ON THE INTERSECTION OF THEORY AND PRACTICE: HYBRID MULTI-MODAL GAME DESIGN AS A MEDIUM OF AFFECTIVE DIGITAL COMMUNICATION

ALLA MIROSHNICHENKO

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Abstract

This dissertation explores the relationship between game design and development from both academic and industry perspectives, while attempting to derive a hybrid model for designing and analysing games as multimodal artifacts. The dissertation consists of a research-creation project informed by game design literature from both academia and the industry in order to facilitate the production of the new knowledge and interdisciplinary scholarship that, as noted by Jarvinen and other foundational game scholars like Bogost, is largely missing from academia at the moment. The dissertation aims to delve into intersectional and interdisciplinary knowledge, as well as to provide a bridge between current game design scholarship and multimodal analysis, that has been successfully employed in the media scholarship to analyse multi-media artifacts like websites and digital and print advertising, but hasn't been used as extensively in game design studies. An emphasis is also given to affect and emotion-formation as a part of digital media (and gaming) experience predicated on human-computer interaction principles.

By proving that games are powerful engagement artifacts because they guide behavior-formation, help learning by association, and offer a better, more enjoyable path to behavior correction, this dissertation aims to encourage and invite further experimentation in game design studies and to support scholars and educators pursuing hybrid research-creation based projects.

Dedication

Dedicated to my Cat, as he was always with me throughout my academic adventures and served as my source for academic curiosity in my pursuit for truth. He was there for me when I begrudgingly left home at 17 (in fact, he was the reason), thus beginning my academic journey, and he was there (on the couch, sleeping) as I delivered the final touches to my dissertation. He showed me that real academics are not afraid to be wrong and that they navigate their research objectives by pursuing truth. He is quite possibly the only baby I am having in my life (at least in the foreseeable future). Dear Cat Baby, since I rescued you, you affected me like no other animal ever did. You are loud and difficult, but it is your feline perspective that enables me to meaningfully engage with life.

Acknowledgments

Herein comes a sizeable list of acknowledgements of all those fantastic people that meaningfully affected me and my personal growth as an academic and artist. All these acknowledgements are intricately honest and heart-felt (and in no particular order of importance), and if they seem a little too personal or unusual for acknowledgements, please know that on average, most academics have these, but leave them heavily edited and professional so they seem more collected after the traumatic experience that PhD is, and won't seem too sentimental or soft. Please note that I am a heavily disillusioned individual, so professionalism in acknowledgements means very little to me, as I am not planning to pursue professional academic career for the sake of preserving emotional honesty.

I would like to acknowledge the support of my wonderful supervisor, Jen Jenson, who not only believed in me to let me pursue my experimental path, but also actively supported me along the way in any way imaginable and possible. Thank you, from the bottom of my heart, for all the opportunities you have given me (some of which I aced, some of which I bombed), it was my honour and greatest pleasure to work with you and for you, and I believe and hope that our friendship and co-operation would stretch far beyond this degree. In the formative years of one's academic career, it is a great rarity to find someone who believes in you unconditionally, and Jen was there 110%. Jen picked me up at the mental bus stop where Jade Ferguson (to find out who that is, keep reading) left me off and worked with my tactlessness to refine it into a critical, logical, argumentative voice, unapologetically questioning every single thing I believed in. I would not have finished my PhD without your support and mentorship, and I am extremely fortunate to be one of your students. Thank you also, Suzanne de Castell, for a bit of tough love

and a lot of encouragement. That initial dry run discussion of my thesis at ReFig in 2017 turned my dissertation around quite a bit.

I would like to acknowledge Jade Ferguson, who is, perhaps, the most influential academic I got a pleasure to learn from at the University of Guelph. Jade turned me from an uneducated, disgruntled teenage box full of angry, misplaced ignorance into an equally angry, but socially conscious, privilege-conscious feminist. Before you read any further – YES, educating bigoted ignorant students WORKS because I am a living example of this, but it does require endless patience and mental energy not many professors can spare. Thank you for all your relentless mental labour, hours spent at your office discussing racism and privilege, psychoanalysis, writings of Hanna Arendt, and your kind yet firm criticisms. You have exposed so many logical flaws in my thinking so many other professors could not (they just gave me low grades and called it a day instead) – I am forever grateful.

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I would like to express heart-felt thank you to my academic committee, as well as everyone who made my educational journey smooth and meaningful. There is probably an endless list of thanks I can attach to this dissertation, but it would surely be longer than the actual dissertation, so I just have to resort to the collective, big 'thank you' to everyone who supported me throughout the five long years of my PhD and that includes everyone whom I met academically and creatively.

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Chapter One: Introduction

On Game design dissertations, research-creation, and design learning

Currently, Game Studies is a vibrant, interdisciplinary area of research that spans multiple disciplines (from Literary Studies to Computer Science) and research methodologies (from Feminist Theory to Machine Learning and beyond). Game and Gamification Research is conducted in academic and corporate environments, public institutions and private UX labs, for public benefit and/or corporate gain. Basic principals of Game Design are taught in high schools, colleges, universities as well as online education platforms like Udemy and Coursera. The kind of research that games inspire is as diverse and multifaceted as the games can be. For example, Mark Edwin Stenerson (M.A. in Human-Computer Interaction, University of Iowa) dedicated his thesis to analysing how games can be used to teach STEM sciences (Stenerson, 2012) and Ivan A. Games (Ph.D, University of Wisconsin-Madison) conducted research and published a dissertation on facilitating literacy skills in disadvantaged middle school students through exposure to game design practices (Games, 2009). In fact, the area of game studies research has become so popular in the recent years, that there was even a conference paper written by Shawna Kelly on how to approach writing a Game-based dissertation (Kelly, 2011).

Apart from more academically accepted thesis-based dissertations, videogame design studies through research-creation methods were also conducted and defended by undergraduate students (Selja Tanskanen, *Player immersion in video games: Designing an immersive game project*) as well as graduate scholars like Lynn Hughes, Bart Simon, Rebecca Goodine, Pippin Barr, and others. There is an entire research centre Technoculture, Art and Games (TAG) housed within University of Concordia exploring game design and development as a research-creation

practice supporting cultural, historical, and sociological studies. Integrating applied game development and design practices into academic, theory-informed research is known as the practice of research-creation in Canada, or arts-based research in United States.

Chapman and Sawchuk write that Research-Creation methodology is not so much new as it is a "newly recognized" academic practice that gained traction and popularity in the past ten years. The term "Research-creation" as applied to academic research practice, is an emergent category within the social sciences and humanities "that speaks to contemporary media experiences and modes of knowing" (Chapman & Sawchuk, 2012, p.4). Academic Research creation usually integrates a creative process, experimental aesthetic component, or an artistic work as an integral part of the study. Chapman and Sawchuk explain that the popularity of the method can be explained by increased interest in research on and with digital technologies. "In research-creation approaches, the theoretical, technical, and creative aspects of a research project are pursued in tandem, and quite often, scholarly form and decorum are broached and breeched in the name of experimentation" (Chapman & Sawchuk, 2012, p.6) in an attempt to produce new knowledge.

Besides pure research-creation studies, there have been multiple attempts from Game Studies scholars of all disciplines and backgrounds to conduct both traditional and research-creation based, mixed-method research that would adopt research practices and approaches from across different disciplines.

Mixed-methods pioneers like Patri Laknoski and Katherine Isbitster explore video games from the perspective of experiential and emotional design, while attempting to connect game design theory to practice. *Experience Assessment and Design in the Analysis of Gameplay*, *Integrating a game with a story – lessons from interactive television concept design*,

Experiencing games: games, play and players (all co-authored by Petri Laknoski) as well as *Computer Games and Emotions* explore issues in storytelling and interaction design from the human side of Human-Computer Interaction (HCI) (Perron, 2016). *How Games Move Us: Emotion by Design* by Ibister explores how games create emotions. Ibister covers a variety of design techniques that evoke emotional responses in players and counters arguments that games are implicated in creating a generation of isolated, emotionally numb, antisocial loners (Isbister, 2016).

While mixed-methods game design research is rapidly growing in popularity, there hasn't been many attempts to analyse game development processes from multidisciplinary and multimodal perspectives simultaneously. The mixed-methods approach undertaken by scholars like Isbitster and Laknoski is relatively new in game studies, and its challenge is to produce knowledge that would cater to both academics and developers. Isbitster's *Emotion by Design*, might incorporate theoretical knowledge with more applied studies on motion game consoles, however, the transition between more abstract theory and very specific practice-based studies seems disjointed and hard to connect.

I believe that combinational approaches that borrow from both sides of human-computer interaction studies as well as industry literature are the key to preparing much-needed ground for academia/industry intersections that can result in creation of more inclusive and transformative game experiences. Some scholars have already envisioned such intersections, for example, Ian Bogost envisions his approach as "as a model for future collaborative encounters, both analytical and practical" (Bogost, 2008, p.x). Jarvinen writes that delving into more experimental areas of game design is necessary for the further development of the field:

> Video game studies should delve into more experimental areas of game design and player experiences. At their best, analytical approaches to such areas can help in uncovering starting points for more versatile insights into games. However, systematic and widely acknowledged methods for video game studies, especially the ones concerning the studying of games from the perspective of game design, are still largely missing. (Jarvinen, 2008, p. 84)

My dissertation aims to answer the call of scholars like Jarvinen, attempting to produce inter-disciplinary knowledge rooted in artistic practice. In this dissertation I will be attempting to generate a different kind of hybrid inter-disciplinary knowledge through mixing theoretical and practical approaches to analysing, developing and studying video games.

My research is informed by a variety of academic disciplines and creative practices like literary studies, creative writing, film studies, visual art and design studies, music performance and composition studies, psychology, sociology, cultural studies, media studies, theatre studies, although for the purposes of this dissertation all these lenses are focused under the umbrella of multimodal communications as a spectrum of creative "tools" and "languages" informing game design and laying the foundations of game development as an artistic practice. I believe that by the end of this dissertation, the reader will discover a new way of appreciating game artifacts not only as sources of amusement and entertainment, but also as incredibly complex, multi-faceted digital artworks that are capable of communicating meaning in a variety of different forms and methods, influencing the player emotionally and capable of producing a long-term behavioral affect. Not to say that all released video games that are currently available on the market are necessarily deep and emotionally impactful, but absolutely all games have the potential to be such due to the richness and complexity of the medium itself.

My dissertation is divided into several sections: *Multimodality*, where I set and clarify the initial definitions like "*What is mode? How many modes are there? Do humans and interfaces operate within the same range of modes?"* and discuss what multimodality means for both humans and interfaces. In the next chapter *Affect and Emotions*, I examine how technologies, and games in particular, are capable of creating engagement environments, affecting cognitive information processing and learning behavior, and how multimodality is an integral part of this human-interface relationship. In chapter "d0main specific", I describe common difficulties and pitfalls when it comes to discussing multimodality in inter-disciplinary setting and examine the implications of intersectional approaches to studying games and interactive technologies. Special attention is paid to the concept of interactivity and what it means in the world of HCI and multimodal interfaces. Interaction/interactivity is perhaps the most striking example of how our human multimodal affordances differ from those of interfaces and hardware. This key concept is also vital to analyse especially in the context of video games, since it is meaningful interaction that distinguishes games from other media like literature or film.

After defining what it means to interact with an interface, we discuss the history of games as artistic artifacts and what significant and influential academic works have contributed to our collective understanding of games as an artform. The next section, "Principles of Game Design" is dedicated to discussing industry literature on game design and revealing most common industry models for game design and analysis. Each of the main frameworks is briefly summarized and analysed from a perspective of game developer/designer. Upon careful analysis of the design frameworks, I offer an alternative framework to game development that is based on combination of practical (applied) development strategies and analytical (theoretical) knowledges drawn from multimodality, HCI and communication studies. In the process of

critically examining my proposed game analysis framework, I draw attention to the main difficulties that occur in attempts to combine applied and academic knowledges. Both practical and theoretical approaches avoid and bypass certain areas of game design process due to inability of stepping outside of the institution-specific knowledge-facilitating simulations: game developer literature often delves into purely practical and pedantic development practices and coding patterns, at times leaving creativity out of the game development process.

For example, most game design guides would not give their reader any information on how to approach designing game assets or where to draw inspiration from, they will also leave out any historical studies of game interfaces or evolution of graphic styles, because it is outside of the practical scope of game development. When it comes to academic game studies, especially in cases where games are studied and close-read as "texts", the role of the game developers and the limits of their involvement in the game design process can be underplayed or misrepresented, which might create a one-sided perception of the game industry. Games that did not produce an afterglow of tangible cultural significance or were abandoned by development teams, for example, are in academia's blind spot. Furthermore, lack of understanding of game programming practices and misinterpretation of how game technologies work can lead to misinformed interpretations of what game algorithms or in-game bugs were meant to represent. This, in turn, can lead to unintended demonization of game developers.

