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Into the Wilds: Influences from Video Games on Our Perception of 'Nature'

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INTO THE WILDS: INFLUENCES FROM VIDEO GAMES ON OUR PERCEPTIONS OF 'NATURE'

By

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Abstract

In this paper I examine how representations of human-sparse natural environments, e.g. wilderness, influence what expectations we have when we actually engage with comparable physical places. I use Don Ihde's phenomenology of technology to describe my own experiences playing three games that take place among large photorealistic human-sparse natural environments: *Elder Scrolls V: Skyrim*, *Horizon Zero Dawn*, and *theHunter: Call of the Wild*. I also conduct a brief literature review on the effects of video games as interactive media on players. I argue that players are capable of applying their expectations of what constitutes realism from digital to physical environments, and that some of these translocations (transferring the perceptual framework from one space to another) limit our ability to meaningfully engage with the world. Although some video games may condition players to hyperreal expectations that leave them disappointed with physical spaces, some games might also produce increased interest and care for human-sparse spaces. The causal relationship between playing video games, changing expectations, and offline behavior therefore merits further study. I conclude with the claim that our experiences with unmediated physical nature should ground our perceptual baselines, rather than evaluating the physical by the standards of the digital.

Chapter One: Phenomenology of Technology and Play as Praxis

The idea that technologies affect the ways we perceive and interact with our surroundings is not new. Neither is the observation that technologies range from dedicated scientific instruments and commercial machines to mundane, even consumerist, tools and gadgets. However, variations in the ways specific technologies function merit examining what differences they possess relative to other ostensibly similar devices. As video games have moved from mere entertainment to an increasingly complex art form, they reproduce common technological elements while displaying distinct features of their own. Phenomenological approaches, focused on lived and common as well as uncommon experiences, provide a foundation for assessing what influences video games may have on our perceptions of the world. These initial claims can then be examined in a wider context of how individuals produce, consume, reify, and contest media influence.

In order to appraise a technology's function and impact, a framework is needed which describes both the theories behind a technology as well as its intended and actual uses. Don Ihde's phenomenology of technology[1] categorizes specific relations, or practices of engagement, humans have with technologies and their surroundings. It is ultimately an analysis of how technologies lend themselves to perceptual and interpretive methodologies. This phenomenology is separated into four sets of relations between humans, technologies, and the world. These relations map onto the properties of video games as a specific grouping of technologies in ways which are both distinct and concurrent. The challenge video games pose to this framework is the

[1] This framework is earlier called a "phenomenology of technics" by Ihde. At the time of his first publication in 1979 (*Technics and Praxis)*, the term "technology" had rivals in discourse in the forms of "Technik" (German) and "technics" (English). However, this dispute has largely been resolved. Ihde himself now uses "technology;" see in Chapter One References, *Technology and the Lifeworld* (1990) and *Bodies in Technology* (2001).

demarcation between sets of relations. More complex technologies resist confinement to a single set of descriptive relations, demanding multiple categorizations and attendant skills from users.

I. Situating Video Games in Contemporary Culture

Before I begin my analysis, it is worth acknowledging those issues that I will not be addressing in depth or at all. There are also several assumptions that I will identify that can shape how my arguments may be interpreted and used. This is necessary not only because of the size and influence of video gaming as a consumer industry, but also because of ongoing social justice and civil rights struggles that intersect with interactive media as a source of culture. It is also important to mark those areas where my analysis is impacted by my perspective as an able-bodied cisgendered heterosexual white male and any assumptions I make about the universality or particularity of my experiences. Finally, there are questions regarding video game influences on players that I do not take up with but are present in contemporary political discourse.

Contemporary video gaming is undergoing a number of linked changes in who creates and plays games, and the form as well as content of games. These shifts are not new, but they are necessary and long overdue. As more people of varied backgrounds visibly produce, consume, and review games, existing inequalities become more tenuous. There is a strong and vicious backlash against inclusivity, but what is encouraging is that inequities and discriminatory attitudes are being forced into the open in front of both gaming and non-gaming publics in ways unlike the past, where those attitudes were either masked or regarded as inherent to the activity of playing video games. Increasingly visible numbers[2] of women, people of color, and members of LGTQ+ communities challenge the longstanding cultural image of video game players as

[2] Observable changes in who identifies as a ‘gamer’ can likely be explained by the increasing confidence and willingness of members of marginalized groups to identify openly as much as an influx of new individuals and demographics to the activity of gaming. Considerable harassment of particular groups remains, and requires combatting; but the exclusivity of video gaming is rightfully being challenged.

socially isolated or hypermasculine young men (almost exclusively white, cisgendered, and heterosexual). Mature and accessible video game journalism as a form of media criticism supports developers who create complex, nuanced characters and narratives. Reviewers critique developers who rely on harmful tropes and bigoted stereotypes, and point out how they can improve. Given the claim that video games are an artistic and cultural medium, they are receiving the critical analysis that those types of artifacts warrant.

The body of this paper on specific video games will not explicitly address many of these larger ongoing trends. However, I acknowledge that my overarching claims – physical environments should not consistently be examined using the lenses players use for digital environments, and direct unmediated contact with physical nature should not be replaced by electronically mediated nature – need to be qualified in light of specific concerns, namely over possible appropriation for ableist, racist, and sexist purposes. My arguments are not meant to deny the possibility that digital representations of human-sparse natural environments can be legitimate ways to encounter and explore spaces where human impact is restrained or imperceptible for those who lack ready access to green spaces (e.g. urban parks, designated wilderness, etc.), or those who find existing infrastructure like gravel trails inaccessible and burdensome. Video games similar to the ones I examine can provide similar benefits as older forms of fiction like printed books, comics, and film to individuals who, through no fault of their own, lack substantial access to particular kinds of human-sparse environments. Any reluctance on my part to present video games as an alternative to direct and primarily physical experiences of specific types of spaces is a reluctance to provide an excuse for preferring the digital over the physical to those with the ability to meaningfully choose between physical and digital human-sparse environments.

I also do not take up with many of the questions regarding how players interact with other entities in the worlds presented by video games, namely through various forms of violence. My focus is on perception of the gameworld and movement through it, as facilitated for players by the in-game avatar in a coherent and self-contained digital space. I do not meaningfully address the forms of violence players can choose to participate in or abstain from. Nor do I address larger questions surrounding violence as a gameplay mechanic and narrative premise: how are players encouraged or discouraged to partake in certain forms of violence; how does violence function as a way of engaging with the gameworld and the entities that populate it; is violence required for progression through narratives; how does violence as a mode of interaction structure players' perceptual frameworks; who participates freely in violence and who has violence forced on them; and what forms of violence can be reproduced by players in real life? Given recurring types of public violence in the United States, the pressure and desire to exhaustively describe the causal mechanisms behind video game influence is understandable.[3] The literature review on media effects in Chapter Two is my most salient contribution to that discussion at this time.

II. Perception and Technological Relations

Ihde's phenomenology of technology is characterized by four main sets of technological relations. Each set of relations structures our perceptions differently. Together they are four different parsings of a basic configuration:

Figure 1. *Human—Instrument—World*

[3] My overarching claim regarding media influence is that video games can exert enough influence to justify caution and concern for how we interact with the world. However, they can be viewed the same way that we view other forms of media: as containing messages subject to both acceptance and resistance, and acting as one of several ideological sources that users are exposed to over time. Playing video games does not necessarily guarantee that our national parks will be abandoned in years to come in favor of screens. Similarly, recent mass shootings cannot be reduced down to the inevitable result of exposure to depictions of violence in video games alone (despite the best efforts of some citizens and policymakers). They are one of several influences that require deliberate, informed, and coordinated action to mitigate and reshape while other causes – toxic masculinity, misogyny, access to firearms, etc. – are also addressed.

1. Embodiment Relations

Embodiment relations are the first set Ihde discusses, and include those technologies which amplify or reduce perceptual capabilities by mediating the distance between ourselves and phenomena via technology. Embodiment relations can be represented thus:

Figure 2. (*Human–Instrument*)→*World*

This class of technologies is marked by three eidetic, or essential and defining, features. First, they employ an amplification-reduction structure in which certain perceptual abilities are heightened while others are diminished or lost. Second, embodiment technologies alter perceptual distance while leaving physical distance unchanged. Third, their design incorporates a concern for transparency; more transparent technologies fade into the perceptual background, only intruding when they fail to function as intended. Embodied technologies are directly linked to the user's inherent perceptual capacities and alter experience of the world from this baseline.

Ihde turns to two modern instruments to demonstrate the function of embodiment relations: the dental probe and the telescope. A dental probe both amplifies and reduces the user's sense of touch. Through the fine point of a probe a dentist is able to trace the shape of a tooth in greater detail than if they were to use their finger. Simultaneously, their tactile sense is limited by the absence of texture and temperature; the probe does not provide information about whether the patient is warm or cold, salivating or dry-mouthed. Meanwhile, a telescope amplifies and reduces in a more holistic sense. The viewer's dependence on their sight is greatly increased and other senses fall into the background because they are not accommodated by the instrument. Indeed, attempting to use one's other senses while gazing through a telescope can lead to a distracting overflow of information. The telescope also alters our perception of space without actually changing physical distance. The ability to see the surface of the Moon in greater detail

as if I were closer to it than is the surface of the Earth is only a temporary oversight; the physical gap between the two bodies does not change. And should the sky be clouded over, or if the telescope is not calibrated for the intended viewing distance, then my awareness that I am using a technological instrument intrudes into the forefront of my consciousness. This intrusion lasts only as long as the telescope does not fulfill its intended purpose of amplifying my visual experience of a distant celestial body. As embodied instruments, the dental probe and the telescope allow me to extend my perceptual abilities beyond my physical body by increasing my reach or bringing phenomena closer to me; but this is achieved at the cost of limiting which of my senses can be brought to bear on a phenomena, and sometimes even in what ways I may use particular sense-capacities.

2. Hermeneutic Relations

Technologies also create situations where information accessed through mediation must first be interpreted in order to become sensible. These hermeneutic relations open up new perceptual possibilities to those with the skills to read what is registered by the instrument. In contrast to the extension of the tool-using subject found in embodiment relations, the technology forms a barrier to the untutored observer, overlaid on top of phenomena:

Figure 3. *Human*→(*Instrument*–*World*)

Hermeneutic technologies do not merely amplify senses by extending existing perceptual abilities into spaces farther away. They open up new possibilities within existing perceptual abilities, such as infrared vision instruments and topographical maps. Infrared vision grants humans access to observing light wavelengths that their normal range of vision does not register in a perceptible way; but this representation must be interpreted according to a metric of colors signifying heat in order to make any sense to the viewer, who is unaccustomed to perceiving the

temperature of objects through sight rather than touch. Topographical maps function in a similar way. The shift from seeing a mountain in three dimensions to seeing its two-dimensional representation requires an understanding of how maps signify elevation changes within a medium capable of only symbolic, not literal, height and depth.

Users who also lack access to the original phenomena because of some precondition of inaccessibility are caught in a web of hermeneutic relations, including possible misinterpretations or technological malfunctions. The system of dials and gauges attached to a hot water heater, for example, is a substitute for access to the actual stored water. Rather than dipping one's hand into the reservoir (or a similar means of temperature measurement), an owner or technician examines the readouts given by the gauges and interprets them in ways that have salient meaning (e.g. a temperature reading in degrees Fahrenheit may be too warm or too cold for an intended use like showering). This can occasionally lead to Kafkaesque situations where the instrument fails to mediate properly between the user and phenomena; the dial may move its needle toward the right to signal increasing pressure when pressure may in fact be decreasing. Such failures are often key causes of technological disasters. The accident at the Three Mile Island nuclear power facility was one such incident where a series of misinterpretations occurred because of the equipment's failure to properly – that is, accurately with regard to actual phenomena – convey what was occurring and the subsequent failures to properly interpret the state of things by operators. The claim that technologies can offer new ways to understand the world depends on the presence of a reliable and informative system of interpreting or translating the information provided by certain technologies.

3. Background Relations

In embodiment relations, instrumental transparency is an ideal to strive towards; the same may be said of background technologies. Background relations characterize those technologies whose mediating influence on our engagements with the world is masked without losing efficacy. As such, they are diagrammed accordingly:

Figure 4. $Human — \left(\frac{Machine}{World} \right)$

Background technologies enable experiences without those technologies being directly accessed themselves except in those cases where they fail to function properly, i.e. as intended. They are not technologies in the immediate sphere of experience, but "those which remain in the background or become a kind of near-technological environment itself" (Ihde, 1990, 108). The prolonged act of writing a research paper is set in an environment full of technological mediation between the writer and their world. Electrical lighting and temperature control like central heating and air conditioning surrounds and structures the writer's experience without seeking to intrude upon it with demands for maintenance, improvement, or appreciation (aside from that implied by continued usage). Similar background functions make much of modern industrialized life possible. The operation of combustion engines in automobiles enables millions to commute to work, ship goods cross-country, and travel to branded vacation sites with little conscious thought given to the complex chemical processes and engineering powering their vehicle of choice – until it breaks down and occupies most thought. The mediation enacted by background technologies is less noticeable but more present and influential in its ubiquity than the context-specific technologies of embodiment and hermeneutic relations.

4. Alterity Relations

Ihde's final set of relations is more demanding in its mediations. Alterity relations describe those technologies which, in their mediating function, displace the world and replace it with another. In doing so they become worlds unto themselves that the user engages:

Figure 5. *Human→Technology–*(*–World*)

Ihde frames this by asking "[h]ow and to what extent do technologies become other or, at least, *quasi-other*?" (Ihde 1990, 98). Alterity technologies in Ihde's scheme do not become fully realized worlds in their own right, but present the appearance of worlds or subjects that move through a world similar to us. The most relevant ways they do this are by encouraging anthropomorphization and the illusion of autonomy. The quasi-otherness of alterity technologies shows that "humans may relate positively or presentially *to* technologies. In that respect and to that degree, technologies emerge as focal entities" that draw a specific kind of attention from their users (1990, 107). The automobile may present itself to us and be measured in terms of a spirited horse (think of the mustang, both the animal and the vehicle), but the car demands different skills and attitudes in its operation and our care for it. Its independence, or capacity for autonomous action, is also illusory when compared to a horse which "does not always obey–and can even start or rear if a rabbit happens to cross its path" (Verbeek, 2001, 131). A horse may be led to a watering trough and still refuse to drink, but my car has no choice – and can express no enthusiasm, relief, or defiance – when I take it to the gasoline pump. Similarly, the kind of apparent autonomy present in children's toys (from simple wooden spinning tops to complex electronic companions) impresses us in its similarity to our own volition as long as it lasts. Once the top loses momentum, or the speaking doll's batteries lose their charge, we are reminded again of the limits of technological appropriation when it comes to mimicking animating forces. In this

way alterity technologies at their most successful are temporary reproductions of objects in the world, periodically pressing for our attention to continue functioning as imitations or replacements.

III. Mediation through Video Games

Although Ihde specifically examines video games as facilitating different kinds of technological relations in 1990, 2001, and most recently in 2010 (in *Technology and the Lifeworld*, *Bodies in Technology*, and *Embodied Technics*), it is worth revisiting how video games as a family of technologies can facilitate different kinds of relations which have effects on our perceptions that are similar to those discussed by Ihde. Advancements in technology, driven by demand from players and artistic ambitions from developers, continue to produce more detailed and complex visuals, greater ranges of artificial intelligence (AI) agency, and a larger variety of controllers and consoles. These changes can still be approached and explained using Ihde's set of technological relations, beginning with his own observations and moving on. Gaming experiences are created and shaped by the material equipment of controllers, consoles, and computers; by digital representations which are the results of functioning software code; by the infrastructure which produces and powers video games; and by the immaterial gameworlds in which players immerse themselves. Together these different dimensions of gaming as a technological activity create a context for the majority of player experiences and structure their perceptual possibilities.

