encountered a similar sentiment of connection while playing *Shelter*:

> **Quote 10**: *"Playing a badger mother in a hostile environment means the odds are stacked against you. There is no way to fight back, yet you have such responsibility [for the badger kids]. I enjoy that this game tries to provide the player with a different non-powerful perspective. [...] Especially since I'm a person, and I will always be a person."* (Shelter, *see 4.2.1,* journal excerpt)

This excerpt showcases how *Shelter* provided me with an experience that broke with the previous canon of being an all too powerful actor—instead it engaged me as the *underdog ("odds are stacked against you")*. This position of weakness is not underpinned by a lack of agency, but instead, I perceive it in strong, powerful and motivating terms that are interwoven into the game's narrative *("you have such responsibility")*. Here, I express clear enjoyment that this game allows me an exploration of what being someone or something else might be like, as a reflection on my own humanness *("I will always be a person")*. These non-human perspectives may still designed by other people, but they open up a space of possibility, and relatedness for me *("different non-powerful perspective")*.

In the following video game sketch, I tried to explore the potential of congruence by engaging with non-human and more-than-human perspectives.

Figure 3: A design sketch of *"OzoooOOO000OOOooone".*

Game Concept: *"OzoooOOO000OOOooone" (see Figure 3)*: *In a turn-based strategy game, you take on the role of the hole in the ozone layer, as a sentient, self-aware being. As you move around, you can choose to communicate with humankind—or completely ignore it. You cannot save during the game, and each run of the game is final. As a player, you can choose to support humankind's interests, grow your own size and wreak havoc, or decide to not interfere with surface dwellers at all.*

In this game sketch, I anthropomorphise the hole in the ozone layer as a sentient character and stand-in for the damage humankind does to our planet. I tried to explore congruence in this sketch by inspiring reflections on non-human actors: They are part of my everyday life but I do not often consciously acknowledge them— especially if they escape my regular senses, by operating in more micro- or macro areas. While I can relate to being a badger *("Shelter")* as another organic lifeform, I tried to see if I could *feel* for or *embody* the hole in the ozone layer. In an effort to approximate more closely to its existence, I imbued the hole with human characteristics, motivations and goals to be able to relate to it more. Here, the limits of myself being (un)able to think outside a human perspective for a congruent framing become clearly visible.

6   DISCUSSION

In the following section, we discuss the work undertaken for this study as a whole. Then, we sketch a set of design impulses that may inform the play, design and work of players, designers and developers alike, as potential inspiration to engage with nature-in-games further.

6.1   Relating to Nature-in-Games Experience

We conceptualised this study as an open-ended, exploratory one for myself—and the rest of the research team by proxy—to become more sensitive to my own perception of nature-in-games. Drawing from phenomenologically-situated auto-ethnography and close reading of video games, I played eight different video games over the course of three months. Through this process of *sensitisation*, we asked

what I could learn from my experiences *(see 1, RQ 1)*, and what insights we, as a team, could gain by proxy *(see 1, RQ 2)*).

Before sketching out answers to our *RQs*, we wish to draw attention to the potential ways of assessing auto-ethnographies *(see 3)*, so that they may aid you, the reader, in evaluating what this paper showcased. I employed *close reading* within an *auto-ethnographic* undertaking as a complementary method: Concretely, close reading provided me the tools (and roles [14]) to make sense of the games I was playing, while auto-ethnography enabled me to capture and express my personal context(s) [51], in which the gameplay was situated in *(see 3)*. We used *ecological (in)congruence* as a guiding humanistic framework to make sense of my experiences of nature in games, as a way of describing how relationality with nature can shape our perception of it, and our willingness to connect more deeply with it—as Bazzano describes it, *"befriend[ing]"* an other [11]. The understandings we ended up constructing of my experience showcase nature-in-games as a deeply negotiated space, full of tensions that put me in a position of constant relational mediation and emotional sense-making—here, we/I leaned on the practice of *"noticing"* [148], as *affectively identifying* with nature [6], and attuning to as something to actively recognise and attune to [114].

Concretely, **the first theme** presented in this paper—inductive *"Incongruence" (see 5.2)*—outlined how my nature-in-games experience was *disconnected* from my own (lived) experiences with nature. Throughout the excerpts, we showcase a *relational gap* between my experiences of real-life nature and in-game nature: The games that I played often provided me with seemingly unlimited power to shape nature, within an escapist framing of nature as beautiful, untouched greenery for myself to use. This centring of myself as *the* authority in-game clashed with my understanding as being one of many parts of *actual* nature; as attempting to exist with nature in reciprocal ways. I continuously wrestled with the boundaries and rules of games, whether self-imposed *(see 5.2)* or hardcoded within the games *(see 5.2)*.