But as much as there are many misconceptions and blind spots between game industry and academia, the most interesting, insightful and truthful knowledge can be produced on the intersections of practice and theory. Examples of such knowledge could be a better understanding of technological limitations and how they affect or distort the game narrative. Another example of such knowledge could be obtaining familiarity with a certain game

technology or software (Phaser, Game Maker), learning the most common design flows and patterns of that technology and attempt to bypass them, thus creating the kinds of games that would look or feel non-typical for that technology. I believe that this kind of hybrid knowledge, that scholars like Jarvinen hope to see produced by the next generations of game scholars, demands wider scope of expertise and inseparable fusion between theory and practice to constantly put each other to the test, chiselling and revealing deeper intricate levels to the subject of game studies.

The last portion of my dissertation is dedicated to practical, theory-informed game development process that helped me to put many game development models to the test and, through a painful process of critical evaluation, determine which of them did not work. To ground myself through game design process, I related to games as composite multimodal artifacts with each mode (sound, graphics, etc.) serving as a meaning-making channel that can exist independently or interplay with other channels to produce more complex meanings. I held myself accountable to the process not like a scholar[1], but like a developer: I adopted agile development practices which helped me to break up and document the entire development journey as a series of smaller, manageable tasks; I tracked my progress and checked my productivity statistics every day. At the end of the day, multi-specialized and armed with critical theory and adaptive research practices, I persevered through the design process procedurally like a developer would, and produced this dissertation that combines hybrid methodologies to address complex intersectional topics in game studies. Links to games and walkthroughs can be found under respective titles of each game experiment writeup.

[1] Because pumping myself with caffeine and pulling all-nighters to finish everything at once stopped working after I turned 28

Before moving into a significant engagement with the concept of multimodality, in the next section I will discuss my artistic and programming expertise and address my complicated relationship with academia.

About Me

Outside of my academic and software development career, I am a classically trained operatic singer[2], self-taught professional audio engineer, cellist, keyboard player, performer, musician and score composer[3]. I am also a graphic artist[4], illustrator, photo manipulation artist, and graphic/game asset designer[5]. I started drawing at age 4 and went to music school when I was 6. I tour the world with my music when opportunity presents itself, both with my solo projects (*Subterranea*, *Alia Synesthesia*) and as a singer for *ATTRITION* [6]; the farthest I have been outside of home was New Zealand in 2018 and Japan in 2019.

I love literature. I have written creative fiction and poetry since I was 8, but my enthusiasm for creative writing took a hit after immigrating to Canada, because English is not my first language and I am self-conscious about expressing myself in writing (I also periodically miss articles like "a" and "the", which is embarrassing and doesn't make my fiction a smooth read). I did, however, publish a book of unusually dark fairy tales – it is available in e-book format for free. After the long and painful editing and publishing process that lasted longer than I wanted, I decided to stay away from the world of creative fiction writing for the time being. I found text-

[2] Over 10 years of practice; 6 years of music education in my home country, 4 years of taking vocal lessons in a Canadian university, and over two years of private lessons.
[3] As of this writing, my discography contains over ten album releases and is continually growing.
[4] Two years of formal schooling in specialized painting school, over two years of middle school painting lessons, though mostly self-taught online
[5] Since being a great illustrator does not always equate knowing how to think in game limitations (for instance, 48px by 48px grid for game assets.)
[6] UK music act founded in 1980, a good ten years before I was born.

based expression very limiting, since I am used to expressing myself in other media such as music or visual art. Ever since I started developing games, I did not find as much satisfaction in creative fiction writing, since my video game projects became the primary storytelling outlet. Nevertheless, I find creative writing master classes and literature courses immensely helpful for game writing and creative idea generation.

During my undergraduate degree in English and Theatre Studies at the University of Guelph, I took courses from a variety of disciplines: English and Theatre Studies, Classics (Hellenic) Studies, Medieval History, Music, Biology and Psychology. My favourite classes were *Witch Hunts in Popular Culture* and *Old English* (both courses, sadly, were discontinued) – and those courses still stay with me when I make art or work on games. When I was an undergrad, I dreamed to be a professor of Medieval studies and was grooming myself to be an expert in Classics and Medieval Literature/History[7]. This dream hit the brick wall during my pursuit of M.A degree in Medievalism which subsequently took a turn into New Media direction for the lack of medieval professors in our department. The final demise of my academic dreams happened during my PhD experience, when I swore to never teach a single undergrad class ever again. But I am not here to complain about education system, I am just here to point out that when I started out as an undergrad student in 2008, the academic world looked or seemed completely different: there were more interesting specialized classes for professions that no longer exist; these classes were hastily discontinued, leaving students with bare essentials necessary for graduation. Great professors left academia, struggling to make ends meet, and the

[7] I was also very interested in medieval history of science and the scientific method!

immense amount of pressure and responsibility associated with teaching undergraduate classes (that seemed to increase every year) made me feel overwhelmed and suicidal.

Academia was urged to discontinue classes that seemed to feel more like "icing on the cake" – classes that taught scientific perspectives on alchemy, linguistic patterns of dead languages, or historical implications of witch hunts – those subjects that seemed not essential, yet were of incredibly high value when it came to developing critical thinking and scientific creativity that is absolutely essential for developing great research skills. As a professional, I cannot change academia with my writing – it is a complex machinery build of obsolete practices and extreme thirst for integrating new 'practical' disciplines that emerge outside of academia into its curriculum[8]. But I can urge new students to be interdisciplinary in their research; push for academic structures to adapt and shift their practices, integrate more abstract courses that engage creativity and critical thinking, and emphasize practice-based research approaches. It is when unrestricted creativity collides with the practicality of what is possible (buildable, manageable, etc.) that new knowledge emerges. Coming from my User Experience (UX) Designer background, I can also emphasize how interesting and creative curriculum creates pleasant learning experience that helps students to retain information better, producing more adventurous and creative researchers.

I extend the same message to emerging game developers as well; if practical experience is already what you are most experienced with, it is worth working on becoming a practical dreamer. Pay attention to trodden development paths, but do not hesitate to venture into completely unexplored grounds inspired by history, classics, alchemy, early scientific method,

[8] It is 2020 now, but by 2022 I fully expect degrees in UX design, Web Development, UX Research and Game Development to start hitting universities as soon as they figure out how to study these theoretically and divorce them from practice. Unless degree includes internship, and for that you pay extra.

culture studies, psychology, folklore – any discipline can inform software development practice, producing new and unexpected ways that we can relate to both software engineering and any academic disciplines. The secret to adopting inter-disciplinary hybridity is exiting the disciplinary simulation, while combining creative open-mindedness with scientific experimentation. My lifelong objective as a researcher is to show how interactive technologies enable communication and are capable of forging relationships between concepts, people, times, disciplines, senses; it can help storing perspectives and preserve memories, tell stories, make associations and learn. My lifelong objective as an artist is to produce digital objects of high personal, empathetic and relational value. My lifelong goals as an informal educator is to inspire students, developers, artists and community to make games to communicate stories, memories, emotions and explore complicated human situations and feelings in an interactive digital game format that is both accessible, reflective, healing[9], and is conducive to facilitating an open discussion.

Currently my official job title is lead UX Engineer/ UX Developer. I design and program software with the focus on user experience, accessibility and usability. This includes both UI design and experiential (interactive) design. I am grateful for exposure to academia because it turned me into a highly adaptive self-learner regardless of the industry I end up integrating into. But my relationship with the beloved ivory towers was always a complicated one.

Brief history of my academic regrets

[9] As a game writer and developer, you will inevitably have to re-evaluate your game narrative and critically engage in it.

I started programming roughly in 2010, out of necessity – I was an enthusiastic English and Theatre Studies student in a world where editing and manuscript translation jobs were no longer on the market (even as summer internships on my own department), but websites and digital archive systems could not design themselves and had to be built and maintained.

I do not have formal computer science education, nor I would be able to get one now, after 6 years of programming experience and a PhD in Affective Technology, due to how rigid and controlled computer science is in academia. Even as a PhD student I was repeatedly unsuccessful at enrolling in undergraduate computer science courses because of missing program requirements or waiting list queues that could not be satisfied with years of practical software development expertise. I found the enrollment process of CS departments designed to be esoteric and unforgiving.

The first letdown that actually hurt was years prior I started my masters at the University of Guelph: I was 21 and actively trying to pitch an multi-disciplinary video-game based degree to the department of Interdisciplinary Studies at York University, where the dean was so enthusiastic, he helped me to try recruit my potential committee himself. We spoke to historians and sociologists, and cultural studies professors and they were all excited. Everything was great until we walked into Lassonde's computer science department. I remember I was told that my idea does not work, that it is unviable and pointless project, and that nothing good would turn out of it because my interdisciplinary methods were unprecedented[10]. I remember feeling completely broken and very confused; I do not remember if I cried, but I definitely wanted to. The dean of Interdisciplinary Studies apologized for the behavior of the computer science professor. I did not

[10] Or more like, CS academics were not equipped to handle them within the constrains of their discipline

enroll in Interdisciplinary Studies that year. Instead, I was admitted as a Medievalist to the University of Guelph, during a time when the only Medievalist professor was on sabbatical for the entire duration of my enrollment.

If I am to compare how (on average) open-minded to cross-sectional approaches science scholars are as opposed to humanities/arts/social sciences scholars, it is like comparing ice with fire. But, as I shortly found out, there are limits and the bias really works both ways. As the only Medievalist student at the University of Guelph with the only Medievalist professor being on sabbatical, I was in a tough spot with my project and started reaching out for new media and digital media courses[11]. I even pitched a digital humanities project with medieval texts; the project was meant to utilize the unique combination of both disciplines to reveal interesting information patterns that can be easily missed due to the scope of the available data[12]. I had high hopes for this interesting, interactive and original project, but I was actively talked out of my intersectional pursuits, since they did not adhere to "disciplinary standards". Back then, I could not understand why and how, a 100-page paper that no one would read[13] comes off as superior to a digital storytelling project based on historical research. What is the worst it can do? Make someone interested in Medieval history? It is upon completing my PhD that I realize, most humanities and social sciences departments are not disciplinarily equipped to take on intersectional challenges due to structural restrictions that govern the production of academic knowledge, and very few supervisors and students want to be in a stressful position of actively pushing against obsolete disciplinary practices. In part, because we feel guilty – we were conditioned to believe into disciplinary practices, but also, because attempting to redefine any

[11] They were so new at the time – no one at our department had experience in teaching those. Having a theatre studies professor teach digital literature was very engaging, however.
[12] It is known that processing information quantifiably is not a human's forte
[13] Due to attention span economy; see The Attention Complex: Media, Archeology, Method by Kenneth Rogers

institutional practices is a goal that is larger than life. And if medical institutions are far more successful in this, because human lives depend on better medical processes, education is so politically neglected that largely we all are left to either fend for ourselves or leave academia. And this is an issue that goes beyond academic institutions.

In 2019, Ontario school teachers went on strike protesting education cuts instilled by the conservative government; conservative educational reforms were meant to increase class sizes and by omission, decrease the educational experience for individual students even further. As I am finishing this dissertation in the midst of COVID-19 lockdown, my friends and acquaintances with families that now have to home school their children get irritated with poorly designed educational portals that are unintuitive and bothersome to use, and poor quality assignments that leave students and parents equally stressed out and averse to learning. But neither academia nor school boards of Ontario actually consider experiential aspect of education, because this expense is hard to justify; the impact of lack of attention to UX of learning has generational resonance and consequences: we have students that slip through the cracks, become workers, and continue being averse and critical of investing into education systems because education systems have already let them down. From unemployable undergraduates to bitter professors that leave academia to pursue an industry career.

As I kept writing my Masters degree in 2014, I kept developing and designing software. I wrote an unremarkable paper on a 17th century text following the best standards for "disciplinary practices". I am convinced it was not a good research: I am embarrassed to publish it, and only use it as an example to demonstrate my academic writing.

It is only on a PhD level at York that I could finally pursue the kind of research I was interested in with the flexibility I desperately needed. My software development experience was

enough to hire me as a Teacher Assistant for Web Art and Digital Media courses at York, although Lassonde to this day does not want to admit me to CS101. Still, a massive portion of my graduate project's success really hinged on how incredibly lucky I was with my committee being both multi-disciplinary and trusting me with knowing what I need to succeed. Part of the success recipe was dropping off the face of academia for two years, right after all my courses were finished and comprehensive exams – written and defended. No publication chasing, no conference presentations, no reading clubs outside of purely satisfying graduation requirements. I did still teach community workshops on game development, scored and composed music for games, created game art, developed games, and actively worked as a graduate assistant, mostly involved in tasks such as developer/designer/tech support for research projects.