1. Embodied Equipment (Embodiment Relations)

The first point of contact between players and games is equipment. Players use a combination of a computing station and compatible controllers. These include computers (desktops and laptops), video game consoles, and less often arcade machines as the base.

Controllers include keyboards and computer mice; free-standing joysticks, most often used in flight simulators; general video games controllers with an integrated combination of buttons, levers, and joysticks; and specially designed controllers such as mats or platforms with sensors used in dancing games, kinesthetic or motion-sensitive controllers like the Nintendo Wii Remote or Playstation Move, kinesthetic cameras and sensors like the Xbox Kinect system, and wheel-plus-pedals setups intended for use in driving or racing simulators. Despite the wide variety of specialized controllers and games which can only be played using this specific equipment, most games are playable using more general equipment. For computers, this is a keyboard and mouse; for consoles, it is the proprietary controller produced by the game company. Controllers become an intermediary between the player and the game station, but in a similar fashion as Ihde's dental probe encourage certain perceptual foci while discouraging or prohibiting others:

Figure 6. (*Player–Controllers*)→*Game*

The clearest example of an amplification-reduction structure comes in the form of what video games scholar Jesper Juul calls *mimetic interfaces*. Interfaces are objects and systems that convey information about the gameworld, including the player's avatar, to the player and allow them to respond. This forms the dynamic of prompt, action, and reaction between the player and the game. Juul grounds his analysis in an understanding of the different spaces at play in video games: the *physical space* of the player, in front of the screen; the *screen space*, which is the flat surface which acts as a literal and figurative border; and the *3-D space* of the digital world (what I will call "the gameworld") represented in three dimensions, inhabited by the avatar but directly inaccessible to the player (2010, 17). It is therefore the avatar, not the player, who acts in 3-D space. The player merely intervenes in the game world through the avatar. Mimetic interfaces and mimetic controllers are those interfaces and controllers that possess what Juul calls a high

degree of compatibility between the actions of the player in physical space and the movements of the player's avatar in 3-D space (34). The avatar *mimics* the player's actions with high compatibility controllers, while low compatibility controllers use an arbitrary relationship to link an action in 3-D space with an action, usually a button press or joystick movement, in player space (103). The closer an interface or avatar movement in 3-D space is to matching player perception and movement in physical space, the more mimetic it is.

More mimetic controllers transfer perception from one space to another, and function as extensions of how players move in non-gaming contexts. To an extent, more mimetic interfaces "support the illusion that the player space is continuous with the 3-D space of the game" (107); less mimetic interfaces depend on a more abstract relationship between player movement and avatar movement which inhibits attempts to draw on common cultural knowledge about how certain activities are performed (108-110, 112). Yet even mimetic interfaces restrict possible player actions. The simplification of activities like guitar or tennis playing confound expert musicians and athletes while amplifying the experience of competence for a musical or athletic amateur (114-115). The expert video game player may fail miserably at physical performances of music or athleticism, or may move differently on a tennis court than when playing the Nintendo Wii. But this is only the case with a mimetic interface like motion-tracking cameras or controllers; a generalized controller which reduces avatar actions to player button pressing may confuse both experts and amateurs until they embody the controls the way a dentist embodies, i.e. appropriates, the probe. Controllers thus allow players to engage with gameworlds, but the engagement is shaped by the control scheme built into particular equipment.

2. Interpreting Interfaces (Hermeneutic Relations)

Video games also demand a measure of hermeneutic skill, and help or force players to cultivate a specialized ability to 'read' cues and non-narrative information imposed upon the representation of the gameworld (the digital space of the video game in which narrative and action take place, what Juul calls 3-D space). Some of these impositions are visual, such as heads-up displays (HUDs) and overlays which frequently appear on the border of the screen to provide supplemental information about avatar health, abilities, inventory, objectives, and position on a map of the given world or level. Visual cues will also convey suggested courses of action to players, such as increasing amounts of on-screen blood splatter reflecting damage taken and encouraging players to find cover, flashing symbols commanding the player to select certain inputs to advance ("quick-time events"), or environmental designs marking opportunities for avatar action like climbable ledges being painted a specific color. Other cues can be auditory or haptic; game music will play specific notes to suggest imminent danger or safety, while controllers may vibrate ("rumble") when a player's avatar takes damage or encounters resistance from an in-game object. These conventions structure a player's attention, but are disorienting and unclear when first encountered. Only through repeated interaction and deliberate training do these elements begin to be easily interpreted, and add to rather than distract or subtract from the player's experience:

Figure 7. *Player→*(*Interfaces–Game*)

Interfaces that players must learn to interpret and respond appropriately to are not limited to the obvious like overlays and menus. Instead, interfaces function like a palimpsest, layered one over the other. At base is the game engine; all representations produced on the screen are means for the player to engage with the software in a series of actions and reactions. Other

interfaces are added at the developer's discretion, being integrated into or superimposed on the gameworld. In general, players tend to consider obvious design choices like menus or health bars to be the only interfaces at work in the game. Scholar Kristine Jørgensen (2013) argues that the gameworld itself – the digital environment, containing all possible actions – is an audio-visual interface mediating between the player and the game system, or the underlying abstracted software generating the interactive game (23-24). However, gameworlds "are not merely interface" but entities to interact with in their own right (4). For Jørgensen gameworlds are ecologies, responding to and influencing the player's exercise of agency, and premised on the importance of ludic (play-centered) consistency instead of fictional coherence (103). She draws on James J. Gibson's theory of affordances, "that we perceive the environment around us in terms of the potential for interaction" (81), to argue that understanding gameworlds *as places to be engaged with* provide a useful metaphor for interacting with the foundational but abstract game mechanics and code (88). Objects and characters in the gameworld are entities in their own right, but also serve as interactive proxies for gameplay goals and methods created by developers. This relationship between gameplay mechanics and representations is found in the combat system of *Star Wars: Knights of the Old Republic* (BioWare 2003).

Knights of the Old Republic is one of several video games adapted from a tabletop format, where games such as Dungeons and Dragons use dice rolls to determine the effects of player actions. This means that combat occurs under the guidance of simulated rolls made by the game engine. Under the notion of interfaces as a palimpsest, combat in *Knights of the Old Republic* occurs via several interfaces.

Figure 8. A screenshot of combat gameplay from *Knights of the Old Republic*.[4]

The first and most superficial level of interface consists of menus superimposed on the representations forming the gameworld; selecting particular options prompts the avatar to take certain actions and other characters to respond appropriately. The audio-visual representations unique to the fictional setting of *Star Wars* form the second level of interface. The decision to have a character fire a shot from a weapon like a laser pistol ("blaster") or swing a laser sword ("lightsaber") at a specific enemy is enacted by the avatar, but whether the shot or swing hits or misses depends entirely on the simulated dice rolls performed by the computer. Success comes

[4] The red '1' above the player avatar's head represents the damage inflicted on their numeric health value after a successful hit from an enemy. The green '8' below the red 1 represents value added to the health value as the avatar uses medicine to instantaneously heal herself. The red-outlined buttons in the upper left represent possible actions the player's avatar can take toward an opponent, not pictured here.

from chance, not the player's skill in aiming. The sounds and sights making up the gameworld thus have a second function beyond representation. They translate abstract automated mathematical operations into something that is not only more understandable but is also entertaining and engaging for players. The untutored player or observer will watch a fight play out and express confusion or indifference toward the invisible logic behind whether characters hit or miss one another, especially when they are in close proximity. In contrast, the learned player is able to identify what kinds of numbers the dice-rolling function is producing by the actions and reactions of character in the gameworld, which has become a glorified, cinematic spreadsheet. This interpretive skill is common among both occasional and frequent players, the difference in knowledge being one of degree and not kind; but it is not innate and must be developed over time by those who play video games in any capacity.

3. Game Engines and Power Grids (Background Relations)

The controllers, interfaces, and digital spaces of video gaming are collectively dependent on at least two levels of background relations: the game engine, or the collection of software which produces the gameworld; and systems of production and consumption which make video gaming possible. The first level of context is the game engine. Game engines are responsible for not only the audiovisual representations making up the gameworld, but also the various scripts governing the behavior of the player's avatar, non-player characters ("NPCs") including AI-controlled enemies and allies ("bots"), and the ecological functions of the world (passage of time, static or dynamic weather, narrative progression, dialogue, etc.). Like other background technologies, the success or failure of the game engine in operating transparently – without drawing attention to its operation by failing to function as intended – is part of creating the

conditions for an ideally immersive, engaging player experience. This relationship can be represented as follows:

Figure 9. (*Player–Game*)–*Software*

Like other technologies that structure our perceptions without drawing attention to themselves (e.g. air conditioning, electrical lighting), game engines make the player's interaction with the gameworld possible because it generates the world and performs the functions necessary for the core gameplay mechanics.

The operation of game consoles is nested in a larger web of relations, however. The infrastructure that has helped create and support video gaming is a result of the research funded and carried out initially by employees and contractors of institutions within the American military-industrial complex. Contemporary video gaming has also been shaped by the shift towards information economies and the demands of consumer capitalism. A video game player and their equipment thus come to exist always-already within and because of complex, interlinked forces of social and material production:

Figure 10. (*Player-Console*)–*Infrastructure*

The first rudimentary video games were created by programmers taking advantage of the resources that came with government contracts (Dyer-Witheford and de Peuter, 2009, 7), and the Internet – the primary vehicle for acquiring and playing games today – originated as the information-sharing network ARPANET whose creation was funded by the U.S. Department of Defense. More recent video game series and individual titles, such as *Call of Duty* or *America's Army*, continue to rely on armed conflicts for narrative and gameplay inspiration, and are used sometimes deliberately to recruit or increase support for the military. In over 60 years of video game history, the influence of militarism has remained a steady and significant context in which

video games are produced; without this initial investment, video games would not exist with the same characters with which we are familiar.

The web of consumer capitalism, frequently accompanied by imperial and militaristic ambitions, is comparably responsible for the growth of video gaming as a cultural phenomenon. The extraction and refinement of precious metals, especially electrical conductors, is driven by the demand for these materials by producers of gaming equipment (computers, consoles and controllers) and the studios of developers who produce the games themselves (as they rely on computers to create the games, even if they release titles as digital downloads rather than distributing physical copies on disc). Electrical power production also makes video gaming possible and helps drive an increasing demand for non-renewable (coal, gas, oil) and renewable (solar, hydroelectric, wind, geothermal) fuels – some of which are secured through actual or threatened use of military force. The creation and maintenance of servers hosting continuously operating online games, such as *Second Life*, and the Internet itself is powered by the web of commodification, exchange, and exploitation of global capitalism (Clark, 2014, 78-79). This set of background relations is composed not only of literal technologies of electrical power and consumer goods production drawing on cheap exportable labor and environmental degradation; it also includes the abstract technologies which produce imperial political power, commodity markets, and advertising or propaganda campaigns which seek to both create demand for select commodities and justify ex post facto their (methods of) production.

4. A Whole New Gameworld (Alterity Relations)

Video games technologies extend our perceptual capacities, demand sustained acts of interpretation, and exist in a web of particular historical and cultural influences; but a large part of what grabs the attention of players are the imaginative, fictionalized settings in which

opportunities for play exist. The compelling force of these settings rests in the claims they make as self-contained environments. Video game technologies attempt to suggest that they are more than individual devices. Part of this suggestion is that they are disclosive of a world and its characteristic relations, revealing some fundamental structure underlying reality. The gameworlds are worlds; certainly dedicated to sets of ludic and narrative potential, but nonetheless spaces imbued with independent and bounded meaning. Gameworlds engage players in a dynamic of alterity, as quasi-spaces with some resemblance to the events and locations of the real world:

Figure 11. *Player→Gameworld–*(*–Physical World*)

A gameworld acts to displace and in some ways replace a real, physical space, regardless whether the virtual space is entirely fictional or a representation of a real-world place (e.g. a mountain). The player's experience of climbing a digital mountain via their avatar is significantly different and, in that moment of play, a substitute for actually climbing the original physical mountain. Digital places with no real-world counterpart exaggerate this effect; they implicitly claim to offer players an entirely new realm of experiences that cannot be replicated in the real world.[5] As virtual spaces, gameworlds function not as parts of our materially grounded reality but rather as rivals for our attention and engagement. Ihde captures the alluring antagonism behind video games when he writes that beyond the embodied and hermeneutic dimensions of gaming, "there is the sense of *interacting with* something other than me, the technological *competitor*. In competition there is a kind of dialogue or exchange. It is the quasi-animation, the quasi-otherness of the technology that fascinates and challenges" (2001, 100-101).

[5] A gameworld set in an entirely fictional setting claims to offer more than a fictionalized perspective on an existing place. Its claim is one of originality and novelty: come visit a place that can only be experienced digitally, as opposed to a place that can be visited virtually and physically. Some gameworlds are thus *alternatives to* physical reality, not merely *alternative versions* of it.

The console shifts from being a mere device to producing a space with its own internal logic and momentum in our view of it. We forget, as players, that the villain in the story or the mobs of individual enemies are governed by scripts and preprogrammed behaviors that structure the action and reactiveness of in-game encounters. Instead, they appear to us as autonomous beings whose presence is a sensible and inevitable part of the world.

More generally, gameworlds are representative of alterity relations because they incorporate representations of phenomena found in the physical world in their own set of representations. Game designer and scholar Steve Swink identifies this commonality as part of what he calls *game feel.* In his eponymous book on virtual sensation, he identifies a taxonomy of game feel and associated principles for creating a compelling game: the metrics of input, response, context, polish, metaphor, and rules are associated with principles of predictable results, instantaneous response, easy entrance but deep potential for mastery of gameplay, novelty, aesthetically appealing response, organic motion, and harmony between game design elements that leads to a cohesive play space (2009, 297). Positive game feel is facilitated by conveying that the game space is a unique physical reality; when elements of the digital world align with our prior experiences and intuitions about physical space, then we are more willing to suspend disbelief and accept the gameworld as a realistic, albeit virtual, space (30). The metric of polish, for example, helps create the illusion of physicality and the logical coherence we expect from space with a given physics, but our evaluation of the objects in game space depends on our expectations of how real-world objects like cars behave and how well the digital representation aligns with those expectations (97). Although polish does not demand total imitation or mimicry of player actions and real-world objects, it stresses the difference made when gameworlds mirror our expectations for their function and thus facilitating our suspension of disbelief.

The metric of polish is associated with the game design principle of harmony, which demands that other elements of a game work together to suggest an interactive physicality to the player, sometimes by using cues that draw on existing cultural knowledge and other times by creating a new consistent system of cues that disclose gameplay mechanics (306-308). One such mechanic is the option for characters to hide behind walls or boxes to avoid being hit by gunfire; players learn to recognize which objects can be used for cover while AI-controlled enemies try to force the avatar out into the open. A game with good game feel produces its immersive attraction by presenting players with a self-contained and predictable physics. The avatar moves through the gameworld in ways that are relatable to how the player moves through physical reality, so that any differences are in degree and not kind. In this sense, good game feel is positively correlated with Juul's notion of mimetic interfaces and controllers. More mimetic setups facilitate players' immersion more easily than more arbitrary arrangements. This is not to argue that less mimetic interfaces and controllers inherently block or limit immersion, but rather that more mimetic schemes create a link between player actions and gameworld effects with less resistance. Gameworlds invite engagement without the risks of adventure or rewards of exploration, offering more mental and emotional than physical interaction and thus appearing as quasi-spaces supplying particular experiences both augmented and impoverished in relation to physical reality as in hermeneutic relations.