To understand this tension more deeply, we decided to revisit the data I created at the end of the study. In a deductive manner, we drew out 1) moments where I did encounter relationality with nature and 2) moments that offered potentials for ecological congruence. Thus, **the second theme**—deductive *"Congruence" (see 5.4)*—showcased how my own ecological sensibilities and my understanding of existing as part of nature substantially influenced how I made sense of nature-in-games. Alongside these data excerpts, we showcase three video game sketches that I designed to process my conflicted feelings further—particularly by reversing, and reframing my incongruent moments with nature in games into ecological *congruent opportunities*: *In the first sketch,* I tried to push the powerful, *deity*-like position given to players to its breaking point, and to explore what being responsible for a whole ecosystem could feel like *(see 5.4.1)*; through the constant need to witness it. Here, I attempted to design for ecological congruence by creating a space for personal reflection: To explore the oppressiveness of total control over an environment and its inhabitants. *In the second sketch,* I sought to find congruence in a design sketch that combines the messiness of death in the world, with how clean and uncomplicated death in games tends to be. Here, the sketch explores dying as the main game mechanic, as a reflection on life and death and its associated cycles in nature—including my own death *(see 5.4.2)*. In

the third sketch, I tried to find congruence within more-than-human lenses that lie outside of (non-)human organic life, and outside of my everyday sensibilities *(see 5.4.3)*. The last game concept asks the player to embody the hole in the ozone layer of our planet. Here, it reflects on the awkwardness and difficulty of relating to others (in the first place) and the heightened difficulties of thinking and being outside a human-centred perspective.

The design sketches showcase that *affectively identifying with* [6] and *noticing* [148] nature in games took me beyond just looking or interacting with it. What I experienced during this study changed me as a person, in ways that are still difficult to fully articulate for me in words. Here, attuning to nature in games meant finding congruence not only in pleasant emotions: I continuously wrestled with complicated, ambiguous feelings, actions and roles that I could take on or do as a player: I tried to imagine alternatives or reconfigurations to what the games I played seemed to offer to me.

Now, having unpacked the work as a whole, we turn to answer *RQ 1 (see 1)*: What did I learn from attuning to nature in games? Before starting this study, I had played many games that feature nature prominently, often with great enjoyment *(see 3.3.1)*. However, this study did not develop in ways that either of us in the author team expected: A near constant current of uneasiness permeates nearly all of my journal entries, with myself becoming more and more detached from the portrayals of nature in the games I played *(see 5.2)*. However, this *emotional whiplash* I encountered *(see 5.3)* was an unexpected, yet very important factor for the whole study. Here, both themes showcase that becoming sensitised to nature in games was *not* a linear procedure of becoming more familiar with it over time as an expert through repeated contact. Instead, it was an experiential process of becoming destabilised and troubled to reconfigure myself and my place within nature on a relational and phenomenologically-situated level. Concretely, 1) I *"oscillated"* between naive player and critical researcher [14], e.g., reflecting on domestication and labour in *Stardew Valley (see 5.2)*. I moved between understanding myself as part of nature, and being an outside *other*, e.g., *"being a foreign element"* in *Minecraft (see 5.2)* and 3) I compared and contrasted my nature (in games) experiences with each other, e.g., by designing with death in-game and outside of it *(see 5.4.2)*.

We ended up mapping out these oscillations as a space, or frame: They form a *relational gap* 1) between my *nature-in-games* experiences as a player and my own experiences with the natural world, with myself existing as part of it and 2) between my ecological *congruence* and *incongruence*. Using this concept, we now seek 1) to outline some potential inspirations for the HCI community to work with, to contest or to think and feel with and 2) to answer *RQ 2* with, showcasing our collective insights further *(see 1)*.

6.2 Design Impulses

Now, we sketch out two potential design impulses to *consciously* negotiate and design for making sense of nature in games. These design impulses may inspire, inform or challenge you, the reader—within the spirit of the humanistic essay. It is important to note that these impulses are not absolute or generalisable design opportunities *(see 3.3)*: Instead, they are concentrated expressions of our

research team's collective understandings and insights throughout this study.

6.2.1 Design Impulse: Attuning to The Relational Gap. Before engaging with this study, I had played plenty of games that portrayed nature in them: Yet, none of these previous encounters led me to consider the *relational gap* we mapped through this auto-ethnography *(see 6.1)*.

These insights were gained only through through *attuning* to nature in games—*see 1*, and by unpacking my experiences, and their affective friction: Together, we reconfigured how I now understand my own agency, impact and power on nature as a person, *and* as a player of games with nature in them *(see 5.3)*.