I did not escape because I hated academic environment, but because I could not produce hybrid, practice-based knowledge if I stayed in a theory-rooted environment. In *Simulation and its Discontents* (Turkle, 2009 p.14), Sherry Turkle writes that with the introduction of digital tools in architecture courses, design students started being over-reliant on such tools and this took a negative toll on their creativity: it was harder to "own" their designs and not fall into the simulation model created by a software interface. Similarly, I believe it is much harder to produce original and useful knowledge by being immersed in highly standardized academic environments. Too often in academia, we are taught and instructed to wholly absorb a mould of certain school of thought that we find intriguing enough to pursue. Marxists are encouraged to socialize with other Marxists; sociologists are applying to sociology conferences. And this is a great first step, as it is done for the knowledge exchange in the field, but environments like these create very little inter-disciplinary traction. One has no need to explain Marxism to a group of other Marxists, and because of this, one robs themselves of having to think through Marxist

theories critically and experientially, whilst communicating those ideas to someone who is not immersed into the same disciplinary mould. Paradoxically, the best way to explore and learn the limitations and usefulness of any theory in any discipline – is to let that theory talk to life.

The reason I am writing about this is to emphasize how much friction and isolationism there is between disciplines, but also between the academia and the world, which is ironic with regards to the goals of academia – to enable new ways of discovering, analysing and knowing the world. And what better way to learn if not by experiencing the richness, the challenges and the limitations of the chosen academic field be it communications or programming? Academically, I believe we put too much emphasis on undesirable consequences of dealing with the failure of disciplinary standards, rather than excitement of seeking and producing new knowledge (through failures or successes). This renders us unable to exit the disciplinary simulation. Interestingly, this is where the industry is running so much further ahead by allowing self-taught experts to reinvent themselves through failure, success, and adaptation to industry demands. But as a drawback, these changes and adaptation strategies often remain undocumented and inaccessible for the lack of time, credentials, and lack of necessity to document their work. For example, game development teams rarely keep developer diaries because they focus on the project deadlines more than on theoretical value of their development strategies, challenges and approaches. As a result, their voices are largely missing from the discussion of game products they have created while game studies scholars discuss the cultural implications of their titles.

Looking into the Future

As I finish my dissertation during the COVID-19 isolation, it becomes painfully apparent that digital entertainment and technologies that connect, engage with us, comfort us, and inspire us will become a necessity in the age of pandemics. Interactive multi-player games will become one of the means of how we can engage with and spend time with our friends and loved ones in isolation.

Interactive experiences like social media games and online concerts through Twitch[14] also become the necessary outlets for self-expression; as musicians and artists can not tour or present their work publicly, they resort to other ways of interacting with their audiences. There has been an increased interest in audio production and score composition from world-famous artists as well as local musicians and performers, who previously preferred to be a part of a band and play their instrument of choice rather than score, produce and engineer their records completely on their own. An explosion of free time for graphic artists and musicians resulted in a massive skill share vortex where the amount of currently offered online classes and private lessons on design, art, photomontage, illustration and game design is hard to believe. Apart from producing online courses, said artists (myself included) also took on the uneasy job of maintaining public sanity by producing frequent artistic releases (music albums, graphic novels, comics, short films, animations).

Currently, to help my friends and supporters distract themselves from negative impacts of isolation, I am working on an interactive cross-media time-released game experience that would combine actual PC gaming with messenger gaming and email gaming in attempt to create an immersive storytelling environment for those who stuck in isolation. The player begins their

[14] You heard it right, Twitch, which is a game streaming platform was adopted by musicians and DJs for online concerts. This is another interesting example of worlds of gaming and artistic practice colliding.

journey by waking up in a spaceship; alone and without any memories of what happened prior. Through a series of puzzles, messenger conversations with the on-board computer and mysterious email threads, the player would have to piece their story together. Their spaceship can be navigated inside of the web-accessible video game, and as the story progresses, new rooms become available for exploration. New rooms, clues, graphics and conversations are scheduled to come out weekly for the duration of the summer. As a part of the game, players are offered and urged to read side-quest materials like newspapers, actual space exploration research, and cold war space race materials. Currently the scope of this project includes photomontage, photography art, podcasting, voice acting, game development, music scoring (compositions written and scored specifically for this project), graphic design work, academic research, creative writing, and storytelling/dialogue writing. The project is also inspired by an unhealthy amount of cold war science fiction and history[15] in the sense that it uses space race journalism and publications as materials that a player can read.

This project is neither meant to be academic nor educational in nature. It is a way for me to connect to others as an artist and attempt to immerse my audience into a fictional world with its fictional problems that they can actively solve or do something about in the times where isolation doesn't leave much choice for action. It is also a way for me to process isolation and create meaningful art that in itself reflects the conditions that have enabled its production.

Without further ado, let us move on to more analytical part of this dissertation, where I explain what theoretical basis lie behind immersive engagement environments created by video

[15] I wrote a paper on space race science fiction comparing trends in Soviet and Western sci-fi with space race journalism for an undergraduate directed reading class. I am more proud of this paper than of my master's thesis.

games and other digital experiences we use on daily basis. Multimodality is perhaps the most essential, yet rarely discussed key concept in game development.

Chapter Two: Multimodality

This dissertation is based on the concept of multimodality, and hence, I will be discuss multimodality at length. But before delving into the relationship between multimodality and affect, I will define the concept of human and interface multimodality and the extent to which it will be used and discussed in this dissertation.

Defined academically, multimodal communication is "the use of several semiotic modes in the design of semiotic product or event" (Kress & van Leeuwen, 2001, p.20). Multimodality is a multidimensional concept that addresses both the nature of communication as well as communication methodology. The theory of multimodal communications is enunciated within multiple conceptual and material levels of understanding. The top level is characterized by the common semiotic principle such as "emotion", or "action", and the next level consists of modes (semiotic resources) that build up the meaning (Kress & van Leeuwen, 2001, p.194). Studies in multimodal analysis, currently pioneered by The Multimodal Analysis Lab (formed by the leading scholars of multimodal research O'Holloran, Kress, and Jewitt), aim to shift the focus from language and text-based analytical tools and bring attention to less explored modes for meaning-making such as sounds, visuals, colours, smells, spatiality, and so on.

Importantly, multimodality studies are not about dismissing the relevance of language (linguistics is a significant part of Multimodal Analysis), but about approaching the meaning-making as a broader semiotic concept that does not rely on text/language alone. Just like language-based analysis, multimodal analysis has its limitations due to the difficulty of

developing theories and frameworks for semiotic resources that would stand on their own (O'Holloran, 2004, p.2).

Communications have always been multimodal: medieval manuscripts were meant to be read both textually and visually, Shakespearean plays were ultimately performed in a theatre and communicated meaning not only textually, but also in actors' movement, intonation, stage design and costumes. Multimodality studies precede the era of digital objects, and began as a branch of linguistics, analysing the relationship between language and rhetoric, print advertising, film, textiles, and other, not necessarily digital, forms of meaning-making and communication. New digital technologies, however, "do play a central role in how modes are made available, configured, and accessed" (Jewitt, 2016 p.5).

Multimodal analysis becomes increasingly more useful and relevant when it comes to analyzing expressive "languages" of new media art and design. Digital objects including websites, apps, games, and interactive art, are multimodal by design. And especially in the era of technological alienation, powered up by all kinds of technologies (from assistive to educational and entertaining), addressing intricacies of multimodal design of digital objects becomes increasingly important.

Analysing video games or digital objects through the lens of multimodality can not only prove a helpful exercise in learning and dissecting how digital objects emanate meaning, but also can greatly contribute to the studies in multimodal design and inspire the next generation of designers to critically assess the meaning of their digital creations, and provide them with a blueprint for prototyping more meaningful and complex digital objects.

This study is interested in the concept of multimodality from a strictly design perspective; it is of interest to this research project of how meaning is created and expressed in interfaces and

digital objects, the kind of modes involved in producing the meaning, and how this meaning gets interpreted. In the process of answering all these questions, it is necessary to pin down what a mode is, and what kind of modes digital objects are capable of expressing/transmitting.

What is a mode?

This term refers to a set of socially and culturally shaped resources for making meaning. A mode is a 'channel' or representation of communication (Kress & van Leeuwen, 2001). Examples of modes can include language, writing, printed, digital or moving image, sound, speech, gaze, posture or gesture. Embracing a variety of communicational means as worthy of investigation constitutes a challenge to the prior predominance of spoken and written 'language' in academic work, and opens up possibilities for recognizing, analyzing and theorizing the variety of ways in which people and technologies make meaning, and how those meanings are multimodally interrelated.

Modes are not autonomous and fixed, but, created through social processes, are fluid and subject to change. Not all modes are universal, but some are particular to the communication practices of a certain community. For example, making marks in the sand, is a community-specific mode common among the Walbiri women of central Australia (Munn, 1986). Another way of defining a mode is testing whether a certain mode meets three Hallidayan 'metafunctions' (Halliday, 1978): whether the communication channel is 'ideational' (has a subject matter), 'interpersonal' (constructs social relations) and 'textual' (creates coherence). The definition of mode continues to be refined and developed as the new modes emerge, allowing us to build new relationships with our lived realities.

In the context of digital objects and interfaces, five major modes (or communication channels) can be identified: visual, audio, interactive (touch/gesture), and textual/linguistic. But

besides the major identifiable five, there are myriads of mode expressions and intersectional modes. For instance, “visual mode” can harbour a variety of intersectional modes and expressions such as animation and video, and audio/sonic mode can include music, synthesized and/or voice-acted speech, and sound effects. Interaction mode can presuppose mouse or keyboard interaction, vibration, touch recognition. It is important to emphasize, however, that interactivity and interaction can imply different concepts and ideas depending on the context and discipline. Interaction and Interactivity will be discussed and analysed at length in the next chapter.

The most exciting and complex messages and meanings are born on the intersections of two or more modes: modal intersectionality is where the concept of playfulness and play is allowed to enter the stage. Speaking in video game contexts, the differences between the multimodal messages that are being communicated to us by the interfaces and our contextual understanding of game environments can lead us to experience playful deception, attachment, competitiveness, and emotional engagement – all those things that make games good, entertaining and often, addictive. It is important to clarify, however, that human modailities and interface modal affordances are not the same, and the difference will be discussed comprehensively in the next section.

Machine Multimodality

From keyboards, mouse, screens, touchscreens, to voice-enabled assistants and virtual reality, we have never had more ways to interact with technology. These means of interaction allow users to enter input and receive output from their devices. These inputs and outputs are often designed together in sets to create cohesive user interfaces (UIs). And in turn, these

interfaces, aside from being responsible for information processing, reflect the way that our senses, cognitive functions, and motor skills also work together in sets called modalities.

Human modalities have existed for far longer than interface modes, enabling us to interact and affect the physical world. Our devices are only beginning to catch up to us. Consider the richness of current multimodal interactions interfaces offer; we can play a video game on motion-tracking Microsoft Kinect, we can ask Amazon Echo a question or make Alexa order us an Uber. As we perform our basic human functions on daily basis, we often use several modalities together in our daily activities, and when our devices can do the same, they are considered multimodal UIs.

Because as species we are intrinsically multimodal, most technologies (digital or otherwise) that we create are already multimodal by design, but because we are so used to them, we don't tend to think of them that way. We know that a microwave is done heating up our lunch when we hear a beeping sound. When we hear a knock on the door, we know that there's someone outside trying to come in. We type text using our keyboard and fingers and see characters appear on the screen in front of our eyes. We ask google assistant a question and see the response animation that confirms that we are being heard. We play a video game and are immersed in sensory information from the screen, speakers, and the rumble-shock controller in our hands.

Unlike multimodality of human interaction, which implies more contextual ambiguity and flexibility, machine multimodality merely refers to the "interaction with the virtual and physical environment through natural modes of communication" (Bourguet, 2003, p. 717). Natural, that is, to humans of course. The majority of beginner computer programming and software development guides emphasize how computers are, simply speaking, "dumb" – they

can process very complex calculations extremely efficiently, but lack even the basic understanding of situational context – that's why behind every great piece of software is even a greater team of developers. Needless to say, unlike humans that are capable of creating countless context–specific modes of communication, machines cannot currently brainstorm their own modes, relying heavily on programmers to develop said features. Multimodal products blend different interface modes together cohesively. They allow us to experience technology seamlessly, the way we experience the world around us: across our senses. Good multimodal design allows us to dissolve in the simulation, while bad multimodal design distracts us with inorganic interactions, unnecessary distractions and irrelevant information, thus contributing to confusion and cognitive dissonance.

Unlike human modalities, which essentially imply expression, machine modality is a complicated translation mechanism that translates commands which a machine can understand and execute, from a medium that is more natural to humans (speech, gesture) into the language a machine can correctly interpret. Programming is the primary method of communication we humans currently employ to interact with machines. It is a direct method of command that allows for minimum ambiguity that can be debugged and made more specific, since machines have been programmed to give developers extensive feedback and tools for identifying and fixing input errors.