IV. Relational Boundaries and Engaging with Nature

Ihde's phenomenology of technology has some room for permeable boundaries between sets of technological relations. Although his writings indicate a preference for assigning a primary relational quality to given technologies, Ihde's notion of multistability allows for ambiguous and diverse yet similarly legitimate potential uses of any technology. It is important

to address this slipperiness because of the specific influences relational sets generate and the implications for praxis, or actions and activities (Ihde, 1979, 12), which arise out of mediated relations. Like technologies, praxes or activities formed via repeated sets of related actions are materially grounded and productive, arising out of material conditions and producing material effects that help spark causal chains (21). They are also inherently value-laden, expressing and reinforcing or challenging particular cultural values; they are choices made among several options regarding how to exist in the world (23). Different relations tend to produce different kinds of effects by favoring certain perceptual mindsets over others and prompting the formation of a frame of reference, while practices may facilitate enrichment or impoverishment of our relations with the world through their repeated enactment.

The ability to use technologies in unexpected and unintended ways raises the question of how strong an influence users exert on devices and vice versa. The desire to define technologies in terms of observable qualities can be attributed to a desire for stable and relatively self-contained categories. If a particular instrument can be sorted into multiple relational sets, then it challenges the notion that there are distinct qualities and processes marking technologies as more different than similar. But there is a separate and equally compelling need to acknowledge the slipperiness of these categories, and the multifaceted uses of many contemporary consumer technologies. Iterations of smartphones have eclipsed audio and text-based communication to function more like pocket computers. Technologies are now designed to be used for work, entertainment, and play on a single device. These uses help disclose that a technology's cultural embeddedness is not ideologically or materially neutral. A technology's multistability contains very different trajectories of application and effect, some more determined and forceful than others, and so "[m]ultistability is not the same as neutrality" (Ihde, 2001, 106). A technology's

character is greatly determined by the system of use, or praxis, it is associated with; and as the same technologies are drawn into different praxes, our understandings of them may shift. Our expectations for engaging with what I will call human-sparse natural environments,[6] and our understandings of the affordances available with physical environments, stand to be affected by the way we are encouraged to view and interact with digital environments. Created to entertain, to challenge, to provoke contemplation, and even to educate, video games are no longer mere diversions. The technologies created in the service of gaming engage as little as split-second hand reflexes in reaction to the visual stimuli of fast-paced platformers or as much as our full range of bodily motion for competitive dance games, and long- as well as short-term thinking in strategy titles. Whether trivial, provocative, or profound, video games incorporate several means of relating to technologies and the world into a diverse but united selection of props, narratives, and play styles.

[6] Human-sparse natural environments include both wilderness areas as well as "green spaces" in urbanized areas where anthropocentric development has been deliberately prohibited, limited, or undone. I therefore use the term "human-sparse" instead of descriptors like "pristine" or "primitive" to indicate physical areas where direct human residence and activity is limited but not nonexistent. I also do this to sidestep concerns about conceiving of wilderness as "areas untrammeled by man," reinforcing a problematic hierarchical human/nonhuman or culture/nature dichotomy. The term is not widely used in existing literature; the only prior use I found was by Ferguson, Adam, & Jori (2012) discussing wildlife conservation programs in South Africa (p. 115).

Ludography

BioWare. 2003. *Star Wars: Knights of the Old Republic*. PC. LucasArts.

References

Clark, J. (2014). *The construction of "nature" in the virtual world* Second Life (Doctoral dissertation). Retrieved from http://purl.flvc.org/fsu/fd/FSU_migr_etd-8957

Dyer-Witheford, N., & de Peuter, G. (2009). *Games of Empire: Global capitalism and video games*. Minneapolis: University of Minnesota Press.

Ferguson, K., Adam, L., & Jori, F. (2012). An adaptive monitoring programme for studying impacts along the western boundary fence of Kruger National Park, South Africa. In M. Somers, (Ed.), *Fencing for conservation: Restriction of evolutionary potential or a riposte to threatening processes?* (pp. 105-123). New York, NY: Springer.

Ihde, D. (1979). *Technics and Praxis*. Boston: D. Reidel Publishing Company.

Ihde, D. (1990). *Technology and the Lifeworld: From Garden to Earth*. Bloomington: Indiana University Press.

Ihde, D. (2001). *Bodies in Technology*. Minneapolis: University of Minnesota Press.

Jørgensen, K. (2013). *Gameworld Interfaces*. Cambridge: The MIT Press.

Juul, J. (2010). *A Casual Revolution: Reinventing video games and their players*. Cambridge: The MIT Press.

Swink, S. (2009). *Game Feel: A game designer's guide to virtual sensation*. Boston: Morgan Kaufmann.

Verbeek, P. (2001). Don Ihde: The Technological Lifeworld. In H. Achterhuis & R. P. Crease (Ed. & Trans.), *American Philosophy of Technology: The Empirical Turn* (119-146). Bloomington: Indiana University Press.

Chapter Two: Media Influence and the Translocation of Perception and Expectation

Video game technologies tend to structure our perceptions in particular ways when engaging us with gameworlds. One question is whether use of these technologies structure our perceptual mindsets when engaging with physical, not digital, spaces. Although video games encourage a particular mindset among users when playing, their short and long-term influence cannot be reduced to a simple direct causal connection. To do so would both overstate the normative influence of video games and understate the agency of users to challenge received messages. What I call the translocation of perception, or the use of a perceptual mindset outside its intended setting, only grows more likely when users of video game technologies receive similar ideological messages from non-gaming contexts and actively agree with them. That being said, video games by themselves do exert some influence on players in how they perceive their world and how to engage with it.

This chapter begins with a brief literature review of studies examining video games' influence on player attitudes. The point is not to show a clear causal link between the perceptual mindset video games demand and the use of this mindset outside of gaming, although the literature indicates a noticeable effect on players in the short and long term. The messages players receive from video games are always contestable, even during play, and are strongest or most influential when they are one of several similar and culturally simultaneous messages that are accepted by players. Rather, my main argument is that it is the application of a perceptual mindset outside of its intended space and practice that has the potential, when supported by other cultural and ideological positions and an individual's acceptance of them, to either encourage or discourage direct engagement with what I call human-sparse natural environments. Human-sparse natural environments are those areas where humans are present and/or have an impact, but

direct engagement and residency is limited or nonexistent. This includes 'pristine' designated wilderness, green spaces in urban centers (e.g. city parks), and low-density or low-population areas. Video games demand a particular approach and mode of perception, and cultivating this for the purpose of play is neither necessarily controversial nor harmful on its own. This is not to say that the series of deliberate decisions made during game production are themselves value-neutral and not worth examining critically, only that perceptual frameworks are presupposed during play to facilitate player engagement and objective completion.[7] It is the application of those evaluative frameworks to physical, not virtual, spaces which should give us pause. The baseline for expectation about the world and our perceptions of it should be grounded in the physical, not the virtual.[8]

Video game influence literature responds to the pressure to investigate the causal relationship between video gaming as an activity and (anti)social behavior. Some studies have found an observable correlation between playing video games and player attitudes, beliefs, and actions; others have discussed implications for both short- and long-term consequences of video game play and exposure to specific scenarios. However, the literature suggests the strongest effects are seen in real-life scenarios which are substantively similar to scenarios encountered by players. This is exemplified in Ortiz de Gortari, Aronsson, and Griffiths' concept of *game transfer phenomena* (GTP). Ultimately, players are able to accept the meanings articulated by

[7] Developers and studios who fail to interrogate the systems of interaction and the kinds of representations they are producing will inevitably overlook problematic and harmful messages that exceed their intentions. For the purposes of this paper, I argue that the use of perceptual frameworks associated with specific games or gameplay mechanics *outside of those contexts of play* is itself often threatening, beyond the issues of discriminatory depictions of people, cultures, and places or specific gameplay mechanics and narrative choices foisted on players by designers. This also assumes that players can distinguish between acceptable actions in-game and acceptable actions in real life, and that choosing to model physical behavior after virtual behavior can be an undesirable decision with unacceptable social and material costs.

[8] Portions of the paper address potential benefits of using perceptual frameworks created during play outside of gaming contexts. These nuances should be read as qualifying but not negating the cautious claims I make regarding the costs of evaluating physical landscapes and places by the standards of digital spaces.

developers through the visual and spatial rhetoric of the gameworlds or challenge them. These challenges may include the creation of competing narratives and spaces that appeal to other cultural messages, as examined by Clark's study of the multiuser virtual environments comprising *Second Life*. From this review I claim that, while demonstrable influence is insufficient to assert a direct causal connection between video game play and particular forms of world-engagement, there is enough evidence to support a claim that video games should be examined critically to avoid the proliferation of harmful normative messages. I conclude by reintroducing my application of Ihde's phenomenology as it informs how game transfer phenomena may occur.

I. Literature Review: Video Game Effects on Players

My own literature review is independent of the literature review performed by researcher Joseph Clark in his dissertation on reproductions of 'natural' environments in the persistently online multiuser virtual world *Second Life*. I address the salient findings of the literature review under two headings. The first examines the measurable effects of video game play on user attitudes, beliefs, and behavior in both the short- and long-term. These effects may be negative, as with re-enactments or expectations of violence, but they may also be positive, as in the case of prosocial behavior like cooperation and empathy toward in-group members. The second heading focuses on game transfer phenomena and its similarity to the notion of a translocation of perception and expectations. The literature review concludes, in both areas, that the influence of games on users is neither entirely positive nor negative, and that GTP is not an inherently enriching or impoverishing example of applying specific frames of reference outside their intended context. Rather, it is how well a frame of reference – the sum of expectations and

perceptual inclinations – promotes the specific affordances of a space that determines whether a case of translocation is appropriate or inappropriate.

1. Immersion and Post-Play Reactions

Part of video games' influence on players can be their immersive quality, which is increased by challenging gameplay as well as photorealistic visuals and other design choices. Examining qualities of immersion and how they form part of the appeal of video gaming will form the background for why players may be affected by games even after they have stopped playing. Immersion can produce positive and negative emotional reactions in players and adjust ranges of physiological response to representations of specific scenarios. However, these influences are limited in scope, often do not translate outside of the contexts presented by video games, and are sometimes accompanied by competing impacts as through differing first-order (probability assessment) and second-order (attitude or belief judgments) effects, an issue to which I will return. Immersion has a significant role in influencing players, but is just one of several aspects of video game play and comes with contextual limitations.

Immersion as denoting degree of involvement in a game is the starting definition used by Jennett et al. (2008) when they measured immersion both subjectively and objectively. Immersion differs subjectively from other descriptors of "absorbing and engaging experiences" like flow, cognitive absorption, and presence (642) because it moves beyond considerations like temporal dissociation and awareness of surroundings to include sub-optimal experiences, and can occur even if immersion is not the intent behind play (643). Immersion is a dynamic phenomenon which occurs along a gradient from engagement to engrossment to immersion. Players are able to advance and regress through states, overcoming barriers like game preference (engagement), gameplay design and interactive possibilities (engrossment), and empathy and

atmosphere or ambiance (immersion) (642). Objectively, deeper immersion in a game resulted in less gaze movement and longer post-play task completion times. Players who became more immersed focused more on parts of the gameworld rather than scanning the virtual environment for cues or becoming distracted by visual components irrelevant to gameplay (652). More immersed players also exhibited longer task completion times when attempting tasks not related to gameplay after they had stopped playing compared to less immersed players, suggesting that "being increasingly immersed in a game decreased one's ability to re-engage with the "real world"" (657). Immersion is both a causal influence on post-play behavior and an effect of player engagement with a game.

Christou (2014) examines immersion as it relates to game appeal and player retention, or the tendency of players to return to specific games. Studying groups of experienced and inexperienced players, Christou concludes that the immersive quality of a game does not generate appeal for players so much as appeal generates immersion as "players' willingness to suspend disbelief further and become further immersed in a game" correlates with a game's appeal to them (99). That is, players are not necessarily drawn to play certain games because of the likelihood they will become immersed, but are more likely to become immersed in games that they want to play for other reasons. Although immersion and appeal are positively correlated, and can be mutually influential, the question of primacy in the causal relationship between perception of appeal and depth of immersion is one that warrants further longitudinal study. The likelihood that a player will become immersed may depend on player preference or familiarity with the conventions of a particular genre. Those used to playing single-player games may find multiplayer games less appealing and harder to become immersed in, while players used to multiuser environments may find AI in single-player games lacking compared to human-

controlled characters. Game appeal as either a component of immersion or a complement, or as both, complicates[9] explanations of not only why video games are played at all, but why specific games are played.

Immersion is influenced not only by considerations of what appeals to media users, but also by technological considerations of content and form in what are called media factors (Hou, Nam, Peng, & Lee, 2012, 617). The way that media content is presented to users, its form, can sometimes significantly influence players feelings of presence, or "the subjective experience of being in one place or environment, even when one is physically situated in another" (Witmer and Singer, 1998, 225). Hou, Nam, Peng, and Lee's investigation of screen size influence on player immersion indicates that larger screen sizes are positively correlated with players' physical and self-presence. In other words, the larger the screen used by players, the more likely they were to identify with their avatar and feel present in the digital space. Players were also more likely to report greater arousal and enjoyment when using a larger screen during play. However, some of these effects were subject to individuals' willingness to become immersed in the game and seek out these types of media experiences (622). Immersion can therefore be affected by individual resistance or openness, by the predetermined likelihood of games' appeal to players, and by tangential factors like technological presentation.

The persistence of immersion is another question informing the issue of how video games influence player behavior and beliefs. Tammy Lin (2017) examines persistent responses over the short-term among players of a virtual reality (VR) survival horror game, specifically same- and next-day fright responses. Some of these influences included the Tetris effect (seeing the game environment when closing one's eyes) (357) and game context-related fears (such as being

[9] These complications can be helpful to those discussing why players play the games they do, especially when players themselves are attempting to articulate or justify their decisions and preferences. These complications can be unhelpful for researchers by adding new variables of partially described significance and number to games studies.

attacked from behind or hearing zombie voices) (359). Although a few participants exhibiting lingering fear effects, an overwhelming majority did not exhibit any next-day fright responses. This suggests that while some can be impressionable to video games, especially during play or immediately afterwards, isolated experiences do not significantly alter player attitudes or behavior. Instead, there must be consistent exposure to several games over time to induce emotional, mental, and/or behavioral changes among players. Even then, changes may be contextual and strictly limited to real-world scenarios similar to in-game scenarios without additional influence from other sources on players.

Grizzard et al. (2015) specifically investigate mechanisms of habituation and generalization among players, using self-reporting measures regarding biophysiological and perceived arousal responses to gameplay. Habituation is defined as a decreased response to stimuli while generalization is an extension of habituation to new yet similar stimuli; both occur over time in response to familiar and unfamiliar situations (65). Biophysiological arousal was measured using blood pressure and heart rate, while perceived arousal was measured using a matrix of arousal, boredom, excitement, and stress (70-71). Gizzard et al. found that while arousal responses became habituated and were consistently observed by both biophysiological measurements and player self-reporting, arousal responses were subject to some generalization but not consistently measured across biophysiological and self-reports (78). Although players were aware of their habituation to scenarios from specific games, they were unaware of their decreased arousal to novel yet similar scenarios. They tended to underestimate their desensitization to unencountered but substantively familiar situations despite accurately estimating the effects of repeated exposure to previously encountered situations. Grizzard et al. conclude their study that, given evidence that "video games, like other stimuli, elicit the

strongest effects during their initial exposures" (79), aggressive responses may follow the same decrease in frequency and/or intensity as arousal to violent situations because "the habituation of arousal responses would suggest that at least *one* motivating factor for aggression is weakened, rather than strengthened, by repeated exposure" (80). Consistent with other studies suggesting that video game influence is strongest immediately during and after play, and in real-life situations comparable to in-game situations, Grizzard et al.'s study gestures at some of the causal mechanisms of short- and long-term influence by video games on players.