With our first design impulse, we invite designers, researchers and game developers to map out their own view of nature in games, and their own *relational gap*. Here, as a potential, inspirational primer, we ask you, the reader: *What does your relational gap with nature in games, or other media beyond, look like? Does it exist (at all)? In which contexts is it embedded in? How does it shape your perception of and relationality with nature, as a whole?*

As a potential frame to aid our mapping efforts, we employed the concept of *ecological (in)congruence (see 1)*. While ecological (in)congruence is rooted in therapeutic approaches and pedagogy *(see 1)*, it is important to state that we did not expect games to engage, or provide such caring qualities—neither should games engaging with nature necessarily provide such a healing, *"self-actualising"* frame. However, we see it as one of many potential, informative sense-making tools to map out *where, how* and *why* relationality to nature (in games) occurs—by feeling out where these spaces allow for *genuine* attunement and *"affective identifying"* [6] with it. *"Noticing"* [148] this resonance does not have to be positive or negative, but we understand it as an ambivalent undertaking of 1) self-discovery *("How do I engage with nature?")* and 2) mapping the contours of nature's mediatedness *("How, and through which media and technologies, do I make sense of nature?")*.

Here, we ask: *What does your ecological (in)congruence look like? Where does it become visible, tangible or accessible during playing games with nature in them? Which other tools, approaches and theories could you use to attune to the complicated context nature in games exists in, and to map out your own relational gap(s) with it?*

We explicitly encourage members of the HCI community and beyond to play games with nature in them, to build an interdependent network of maps and a pluralistic catalogue of portrayals of (digitised) nature.

6.2.2 Design Impulse: Designing for, with and towards Nature in Games. With the second design impulse, we seek to invite people who (wish to) work with nature in games to consider it as a pluralistic, interdisciplinary undertaking. Throughout the study, I was faced with a feeling that games made me, the player, the most important actor in the game. This unquestioned power led not only to a feeling of profound *ecological incongruence (see 5.2)* and emotional whiplash *(see 5.3)*, but it also led to a reconfiguration of the whole study in itself; resulting in the creation of the deductive theme, and a set of *congruent opportunities*, in the form of video game sketches (see 5.4).

It is important to note here that we did not expect games to cater to my or the team's ecological sensibilities: Games can provide

meaningful, escapist refuge from the often depressing reality of everyday life *(see 2.3)*. Games already allow us to embody different characters, be part of compelling narratives and adopt non-human point of views: Drawing from these affordances, the player's role within nature does not mean that games necessarily have to be *truthful* to real-life limitations. Instead, it is an opportunity to recontextualise the role of the player, embedded within an understanding that the natural world and humankind exist as interlinked systems, across a pluralistic set of histories, spatialities, temporalities and relationships—the micro, the macro, and everything in between *(see 2)*. Here, we point back towards our collective efforts to find congruent potentials in the data set, and to express them as video game sketches *(see 5.4)*; to articulate what other ways of interacting with digital nature could be like. The relational gap I encountered made me want to push current modes of engaging with nature as a (powerful) player to their logical end *(see "The Witnesser" in 5.4.1)*, but it also made me want to feel for non-human actors *(see "OzoooOOO000OOOooone" in 5.4.3)*, and led me to reflect on being organic, and death in itself *(see "The body is a vessel" in 5.4.2)*.

We ask you: *Which relational gap (or the lack of one) could you consciously design for, or articulate through making video games? Which insights about your own "ecological sensitivity" could you gain?*

Finally, we see a lot of power in video games as important vehicles that mediate the pluralistic, complex relationship people have with nature. Video games as an art form and medium can engage us with complicated issues and complex stories—including wrestling with current difficulties, like the slow violence of climate change, as described by Nixon [105], and ecological crises yet to come. We speculate that portrayals of (digitised) nature, informed by video games and their affordances *(see 2.3)*, will gain importance as our planet degrades: Here, we wish to encourage designers, developers and researchers working with games and beyond to carefully consider if their work portrays or treats nature in ways that make such *"ecological sensitivity"* difficult or impossible: Provocatively stated, we encourage you, the reader, to allow yourself to approach, see and treat nature in games as *more* than just a convenient backdrop, theme or actor to do *stuff* in or with; to contest, question and reconfigure current, common discourses of seeing nature in often reductionist ways, and outside of human action *(see 2.1)*—often echoing or alluding to oppressive, colonial and imperialist frames [9, 147].

We ask you: *What would your version of digitised nature look like? What could other people learn from attuning to it, and what might they notice? Can you imagine how it would make them feel, think or behave?*

7 CONCLUSION

In this paper, we report on a sensitisation and sense-making effort of digital portrayals of nature. Using the exemplary medium of games, the first author embarked on a three-months-long study, during which they played eight games which prominently feature nature. Using auto-ethnography and close reading, VS collected data about their experience, which was thematically analysed. This process resulted in two themes: *First, "Incongruence"*, which showcased the

relational gap between [first author's] real-life and their in-game nature experiences. *Second,* we showcase a deductively-created theme, *"Congruence"*, which highlighted moments of togetherness and perceived potentials for connecting with nature in the data. Based on our collective insights, we synthesise two situated design impulses for how players, game designers and researchers alike could engage—think, play, or create—with *nature-in-games.*

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