But there are other means and modes that keep evolving every day. Movement/gesture, image or voice recognition ("Ok, google!") are all modes of communication that users can use to interact with computers and programs. Text input, gesture, speech or touch are considered "input modalities" that we employ to send information, and what we get in return – speech synthesis ("How can I help you?"), animated graphics, or an executed command are considered "output"

modalities. As technology evolves to be more and more user-friendly, software developers are challenged to create interfaces that would allow to blend modalities in new combinations, thus creating better, more organic experiences that are designed to assist us in everyday life, re-envisioning and re-figuring ways which we are used to interact with physical and digital information.

Multimodal machine learning (MML) today is a vibrant, multi-disciplinary research field which addresses some of the original goals of artificial intelligence by integrating and modeling multiple communicative modalities, including linguistic, acoustic and visual messages. With the initial research on audio-visual speech recognition, and more recently with language and vision projects such as image and video captioning, this research field brings some unique challenges for multimodal researchers given the heterogeneity of the data and the contingency often found between modalities. A multimodal system has to recognize the inputs from the different modalities combining them according to temporal and contextual constraints in order to allow their interpretation. This process is known as multimodal fusion. The combined inputs are interpreted by the system. Naturalness and flexibility can produce more than one interpretation for each different modality (channel) and for their simultaneous use. They consequently can produce multimodal ambiguity generally due to imprecision, noises or other similar factors.

We and our systems

As briefly mentioned in the previous section, we and our machines have significantly different sets of cognitive affordances. We might not be as fast in performing mathematical calculations, but we have greater frames of reference when it comes to interpreting results. Computers, accordingly, might have little to no frame of reference when it comes to processing the information without the aid of software programmers, but are extremely efficient at

registering information and performing calculations. In many exciting computer-assisted programs around the world, we use machine advantages to help us solve human problems, thus turning interfaces into extensions of our senses. This is how we can gaze deep into space, using machines in various capacity to calculate the distance between planets, program the landrovers and send them to their predefined and precalculated destinations. We use technology as an extension of our senses in more ways than you could imagine off the top of your head. And all these means are designed to receive and process information multimodally. In *Medium is the Message*, McLuhan writes that "The medium, or process, of our time—electric technology—is reshaping and restructuring patterns of social interdependence and every aspect of our personal life." (McLuhan 1969, p.9) As we program our software to be a better, more multimodal communicator, we are redefining the very nature of communication itself both for ourselves and for our technologies. And by extension, making software and hardware (from digital media artifacts to robots) the extension of our visions, ideologies, sensibilities and thoughts.

For example, Rainforest Connection (RFCx) creates acoustic monitoring systems to help ending illegal deforestation in real time. Working across the globe, RFCx reuses upcycled or refurbished mobile devices, suspended high within the forest canopy, as sensors to monitor protected areas of Amazon rainforest as well as endangered forests in Indonesia and Africa. Phones are placed in solar-battery operated cradles and effectively detect the sound of human presence associated with invasive activities like motorcycles, logging tracks and chainsaws. Once the sounds are detected, the phones send an alert message, notifying the residents and ranges who can respond immediately. Topher White, the founder of Rainforest Connection, described his first effort in Indonesia:

We're talking hundreds of kilometers from the nearest road, there's certainly no electricity, but they had very good cell phone service, these people in the towns were on Facebook all the time…this sort of got me thinking that in fact it would be possible to use the sounds of the forest, pick up the sounds of chainsaws programmatically, because people can't hear them, and send an alert. But you have to have a device to go up in the trees. So if we can use some device to listen to the sounds of the forest, connect to the cell phone network that's there, and send an alert to people on the ground, perhaps we could have a solution to this issue…if you can show up in real time and stop people, it's enough of a deterrent they won't come back. (Park, 2018 p.7)

A similar type of sensor technology, although used in a completely different setting, helps museums around the world to offer tourists a chance to explore historical and popular culture-specific exhibits in their own language. In London's Tower, Tokyo's National Museum as well as in many other tourist destinations across the globe, visitors are offered a cell-phone-like, geolocation-responsive device that registers the physical location of the visitor using satellite or google maps API and plays a pre-recorded lecture that corresponds to the location of the exhibit attraction the tourist is currently exploring. The lectures are available in more than 30 languages that utilize advanced text to speech synthesis to read the exhibit information, thus lowering the costs for museums to record and edit their lectures using human voice actors.

Both examples offered above look at the human-machine multimodal interaction patterns on a global scale, but if you look closer, you will find thousand of examples of how we engage in multimodal interaction with interfaces on daily basis. We already delegate a lot of work to

machines in helping us to keep in touch with our humanness. We employ interfaces to remind us to stay active, teach us skills online, remind us to drink water or help us fall asleep.

Interestingly, most assistive technologies that we use on daily basis integrate one or more principal of gamification as a means to holding us accountable to our set goals. Gamification, for instance, is already widespread in digital healthcare apps. An estimated 63% of employer-sponsored wellness programs feature elements of gamification/competition (PWC Research, 2017, p.7), and 24% are interested in offering such features. And as of 2016, research has identified 64 health apps that include gamification in the National Health Service (NHS) Health Apps Library and top-rated medical, health and wellness apps as defined by Apple and Google Play (Edwards *et all*, 2016).

When it comes to the benefits of gamification, it seems to bring positive behavioral change, which in turn make achieving simple healthcare goals possible. One study from 2014 examined the efficacy of gamification on adults with anxiety (Dennis & O'Toole, 2014). The researchers found that participants who played a 40-minute game were able to reduce their anxiety considerably. Interestingly, participants who played only a 20-minute version of the same game did not see the same results. Another study reported similar results around reduction of perceived pain after using a gamified health app.

Not all multimodal technologies employ the principles of gamification, but all technologies that use gamification principles to help us achieve health milestones undoubtedly engage users in multimodal communication with interfaces, regardless of whether those communications come down to seeing a congratulatory animation that plays in your app whenever you achieve a fitness milestone, or a sensory interface that monitors your sleep patterns and provides a visual feedback by displaying your biometric data. This establishes an

obvious, traceable connection between multimodality, information processing, gamification and behavioral change as well as emphasizes how interfaces reflect our own communication modalities.

Chapter Three: Affect and Emotions

When discussing any kind of information processing that leads to behavioral change, whether it is instigated by technologies or not, it brings me to the discussion of affect and emotions and the role they both play in cognitive processing and retaining information.
In fact, it's not surprising that the most active area of research and theory of social information processing to emerge in the past two decades is concerned with the behavioral consequences of affect and emotion (Fiske & Taylor, 1991; Higgins & Sorrentino, 1990; Sorrentino & Higgins, 1986; Wyer & Srull, 1984, 1994). Some research addressed emotional reactions to stimuli and the cognitive processes involved in facilitating such reaction (Smith & Ellsworth, 1985; Abelson, 1983; Ortony, Clore, & Collins, 1988; Roseman, 1984, 1991). Other research studies analysed how emotional response and affect influenced the way information is retained in memory (Bower, 1981, 1991) and, consequently, how emotions and affect influence previously acquired knowledge (Blaney, 1986) and is used as basis for future judgement and decision-making (Clore, 1992; Schwarz & Clore, 1983, 1988).

There has also been a lot of great work conducted on determining the impact of persuasive messages (Bless, Bohner, Schwarz, & Strack, 1990; Mackie & Worth, 1989), impression formation (Isbell, Clore, & Wyer, 1998), stereotyping (Bodenhausen, 1993; Bodenhausen, Sheppard & Kramer, 1994), self-evaluations (Levine, Schwarz, & Wyer, 1994;

Schwarz & Clore, 1983) and political judgment (Abelson, Kinder, Peters, & Fiske, 1982; Isbell & Wyer, 1998; Ottati & Isbell, 1996; Ottati & Wyer, 1992).

Segworth and Gregg define affect as "an entire, vital and modulating field of myriad becomings between human and non-human" (2010). A more specific definition of affect that comes from cognitive psychology, explains affect as positively or negatively valenced subjective reactions that a person experiences at a given point in time that can lead to evoking either pleasant or unpleasant feelings (Affect and Information Processing, 1990, p.3). Affective reactions can be created either by perceptions of one's immediate stimulus environment or by thoughts about past or future events, but can also stimulated by physical sensations of pain or pleasure, or evoked by psychedelic drugs. In other cases, affect can be stimulated by proprioceptive cues such as facial expressions (Strack, Martin, & Stepper, 1988; Zajonc, Murray, & Inglehart, 1989).

As discussed by Robert S. Wyer, Jr., Gerald L. Clore and Linda M. Isbell in "Affect and Information Processing", the connection between affect and stimulus response formation is not as definitive as it may seem at first; affective responses do not directly influence our behavior principles, but rather, become preconditions for stimuli formation that govern behavior in specific types of situations to which said stimuli are relevant. Once these procedures are activated, they can influence responses to new information without conscious awareness. A video game enthusiast that is most experienced in playing shooters is not likely to associate humans with in-game human targets but is likely to recall in-game strategies and experiences whenever the environmental stimuli present her with similar options, for instance, while playing paintball with her friends. And this connection is fascinating, especially when we discuss how

games and simulations can create a behaviour-governing environment for more beneficial absorption of knowledge and information.

Gaming, Affect and Emotions

Peter Kelly (2015), Annika Waern (2015), Diane Carr (2009) and Peter Lankoski (2012), among others, argue that video games are highly affective. In extreme cases, emotional affect presents itself as severe videogame addictions or as players having romantic attractions for video game characters (phenomenon known as *pixelcrush*). Affective games generate volumes of unofficial paratexts in the form of fandom, sharing, fan art and fiction, and eventually become part of popular culture. Game-inspired fan-generated content remains as a proof of the affective powers of gaming, since affect is "intrinsically involved in the human autonomic system and is engaging an energetic dimension that impels or inhibits the body's capacity to action" (Segworth, 2010, p.188). In this case, action is the creation and facilitation of game-inspired content. It is important, however, to add, that in video games, affect cannot be predicted, organized, produced, or engineered. It is rather a response that can be evoked in the process of play, although it cannot be guaranteed or regulated.

How Multimodal Interfaces Create Engagement Environments

Before proceeding further, let's summarize what we already know from the research findings above: we, as humans, employ multimodal communications on a daily basis, and design our machines to be multimodal. Multimodality is not the same for us as it is for the interfaces we interact with, but good interfaces aim to mimic our expectations of multimodal communication more closely to establish a "multimodal dialogue" with us where our actions can receive an

appropriate reaction from the machine interface. This multimodal connection to our devices often employs gamification techniques, because it's one of the most natural ways a multimodal interface can initiate a "conversation" with us, where we can see an immediate response to our actions. This kind of conversation also makes it possible for us to create a safe environment for us to learn, process information and shift our behavioral conditioning. While video games and gamification apps do not influence our actions directly, they create a cognitive space for us where we can process the new information, and by extension, learn. The conclusion we are arriving to is that videogames and gamification apps facilitate learning environments due to the very fact that they are multimodal. Just like when we interact with other human beings, (the very moment of interaction itself creates an opportunity for learning), our interactions with technologies and interfaces likewise become facilitated grounds for learning when they follow the same standards we expect from our interactions with human beings. And what we have been conditioned to expect are rich, multifaceted and multimodal dialogues that can engage our senses on more than one interpretational level.

Chapter Four: Discussing Terminologies: d0main specific

Definition Breakdown: The Conceptual Loop

In the previous chapters, I discussed mode and modality, and how human modalities differ from interface modes. This brings us to the point of the true complexity of the middle ground we are dealing with here; the kind of complexity that is unwise to subject to a strict hierarchy or documentation but is crucial to understand if we are to discuss interactive and game-making technologies to their full potential. Here, we are dealing with the fascinating concept of meaning transcending the boundary between human-computer communication spectrum. We are witnessing the "space where species meet" (concept coined by Donna Haraway, 2008), and the

meaning signal is getting translated from human system to the machine system and back, engaging us in a fascinating call and response loop. We are entering the mirror-land where the concepts of interaction, affect, and multimodality become intersectional and cannot be examined apart from one another and need to be understood in conjunction: we have successfully bridged the gap where humanitarian and programming terminology collide.

To attempt to explain what I mean by the collision of terminologies, I have to bring up an anecdote from my graduate student career that made me truly appreciate the fascinating intricacies of terminology and how the fluid concept of meaning tends to be space-specific. I come from a technical/development background where terms like interaction for me carried a practical/technical undertone: keyboard/mouse interaction, joystick, onclick processes, etc. I was drafting my dissertation for *ReFig* – a conference dedicated to re-figuring and critically examining aspects of games and game cultures. As part of the graduate student experience, we received feedback from the reviewing committee of prominent scholars in the field. My draft was dedicated to exploring multimodal interactive affordances of game technologies, and I was taken aback by the criticism towards my statement that interaction is a mode. The committee considered interaction to be a concept superior to that of a mode, if not an overarching force that drives the modes of communication.