Video game influence can even sometimes suggest effects which are in tension with one another. Gabriel Chong, Scott Teng, Amy Siew, and Skoric (2012) employed a cultivation theory approach in their examination of player responses to playing *Grand Theft Auto IV*. Cultivation theory is based on the premise that media exposure over time tends to shift user perspectives so that the real world is compared to the gameworld instead of the opposite (953). Cultivation theory distinguishes between first-order effects, which are judgments "made with regards to the perceptions of probability of situations and prevalence of issues," and second-order effects, which are "judgments that indicate people's belief and attitudes" (954). Previous cultivation studies had indicated some first-order and no second-order effects, but only with regard to situations similar to in-game content (958). Gabriel Chong, Scott Teng, Amy Siew, and Skoric found some evidence of first-order effects, but only for some of the various scenarios presented in the game; players estimated higher rates of deaths in auto accidents or from drug overdose than the control group, but did not estimate more instances of death or injury from assault and other violent crimes (965). Interestingly, second-order effects were nonexistent except for one counter-cultivational estimate of greater, not lesser, difficulty in auto theft (966). This aligned with researchers' caveat that the interactive nature of video games may provide players with the

agency to dispute representations of phenomena or meta-narratives compared to the more passive observation of television (967). Photorealism also seems to play a role in cultivation that is not yet fully described, although video games are rapidly approaching the photorealistic quality of television and film (968). Although some of the mechanisms behind cultivation theory and interactive media warrant further investigation, there is some measurable influence. However, this influence is limited to similar contexts between the real world and gameworlds, and is not necessarily a strong or indisputable influence with guaranteed effects.

2. Game Transfer Phenomena

Video game influence appears to be limited in strength, restricted by context, occasionally inconsistent, and determined by several factors including immersive potential, player preference, and technological presentation. There may seem to be little danger of what I call translocation of perception and expectation, which is when players apply the cognitive and perceptual frame of reference used during digital play to physical locations and their inhabitants. Despite the lack of a strong, consistent, and direct causal relationship between play and post-play behavior, there is some evidence that translocations transpire. This is best framed as Ortiz de Gortari, Aronsson, and Griffith's (2011) notion of *game transfer phenomena*, which is supported by Greitemeyer and Mügge's (2014) review of the effects of both violent and prosocial play. These studies are linked back to cultivation theory and to questions of how influence may operate according to early work done by Williams (2006). Even if video game influence is far from guaranteed, what it looks like when it occurs ought to inform our considerations of short- and long-term effects on players.

Game transfer phenomena (GTP) is defined by Ortiz de Gortari, Aronsson, and Griffith (2011) as "phenomena that occur when video game elements are associated with real life

elements triggering subsequent thoughts, sensations, and/or behavior among players" (17). GTP can occur involuntarily or voluntarily among players and includes a wide range of phenomena from hallucinated images and automated or reflexive actions to deliberately integrating video game elements like dialogue or movement into daily life (18). Some GTP are manifest as shifts in perception. Involuntary shifts often included encounters with real world objects or stimuli that reminded players of game elements, which sometimes produced behavior that was appropriate for a gameworld environment but not necessarily a real world environment such as pushing one's way through a crowd (21, 23). Voluntary GTP included attempts to apply lessons learned from in-game action to real-life scenarios, such as laser tag, or actively imagining game scenarios taking place in real life (25). Players also reported changes in how they perceived the world in situations similar to in-game contexts; dark forests at nighttime took on new meaning for players of survival horror games (27). Overall, GTP was associated with the intensity of players' engagement with games and their willingness to entertain indistinctions between gameworlds and real life; some basic associative conditioning through repeated exposure was also theorized to play a role in facilitating GTP (28). Ortiz de Gortari, Aronsson, and Griffith were careful to note that generalizing about GTP among players remains a suspect and tentative move, and that further study on the mechanisms and strength of interactive media influence is warranted. However, the similarities between GTP and translocation of perception indicate potential outcomes of both deliberate and inadvertent comparisons of physical environments to digital ones.

Grietemeyer and Mügge's (2014) meta-analysis of studies on aggression and prosocial behavior among video game players comes to the conclusion that video games do have the potential to increase both aggressive and prosocial behavior. In examining previous studies,

including other meta-analyses, they found that there remains some disagreement among researchers on whether games produce effects on behavior based on content and repeated exposure over time (579). Grietemeyer and Mügge found that effects on aggressive and helping behavior had similar effect magnitudes (583); moreover, both violent and prosocial content and their effects could not always be clearly separated. Violent video games often included prosocial elements, such as shooters that encourage cooperation and care for teammates while promoting violence against opponents (585). The strongest social outcomes were occurred in the long-term, in cases where video games were one of several similar influences, and as more people were exposed. Their final recommendation is that the potential risks of video game play are accompanied by potential benefits (586). Similar to instances of GTP, effects of video game play could vary in intensity and included positive, negative, and neutral effects, and were strongest when additional factors reinforced rather than challenged context-specific messages.

The importance of similarity between real-life situations or places and those found in games cannot, as evident by the frequent references in this chapter, be ignored while one must be careful not to imply an influence that interactive media likely does not possess. Williams (2006) was an early cultivation study of media effects, and helped lay the groundwork for later studies examining video game influence using cultivation theory to study specific mechanisms of cultivation rather than testing "global influences and large sociocultural effects" (70). Williams found cultivation effects for precise effects on player perception but not for more general effects; players only reported perceiving an increase in the likelihood of real-life events that corresponded to events encountered in the gameworld. Moreover, longer time spent playing produced correspondingly stronger effects. The more people played, the more likely they were to adjust their expectations of real-life to match what did or was likely to occur in the game (82).

Williams tested the claims of earlier studies using cultivation theory by shifting from television to video games, and he laid the groundwork for later research into the effects of interactive media on player expectations. Given this grounding, the findings of later studies that video games may produce beneficial as well as harmful effects, exert stronger influences with greater exposure, and limit their effects to comparable situations appear sensible.

II. Joseph Clark on Virtually Constructing 'Nature'

Video games appear to affect players under specific conditions and with a measurable but not incontestable influence. Given that they are cultural artifacts, this is not unexpected; but there is also a question of what ideological messages video games traffic in. This traffic not only affects players, but is possible in part because of the actions they sponsor in reproducing or challenging dominant ideologies. Player agency is crucial to the spread of existing cultural messages and the creation of new ones. Clark (2014) examines this interplay between player agency and media transmission of cultural ideologies as it occurs in the construction of virtual nature in the multiuser virtual world of *Second Life*. *Second Life* is an online virtual world that provides a space which users can inhabit simultaneously for the purposes of socializing and virtually constructing structures, geographic landmarks, and even digital animals with preprogrammed ("scripted") behaviors. The common areas are saved on the corporate servers of developer Linden Labs, while user-specific information is saved on the user's own computer hard drive. Access is free, although users can purchase digital currency with real currency in order to acquire objects and pay for subscriptions to unlock the ability to own digital parcels of land. Clark's broad conclusions are that digital representations of natural environments are subject to numerous tensions: first, between propagating and resisting commodification of

nature; and second, between immersion in a technological medium and making mediation of immersion transparent.

Clark's study incorporates close readings of sites in *Second Life*, interviews with virtual builders and visitors, and reviewing circulated press materials about types of environments constructed and encountered in *Second Life* (86). Readings and interviews revolved around locations that were examples of: the "pastoral idyll" or "wilderness," "[t]ouristic tropical island getaways and nature-themed amusement areas, [n]atural science exhibits, [p]lant and animal vendors… [and s]ites explicitly protesting or resisting environmental real-world practices" (88-89). Each of these sites can be understood as attempts to fulfill a goal of realistic visual representation, attempting to "recreate the myth of photorealism" as it pertains to idealized human-sparse natural environments (69).[10] Ironically, many of these attempts result in sites which are "actually simulacra because their real-world referents are generic (e.g. housing developments and shopping malls)" (69-70). The result is a series of virtual locations which visually claim to represent what users may find familiar without reproducing a specific site in fallible detail. A *Second Life* locale is meant "to evoke a sense of place, [but] it is not so much a particular real-world analogue as simply a series of plausible (but decontextualized) habitats" (162). Despite this, realism is understood by *Second Life* developers as facilitating immersion and generating appeal (148). Ultimately, the possibilities of representation afforded by virtual spaces are limited because of the rapid ideological colonization of new media which results in the reproduction of existing ideas concerning nature and our relationship with it (190). Despite

[10] Competing visions of human-sparse natural environments, and even spaces which resist the notion of isolated and commodified pristine landscapes (like an inhabited post-industrial island with eco-friendly housing and public transit systems) or pristine nature and green urban spaces as guiding ideals (like a server dedicated to showing heavily polluted industrial sites) all share the standard of photorealism. The more realistic-looking a digital spaces is based on our expectations carried over from physical spaces, the more impactful – and legitimate – these mediated representations appear to be to users.

the practically limitless potential of users to produce what they consider to be 'nature' online, what is actually created are manifestations of existing understandings of what qualities as natural among individual users and top-down corporate or group-level descriptive and normative views of natural spaces in service to goals besides authenticity, e.g. profitability or maintaining hegemonic systems of domination and privilege. Virtual creations guided by a photorealistic ideal are constantly subject to technophilic evaluations and projects that purport to improve upon representations of natural environments as they matter to humans (110-111).

This limited view of what matters in terms of achieving a photorealistic ideal reflects what Clark calls "a myopic anthropocentrism that denies the existence and importance of what which cannot be seen," such as underwater environments (112). This anthropocentric focus is understandable given the context in which *Second Life* operates and the entertainment model it offers to users. Its effects, however, extend to the ways an anthropocentric perspective may fail to attend to physical realities or distort attempts at perspective-taking; while many of the ocean floors in *Second Life* are barren of virtual flora and fauna, even the deepest depths of physical oceans are home to various forms of life. Animals included in *Second Life* are often available for purchase through digital vendors, and their behavior can be modified by users so that the frequent outcome of inclusion is to make human users feel more at ease and more immersed (121, 125-127). Clark's myopic anthropocentrism also extends to sites that contest an underlying technophilic narrative. Virtual locations "set amid a dystopian landscape of industrial decay" provide resistive readings to technology-as-solution that focus on the impacts of industrialization on humans (133). But while these sites are set in blighted landscapes, the focus is not on pollution as harming something with its own intrinsic value. Rather, the message is that these places are unfit for human habitation; the intrinsic value of a landscape, or the (un)suitability of

polluted sites for nonhuman animals is conspicuously absent (136-137). Even as users attempt to engage in performative critiques of the types of environments found in *Second Life* and the socioeconomic infrastructure of its operation, their visual arguments inadvertently reinforce notions of desirable nature as pristine and/or accessible while undesirable nature is exploited and inaccessible without harm. Locations as visual rhetoric are polysemic, "offering opportunities for a variety of readings by users," (142) but the potential for readings that challenge dominant anthropocentric or economic narratives is diminished by how rarely they occur and the alternative visions they present.

III. Technology and GTP

My application of Ihde's phenomenology of technology to the specific grouping of technologies associated with video gaming requires a broad empirical context. To this end I conducted a literature review of what influence video game technologies have been shown to have on players in order to supplement the philosophical consideration of how technological mediation functions. From this literature review, I argue that video games exert a demonstrable influence on players that is not absolute, but contestable and one of several carriers of cultural messages that players have the agency to accept or reject. This claim is rooted in findings that the media effects of video games: tend to correlate positively with player immersion; be strongest with regard to real-life situations and events that correspond to situations and events encounter in games; are affected by the content and technological presentation of video games; are neither wholly negative or positive, but frequently a mixture of both; and depend on decisions made by both creators and consumers of media content. The rationale of selection of studies has been whether game developers opt to use photorealism as a guiding principle for game visuals and how the preferences of players are expressed through subjective measurements of game appeal.

User agency of video game technologies therefore plays an important role in how influential these technologies are in shaping perception and expectation, although it is similarly not absolute and can be subverted or undermined by these same technologies.

Combining Ihde's understanding of how technologies predispose and encourage us to perceive the world with the content of those perceptions and expectations allows us to consider what I call a translocation of perception and expectation may look like in practice and outcomes. The theoretical framework for this exploration is now built around the idea that the character and design of particular technologies encourages us to create and use specific frames of reference and perceptual mindsets in given contexts. The question moving forward is how applying those mindsets to actual instead of virtual environments may play out, pun intended, and whether those applications across contexts are appropriate or inappropriate. In remembering that Ihde's phenomenology details an amplification/reduction structure that increases some perceptual capabilities while reducing or eliminating others, I will argue that appropriate translocation increases our ability to perceive ways of engaging with the world. Inappropriate translocation reduces our ability to perceive ways of engaging with the world and results in an impoverished view of those spaces in which we spend most of our time, which has additional impacts on our willingness to find those spaces interesting at all. Translocation, as evidenced by GTP, is a real possible outcome of play in photorealistic digital environments; what remains to be seen is whether it should be normatively encouraged or discouraged.

References

Christou, G. (2014). “The interplay between immersion and appeal in video games.” *Computers in Human Behavior, 32,* 92-100.

Clark, J. (2014). *The Construction of “Nature” in the virtual world* Second Life (Doctoral Dissertation). Retrieved from http://purl.flvc.org/fsu/fd/FSU_migr_etd-8957

Gabriel Chong, Y. M., Scott Teng, K. Z., Amy Siew, S. C., & Skorkic, M. M. (2012). “Cultivation effects of video games: A longer-term experimental test of first- and second-order effects.” *Journal of Social and Clinical Psychology, 31*(9), 952-971.

Greitemeyer, T., & Mügge, D. O. (2014). “Video games do affect social outcomes: A meta-analytic review of the effects of violent and prosocial video game play.” *Personality and Social Psychological Bulletin, 40*(5), 578-589.

Grizzard, M., Tamborini, R., Sherry, J. L., Weber, R., Prabhu, S., Hahn, L., & Idzik, P. (2015). “The thrill is gone, but you might not know: Habituation and generalization of biophysiological and self-reported arousal responses to video games.” *Communication Monographs, 82*(1), 64-87.

Hou, J., Nam, Y., Peng, W., & Min Lee, K. (2012). “Effects of screen size, viewing angle, and players’ immersion tendencies on game experience.” *Computers in Human Behavior, 28,* 617-623.

Jennett, C., Cox, A. L., Cairns, P., Dhoparee, S., Epps, A., Tijs, T., & Walton, A. (2008). “Measuring and defining the experience of immersion in games.” *International Journal of Human-Computer Studies, 66,* 641-661.

Lin, J. H. T. (2017). “Fear in virtual reality (VR): Fear elements, coping reactions, immediate and next-day fright responses toward a survival horror zombie virtual reality game.” *Computers in Human Behavior, 72,* 350-361.

Ortiz de Gortari, A. B., Aronsson, K., & Griffiths, M. D. (2011). “Game transfer phenomena in video game playing: A qualitative interview study.” *International Journal of Cyber Behavior, Psychology and Learning, 1*(3), 15-33.

Williams, Dmitri. (2006). “Virtual cultivation: Online worlds, offline perceptions.” *Journal of Communication, 56,* 69-87.

Witmer, B. G., & Singer, M. J. (1998). “Measuring presence in virtual environments: A presence questionnaire.” *Presence, 7*(3), 225-240.

Chapter Three: Phenomenology of Gameplay in Virtual Environments

Previous chapters have examined video games in fairly broad terms, beginning with a framework for how technologies may generally affect our perceptual capabilities and expectations in Don Ihde's phenomenology of technology, and moving to a slightly more narrow focus on video games as interactive media with possible effects on players. These theoretical explanations provide context for individual encounters with video game technologies. These individual experiences are not taken as universal but as indicative of the possible outcomes of playing specific kinds of video games. In this chapter I undertake a phenomenology of gameplay rooted in my own experiences and presented through Ihde's phenomenology of technology. My specific account is intended to show where application of this phenomenological framework is illuminating as well as those instances which exceed its disclosive capacities.