After half an hour of unwrapping the argument that nearly drove me to tears, we suddenly became aware that we are not discussing the same concept of interaction. We bridged the mirror land where the human concept of interaction (looking, interacting, viewing, engaging cognitive participation and the entire theoretical groundwork associated with those phenomena) intersects its mirror double of the same term, but applied to systems, interfaces and technologies: response actions, functions, software-hardware signal response processes. We are, after all, exploring the

land of human-computer interaction, where terminology can become fluid and transcendental, but nonetheless vital to navigate and explore if we are to truly understand what these interactions mean for us as well as the interfaces we interact with. At the time, the pure realization of the existence of these mirror concepts (such as interactivity/interaction, modalities/modes – that imply completely different, albeit connected, terms in the worlds of humans and machines) fascinated me greatly, because I seem to have found an invisible "point of collision" on the intersection of theoretical and practical applications; the "space where species meet". But this experience also made me aware that untangling my thesis would require extra clarification of the terms I am operating with, for terms tend to be d0main-specific.

Why do we need to be aware of this invisible collision? This question lies at the very foundation of emerging User Experience Engineering discipline. Unlike User Experience Design (UXD) which is directly connected to visual culture and graphic design studies stemming back to painting, calligraphy, textile print, typography work, movements like art deco and dada, User Experience Engineering (UXE) is a relatively new discipline that is not separable from applied programming, and therefore dates back to the beginning of personal computing and software interface design. UXE is an intermediary discipline that operates between human and machine modalities: designing and translating interface concepts that create seamless experiences for the user into the modalities that machines and systems can easily interpret, and the other way around. Seamless bridging of this so-described "invisible collision" between what humans and machines experience and interpret is vital for the creation of not only high quality, but also highly useful/highly usable digital products. It is necessary for us to keep actively engaging with "collision concepts" in order to enable the kind of hybrid game design scholarship Jarvinen and

other scholars keep talking about when they say that Game Studies need more intersectional perspectives.

Now that we have successfully acknowledged the phenomenon of concept definition breakdown, the mirror-land that we will be bridging often when it comes to discussing the nature of human-computer interaction, we are ready to engage with the intersectional understanding of the concepts like **Interactivity** and **Play**. In the next few segments, I will dissect the abovementioned concepts and analyse what they mean for humans and machines respectively. Once clear on these key concepts, I will delve deeper into what constitutes a human-computer interaction in play, and what kind of values beyond entertainment we can extract from the process of play. How does digital media change us and how do trends in gaming change our interaction with computer systems via game interfaces?

Play/Game

In his 1978 book The Grasshopper, Bernard Suits (who was a professor of philosophy at the University of Waterloo) declares that "a game is the voluntary attempt to overcome unnecessary obstacles" (p. 55). Game design legend Sid Meier says that "a game is a series of interesting decisions." In *Game Design Workshop*, Tracy Fullerton defines a game as "a closed, formal system that engages players in a structured conflict and resolves its uncertainty in an unequal outcome" (2004, p.46). In *The Art of Game Design*, after examining several definitions, Jesse Schell defines game as a "problem-solving activity, approached with a playful attitude." (2008, p.37) In the book *Game Design Theory*, Keith Burgun presents a definition of game as "a system of rules in which agents compete by making ambiguous, endogenously meaningful decisions" (2012, p.19). Definitions of games vary across disciplines as the above examples

demonstrate, some of which imply a system of limitations and rules, and others viewing games as a decision-making journey.

Video Games: An Aesthetic History of the Medium

The first mentions of affect and emotions in the content of video games appear as early as in the 1980s, in "What Makes Things Fun to Learn: A Study of Intrinsically Motivating Computer Games" (Malone, 1980) – now considered to be the first PhD thesis in computer games, and "Mind at Play: The Psychology of Video Games" (Loftus, 1983). Despite the early scholarly fascination with the affective powers of video games, Malone's contemporary Chris Crawford in his seminar "The Art of Computer Game Design", stressed that generally, games are not impressive art forms, since they are not able to deliver the complexity of affective, emotional experiences that other, more traditional and developed art forms could (1982).

At that time, games were discussed in terms of catharsis and narrative – both terms delivered from performance arts and literature. The early research on games was also largely situated in humanitarian disciplines. A remarkably interesting research, although centered not on games but on human-computer interaction was produced by Brenda Laurel; Laurel's work "Computers as Theatre", among other things, implies that like theatrical performance, human-computer interaction implies direct engagement, which carries emotional and cognitive values that may result in catharsis (1991, p.122). This kind of catharsis can be either the best or the worst depending on who wins: the player or her opponent/computer. The concept of player/user agency that is emphasized in Laurel's work becomes of primary importance for videogame and virtual reality experiences.

First-person sensory agency is linked with participation and involvement in computer-based activity and experiences. Examples of this direct relationship between sensory agency and

participation can be best seen in contemporary simulators and virtual reality experiences. Particularly in VR, the forced removal of agency, especially when the player is being forcefully moved in space, is connected with very undesirable cognitive experiences and motion sickness. The weakening of participatory link was also proven to lessen the participant's immersion in virtual experiences. In *Artificial Reality II*, Myron Krueger describes a VR experiment where the participant was virtually put in the body of a lobster (1991). The link between the participants' body composition (arms and legs) and lobster's body composition was too weak due to differences in affordances. Consequently, the participatory experience was rated as not fully immersive.

There is a significant body of scholarly work produced after Laurel's work on computer performance. The concepts of agency, immersion and transformation all came together in Murray's monograph *Hamlet on the Holo Deck: The Future Narrative of Cyberspace*. Murray (1997) looks at video games as digital environments that possess a certain set of means and tools for giving pleasure, creating beauty and seeking truth.

All these historically significant works like *The Art of Game Design*, *Computer Theatre* and *Hamlet on a Holo Deck* created space for game conversations and helped to establish game studies and game design studies as interdisciplinary, hybrid and multidimensional areas of research. Games started to be looked at from the perspective of behavioural conditioning, emotional processing and cognitive psychology. Interestingly, many guides dedicated to studying video games from the perspective of cognition and emotion adopted more scientific language conventions: "emotioneering", or "engineering emotions," for example, comes up in Freedman's (2004) practice-based guide for creating player motivation though NPC, dialogue, plot and gameplay pattern design. It's as if the more scholars started exploring the affective merit of game

systems, the more technical and structured the efforts of explaining a game's affective magic has become. In other words, if it is a system/interface/machine, there must be a scientifically satisfying way of explaining how it works to make players feel. In truth, the participatory environment created by video games (the game world where the player can interact with game options) transcends the segment of the actual play where the player can interact with the game system in real time. And design literature addresses this far more extensively than game studies scholarship that often seems to focus on games as cultural objects.

The majority of video game studies scholars examine game-to-player interactivity as a primary object that doesn't necessarily look at graphics, music, or narrative. James Paul Gee, for example, sees player interaction as a "turn-based conversation", separate and different from other multimodal channels that games employ to communicate with the player. In a sense, Gee is right; if we think of interactivity as of a sum of all ways a player can interact with the game, it is a much vaster concept than game music or graphics. Creative expression like fan fiction or fan art can be arguably by-products of a player interacting with a game system. If we adopt Gee's perspective, you could even say that music and graphics can be sub-components of interactivity, or at the very least, subservient "helper" elements of game expression driven by interactive affordances. For example, when player leaves one game room and is transferred to another, the music theme might change – but it is a direct response to player's action.

Gee's definition doesn't discuss or consider that there could be more than one concept of interactivity (or more than one dimension of this concept) present in a game system. As I already mentioned above, when we navigate realms of video game studies/video game design studies, theoretical language becomes transcendental and intersectional. Because in truth, we are not dealing with a monolithic game system that exists as a floating artifact by itself and is complete,

independent and whole. We are navigating a complex network of communications and connections that exists between developer and game system, and between game system and the player. And as already mentioned above in the section where the differences between human and machine multimodalities are discussed, when it comes to creating digital artifacts (that are all multimodal by default), we do not create static monoliths, we engage in an intricate process of transcription and translation of multimodal channels that humans can engage with into multimodal channels which machines can understand, so that machines can interact with human users in predictable and expected ways for humans. And thus, there's interactivity that relates to human modalities, and interactivity that relates to machine modalities.

There's a global concept of interactivity, that is a "zone of contact" between the player and the computer system. It is a dialogue, and a conversation as much as it is a system of call and response: the player performs a certain action in the game, and the system reacts to that action; the player presses a button, and the quest log opens. This global concept of interaction might imply immediate contact with the game (by playing it in real time), or a prolonged affect from the game that affects the player far beyond the time scope. For example, a player might become emotionally affected by the game, or have dreams about game characters, or remember the experience of playing a game years after the actual playing experience has happened. The game could even affect the player behaviorally; as discussed earlier in the dissertation, by preconditioning the player to recall certain familiar stimuli. This concept of interactivity is multifaceted and complex.

But there is also a more grounded and more immediate concept of interaction involved in the creation of video games, and this concept can be considered a part of communicative multimodal affordances video games employ alongside visuals, sound, and narrative. This kind

of interaction presupposes real-time interactive affordances that a game makes available to the player: how the game system responds to the player actions, what options it offers to the player, and how it responds to these options once they are followed up on.

To illustrate the difference between those two concepts better, let's imagine you are playing a video game right this moment. You look at the screen, you can interact with the game visuals by looking at them, admiring the art, wondering why the grass is blue and not green, and you can hear a sound made by an in-game owl and turn your head to peek at the side of your screen. You can listen to in-game music while you complete your quest objectives and cognitively process it – is it sad? Is it happy? Cognitive processing is also a part of the game system interacting with you, the player. You can hear suspenseful music as you interact with that particularly suspicious NPC and suspect that they are deceiving you; just the gut feeling you have. You leave your game half-finished, because you need to sleep, and at night you dream about that dialogue you had with an NPC. Your brain somehow connects that dialogue with a bunch of other unconnected things you've done the day before and you can't help but make new strange associations. That's because the game has affected you, and your brain has already started connecting this simulated affective playing experience to other things that might have made you feel in a similar way. Or maybe the NPC model just really reminded you of a face you've seen somewhere before? This "higher level" concept of interaction is what James Paul Gee, Ian Bogost and other game studies scholars (especially if they are cross-disciplinary scholars from film, media, literature or humanities) are sometimes talking about when they discuss games in the context of interactivity.

The more grounded concept of interactivity is still there as your brain creates and processes all these complex, and sometimes nonsensical, affective associations. In fact, it was

there far before you had a chance to be affected by the multimodal fabric of the game narrative. This layer of interactivity is what game designers and developers are highly engaged with as they work on a coherent and immersive game product. We can experience this kind of interactivity by interacting with game GUI (graphic user interfaces), in-game objects, dialogue options; by "choosing" our own adventure, or even by deciding on whether we want to experience the game on a console or PC. And the occasional unintended limitation that the player faces, for instance when encountering a dialogue option which is supposed to give you an additional zone to explore in the game but fails to do so (due to a bug or error in the game-making process), is, for better or worse, also a part of this grounded interactivity concept. This kind of grounded interactivity is most definitely a mode, a communication channel alongside other channels like visuals that you see, sounds and music that you hear, and text that appears on your screen. In human multimodality, this machine mode would be similar to gesture and posture (when it comes to embodied interaction). But alas, because machines do not walk or pose, for now event and conditional processing would have to do the trick.

To make it even more interesting, complicated, and intricate, those two concepts of global and grounded interactivity are connected like call and response, like point A and point B, like wine and vinegar, and sometimes – like chicken and eggs. Metaphorically, these two concepts are like buns of the sandwich, with the actual game product being the toppings in the middle. The bottom bun is the developer's design intent (human multimodality – machine multimodality translation) and the top bun is the player's reception (machine multimodality – human multimodality translation). It is a truly fascinating creative design transmutation, a kind of "alchemy": translation of the conceptual game idea ("I want to make a game about X!") into software limitations (conditional logic, if statements, sound triggers, screen translations), and

then extraction of that conceptual idea (on the player's side) from the game system with all its limited communicational/multimodal affordances (that nonetheless become more and more robust over time). Just like any other art object, once game products are being publicly released, the creator(s) lose the ideational agency over their product, letting the player to create their own associations, interpretations, theories, fandom and paratexts that stem from events and interactive options available in the game, now passing through the additional affective/emotional processing of the player.

Now that we have discussed and differentiated parallel mirror concepts of game interactivity, and equated translational process of game design to a sandwich, where one bun of the sandwich is the developer's intent, and the other – the player's reception, let's explore and discuss a variety of preceding game design frameworks that helped to shape this model. All these frameworks are collected from design manuals and do not take multimodality as a core concept key to understanding game artifacts.