I. Texts and Selection Criteria

In order to examine the strongest possible influence of play on player perception and expectations, I used the following criteria to select three video games as primary texts:

1. Developers use *photorealism* as the ideal for visual representation, even for fantasy or fictional elements. This principle is evident in both in-game graphics and in press coverage surrounding games (including interviews, reviews, and marketing or advertisements).
2. Games can be classified as *open world* titles, meaning that the player is free to choose how they move through the gameworld and are able to progress through the main narrative at their leisure, even ignoring the storyline completely if they so choose.
3. Games are primarily set in what I have called *human-sparse spaces* (spaces that are also referred to as wilderness areas, natural environments, or green spaces). This does not

mean that there are no urban areas or human settlements, merely that the majority of the gameworld is not an environment built by virtual characters.

4. Games represent a *mixture of perspectives* that players can take, as displayed by the position of the camera. I examine games that use a *first-person* (the avatar's body is not visible because players see the gameworld from the avatar's embodied perspective) or *third-person* (the avatar's body is visible because the camera is situated outside of the avatar's embodied perspective, usually behind the avatar) perspective, or allow players to switch between perspectives.
5. Games display a range of locations from the *entirely fictional* to *fictional analogues* of real-world locations. This includes virtual spaces that act as simulacra because they are not entirely fictionalized and imagined places but do not have a real-world counterpart; they instead are designed to evoke the character of a particular place in its own right.

I have selected three games in accord with these criteria: *The Elder Scrolls V: Skyrim* (2011), *Horizon Zero Dawn* (2017), and *theHunter: Call of the Wild* (2017). *The Elder Scrolls V: Skyrim* and *theHunter: Call of the Wild* were played on a personal computer (PC), while *Horizon Zero Dawn* was played on the proprietary Playstation 4 console. I also reference similar situations and gameplay mechanics found in other game titles in order to contextualize my observations, but the main focus will be on the aforementioned three.

1. *The Elder Scrolls V: Skyrim*

Originally released in late 2011 to great anticipation and acclaim for PC and the Playstation 3 and Xbox 360 gaming consoles, *The Elder Scrolls V: Skyrim* (often abbreviated to *Skyrim*) is set in the eponymous province on the fictional continent of Tamriel. It is the fifth installment in a series of open world fantasy role-playing games (RPGs). Gameplay involves

medieval weapons and armor alongside the use of magic and presence of creatures from folklore. The civilizations, technology, and architecture represented in the gameworld are best described as fantasy medievalism,[11] and most of the gameworld is made up of a variety of ecological environments that could be described as pristine wilderness. The player is allowed to switch between first- and third-person perspectives as they take part through a customizable avatar in a number of possible adventures represented by quests. After the introductory sequence, which includes tutorials on the fundamental gameplay mechanics, players are free to engage with the gameworld as they see fit. The gameworld exhibits some change in response to player progress and decisions made in response to quest prompts, but overall remains fairly constant (albeit dynamic) and does not have a defined end point past which the player can no longer continue playing. *Skyrim* adheres to a design principle of photorealism, called "epic reality" by art director Matt Carofano, even as it includes fantasy elements like lizard-folk and dragons. This aspect of the game's design was one of the first areas of modifications made by players. The process of "modding" (altering the game's code to create digital items, characters, spaces, or narratives collectively referred to as "mods," or modifications) by players using PCs resulted in the creation of thousands of mods that are shared among players via file-sharing websites and aimed at 'improving' the realism of the game's appearance and physics.

2. *Horizon Zero Dawn*

Horizon Zero Dawn is a post-apocalyptic action RPG released in 2017 for the Playstation 4. It is staged in a fictionalized version of Colorado and Utah with recognizable landmarks from the Denver metropolitan area; an expansion to the basic game allows the player to travel to the landscape of Yellowstone National Park. Set approximately a thousand years from the present

[11] The medievalist setting imagined by developers is not a historically accurate reproduction, and in some ways is not meant to be. Steam-operated technologies, literal magic, and creatures from folklore are part of the gameworld's fiction. Therefore, any claims to 'realism' should be evaluated in a context that presupposes unrealistic elements.

after the creation of advanced robotics and a civilization-level global catastrophe, humanity lives in pre-industrial hunter-gatherer tribal societies. Most of the gameworld consists of what may be regarded as rewilded green spaces; signs of human habitation are initially restricted to villages of wooden structures and ruins of contemporary cities, although as the player progresses they travel to cities and military structures assembled from stone. Spaces outside of settlements are populated by a variety of nonhuman animals and robotic machines modeled after animals such as crocodiles, eagles, and rams. Players are confined to a third-person perspective, although the camera is not fixed to the direction of the avatar Aloy's gaze and can be rotated around her. *Horizon Zero Dawn* implements a form of hyper-realism inspired by the presentation of BBC nature documentaries according to art director Jan-Bart van Beek, so that while individual elements of the gameworld are photorealistic, the way that they interact to form landscapes maximizes the awe-inspiring quality of the environments that the player traverses.

3. *theHunter: Call of the Wild*

theHunter: Call of the Wild (hereafter *theHunter*) is a hunting simulator game released in 2017 on multiple platforms. Players are able to select from one of two hunting grounds in the basic game; a third can be purchased as an add-on. Each hunting ground is intended to represent a particular area, but does not possess a real-world counterpart; it functions instead as a simulacra evoking the feel and characteristic look of the American Pacific Northwest, forested Central Europe, and the Siberian taiga. Players are locked into a first-person perspective during the game. Although there are short narratives ("missions") involving the player helping virtual human residents of the various reserves, gameplay revolves primarily around the player tracking and shooting animals using firearms, bows, and luring equipment such as calls or scents. The reserves are scarcely populated by humans, and the largest encampments are small campsites

with bunkhouses; there are no large permanent settlements. The game claims to offer as an experience to players that is as realistic as possible. Photorealism is therefore one of several design principles aimed at increasing player immersion that include simulated animal behavior and simulated physics systems including ballistics and scent carried by wind.

II. A Phenomenology of Gameplay

Using *Skyrim*, *Horizon Zero Dawn*, and *theHunter* as specific case studies, I will describe notable experiences I had while playing these games in this section. At times I will make reference to similar experiences or gameplay mechanics in other titles to reinforce that the three selected titles are representative examples of specific gameplay mechanics as well as technological and game genre conventions. These experiences will be framed through Ihde's phenomenology of technology and associated scholarship, as cited earlier in this investigation.

1. To Sprint, Hold the 'Shift' Key (Embodiment Relations)

In *Skyrim* and *theHunter* the game's control scheme uses a keyboard and a mouse. In my case these devices are connected to the computer via a wireless connection using a USB receiver plugged into an appropriate port, rather than connecting them via an attached wire. A keyboard and mouse setup exhibits what Jesper Juul calls low compatibility between player movement in physical space and avatar movement in 3-D space (what I call the *gameworld*). They are less mimetic controllers because if I press a specific key ("W") with my finger, the avatar does not press a key in the gameworld with their finger but begins to run forward. The relationship between player input and avatar output, i.e. behavior, is thus arbitrary and at times frustrating. There have been occasions where I press a key in order to make my avatar move forward and they move further than I intended, walking off of a cliff. Adjusting the rate of camera movement, which is linked to the sensitivity of mouse input, is frequently necessary for me because the

camera may rotate too quickly or too slowly. As a result, I am unable to sensibly perceive the gameworld and move my character through it, or cannot react quickly enough to in-game stimuli to engage meaningfully with other entities (such as not being able to aim at a moving enemy because the camera does not keep pace with their speed). This also means that my actions in real-life do not literally reflect what I am commanding my avatar to do. Frantically clicking the left mouse button bears little resemblance to my avatar's furious sword swings, and holding the right mouse button drastically simplifies the action of raising a rifle up against my shoulder in order to look though its scope.

This arbitrary relationship between keyboard/mouse inputs and avatar behavior is mitigated by standardized control scheme layouts among games. Most games will present movement in terms of forward/backward and left/right axes tied to the four directions of the arrow keys (up/down, left-right) or what is called the QWERTY layout (where players use the W, A, S, and D keys in place of the arrow keys). This is part of a larger industry trend that extends even to platform-specific controllers, wherein the left hand controls avatar movement and the right hand controls player view (i.e. camera direction). Learning curves for video games are not as steep as they could be in light of this voluntary standardization among developers, although many games come with slight variations on the standard model. One such instance occurs in the *Mass Effect* series by BioWare, where the input for sprinting changed from being the shift key in the first game to the space bar in the second, resulting in momentary confusion when switching between games. Familiarity with this arbitrary relationship can also present an obstacle when using game technologies that have a different standard, such as playing a game on a Playstation console and not a PC. I often forget which buttons are linked ("mapped") to which actions and where the buttons are located on the controller, forcing me to look down at the

controller and away from the screen. This stands in stark contrast to not having to look at the keyboard when playing PC games to know where the usable keys are located on the device. Because I use the computer more often (both for play and professional purposes like typing papers) I am accustomed to a specific physical layout, and my muscle memory reflects this.

Mimesis is slightly higher for the control scheme used in *Horizon Zero Dawn* because the proprietary Playstation controller conveys a much smoother feeling of association between player input and avatar behavior. Rather than simply pressing keys and clicking mouse buttons, the Playstation controller uses gyroscopic sticks and 'trigger' pads. This allows players using the controller to rotate sticks using their thumbs through 360 degrees of motion and mimic the squeezing of a trigger to perform certain actions through the avatar. Although I find aiming to be more difficult and less precise when using a console controller rather than a mouse, I have more confidence in the amount of control I have over my avatar's movements when using a controller because the range of movement is contained in a full circle rather than in combinations of four cardinal directions. Other gameplay aspects such as pressing the trigger pad on the left to nock an arrow (to place it on the bowstring) and draw the bowstring, and pressing the right trigger pad to release the arrow, conform to past experiences with games where combat design results in mapping the act of aiming a weapon to the left hand and the act of firing a weapon to the right. This in turn relates to the way many people, myself included, handle real-life weapons. The weapon is pointed in a general direction using the left hand, which also supports most of the weapon's weight, while finer aiming and projectile release is controlled by the right hand.

Most interestingly, the relatively limited mimetic potential of the controls does not preclude the rest of my body from reacting strongly to game stimuli. During especially tense situations (e.g. my avatar's health is low, my avatar is being chased by an especially frightening

enemy, there are multiple enemies surrounding my avatar) I will react subconsciously by pressing more forcefully on keys (even though this has no effect on how quickly or effectively the action is performed) and moving my body from side to side, in much the same manner as a racetrack driver shifts their weight during turns, in a vain attempt to get my avatar to move faster. During calmer moments, like aiming over a long virtual distance, I will lean closer to the screen and even squint – even though the entity I am aiming at does not exist past the screen because the screen functionally flattens space, and my squinting does not make the image any clearer. These reactions do not go unnoticed, but it is usually after the fact that I become aware of how I am responding. In addition, even low mimesis controllers do not allow me to adopt just any bodily position while playing. I cannot lay on my back parallel to the screen, or rest on my stomach with the keyboard and mouse on the floor for my cat to step across, without impairing my ability to respond to game stimuli. The optimal playing position is sitting upright in much the same way that I do when typing at a desk. Although the abstract character of the controls is not mimetically immersive, it is not so unrelated that I can be engaged in thematically opposing physical and mental activities. My physical actions either align with the activity taking place in the gameworld or do not interfere with my mental focus on the cycle of prompts and response undergirding play.

2. The Path Up the Mountain is Marked by Painted Ledges (Hermeneutic Relations)

In *Skyrim* and *theHunter*, the first-person perspective allows developers to present the world to the player in ways that imitate perceptual lenses we may use when exploring human-sparse areas. When looking for a hiking path up a mountain, I don't look for a brightly colored neon line or a paved sidewalk. Rather, I look for visual cues that indicate previous passage by

human and nonhuman animals: worn or shortened grass, a narrow line of dirt, proximity to more clearly demarcated paths or roads, etc.

Figure 12. A dirt path up a hill in *theHunter*, leading to a lookout tower (not visible).

These are not the only ways I might be able to walk up a hill or mountain, but they are certainly the easiest and the fastest. In some cases, terrain might be impassable because it is too steep or because the developers placed an invisible barrier as a means of guiding the player to certain narrative and interactive points. In these cases, there may be visual cues in the form of different colors or patterns on the landscape ("textures") to indicate terrain that can or cannot be traversed. Movement through terrain may also be affected by the avatar's (in)ability to jump.

Figure 13. A path leading into the mountains in *Skyrim*, viewed from the first-person perspective. The right side, marked by a steep grade and snow-covered gravel, is too steep for my avatar to traverse.

While *theHunter* includes a jump ability for avatar movement, it is fairly limited – so limited, in fact, that I forgot that it was available and hardly used it. The same ability in *Skyrim* allows my avatar to jump across gaps and onto suitably low ledges or steps. Learning to judge which gaps a character is able to jump across, and which jumps require a running start or more precise timing, is a skill refined over time. It can also be affected by switching between perspectives because it is easier sometimes to judge when to jump from one perspective than another.

Learning to read the gameworld is more important in *Horizon Zero Dawn* as certain locations are inaccessible without following specifically designed routes. To indicate to players where to look for grip and passage while climbing, developers use one of two options. The first are embedded wooden posts and ropes strung between them, all painted yellow. These posts and ropes not only provide handholds for Aloy, but guidance on how to move forward and upward.

They also indicate, within the fictional context, the presence and close proximity of human characters in the gameworld. Finding posts and ropes leading up the side of a hill or mountain is usually a reliable indicator that there are other human characters (non-playable characters, or "NPCs") and inhabited human structures nearby.

Figure 14. Inserted into gaps in the rock, yellow posts and rope lines (upper center and middle right) provide easier hand and footholds for Aloy than bare rock. She grips a single post, bottom center. The far center right contains a graspable rock ledge; in the upper right is a wooden platform with a zip line attached to a wooden post.

Figure 15. Aloy climbs at night, gripping a rock ledge marked by white chalk or paint (center, slightly bottom). The next available handhold up the cliff is a pair of yellow-marked posts driven into the rock and connected by a short wooden beam (upper right).

The second set of cues developers use are ledges and small rocky outcroppings that have white markings on their uppermost edge resembling chalk, snow, or paint. These ledges do not carry the same in-game social meaning that implanted posts and ropes do, even though their instrumental value is a clear result of anthropocentric decisions made by game developers. They indicate that although Aloy has entered a domain of wildness far from civilization, there are still ways for her to move through the world that depend on skills she has developed over time.

Figure 16. Marked by chalk, snow, and/or white weathering, the top of the ledge (upper right) indicates where Aloy can grab to pull herself up from the ledge she is currently grasping on the mountainside (center, slightly right).

Visual cues also serve an important purpose in terms of facilitating immersion in that they function as means of conferring skill on the player that their avatar allegedly possesses. Aloy is presented to players as an accomplished hunter and an agile, athletic person capable of meeting the challenges of moving around the gameworld on foot and engaging in strenuous combat against human and robotic enemies. In short, I am presented with a character who has spent years learning many skills necessary for her survival without actually witnessing or participating in those years of practice. By marking usable ledges with clear visual cues that I can learn to recognize within a few hours of playing, developers allow me the illusion of being as skilled in reading the landscape as Aloy must be. The textures act as a discursive shorthand. The end result is not only that I can move around the gameworld through my avatar, but that I more easily accept the fictional narrative that asserts that my avatar is a skilled explorer, climber, and

fighter. A similar dynamic is at play in the climbing mechanics for characters like Lara Croft in the rebooted *Tomb Raider* (2013), Nathan Drake in *Uncharted 2: Among Thieves* (2009), and Altaïr Ibn-La'Ahad, the eponymous assassin of *Assassin's Creed* (2008). These games feature extensive climbing for the players to progress through the narrative by reaching specific gameworld locations and solving puzzles. The situations they find themselves in would certainly confound an amateur climber like myself; I've lost count of the number of times I have thought, "How am I supposed to get up there?" In real life, I haven't learned to read cliffs or buildings the ways Aloy, Lara, Nathan, and Altaïr have. Nor would I be physically conditioned to take advantage of those insights, even if I had them; seeing a way up does not mean I possess the strength or nerve to take it. Visual cues like paint-marked ledges and different textures allow me to circumvent this lack of skill. In a few hours I can learn to do, in a rudimentary sense, what these characters have spent years training to do so that new paths and possible ways of moving through the world become perceptible.

3. Adventure.exe (Background Relations)

The differences in background relations between the two platforms, PC and Playstation 4, produce different demands and afford different possibilities. They are also nested in slightly different webs of production and consumption. While *Skyrim* and *theHunter* offer more flexibility for how and where I play, *Horizon Zero Dawn* provides players with a more easily socialized experience. Although *theHunter* is the only game in this study with a multiplayer option that would allow me to play in the same virtual space as other players via avatars, I have not used this mode. The result is that social connections arise from aspects of video gaming tangentially related to actual play.

Skyrim and *theHunter* are both games that I play on a PC, despite them being available on the most recent versions of gaming consoles (Xbox One and Playstation 4). Much of this is tied to their availability via Steam, a digital content distribution platform for video games, and the ease of modifying games on PC relative to consoles. Steam allows users to obtain copies of games through digital purchases or by entering in verification codes from physical CD purchases. Once games are registered to a user's "library," the user can play them on any device which has the base Steam application installed. Play becomes ubiquitously accessible, provided the physical equipment of the computer is able to meet the demands of the software. This rising barrier to entry for visually realistic games drives up the cost of computer components and specially designed desktop and laptop computers. Top-of-the-line computers can cost thousands of dollars and represent a significant investment into the pastime, even if they will run software at the highest levels of quality for many years. Whether players purchase preassembled computers or purchase components to assemble the computers themselves, PC gaming as a technological practice currently occurs among a web of financial, knowledge, and skill requirements.

PC games are also easier to mod than console games (which in many cases do not allow modding at all) which opens up new and sometimes radically different ways to experience the same content. Developer response to modding can vary, but the studio behind *Skyrim* is famous among players for encouraging them to use the foundational software (the "game engine") to modify the standard-issue game and create new digital assets ranging from minor appearance alterations up to entire new quest narratives and locations. The institutional framework created around intellectual property and its enforcement forms the social context for modding. Modding itself depends on the selective enforcement of copyright and the dedication of players who create

mods as a hobby or volunteer project. Although I have no mods installed for *theHunter*, I have installed approximately 40 mods to *Skyrim*. These mods have added new armors and weapons consistent with the game's art style, but more importantly have also added new wildlife sounds and gameplay mechanics that allow my avatar to be affected by the gameworld's weather. I will elaborate on these dynamics in the following section on alterity relations, as they substantively influence my perception of the gameworld as an affective environment.

Horizon Zero Dawn as an intellectual property is exclusive to Sony Interactive entertainment, and is only available to play on the Playstation 4 console. Gaming consoles enjoy and suffer from the consequences of specialization, and incorporate features meant to encourage players to see gaming as an activity with social as well as individual dimensions. Consoles are designed for entertainment and can play films or television shows on DVD or Blu-ray discs as well as video games, but they lack the professional versatility that comes with PCs that can use office-specific software. On rare occasions gaming consoles have been repurposed, as in the famous case of the U.S. Air Force's Condor Cluster[12], but overall gaming consoles are a material indication of the user's dedication to video gaming. The production and purchase of gaming consoles therefore exists in a globalized context of specialization and consumer capitalism in a much more overt way than PCs (which are not exclusively created for entertainment and can be used to resist dominant institutions and entrenched power dynamics through practices like cyber-activism, or "hacktivism"). My own individual use reflects this systemic context; the console is only used for entertainment, and primarily for playing games rather than watching films. The

[12] In late 2010, the U.S. Air Force connected 1,760 Playstation 3 consoles together with 168 graphical processing units to form a supercomputer tasked with radar enhancement and artificial intelligence research. Named the Condor Cluster (CC), the supercomputer was an attempt to generate cost savings and environmental sustainability. The total cost of the system was approx. $2 million USD (compared to a $20-$40 million conventional supercomputer) and was predicted to consume 1/10 the power of comparable supercomputers. The CC was decommissioned by late 2014.

games that have been played socially have been games played with my partner in the same room. During these play sessions we each use a controller that is connected to a single console, and the on-screen display is split to present both perspectives of our selected avatars.

This singular focus on entertainment and play has allowed Sony to create an entire system of reward and sociability around the practice of gaming on their consoles. Playstation Network provides players with a profile, similar to social media, that displays their achievements, games played, and other information that players may want to know about one another.[13] Metadata is also available, as Playstation Network allows players to view their performance relative to all players on the network. Players can view, for example, what percentage of all players of a certain game have completed the requirements for a particular achievement and compare themselves. The fact that this information is publicly accessible by members of the community means that all play, even for games with no option for playing with others, is inherently socially meaningful. While this kind of information is also available for PC players who use the Steam platform, it is not always as relevant to a player's experience and can be rendered inaccessible by users changing their privacy settings. The availability of this contextualizing information led me to the revelation that I had, at one point in playing *Horizon Zero Dawn*, progressed further along in the main storyline than a majority of other players (a surprising number of whom had not even played past the introductory narratives, perhaps indicating a lack of interest). Playstation Network can also intrude upon play at times to notify a player when a member of their social network is online or when the player has earned an achievement (a "trophy") for performing a particular in-game action. Rather than being perceived as invasive and unwelcome, these notifications – complete with a short chirp – often

[13] This information is also valuable to Sony and developers as they analyze player responses to games and playing habits. In addition to influencing future game and console development, this information can also be used for more effective and targeted advertising campaigns.

left me surprised and delighted at the recognition of having successfully found an item or bested an opponent. In this regard console play presents itself as readily being more socially aware and engaged than PC gaming, even when I play through a self-contained single-player narrative.

4. Get In Loser, We're Going Exploring (Alterity Relations)

By far the most engaging aspect of video games is the opportunity to explore vast worlds: entire collections of narrative and action and perspective that can be investigated through exercise of the player's agency.[14] Part of this experience is the sense that the player, through their avatar, comes to inhabit a world with its own history and momentum that nudges the player along as well in responding to them. In this section I will restrict myself to discussing weather, which altered my mode of play and movement through the gameworld, and affective vistas that drew me out of a more task-oriented mindset and into an attitude of contemplation and appreciation.

In *Skyrim* and *theHunter* the basic game includes dynamic weather, or simulated weather systems that change over time. Not only does this increase immersion by making the gameworld feel like a living system, but it is also necessary because of the variety of biomes represented in each game. *Skyrim* is a land with towering mountains, frigid swamps, lush pine forests, and rolling plains; it would be insensible for them all exhibit the same weather. Similarly, *theHunter* allows players to travel to areas with vastly different geographies and animal populations, and its

[14] While other media can be explored through the imagination, interactive media grants access to worlds created through art in a substantively different way. This difference became more apparent in a conversation with my partner, who had received a collection of concept art in a book titled "The Art of *Uncharted 4: A Thief's End*." I remarked that many of the places and scenes depicted were of similar quality to pieces found in art museums. Her response was that these pieces could not only be admired from a metaphorical distance but explored and enjoyed at the player's whim in the game. The barrier of the canvas was nonexistent in virtual space, and she was allowed – encouraged, even – to investigate the interior of a ruined castle in a virtually embodied way not possible with more established art forms. I also observed that, unlike dynamic media like film and television, video games allow players to decide what is worth paying attention to without being restricted by the director's or cinematographer's perspective. In this way it more closely resembles interactive or performance art exhibits, albeit with less actual physicality.

realism depends on appropriate weather in each locale. However, there are few or no effects on the player's avatar. A blizzard in the basic *Skyrim* does not threaten me with hypothermia, and rain in *theHunter* is a mere annoyance that temporarily obstructs my vision.

Modding allows players to introduce effects from gameworld weather onto their avatar. This can increase the challenge a player feels and potentially facilitates immersion (although having to micromanage how one's avatar responds to weather effects can quickly devolve into a tedious, immersion-breaking endeavor). Some of the mods I have installed for *Skyrim* insert new gameplay mechanics into the game that are present in other titles published by Bethesda Softworks (such as *Fallout New Vegas* (2010), which includes a mode wherein my avatar must regularly ingest radiation-free food and drink, and get regular amounts of sleep, in order to stay 'healthy'). My favorite among these installed mods is called "Frostfall," and forces the player to attend to how warm or cold and dry or wet their avatar is. Players are given the ability to build campfires and shelters, and must pay attention to what clothing they wear to avoid perishing from cold in a blizzard or freezing to death in an alpine lake.[15] Although Frostfall makes the game more difficult in some respects, I find it an enjoyable addition because it forces me to attend to the gameworld as it presents itself, rather than forcing it to conform to my desires. It also increases my sense of immersion and the enjoyment I gain from role-playing; I no longer use the "fast travel" option, which teleports my avatars between locations in the gameworld. I instead travel on foot or by riding a horse from place to place, which opens me up to more spontaneous encounters that reinforce the feel of the gameworld as a dynamic autonomous system.

[15] Players are able to adjust the settings for the mod so that their avatar loses consciousness and is miraculously rescued when reaching certain levels of cold rather than dying. While failing to fully embrace the spirit behind the mod, these technical options safeguard player agency over how to balance risk management and pleasure during play.

While *Horizon Zero Dawn* includes a similarly aesthetic dynamic weather system, the gameworld's ability to affect players like myself cognitively and emotionally rests in the visual presentation of the gameworld and the real-life locations fictionalized within. One of the most vivid recollections I have is stopping on my way to hunt a particularly large and dangerous machine to enjoy the sunrise. As Aloy stood on the hillside overlooking the valley, grass swaying in the breeze, the sun rose over the mountaintops in the distance. I was so drawn out of my task-oriented mindset – go here, destroy this machine, go someplace else for a reward – that I let the controller rest in my lap, fingers relaxing away from the buttons and joysticks, and watched the clouds pass across the sky as the light changed from a deep rose to brilliant gold and finally a warm, clear white. This took no longer than five minutes, but it was a peaceful and absorbing five minutes that felt far longer.

Another similarly affective encounter I had was when I stumbled upon a ruined building that looked vaguely familiar. The remains of its sharp triangulated roof jabbed upward into the night sky in an aligned series, reminding me of the chapel at the Air Force Academy near Colorado Springs. I mentioned this excitedly (and a little incredulously; could this really be what I thought it was?) to my partner, that I was so sure that I had just found the chapel despite this being a fictional work. She looked up information on the game's narrative premise online and not only confirmed that these were supposed to be the ruins of the Air Force Academy (renamed the "Air Combat Academy"), but that the entire game was set in Colorado and Utah, where I had grown up. From that point forward I could no longer see the gameworld as another fantastic series of environments, valuable for their own beauty and the grace (and danger) of their inhabitants. It became an intimately familiar place, measured against my own memories and

experiences.[16] This led me to excitement over discoveries like the Denver Broncos football stadium, Red Rocks Amphitheater, Arches National Park near Moab, Utah, and Lake Powell – all places I was familiar with, having visited them years ago. Having such an intense emotional connection over shared spaces fundamentally altered my perception of the gameworld and Aloy's movement through it, including a newfound sense of loss and awe at the speculative future the developers had imagined. These sorts of speculative histories can even encourage reflection on ethical ways of being in the world, creating a reverse moral hazard that in turn generates preventative behavior to avoid the same sort of devastation in the real world.[17]

III. Necessary Compromises: Gameplay, Enjoyment, and Realism In Tension

In the previous section, I used Don Ihde's phenomenology of technology to interpret my own experiences playing photorealistic video games on both a computer and a specialized gaming console. These sets of technological relations contextualized the ways technology structured my experiences, even making them possible in some respects. However, there are aspects of video gaming as a technological practice which these relational structures cannot easily make sense of. Gameplay is subject to demands besides immersion. Games are seen as needing to be fun and responsive without proving to be tedious and burdensome. This can lead to representations that move away from realism, and mechanics that distort player's experience of the virtual space in ways desirable both to developers and to players. Gaming is built upon a

[16] The fact that I was living in Boulder, Colorado at the time when I first played through *Horizon Zero Dawn* only strengthened my emotional reactions, such as the wonder, awe, and joy at seeing places I had experienced being seen as a worthy setting for a grand science fiction adventure.

[17] Moral hazard is the concept of increasing risky behavior when insured against consequences, which decreases incentives to investigate alternative solutions to problems. Reverse moral hazard is the concept of a solution compounding existing problems or creating new ones, often prompting a search for other solutions. My sense of loss when presented with the ruins of civilization and some ecological collapse can be read as the roots of a reverse moral hazard that would motivate greater environmental concern and care. Although this is a legitimate reading of my experience, it applies only to my vision of the fictionalized gameworld and may not hold true for others, let alone a majority of players (many of whom may not be as familiar with the real-world places depicted in the game, and less likely to feel a sense of loss as keenly or at all).

series of compromises between realistic depictions of space, narrative constraints, effective but continually novel gameplay mechanics, and providing players with pleasant experiences.

The depiction of space and time in games, particularly open world titles, is subject to distortions deemed necessary for effective tolerable movement through the gameworld. Space is frequently scaled down so that travel becomes more manageable. This sometimes leads, on reflection, to absurd premises and outcomes. In *Horizon Zero Dawn*, Aloy travels on foot unless she tames a robotic mount (a machinic equivalents of horses, cattle, and rams) by hacking it. Given the scale of the gameworld, she is incredibly fit. Players can run without a break from the fictionalized remains of Colorado Springs to Denver (a real-world distance of approximately 60 miles) in a matter of hours, and certainly in the same day.[18] Thankfully, it does not take players that long to move their avatar between points in the game because the virtual physicality of the gameworld is compressed together so that relevant entities, i.e. locations, are literally closer together. This compression of space necessities another distortion by developers, that of time. In *Skyrim*, the default setting is a real-time: game-time ratio of 1:20. One real-life minute is thus the equivalent of 20 minutes in-game. Although this can be altered by players, it is necessary to preserve the sense of scale developers intended. Alteration may result in cities in the gameworld being minutes or hours apart rather than days. Despite the fact that this is less realistic (in the sense of not being a faithful, 1:1 reproduction of space and time), it is deemed necessary for games to be enjoyable. Few games have attempted to make the same demands on players that the activities they represent do in real life,[19] in large part because realism regarding certain activities

[18] I do concede that this sort of athletic performance is not impossible. One can estimate taking 7 hours to run, at an average pace of 7 minutes per mile, from the Air Force Academy Chapel to Sports Authority Field. However, given the other fictional constraints – the equipment Aloy carries in her inventory, the clothing she wears, the uneven terrain, and the need to avoid conflict – it begins to seem highly unlikely to do once, let alone consistently over time.
[19] The 1998 game *Desert Bus* is one infamous example. The game puts the player in the position of a bus driver driving from Tucson, AZ to Las Vegas, NV in real-time and no ability to pause the game. The result is an eight-hour trip demanding constant attention, as the bus is misaligned and will drift off the road if left unattended.

hinders instead of facilities immersion and enjoyment. Players tend to regard travel as something to be avoided or enjoyed under certain conditions, provided there is always the option to circumvent it.