Chapter Five: Principles of Game Design

Some of the most popular frameworks for game design include MDA (mechanics, dynamics, and aesthetics) first presented by Robin Hunicke, Marc LeBlanc, and Robert Zubek, FDD (formal, dramatic and dynamic elements) coined by Tracy Fullerton and Chris Swain in the book *Game Design Workshop*, and Elemental Tetrad introduced by Jesse Schell in his book *The Art of Game Design*.

Mechanics, Dynamics, Aesthetics Framework

MDA is perhaps the most popular framework among professional game designers; it is predicated on the fact that players and designers approach games completely differently. Designers often tend to start working with mechanics, while players experience the game first and foremost – aesthetically. MDA encourages designers to approach game development "backwards" – starting with aesthetics and working from the ground up to dynamics and mechanics to generate and support the game aesthetics.

According to MDA, designers should start with defining what they want they players to feel and experience while playing the game. After aesthetics are set, the developer will work backward to create the kind of player experience that would prompt those feelings, and finally move to the gameplay mechanics that will make those dynamics technologically possible. Unlike Designers, Players tend to view the game in the opposite way: first experiencing the mechanics (often by reading the written rules for the game), then experiencing the dynamics by playing the game, and finally (hopefully) experiencing the aesthetics that were initially envisioned by the designer. While MDA provides better common ground for game design discussions, FDD is the kind of tool that focuses on offering better design tools.

Formal, Dramatic, and Dynamic Framework

A FDD framework is derived partially from history of film studies and aims to provide Designers with concrete analytical tools to help them make better games and push their ideas further. According to the framework, a game is a sum of formal, dramatic, and dynamic elements that differentiate games from other forms of media. Formal elements include things like rules, resources, and boundaries. Dramatic elements are characterized by narrative of the game, including character arcs and main quest objectives that tie formal and dynamic elements together, help players understand the rules, and encourage the player to become emotionally

invested in the outcome of the game. Dynamic elements include things like strategy, behaviour, and relationships between game entities. It is important to note that FDD's definition of "dynamics" is broader than MDA's, because it includes more than just the runtime behavior of the mechanics.

Elemental Tetrad

Elemental Tetrad splits games into four core elements: mechanics, aesthetics, story, and technology. Mechanics are defined as rules for interaction between the player and the game (rules, objectives) and are the most medium-defining element that helps to distinguish games from non-interactive media like film, literature or painting. This is different from the mechanics presented by MDA because in the Tetrad framework, Schell differentiates mechanics from technology. Shell's definition of aesthetics bridges into multimodal territory, as it describes aesthetics as anything that is perceived by the five senses: vision, sound, smell, taste, and touch. And as much as sense of smell or taste is not as commonly stimulated in modern video games as others, the rest cover everything from the soundtrack of the game to the character models, packaging, and cover art. This definition is different from MDA's "aesthetics" because in MDA, aesthetics stand for emotional response stimulated by the game, whereas Schell refers to the actual game assets that are crafted by the game developers. Technology element sums up all the underlying technology that makes the game work: console hardware, computer software, rendering pipelines, graphics and sound engines. And finally, Story: in Schell's definition, story is used to convey everything covered by Fullerton's dramatic elements; it is the narrative that occurs in the game as well as story arcs of the characters and the main objective/premise.

Each of these frameworks discussed above offers a different perspective and lens when it comes to understanding game design and development. MDA seeks to demonstrate that players

and designers approach games from “the opposite sides of the table” and proposes that designers can be more effective when they approach game development from the same perspective as players experience games. The Formal, Dramatic, and Dynamic elements framework attempts to dissect game design into specific elements/components that can each be individually worked on and improved, thus giving the designers a better way to structure their development process. Elemental Tetrad shares more of a developer’s view on game making: it defines and separates the most essential elements that make up games, and intriguingly, each of these sections fall organically into various roles within a game development studio: UX designers, artists, developers and writers. Various hybrid forms of these three frameworks lay a sturdy foundation for other hybrid frameworks to be discussed in this section. For example, Layered Tetrad, as presented in *Introduction to Game Design, Prototyping, and Development: From Concept to Playable Game with Unity and C#.*

Layered Tetrad

Layered Tetrad developed by Jeremy Gibson (2014) takes a similar direction to Elemental Tetrad by Scholl, discussed earlier, but also combines various aspects of other frameworks. It also takes the understanding of game development “out of the box”, considering not only the gameplay experience itself, but also the cultural journey of the game. The framework has almost a 3D effect to it as it considers 4 major elements of game design borrowed from Scholl’s Layered Tetrad, but through three different layers or states/dimensions: inscribed, dynamic, and cultural.

The “states” analogy is best understood through programming logic. The inscribed layer can be described as an “off” condition that is set when the game is not played. Inscribed Mechanics define how the player and the game will interact and includes sub-elements such as

interaction patterns, objectives, resources, and boundaries. Inscribed aesthetics dictate how the game looks, sounds, smells, tastes, and feels and cover aspects such as game assets (graphics/sound), packaging, and cover art. Inscribed Technology is everything that makes the game work. And Inscribed Narrative includes the premise and written character arcs in addition to the game plot as it was originally intended.

The Dynamic layer/state condition is switched to "on" when the game is played. Everything that happens on the Dynamic layer happens during the game play itself. The Dynamic layer is the realm of emergence (or the space where "species meet"), is represented by the player's action and machine's response, and is home to phenomena such as immersion, uncanny valley and mechanical exploits. Dynamic Mechanics presuppose those abovementioned exploits, strategies, any kind of in-game interaction, as well as the outcome of the game. Dynamic Aesthetics cover procedurally generated graphics to the physical strain that results from repeatedly "mashing" a button for a long period of time. Dynamic Technology presupposes all obfuscated computer calculations and rendering processes that happen during the game. Dynamic Narrative refers to all narratives that are procedurally generated throughout the game with all potential NPC interactions and side quests.

And finally, the cultural layer describes the game beyond play, and covers cultural impact of the game on culture and vise-versa. The delineations between the four elements are much blurrier in the cultural layer. Cultural mechanics cover things like game mods and playing styles that the game contributes to society (for example, Flappy Bird being the first of its kind, created an entire genre of similar games). Cultural aesthetics cover things like fan art, remixes on game music, covers of game soundtracks. Cultural technology covers both the use of game technologies for non-game purposes (e.g., flocking algorithms for game characters could also be

used in robotics) and the ability of technology to affect the game experience, like development of new kinds of controllers and joysticks. Cultural narrative encompasses the narrative aspects of fan-made transmedia properties created from the game (e.g., fan fiction, the narratives of fan-made tribute movies, and the fan-made characters and premises that are part of some game mods). It also covers the stories told about the game in culture and society, including both the stories that vilify games like *Grand Theft Auto* and the stories that extol the virtues and artistic merit of games like *Journey* and *Ico*.

As much as Layered Tetrad is the most complex game design framework of all frameworks mentioned above, it leaves room for questions. For example, why would Dynamic Mechanics and Dynamic Technology not be the same category? Wouldn't ability to exploit code be connected to the execution of the code itself, as it's running in the background? The Cultural Layer causes the most confusion: why would fan art and remixes on game music belong in the same category, while fan fiction be separated into its own individual layer? Why should Technology (code that can be applied to other industries outside of game development) and Mechanics (popularization of certain play styles) be separated from each other when they both pertain to the design/architecture of the game code? Furthermore, how often is game code really reused for projects in other industries like healthcare or robotics?

Multimodal Adaptive Framework

I propose a framework that is in part a combination of the known frameworks and approaches offered above, but also considers game development from a completely different perspective adopted from multimodal discourse analysis frameworks that is not offered in any of the approaches above.

If Layered Tetrad offers a 2D view on the game development, considering not only elements like Mechanics, Dynamic, Aesthetics and Story, but also taking into account states or conditions such as Game Intent (while it's not played), Game Dynamics (while it's played) and Game's Cultural Journey, Multimodal Additive Framework is an attempt to offer a more complex, 3D view on the game creation process.

Like earlier predecessor of Layered Tetrad, MDA, Multimodal Adaptive Framework considers a two-way binding of game creation experience: it is a two-part equation that includes a developer's intent and a player's reception/experience. The developer creates a game in certain artistic and socio-political conditions, influenced by societal structures like class, race, education, and gender. The same model applies to the experiential conditions of the player who engages with the final product. In the framework graph, they both are represented as circles. The space where the circles meet is the game itself, or the interaction ground where the developer's intent meets the player's experience.

Figure 1:Multimodal Adaptive Framework of Game Analysis

If both Elemental and Layered Tetrad Frameworks grouped game elements like sound and graphics together under aesthetics, mechanics, and technology into their separate categories, I would like to liberate all these concepts (including dynamics and technology) and reintroduce them under "multimodal channels" instead. Because code, just like writing, or visual art, or sound is a mode, and is a language of expression. Code is also the most straightforward method of communication with our computing machines that are actively involved both in the process of game design as well as gaming experience. It is important to mention that multimodal channels aren't fixed, and it's a flexible, complex and expandable category. As new technology becomes available, gaming products would take advantage of the missing senses like taste and smell in the foreseeable future.

For now, the main multimodal channels can be separated into Sound, Graphics, Interaction Design/Experience (UX), Narrative, and Code. A myriad of new sub-modes and

expressions can emerge at the intersection of the main modes, which can greatly enrich the analytical approaches to discussing game design, but for the purposes of development practices, 5 multimodal channels feel like an organic separation (as tested on actual game development projects). Modes and sub-modes are represented on the framework graph as a rainbow, because as much as the communicational channel separation could seem clear (sound can be easily separated from graphics or dialogue), the sub-modes that would inevitably result in the intersections of meaning would come in a myriad of shades, the separation of which would difficult and unnecessary to theorize.

Sound includes all aspects of sound in the game: character voiceovers, soundtrack, SFX and event themes (battle, idle exploration, etc.). Graphics encompass everything from sprite design to title screens, concept art journey (yes, even if the actual game art deviated from the drawings), animations, and any visual cutscenes. Narrative is everything from the actual plot/script written by the game design team to dialogues and event descriptors. Interaction Design includes the "front-end" interactional logic of the game (UI, interactive design, strategic placement of the game objects and the way those objects are accessed and experienced). Technology/Code takes care of the obfuscated "back-end" logic that player doesn't see or understands unless they have access to the game code (and which the designer/developer works with and has access to).

While we have two perspectives (developer's and player's) represented by circles on the graph, and 5 communication modalities represented by the rainbow river, now we need to address the temporal process of game creation. This aspect can be addressed by the three states that are borrowed directly from the Layered Tetrad Framework with slight modifications.

The first state is “when the game is being developed”, which is different from Layered Framework’s state “when the game is NOT being played”, because it takes into account the lengthy and painful process of design and development and asset generation (both ones that are used and not used in the final game). This subtle adjustment to the Layered Tetrad Framework would hopefully enable us to discuss the development journey as a separate, equally valuable process, and would still allow us to analyse development approaches that are unsuccessful or interrupted or do not result in the final game product being finished and delivered to the player.

For example, *Vampire the Masquarade* was practically unfinished at the time of its release and was offered to the players “as is” with bugs and severe UX issues, rendering the game to be practically unplayable out of the box. This is where the tech savvy fan/hobbyist developer community took the game under their wing and released several patches and hotfixes to stitch up the game. It is important to have analytical room to scholastically discuss situations and stories like this, instead of dismissing the conversations about unfinished games altogether, since some of them are unplayable and cannot be experienced fully as complete, independent and whole immersive simulations.

The second state is identical to Layered Tetrad’s Dynamic Layer – it is when the game is “being experienced” by the player with all its in-game affordances, exploits, bugs and progressions. This state allows for discussing immersion and is the meeting ground between the developer, the player, and the game itself. It is the space where game is capable of producing emotional affect.

The third state is identical to Layered Tetrad’s “Cultural Layer”: it is when the game becomes a cultural product, generates journalism, paratexts, fandom, fan art, conspiracy theories and more. It’s the state when a series of affective interactions experienced throughout the game

incubate into emotions, inspire, move us, drive us crazy, result in pixel crush, make us angry, make us aware and act upon issues and problems we weren't aware of before, and ascend into media folklore. What I have hoped to show by the development of this framework is that multimodality occupies an important role in game development; in a way, it "liberates" the game developer from thinking about game assets in a paradoxically specific, yet vague way introduced by other game development frameworks. 'Game assets' are not only graphics and sounds; they are communicational channels that become harder to separate the further game technologies advance. If forty years ago basic graphics and basic computer-generated sounds were enough to constitute as "game assets", as games continued to evolve, video, experiential layering, and procedural generation algorithms joined the 'asset' ranks. In the future we might see multimodality of digital artifacts expanding into realms of smell and gesture, and the terminology we employ to discuss all these affordances should be flexible enough to allow for expansions. It also allows approaching game development from a broader communication studies perspective, enables game creators to educate and help themselves when it comes to drawing on a broader scope of academic literature on multimodality in order to understand the broader history of game modes, as well as to study how various game modes communicate meaning and relate to each other. It is like laying out a bridge to related connected disciplines that can help expand our understanding of game design studies with the right mind model in place.