The effects of narrative constraints on gameworld representation also test the limits of a phenomenological framework focused on technologies mediating between users and the world they immediately inhabit. Premises can undermine any claims to realism that video games might make; however we may desire things to be otherwise, the plausibility of the dragons in *Skyrim* or the animalistic machines in *Horizon Zero Dawn* does not make them anymore an actual part of physical reality as we understand it. In extreme cases video games narratives can cause us to question whether the world being mediated is not an alternate reality presented in an interactive format but a technologically realized delusion. The game *Hellblade: Senua's Sacrifice* (2017) leaves players to grapple with this ambiguity, as the ending is deliberately unclear whether Senua's journey was actual or imagined during a prolonged psychotic break. These deliberate distortions, presented alongside claims of realism and pleasure stemming from escapism and power fantasies, poses a problem for a framework which is predicated on technologies mediating between users and an actual, undistorted world. Ihde's relational sets assume that the user of a given technology always has the option of an unmediated engagement with the world independent of that technology.[20] Video games do not offer this to players, even in virtual reality; the player only accesses the gameworld through a perspective shaped by technological potential and limitations, and developers' imagination, creativity, and design choices. The world of the game is always already mediated, even as it and its creators claim otherwise. Narratives,

[20] This phrasing is not meant to suggest that our innate, i.e. biological, perceptual capabilities may or may not themselves constitute a kind of mediation. However, it is my operational position that inherent perceptual capabilities are not comparable to technological mediations, inasmuch as consciousness is emergent but inseparable from our physical and embodied being. The opposing position, that these innate capabilities are another form of mediation, invites a problematic Cartesian-esque dualism.

mechanics meant to produce pleasure and a sense of skill, and design goals like immersion and photorealism provide a number of interesting combinations for developers working through their interplay to create games.

IV. Translocation of Perception and Expectation Between Digital and Physical Space

Ihde's phenomenology of technology does not easily account for demands common among video game design, but this does not disqualify it from helping articulate some of the cultural and normative significance behind video games as a set of technologies and their associated praxes. His theory carries an implicit assumption that lends itself to consideration of video games as a template for how we engage with the world. Grouping technologies into sets of mediating relations not only assumes that what is significant are particular relational qualities, but that some are more relevant than others when describing how a technology does and can perform a mediating function. Exposing these assumptions and their implications allows us to discuss what I call a translocation of perception and expectation, and has elsewhere been identified as game transfer phenomena.

Evaluating the appropriateness of a perceptual lens, or a conceptual framework with certain expectations about the character of reality, involves reflecting on Ihde's notions of multistability and the amplification/reduction structure behind technologically mediated relationships. Rather than a strict binary of appropriate and inappropriate instances of use, technologies and their uses can be evaluated along a spectrum between these two points and described in terms of being more or less appropriate. The least appropriate cases can then be called inappropriate applications of a technology, or of the perceptual lens and conceptual framework associated with it. The informative criteria is the amplification/reduction structure: an appropriate use of technology or perceptual mindset is one that reveals more possibilities for

interaction than it eliminates. An inappropriate translocation is therefore the application of a perceptual frame to a context which results in it obscuring more potential engagements than it discloses. Misclassifying a technology's use as being appropriate when inappropriate (and vice versa) is not a misidentification of what qualities a technology possesses as it mediates between users and the world. Instead it is a normative evaluation of the specific technological relationship's structure between user and world, which overemphasizes or downplays the significance of particular trajectories depending on the circumstances of its use. Although technologies are multistable, some trajectories are more stable than others. They are more likely to produce certain outcomes and behaviors by virtue of how they mediate our experiences and shape our perceptions. Likewise, some uses of conceptual frameworks derived from mediated interactions are more appropriate in given contexts than others, and their inappropriateness comes from applying a perceptual lens to a situation or entity for which its use is ill-suited.

The peril and promise of translocations is the potential for users of a technology within its most appropriate context – those situations to which its relational structure is most suited to increase disclosure – to attempt to apply the same frame of reference to a different context, or even with a different technology (or an absence of technology). The promise is that perceiving the world and thinking about specific situations using a technologically mediated frame of reference may inspire thoughts on new ways of being in and moving through the world. The peril is that these lenses may obscure our vision, even blinding us to new and existing possibilities. As evidenced by studies showing that video games influence players in ways broadly similar to other media, the question is not whether translocation of perceptual frameworks and expectations occurs. It does. Rather, the question I will attempt to address is whether translocation should occur, and in what direction it should flow. Accordingly, there is a question concerning video

game technologies: whether they should form a baseline for our experiences of physical spaces, or whether our physical encounters should shape our judgments of digital places.

Ludography

Bethesda Game Studios. 2011. *Elder Scrolls V: Skyrim*. PC. Bethesda Softworks.

BioWare. 2007. *Mass Effect*. PC. Microsoft Game Studios and Electronic Arts.

BioWare. 2010. *Mass Effect 2*. PC. Electronic Arts.

Crystal Dynamics. 2013. *Tomb Raider*. PC. Square Enix.

Expansive Worlds AB. 2017. *theHunter: Call of the Wild*. PC. Avalanche Studios.

Guerrilla Games. 2017. *Horizon Zero Dawn*. Playstation 4. Sony Interactive Entertainment.

Naughty Dog. 2009. *Uncharted 2: Among Thieves*. Playstation 3. Sony Interactive Entertainment.

Ninja Theory. 2017. *Hellblade: Senua's Sacrifice*. PC. Ninja Theory.

Obsidian Entertainment. 2010. *Fallout: New Vegas*. PC. Bethesda Softworks.

Ubisoft Montreal. 2008. *Assassin's Creed*. PC. Ubisoft.

References

Freund, M. (2014, December 28). College researcher makes supercomputer from 420 PS3s. *Hackaday*. Retrieved from https://hackaday.com/2014/12/28/college-researcher-makes-supercomputer-from-420-ps3s/

Hanson, B. (2011, January 26). The Art of Skyrim. *Game Informer*. Retrieved from http://www.gameinformer.com/b/news/archive/2011/01/26/the-art-of-skyrim.aspx

Hernandez, P. (2017, March 23). *Horizon Zero Dawn* looks unnaturally good because of 'hyper-realism.' *Kotaku*. Retrieved from https://kotaku.com/horizon-zero-dawn-looks-unnaturally-good-because-of-hyp-1793570455

Littell, C. (2010, November 17). AFRL to hold ribbon cutting for Condor supercomputer. *The Official Web Site of the Wright-Patterson Air Force Base*. Retrieved from https://web.archive.org/web/20101209141211/http://www.wpafb.af.mil/news/story.asp?id=123231285

Chapter Four: Virtual Eyes Viewing Real Skies: Blurring Perceptual Lines Between the Digital and the Physical

So far, I have used Don Ihde's phenomenology of technology to frame my experiences playing photorealistic games set in digital representations of human-sparse natural environments. This individual testimony is contextualized by an examination of the influences that video games as interactive media have on users. These influences are strongest when real-world situations are comparable to situations encountered in games, but are always contestable and one of several cultural messages – sometimes competing, sometimes complementary – that users are exposed to in our contemporary media-saturated societies. My concern has been whether players, who take the perceptual mindsets that they have cultivated through digital play and apply them to physical places, engage in an inappropriate translocation of perception and expectation that limits rather than expands their ability to perceive affordances and polysemic meanings concerning the world. In this concluding chapter I argue that there is both peril and promise (not in equal measure) in transferring digitally derived frames of reference across interactive contexts. There are implications for the future of conservation movements and the ability of individuals to engage with the world that reflect great anxiety and great hope. Although I try to adopt an optimistic approach, I believe that frankness concerning troubling possibilities and significance of certain directions and trends of development is well-warranted, necessary, and conducive to a healthier and more ethically engaged culture. I conclude by gesturing at avenues for future research on the interplay between video games and digital representations of human-sparse natural environments.

I. Translocations

What I call translocation of perception and expectations is similar to the documented concept of game transfer phenomena (Ortiz de Gortari, Aronsson, & Griffith, 2011). It is the act

of taking a frame of reference or a perceptual lens that is produced for use in one context and attempting to use that same mindset in another context; the location of application is transferred from one to another. This can be deliberate or inadvertent, and each poses its own unique dangers and opportunities. Perception and expectation do not have to be translocated together, although it is difficult to apply one without the other. What we expect to perceive often causes us to seek out corresponding stimuli, and what impresses itself upon our senses most often shapes our predictions for the future. Nonetheless, I examine the potential positives and negatives of translocations of perception and translocations of expectation separately. These pros and cons will be presented in terms of appropriateness or inappropriateness, evaluated by their ability to increase or decrease an individual's ability to perceive meaning and room for engagement with the world.

1. Applying Perceptual Frameworks

Much can be said about viewing places and events through perspectives that simplify and romanticize, most of it centering around the possible disappointment and disillusionment once veils of simplicity and charm have been dispelled to reveal complexity and unpleasantness. Robert Fletcher pushes back against this understanding of representations of human-sparse natural environments by arguing that video games produced by conservation organizations actually help inspire interest in threatened areas and produce a stronger affective commitment to environmental protections. Drawing on Büscher's (2016) notion of Nature 2.0 – the collection of new forms and manifestations via Web 2.0 of humanly-produced conceptual and physical nature (727) – Fletcher (2017) argues that interactive media does not necessarily produce apathy and cognitive distance:

> Consistent with the promise of nature 2.0 in general, it all hinges on the games' immersive, interactive and participatory nature. The wager is that drawing users into virtual nature experiences in a way that allows them to actively engage with these experiences in an enjoyable manner will transcend the passivity and apathy to which critics worry conventional media experiences lead and instead precipitate an affective attachment motivating users to channel their energies into a renewed commitment to conservation causes in the "real world" that these media simulate. (157).

Fletcher concedes that gamification "(the application of certain gaming characteristics) in diverse social realms" (153) does seem to contribute to a "widely documented "environmental values-behavior" (EVB) gap between professed commitment to environmental causes and one's effective action in support of such causes" (154). However, the first step of getting individuals, who are geographically distant from pressing environmental crises like tropical deforestation to engage in effective action, is to craft representations that convey the need to view human-impacted physical spaces as being actually as vibrant and awe-inspiring as digitally crafted environments. By opening up individuals to previously unperceived beauty and vulnerability, this translocation expands perceptual horizons to introduce new areas of interest and care. This expansion provides an example of an appropriate translocation because my perception of a physical place is open to more possibilities.

Yet the application of a perspective gained from technological mediation may be as unwelcome and inappropriate as the introduction of technologies themselves. Pohl (2006) argues that without adhering to a process of reasonable simplicity to discern what to bring and what to leave when actually traveling into wilderness areas, we work against ourselves and the goals we have by going into the backcountry (149). Experiences in wilderness areas have the qualities of

challenge and survival, escape, opportunities for skill development, witnessing natural awe and beauty, and solitude in common (151-153). Certain technologies safeguard us from misery and risk that would detract from these experiences, but others unnecessarily disburden and shield us from discomfort and exertion; they solve our problems for us (155). Adopting an attitude of reasonable simplicity toward the technologies we bring with us into human-sparse natural environments is an active counter to this encroachment. After all, "is it not counterproductive to import the very devices that symbolize a mindset from which we are trying to depart?" (154). If it is a reasonable step to move from eschewing technological devices that detract from our ability to enjoy the challenge and rugged solitude of human-sparse natural environment, then it seems equally reasonable to eschew technological perspectives that arise from our prior engagement with such devices.

Some lenses derived from digital play only produce instrumental perspectives of wilderness and green spaces: how useful is that tree, and how many resources can I get from it if it is harvested? Real-time strategy games that give player's a god's-eye perspective, like *Age of Empires II: The Age of Kings* (Ensemble Studios 1999) rarely escape this instrumental view of the world. Forests become fuel for cultural development or defensive barriers between oneself and one's enemies. They are no longer muses or co-inhabitants in a Leopoldian biotic community, merely tools and material aggregations of utility. The argument can be made that the player of a game like *Skyrim* or *Age of Empires II* is not bound to the same constraints as the game entities. If I find the plains of Skyrim or the medieval Black Forest worth exploring through prose, I am free to do so – but not within the confines of the game. I cannot write volumes of poetry inspired by the landscape as and through my avatar, or tend to an individual tree's needs. In-game affordances are limited to observation without interaction, or instrumental

exploitation. Taking this mindset – my options to engage with the trees are to chop it down for lumber or to ignore it – and applying it to physical spaces is an inappropriate translocation because by employing it I have limited my ability to engage with the world and derive knowledge and meaning from those engagements.

Bringing digital perspectives with us as we move through the world is not entirely negative. But there is a difference between a perspective gained digitally and the technological mindsets to which Pohl refers. Knowledge gained through indirect experience, or decontextualized encounters, can be enriched and recontextualized when it is applied to its original network of relationships. Being somewhat inept at botany, and lacking both quantity and quality in experiential learning, I must admit that I have learned how to recognize particular plants from encountering them in digital gameworlds. My primary example for this is lavender, which is prevalent in the plains areas of *Skyrim*. In a sense this is fundamentally similar to reading about lavender from a printed book, although the book would be more informative than the video game. Regardless, the perception gained – this is a visual representation of lavender – is both an impoverished representation (relative to an actual lavender plant) and an applicable conceptual tool. It is similar to hearing a recording of a western meadowlark or the distinctive whistle of a white-throated sparrow from both a bird identification guide and my grandparents' chiming clock. The problem does not lie with the information gained from a digital representation. Problems enter when a technological perspective is employed in the backcountry that reduces plant or animal identification to only those entities encountered via technology, and does not allow for direct, i.e. physical, encounters to impress meaning upon us.

2. Setting New Expectations and Potential Impacts for Conservation

As cultural artifacts, video games serve a powerful role in the reproduction and shaping of culture as well as helping define transgression and conformity. Video games provide a dedicated virtual space for play which is bounded by rules and conventions as well as technology. They act as more than texts that reflect culture; games function as producers and shapers of culture. The argument made by some scholars, like Troy Innocent (2015), is that because games play such a potentially powerful role in reproducing culture, certain types of games will allow us to understand and respond beneficially to contemporary crises. If one sees play being as a foundational language of culture, then play is everywhere: "This perspective sees the entire world as a playground, not just the spaces we typically associate with games" (61). Troy Innocent leverages this understanding to demonstrate how, in the epoch of the Anthropocene, humans can change what actions are possible to reconceiving of play as ubiquitous and thus capable of resistance or disruption as well as reinforcement and validation (62). Play in the Anthropocene responds to rapid systemic changes like temperatures increases, increasingly unstable ecosystems, and rising sea levels by encouraging humans to become "fluent in simulation and process and able to modify rules and systems that can change the environment where they live" (64). Play becomes both a transgressive act and a survival strategy that reprograms reality by altering our understandings of what is possible and what is permissible (65). Digital play that technologically or conceptually breaks down barriers between virtual and physical spaces to produce mixed realities also has the potential to challenge anthropocentric worldviews and make complex systems of various arrangements comprehensible, able to be imitated and adapted for human purposes (67). Translocating expectations from digital spaces to physical ones may be an appropriate translocation because these new expectations of possibility

(what ‘could be’) increase our individual and collective ability to respond to contemporary crises and pressures. It also increases our understanding of the character of challenges we may face as we move forward inescapably into the epoch of pervasive human influence that defines the Anthropocene in large part.