Hopefully, I have also successfully demonstrated that game artifacts are cultural products and that the game creation process is a 'state' process: it is a journey from developer's intent to cultural reception, and that every step of this process matters and can (and should) be a subject of academic discussion within a broader concept of game design studies.

Chapter Six: Developer Diary

A practical component to my dissertation not only resulted in an enhanced understanding of game design theory, but also helped me to apply, test and critically evaluate the theoretical knowledge generated to date in the areas of game studies and game design studies. This practical component, which is, arguably, the main component of my dissertation, sheds light on of design and development areas that I had no way of accessing prior to starting to work with code. And the nature of my revelations was not strictly code-related either. For instance, it became extensively evident that game studies literature rarely addresses development process or developers' background in the discussion of video game artifacts. Prior to working with code, I never questioned the lack of scholarly attention to the developer background and influences, moods, tools of choice, and cultural environment that contributed to development, which is a sizeable scope of the context that scholars are missing out on when analysing or close-reading game artifacts. Arguably, one can understand the temptation of working with a game, while treating it as a monolith in a vacuum: complete, and untouchable text with fixed meaning that is waiting to be interpreted, extracted and analysed. But in truth, game artifacts are messages in the bottle – a communication artifact. Perhaps this approach to analysing games through developers will also become more popular as more and more independent developers and game creators emerge. In this dissertation, I attempted to shift the mental model of a game as a monolithic object and, hopefully, encouraged future scholars and developers to look at video games as communication streams with cultural journeys.

When analysing the modern state of societal over-reliance on software simulations, in *Simulation and Its Discontents*, Sherry Turkle writes that the negative yet seductive effect of simulations lies in them offering quick albeit not always thoughtful and good mental models of

how design processes work. Students end up relying on simulations for convenience, but in turn give away the ownership over their unique creative design solutions in favour of succumbing to standardization that simulations and interfaces offer. I would extend that approach to prominent ideas and theories in disciplinary scholarship as well: once a scholar is conditioned to address their discipline in a predefined, tried-and-true approach, it is very hard to escape the mould and engage with the discipline's scholarship from a different perspective. This is where research-creation should be encouraged and supported in any discipline. Practical familiarity with the field of research allows one to experience the field of research inquiry and access it multimodally: by seeing, listening, interacting, engaging and allowing new knowledge and meaning to be born in the intersection of these senses.

A similar approach to Research-Creation is already actively used in the UX Engineering industry either under the umbrella of "iterative design" or development-fusion design approaches. The idea behind this method is that design and development (read: theory and practice) are in a constant fusion and cross-inform each other rather than dictate one another. But it is necessary for a scholar to be both theoretically and practically engaged in order to take the advantage of this approach. Prior to starting the development process, the majority of my theoretical knowledge was already accumulated in the form of satisfying my comprehensive exam's reading list requirements and coursework, where I engaged with prominent theorists in the field such as Gee, Bogost, and others. The practical part of my dissertation came with much more effort and pain than I originally wanted to admit.

Development Process

The first conclusion I made, after I started following design guides and documents offered in game development literature, is just how limited and unexplored the notion of the

developer's intent is. Most game studies literature assumes that the game just exists to be close-read, while development literature encourages the developer to "just decide on which emotions you want your players to feel and design the game around that" (MDA framework). It is almost as if the game studies side prefers to underplay the importance of the developer, while developer literature downplays the complexity of affect. Both omitted areas add complexity. It is almost impossible to tell the player "what to feel" in a game, because this is outside of the developer's control, and I would argue – not worth it (this was the first rabbit hole I went down). A game should be developed to tell a story or explore a concept. It is an art form and a form of self-expression. Not a single developer can confidently determine what would make their players laugh or cry, so they might as well focus on shaping up the multimodal channels to suit their story or concept instead.

Another complicated roadblock along my development journey was that game developer resources fall under one or two categories: either too specific to be useful, or too conceptually broad to be useful. In developer and game design literature, a theoretical lens can only go so far; after all, there is only so much that can be said about best design patterns and practices – they shift and change dependent on game technologies and their limitations. So, in a sense, any applied development pattern manual would be addressing the programming language of the gaming system that a developer choose to work with (C, JavaScript) and not exactly take a wholesome all-encompassing approach to making a game product.

Design theories and frameworks (such as MDA, Layered Tetrad) were not as thorough and descriptive as I had hoped. Although they addressed game layers and elements that helped to understand the design process better, they didn't contain any step-by-step practical application for how to approach, for example, asset design. Some of my unanswered questions included:

"What do I start with? How do I gather product requirements? What is better: to design tilesets or characters? Why?" And the limitations of design manuals can be understood: since games are such complex artifacts, the author of the game design manual would have to be well-versed in game sound design, graphic design, UX design and other creative fields that have to be studied in order to obtain an enhanced understanding of how they all come together in a game artifact. Moreover, sometimes a designer would have to be an active developer as well, in order to address technical aspects of artwork requirements. This is where game studies scholarship was immensely helpful – multimodal discourse analysis, multimodal sound design literature, practical approaches to design (all written by scholars in the field) are what I mainly used to adapt my design approach, in combination with researching technical limitations from developer manuals and tutorials. New knowledge was born out of this process, as I learned the basics of designing practical aesthetics for games: a graphic resource with too many layers may look better, but affect loading times which, in turn, would diminish player experience, and so sacrifices had to be made strategically on all fronts: sound, graphics, programming, user experience, interactive components (which would execute flawlessly, but sometimes botch graphics).

My main strategies to bridge the gaps between practical game development and game studies literature ended up being Research and Extrapolation.

When it comes to **research** – I researched everything: from biographies of game writers and their education to how radioactive half-life works. I researched programming design patterns as I kept troubleshooting my games, and repeatedly fixed my code to make it more asynchronous. Knowledge gives courage and confidence, and even when certain approaches did not work at first, availability and access to information (from applied material on conditional statements to scholarly publications on history of audio engineering gave me the reassurance and

support I needed). Often, research also gave me inspiration and creative ideas I could use as plot or narrative elements in my games. But again, without having an extensive scholarly background I would not be able to understand what good research is. University taught me how to learn effectively, and this is something many beginning developers don't have access to.

Extrapolation proved to be useful especially in combination with research when it came to navigating "gaps" in game development theory and practice, of which there are many, since interactive media creation is a relatively new and highly interdisciplinary field of artistic practice. To this day, interactive media and video game design still do not stand on their own, incorporating practices, theories and critical approaches from adjacent disciplines like film, visual media, theatre and creative writing. Using extrapolation, I adopted storytelling devices from film sound design (manipulating the source of sound to create certain effect of depth and distance), theatre and creative writing (especially when it came to dialogues and character arc creation), as well as programming.

Development design patters informed some of the programming decisions and behaviours in my games in a similar way to how dialogue-writing techniques and approaches helped me to develop better dialogues. Some of resources that I used for inspiration and learning were MasterClass courses on creative writing and filmmaking. In his masterclass on creative writing, Neil Gaiman shares some of the most essential storytelling tools and techniques for aspiring writers, and with certain amusement he emphasizes that writers, as well as other kinds of creative professionals, often draw their inspirations in a multidisciplinary manner: from songs, paintings, films – yet rarely admit that these interdisciplinary works and their respective creators served as sources of inspiration. This might have to do with the fact that we tend to be so discipline/mode-attached that we tend to seek alignment with other professionals that operate in the same

mode/discipline, rather than thinking more broadly, in terms of emotions, moods, and affect that we pick up from various works of art. That is why, for instance, when we are asked to describe what our writing style is like, we tend to fall back on other writers we admire and influenced by, while neglecting to consider an entire body of creative works from music to animation and visual art that could have equally affected our creativity. *Designing Across the Senses*, a UX manual by Park and Alderman, states that we have always experienced the world multimodally and process information across multiple channels and sources.

And last but not least, thinking of aesthetic elements of game design as separate modes that interplay with each other considerably affected my development process in a beneficial way. Many design guides don't give a clear sense of scope of what constitutes "game assets" when those are being discussed, as if they presuppose that game development process is a teamwork activity, and the main game artists would be already aware of their role in the process, having all the necessary knowledge on how to proceed. Speaking purely hypothetically, it would have been logical to start with artwork sketches or concept art that artists usually create to pitch an idea of artistic concept, but I was developing my games entirely alone, there was no need for pitching ideas to myself, and this path would have inevitably resulted in a considerable delay in development.

Instead, I approached game design as a multi-channel story, where I allowed myself to work on musical storytelling in the same way I allowed myself to work on the dialogue writing – all those modes tell stories. Now it was my personal creative responsibility to determine what kind of stories those modes tell, and whether those stories are true and confirm each other, or whether they create confusion or dissonance.

Boring but Essential Part: Project Management

Not a single resource I navigated emphasized the dire need for project management techniques, tools, and approaches. It is a very common stereotype for artistic kinds of people that their creativity gently floats on the warm winds of inspiration, but this is not always true, and doesn't work for everyone. This surely did not work for me, although I tried. This was one of my pitfalls that I probably regret the most – waiting for the inspiration.

In my case, creative juices or inspiration do not appear magically by themselves but have to be sparked up by specific yet manageable creative tasks and challenges. Creative engagement comes in the process of looking for solution (using both **research** and **extrapolation**). This is where the creative hybrid designer/developer of the future should adopt project delivery strategies from software development industry. Agile development methodology is a very common buzzword in the software industry, and it encompasses multiple agile methodology types like SCRUM, Kanban and others.

The basic idea behind agile project management methodology is that it helps a team to break down complicated tasks and track them throughout the development process, following certain standards and etiquette (specific to the type of methodology). Agile methodology discourages micromanagement, which both allows team members to assume personal responsibility as well as give the project some breathing room. A typical agile day starts with a team meeting over a video call or in person, discussing a task strategy for the day, and/or dividing tasks. A big part of the process is also collective brainstorming on how to break complex tasks apart into more manageable tasks. This is what agile task management software such as Jira helps with. Using storytelling analogies, it allows developers to create Tasks that can be part of Stories that can, in turn be collected into Epics. The developers mark which tasks they

work on daily; when a task is completed, it can be closed and counted towards the overall progress. When I realised that my chaotic creative approach did not work, I started using Jira for tracking my game development progress.

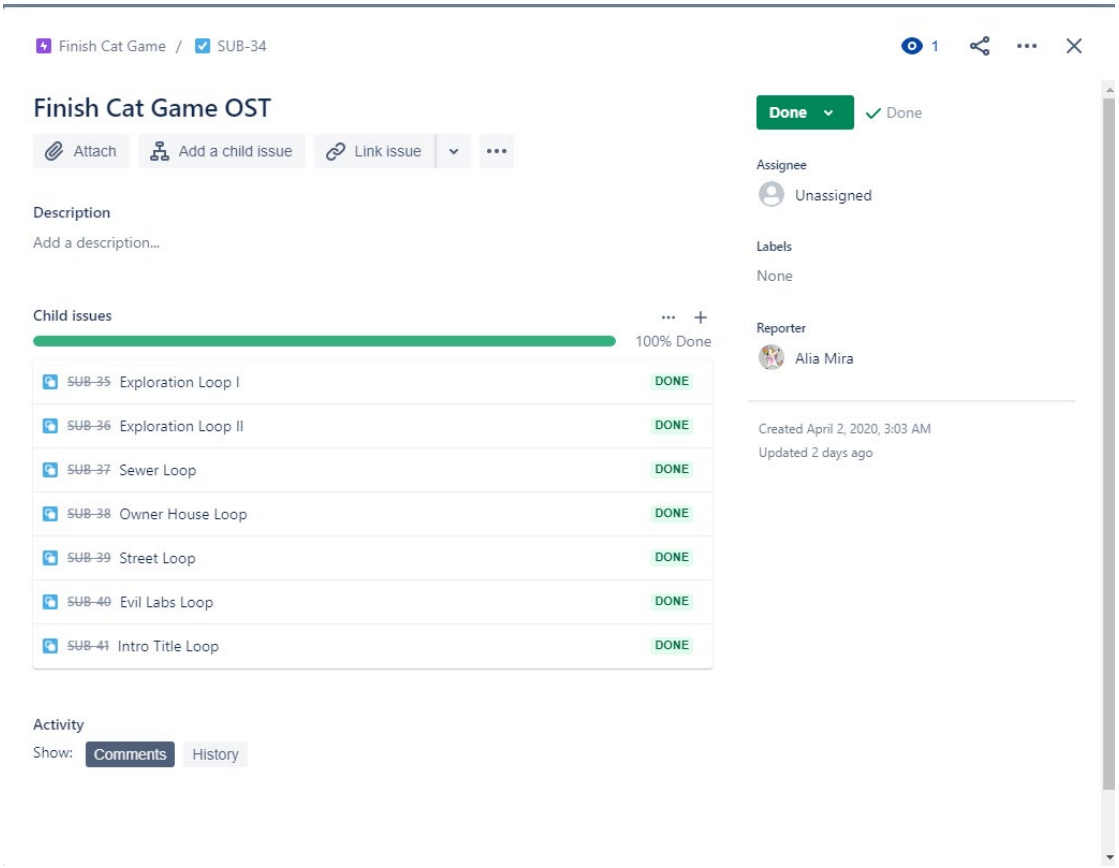

Figure 2: Jira Task Management Software for tracking Game Development

Even though I was the only member of my team, keeping track of goals and progress as well as having an ability to assign tasks for roadblocks has helped to speed up the development process immensely.