The danger is that notions of what is possible (what ‘could be’) and subsequently what is normal (what ‘should be’) become vulnerable to manipulation. The Anthropocene is marked not only by widespread human ecological impacts, but also by specific material, economic, and political systems and ideologies which have acted in ways that contribute to the causal chains and characters of contemporary crises. Cypher and Higgs (1997) refer to this “pattern that connects all of the diverse attempts to manufacture experience as the *colonization of the imagination*” (109, emphasis original) in their examination of Disneyland’s Wilderness Lodge. As a willful and influential participant in both the tourist and entertainment industries, Disney as a corporation produces a material environment that reflects certain assumptions about history and particular landscapes. Validation of these constructions in the form of park visitors, revenue, and merchandise consumption produces and reinforces their ideological legitimacy as determined by the dominant culture:

> Disney is successful at turning wilderness into a conceptual product — one that is adaptable, delimitable, endlessly pliable and available — and then creating a new reality in which to experience it. Moreover, the experience of this consumption conditions our understanding of the real thing, that is, natural places which have not yet fallen under their empire. (110).

Like Disneyland’s Wilderness Lodge, photorealistic video games set in human-sparse natural environments are the product of hundreds, if not thousands, or deliberate design decisions that

result in audiovisual representations of developers' and publishers' normative expectations regarding nature. This normativity is cloaked either behind a veil of obfuscating neutrality and objectivity, or behind the shield of justified distortions that are 'demanded' by the narrative and gameplay created by developers.[21] Ultimately the ideological work is conducted behind the scenes as players are enveloped in "an all-encompassing, yet unobtrusive cocoon of authenticity, fantasy, and good feeling" that encourages "the blurring of the boundaries between reality and fantasy, playing on the desire to experience this unreal territory" (114). *Horizon Zero Dawn* acknowledges the differences between the virtual, speculative future American West and the physical contemporary American West by making no pretense regarding temporality and causality; this is a future where humans have been eclipsed by their robotic creations. But the landscape itself is simultaneously presented as familiar, largely unchanged, and compelling in its fidelity to the original. Just as the Wilderness Lodge is somewhere in the West picked up and placed in Florida, *Horizon Zero Dawn* is Colorado and Utah shifted through time to function as a simulacra hiding its artificiality brazenly in the open. By casting these new and deliberately manufactured expectations as merely reflective and not excessively distorted, video games legitimize holding real places to hyperreal standards of realism and authenticity. This translocation is inappropriate because it does more than limit how human-sparse environments can change over time, with or without human impact. Its inappropriateness stems from the reduced range of acceptable ways for the world to be in our minds and in our culture. If a

[21] By presenting games as primarily descriptive, developers either intentionally downplay the normative implications of their work or fail to appreciate how fiction suggests the world should be by defending or critiquing the status quo. Games that feature only cisgendered male characters or do not include people of color, and justify these decisions on the basis of arguments like 'being historically accurate,' do not only attempt to describe how the world is. They implicitly suggest how the world should be. These choices also reflect what is individually and culturally considered to be legitimate. Players should therefore always be mindful of how media asserts the authenticity of its representations, and whether the rhetorical construction of their legitimacy is acknowledged or hidden by creators.

physical space cannot meet the high standard set by digital representations, then it fails as authentic nature. The original is outdone by the reproduction and is found wanting.

Environmentalists often worry about the effects of digital play on support for conservation. Time spent viewing and interacting with digital or cinematically curated representations of human-sparse natural environments automatically limits the time spent engaging with physical spaces. This leads to the argument that media involves both an opportunity cost, at nature's loss, and a growing preference for the virtual over the physical. Büscher (2016) questions the merits of this claims and the description of how digitizing nature influences our perception of its value. Büscher analyzes the relationship between new media, like social media on the interactive Web 2.0, and conservation organizations and movements, synthesized together into the concept of *Nature 2.0* (727). He finds that Nature 2.0 involves a stimulation and complication of processes which commodify nature. The ubiquitous reach of online platforms promotes the reduction of natural areas to digital content, but the forms of commodification – and the number of sites for resistance like culture jamming or decommodification – multiply, as well as the simplicity or generality of the narratives surrounding specific conservation projects (732-734). Individuals are also encouraged to envision what conservation looks like on the ground to them, and nature is reimagined in exceedingly tailored, niche ways (735) that conform to a growing neoliberal vision of activism (736). In this sense, changes to the political economy of conservation are necessary in order to keep pace with patterns of technological development and accompanying social shifts. If one way to get geographically distant peoples to care about their global ecological footprint and related environmental impacts, e.g. deforestation from expanding croplands, is through new

interactive media, then failing to leverage that for conservation goals would cede valuable ground to anti-environmentalists and exploitative practices.

Yet the potential of these technologies is worth questioning because of the institutional context in which they are created and used. Given Büscher's acknowledgement of the neoliberal capitalist systems in which modern conservation organizations operate, and Fletcher's acknowledgement of a growing gap between emotional investment and effective action, it may be that individual-focused capitalist institutions continue to be adept at appropriating challenges to their regime, incorporating them into old and new social and market functions. Culturally, we live in a society dominated by what Strong (1995) calls *heedless thinking*, which in the case of agriculture "narrows the object of husbandry to large farms, large crops, and monetary profit" (65) but fails to attend to networks of health, labor, and relationship. Strong positions wilderness as a counter force to a technological culture defined by heedless thinking and heedless seeing (206). Wilderness draws together meaning that is disclosed not only through certain activities, but entire practices that attend to the relationships and connections that form a world (68). This stands in opposition to a perceptual framework unable to disclose the dimensions of a place – its history, its characteristic system of flora and fauna and geologic processes – because it is "shallow, narrow, and flattened… a heedless, shallow seeing is connected with heedless thinking" (65). Actual human-sparse natural environments have the potential to call us back to an unmediated,[22] demanding, and fulfilling mode of being.

The complication with this view is the propensity of markets to draw challenges to their existence into their boundaries and make them profitable, i.e. to commodify them. Photorealistic

[22] It may be helpful to also conceive of experiences with physical human-sparse natural environments in terms of being more or less, or heavily and lightly, mediated rather than a strict mediated/unmediated binary. This relates to footnote 20 on page 64 and how ingrained technologies of various kinds are in our lives. However, the discussion on what does and does not constitute mediation is a related but separate topic from the focus of this paper and my use of mediation as being primarily technological and electronic under Ihde's phenomenology.

depictions of human-sparse natural environments in video games are one such commodification. Those very places that Strong argues have the power to cause us to question a technologically oriented life are being analyzed, reproduced, and simulated within cooperating technological and consumerist frameworks. Technology and play in the service of profit and consumption retain their dominance. Against this dynamic, encouraging translocations of perception and expectation may well end up encouraging an evaluation of the real by the standards of the virtual. Such a reversal has the power to deflate urgency and allow unsustainable modes of being to persist indefinitely.

II. Potential Impacts on Humans Being Well

Using perceptual lenses gained from extensive video game playing to view physical places through those frameworks and expectations may make us more attentive and more willing to seek out wilderness and green spaces. The corresponding danger is that those same mindsets may hold physical landscapes to aesthetically impossible standards. These both address some of the perils and promises associated with translocations of perception and expectation *for the world apart from humans*. There are also possible impacts *on humans themselves*, on our ability and willingness to move through the world in certain ways that apply to more than our encounters with less urbanized areas.

Gomes (2012) and Louv (2008) both document the effects of prolonged and constant exposure to digital media on human health and functioning, particularly with an eye toward individual and collective relationships with green spaces. Gomes, as an ecopsychologist, documents the pressing need to address electronic media use as either a complement or alternative to ‘unplugged’ interaction. The effects of prolonged and consistent use of contemporary digital media – overconsumption, sensory overload and distraction, psychological

disorders, and constant connectivity – confine users to a narrowly bounded way of being in the world (2012, 117-118). She records the effects and feedback from students after asking them to fast from media for one week. Students often report an increase in available time, a calmer and more reflective disposition, and greater discernment upon breaking their fast over the content as well as the quantity of the media they choose to consume (119). These effects are more likely to be stronger and longer-lasting if social networks engage in similar fasting behaviors, in turn raising the prospect of altering communal patterns of relating and communicating with one another (120). Gomes' hope is that reporting on the positive effects of more conscientious media usage will help form deeper and more nuanced relationships with the world as well as stronger, more resilient communities (121). This process of identifying the harms of current technological and social patterns and demonstrating viable, compelling alternatives gives added significance to sorting out how and when use of technological mindsets as well as specific embodied technologies can help or hinder us in achieving collective, consensus-based modes of being.

Louv champions a very similar concern, and is arguably a standard bearer in the fight for more connected and directly enmeshed interactions with parts of the physical world. Louv (2008) coined the term *nature deficit-disorder* not as a clinical diagnosis, but as descriptive shorthand for the argument that human well-being is inextricable from exposure and engagement with non-urban spaces (36). Core to this notion is unmediated interaction, which develops multiple skills and conceptual frameworks for children and adults to be able to meaningfully and fitfully act in the world (72-73). Louv argues against what he cites as "videophilia," or the love of screens that causes individuals to conceptually and physically distance themselves from the outdoors in a vicious cycle (148-149). His proposed remedy is greater involvement with the outdoors and human-sparse spaces, to not only foster greater physical capability and awareness but to address

rising trends of diagnosing children with attention deficit disorders (100). If his premise is sound, then digital environments will always prove insufficient for the task of preparing humans to live well. This hypothesis seems to have some merit; even Fletcher (2017) acknowledges that while individuals may be led to care more about conservation sites through interaction with digital representations, "research demonstrates that significant prior conditioning is necessary to be able to see and know the environment in a manner inspiring affective attachment" (159). No matter how well-crafted the gameworld may be, lasting appreciation and a deep understanding of meaning in the world comes from bringing expectations borne out of unmediated experience to video game play – not the inverse.

III. Future Research

This exploration has used a narrow set of criteria and video games as texts or artifacts. I have also relied upon reviewing published literature, including in-depth studies, surveys, and pedagogical activities, for its empirical grounding rather than conducting my own specially designed study. Future research from games studies and philosophical perspectives may mitigate the limitations of this methodology by addressing several alternative paths of concentration. These practical considerations may include but are not limited to the art style of selected video games, perspectives beyond the first- or third-person, the purpose behind the creation of games, and the influence of players' backgrounds. Other philosophical positions may also articulate arguments and findings not identified through this phenomenological and technology-focused approach.

Future studies will benefit from examining games outside the narrow range examined here because of the assumption, worth challenging, that photorealistic depictions of environments are those most likely to disclose deep and lasting truths about the world and our

places in it. There is a strong possibility that games with exaggerated or abstract art styles, like the walking simulator *Firewatch* (Campo Santo 2016), can still convey truths about the world to players through artistic choices emphasizing or minimizing specific aspects of reality. Similarly, a wider range of perspectives may allow researchers to explore what associations can be represented by developers and perceived by players. Perspective-taking games like *WolfQuest* (eduweb 2015), *Shelter* (Might and Delight 2013), and *Beyond Eyes* (Tiger and Squid and Team17 Digital Ltd. 2015) allow players to take on the perspectives of a Yellowstone wolf, a mother badger, and a young blind human girl respectively. The way the world presents itself to each of these characters, and the artistic choices made regarding how to represent the world, contain messages about how we can, do, and should perceive our shared reality.

Future research can also account for the variety of messaging present even within the same genre or series of games in greater detail. Real-time strategy games are premised on an instrumental view of the gameworld, but specific gameplay mechanics can provide ways of interacting instrumentally with entities that are not destructive, such as the sustainable harvesting mechanics in *Warcraft III: Reign of Chaos* (Blizzard Entertainment 2002) or the special ability to promote forest regrowth in *Age of Mythology: The Titans* (Ensemble Studios 2003). Other gameplay mechanics may be used by developers whose intentions are to educate children, or to provide games that can be used to teach while simultaneously being entertaining and engaging like the wildly popular (and heavily stylized) *Minecraft* (Mojang 2011). Finally, paying greater attention to player demographics may yield more detailed and applicable insights regarding the causal relationships between play, perceptive tendencies, and expectations over time.

IV. Concluding Remarks

One of the most famous video games, *The Legend of Zelda*, was reportedly influenced by creator Shigeru Miyamoto's childhood.

> The inspiration for this style of gameplay was Mr. Miyamoto's own childhood memories from the countryside of Sonobe, Japan: combing rice fields, scaling hillsides, fishing lakes. One foundational experience he had as a child was stumbling upon a cave, which he eventually mustered the courage to enter by the light of a homemade lantern. (D. K., para. 6).

Mr. Miyamoto himself put in the effort, along with his colleagues at Nintendo, to create this first game in a series that is now a household name. But the groundwork was laid in his time spent directly engaged with his environments. His unmediated experiences became a source of reference, comparison, and imagination that millions of people have been able to share. I mention Mr. Miyamoto because the structure of this relationship between coming to know the world and creating art is one that I have experienced, and one that grounds the crucial normative claim behind this project.

My own mixed childhood was entangled in books, woods, creeks, and screens. Like millions of others, I moved between the physical, the digital, and the imaginative; not always with ease, but frequently with wonder, enthusiasm, fright, and inquisitiveness. I continue to move between worlds as an adult. Although fiction in prose and code shaped my thoughts on what could and what ought to be (and still does), my evaluation of fictional worlds remains grounded in the material world that was always and continues to be, with varying degrees of access, available for me to engage with. This primacy is paramount. It is the guiding principle behind my stance that unmediated physical environments should provide our baselines of

reference, comparison, and speculation. Material human-sparse natural environments cannot be compared to digital environments by the hyperreal standards of the latter without cost, that cost being our ability to find value, contentment, and guidance in what is. I believe that video games as an artistic medium have much to contribute in the way of helping us form deeper, richer connections to the world and the way that it could – and always should – be more just, more equitable, more inclusive, and more engaging.

Ludography

Blizzard Entertainment. 2002. *Warcraft III: Reign of Chaos*. PC. Blizzard Entertainment.

Campo Santo. 2016. *Firewatch*. PC. Campo Santo and Panic.

Ensemble Studios. 1999. *Age of Empires II: The Age of Kings*. PC. Microsoft.

Ensemble Studios. 2003. *Age of Mythology: The Titans*. PC. Microsoft Game Studios.

References

Büscher, B. (2016). "Nature 2.0: Exploring and theorizing the links between new media and nature conservation."

Clark, J. (2014). *The Construction of "Nature" in the virtual world* Second Life (Doctoral Dissertation). Retrieved from http://purl.flvc.org/fsu/fd/FSU_migr_etd-8957

Cypher, Jennifer, and Higgs, Eric. (1997). "Colonizing the Imagination: Disney's Wilderness Lodge." *Capitalism, Nature, Socialism, 8*(4), 107-130.

Fletcher, R. (2017). "Gaming conservation: Nature 2.0 confronts nature-deficit disorder." *Geoforum, 79*, 153-162.

Gomes, M. E. (2012). "Breaking the electronic media spell: An ecopsychological intervention." *Ecopsychology, 4*(2), 117-121.

Innocent, T. (2015). "FCJ-175 Humans at play in the Anthropocene." *The Fibreculture Journal, 24*, 59-80.

K. D. (2017, March 6). The legacy of Zelda: How Nintendo told gamers to get lost. *The Economist*. Retrieved from https://www.economist.com/prospero/2017/03/06/how-nintendo-told-gamers-to-get-lost

Louv, R. (2008). *Last Child in the Woods*. Chapel Hill, NC: Algonquin Books of Chapel Hill.

Ortiz de Gortari, A. B., Aronsson, K., & Griffiths, M. D. (2011). "Game transfer phenomena in video game playing: A qualitative interview study." *International Journal of Cyber Behavior, Psychology and Learning, 1*(3), 15-33.

Pohl, S. (2006). "Technology and the wilderness experience." *Environmental ethics, 28*(2), 147-163.

Strong, D. (1995). *Crazy Mountains: Learning from Wilderness to weigh Technology*. Albany, NY: State University of New York Press.