Being an independent game developer almost always requires wearing multiple hats and assuming more than one role that can come with their own sets of perspectives and lenses, which is why staying on track with the task plan, at times, was the only thing that kept me focused. I

would be lying if I said that game development was an easy process. As an artist I was used to relying on bursts of inspiration and heightened creativity to carry me through the artistic process. But game development is not always a creative process. This is where the developer's outlook on work was immensely helpful. Inspiration comes and goes, but software needs to be designed and progress must be made. When I felt uninspired, I focused on more pragmatic and less creative tasks such as setting up a game zone map, or room lighting, or converting audio files from their original raw .wav format into the lossy formats like .ogg or .mp4 (to reduce game loading times). When I felt more creative and inspired, I took on more involved tasks like creating game assets, loading screens or characters. And when I felt neither inspired nor prepared to spend 5-6 additional hours at my PC[16], I was conducting game research: looking into industry literature, seeking out tutorials to watch later, watching master classes or listening to podcasts and lectures, reading Wikipedia or browsing journal articles on game design. If you are familiar with the viral video of "How to fill a glass jar with stones", you will get the analogy. I found this methodology/philosophy to be most similar to my game development approach. I am not a philosophical or spiritual person, however, and find this approach useful purely for its task management value.

[16] I work full-time 8 hours a day, so I usually spend a good 12 hours working with code every day if we count passion projects

Figure 3: Video: How to Fill a Jar with Stones

How to fill a jar with stones

In the video, person is filling a glass jar first with large stones, then medium and small stones, and finally – with sand to fill all the remaining crevices. The takeaway is that we can always optimize our time for the right kinds of tasks. I treated design or composition tasks as large stones because of all possible game development tasks, creative tasks like asset design demand most energy, concentration and inspiration. It is painful to force yourself to produce something creative when you don't feel like it, and even if you were successful at forcing yourself to do so – the final product comes with either frustration, guilt, or a sense of shallowness (because, metaphorically, you just forced yourself to run on empty fuel). Anyone who participated in creative challenges like "20 days of illustration" or "21 day of video game music composition" will likely find themselves running out of creative fuel in the middle of the

commitment. This is the point of the undertaking; a professional artist should learn how to rest and how to facilitate and control their creativity.

I found myself running completely out of creative fuel by day 17 or 18 of 21-day video game music composition sprint that I was participating in. All ideas I was excited to musically explore (Lovecraftian themes, sci-fi themes, orchestral pieces, 8bit themes) were already explored, and I either had to repeat myself or delve into something I was not excited about (for instance, pirate theme music – never was particularly thrilled about those). Two things that helped me finish the challenge were: learning how to shift my perspective or alter my environment in order to facilitate creativity, and talking/engaging/co-operating with other artists to bounce off their ideas and keep myself accountable. Also, switching from one medium (music) to another (graphics) sometimes helped me when I felt stuck.

Medium/small stones in the jar of my game development process were menial or not extremely interesting tasks, like mapping out exits and entrances from one game zone to another, setting up mood lightning in the game zones, estimating better timing for timed events, adjusting speed of text appearing on the screen to improve user experience. These tasks sometimes can be also boring, so I often combined doing these with listening to audiobooks or podcasts.

And finally, sand that filled the rest of the spaces between the stones in my jar was research – keeping the medium, large and small stones together. Game research, sound production research, tutorials, inspiration, playing other video games, reading interviews, listening to game music – all those things I found to be varying degrees of research. In the next two sections I will be discussing my game development process for each of the games I have created as a part of this dissertation project. I focused specifically on what kind of inspirations I

was drawing on for each game, and how those inspirations, combined with the messages and ideas I wanted to communicate, resulted in finished game artifacts.

Game Experiment #1

Kodama: The Judgement Day

The game can be experienced on the Collider Hub Website: Kodama

Playthrough can be accessed here.

Scope of Work: audio and music, graphics, pixel sprites, maps, character design, code, narrative design, game script

Prior to describing the inspirations behind Kodama, I would like to address the cultural appropriation concerns raised by one of the members of my committee with regards to this game. The only reference in this game that was borrowed from Japanese Culture is the word “Kodama” which was (incidentally) was borrowed from an album titled “Kodama” by the French band “Alcest”. The game does not reference any other symbols of mythological creatures of Japanese culture, folklore, or Japanese livelihood. Kaiju it mentions not. Kami it does not reference at all. No mentions of Kaidan were spotted in the game whatsoever. No monsters or direct quotes were borrowed from Junji Ito, despite the game dealing with horror themes. The game also completely fails to mention any creatures that end with -onna or -yokai. Even a potted plant in the game is called “A potted plant” and not 鉢植え (Hachiue). The only monsters that appear in this game besides Kodama (the main character) are of Victorian (vampire) and Greek (medusa) origin. I consulted my friend from Japan, Nekoi, who is a manga artist and musician, whether 'Kodama' is an appropriate name for the game and the character, and whether I can use it in the game, and she said - "I can't see why not?". Trees, I believe, are mythologically neutral and no species of Japanese trees were used in the game.

In Japanese folklore as well as in popular culture, kodama are the nature spirits similar to dryads in Greek mythology. The term is also used to denote a tree in which a kodama supposedly resides, so a kodama is both a tree and a spirit. But what is even more interesting, a delayed echo

effect that occurs in mountains and valleys (and is attributed to kodama) may be also referred to as “kodama”, so in a way, the spirit, which is a tree, is also a sound.

These spirits are considered to nimbly bustle about nature landscapes and mountainous areas. In Japanese folklore, most commonly, kodama appears as an ordinary tree (although in some cases, it may have human-like appearance); if one attempts to cut down the kodama tree, one would become cursed, and thus kodama are considered to have some kind of mysterious supernatural power. There is also a theory that when old trees are cut, blood could come forth from them, and this is also tied back to the kodama myth.

In Japanese culture, the knowledge of those trees that have kodama living in them is passed down by the elders of that area over successive generations and those elders are also protected. In popular culture, the appearance of kodama in animated films and music is often tied to criticism of consumerist exploitation of natural resources and ecological activism. Perhaps one of the most popular appearances of kodama in the context of activism would be in Hayao Miyazaki’s animated film *Princess Mononoke*, where kodama look like glowing, slightly misshapen ghosts. According to the storyline of the animated film, frequent appearance of

kodama in their natural environments indicates that the forests they inhabit are healthy; kodama die if their forest dies.

Figure 4 Kodama Creatures, Princess Mononoke Animated Film, Studio Ghibli

Miyazaki's kodama are meant to serve as a criticism of industrialization and misuse of natural resources – a theme that permeates through the film *Princess Mononoke* in general. This inspired a myriad of paratexts and fan art, but also, it inspired musicians, who perhaps found ideational resonance in Miyazaki's feature.

In September 2016, French band Alcest (signed to Prophecy Productions record label) released a record inspired by *Princess Mononoke,* nearly twenty years after the release of the animated film. The record is entitled *Kodama*. In interviews, Alcest attribute the inspiration behind it to Miyazaki's *Princess Mononoke*. The record sounds like "kodama" in the sense that due to a liberal use of reverb and delay audio effects (typical for the shoegaze genre production style), it does create an effect similar to the echoes one hears in the mountain valleys, as described in Japanese folklore.

The actual genre label assigned to the *Kodama* record, as well as the kind of music Alcest creates is “blackgaze”; it is a combined genre that draws inspiration from shoegaze production fusing it with extreme vocals and aggressive guitar riffs typical for black metal and other extreme metal sub-genres. The album itself strikes a perfect balance between ethereal, aural

Figure 5: Kodama (2016), by Alcest (Album Cover)

airiness achieved with reverb/delay effects, and aggressive, guitar-driven pumping rhythms and screaming vocals, to create a musical mood that drifts between dream-like melodic calmness and an overwhelming sense of worry and urgency.

The idea of creating the game *Kodama: The Judgement Day* came to me while I was on tour in Japan, in December 2019, as I was walking the streets of Tokyo listening to Alcest and reading Japanese folklore between the performance sets. *Kodama* as a game concept was already incubating in me for many moths starting the development process, as I kept following news on anxiety over rising temperatures, activism of Greta Thunberg, and overwhelming pushback and denial of responsibility for climate change from some political leaders and governments.

A trip to Tokyo and the experience of listening to Alcest’s record, however, acted as a catalyst that fueled the creative process, gave it a platform, shape, urgency and justification.

Working on *Kodama: The Judgement Day* became both a form of resistance and activism. An artifact in time marking the rising panic around the lack of political accountability to preserving environment and turning a blind eye on rapid depletion of natural resources.

As the game development process was nearing completion, coronavirus COVID-19, was declared to be a global pandemic. In her TED Talk, international health specialist Alanna Shaikh declared pandemics becoming more common in our future:

> "There will be more epidemics and it's a given. And it's the result of how we, as human beings, interact with out planet […] part of this is climate change and the way warmer climate makes the world more hospitable to viruses and bacteria, but it's also about the way we are pushing into the last wild spaces on our planet. When we burn and plow the amazon rainforest so that we can have cheap land for ranching, when the last of the African bush gets converted to farms, when wild animals in China are hunted to extinction, human beings come into contact with wildlife populations that they've never come into contact with before, and these populations have new kinds of diseases: bacteria, viruses".

This TED Talk resonated with me while I was finishing making Kodama, as it reaffirmed the ideas I have already expressed in the game, as well as provided me with additional context and perspective that I could use to illustrate what I was conveying.

Storyline

The game starts with a short introduction scene, where the player learns that in response to rapid deforestation, Kodama, a vengeful spirit and protector of the forest, is finally awakened after centuries of restless slumber. Upon Kodama's awakening, (which is a rare occurrence that

signifies extreme circumstances) they are bestowed with two artifacts that have always aided them on their previous quests: Grimoire of Souls and a two-handed hammer. Grimoire of Souls turns humans into trees, while the two-handed hammer smashes human equipment and particularly useless humans to bits. Kodama's quest is over when the human population is extinct, and forests are regrown.

The choice of Kodama's main weapons determine the character's affordances, and this innovation came to me organically. After some critical consideration, I realized that Kodama's weapons symbolically correlate with the musical dynamics I have observed in Alcest's composition: cold dreaminess of shoegaze (Grimoire of Souls) and black metal-like aggression (two-handed hammer). And of course, there is no better weapon to reinforce a point better than a hammer – it's blunt and it's heavy. Swords as a weapon choice are so often overused in epic fantasy and RPG quests that they nearly lost the ability to emphasize the point.

Kodama: The Judgement Day is a top-down RPG with pixelated graphics. The player controls the main protagonist (Kodama, the forest protector) and helps them progress towards the final goal of regrowing forests, which unfortunately also means ending human civilization. Kodama's interests do not align with the interests of human NPCs that can be encountered in the game. No compromises can be made.

Affect and Emotions

The two predominant underlying emotions that compose the affective-emotional fabric of *Kodama: The Judgement Day*, are aggressiveness and apathetic indifference. This kind of affective-emotional landscape is typically encountered in shooters, where the protagonist's main goal is to take down enemy targets. The player is rewarded with loot and experience for

eliminating targets (aggressive behavior) without the ability to empathize with them (apathetic indifference) – empathy is just not a part of the "simulation". Players are usually not prompted to question the moral correctness of their actions, since the game simulation itself already presupposes that the player is "morally absolved" from the consequences of their actions. Sometimes shooters take an extra step and "demonize" the enemy targets to give the player more justification. Some games that come to directly to mind are *Counter-Strike* and *Doom*, but also modern military-flavoured titles like *Black Ops*. There are of course titles that serve as exceptions to this classic shooter model, but they will not be discussed here.

When brainstorming ideas for *Kodama*, I was ironically influenced by vintage "boy" games like *Duke Nukem. Duke Nukem* can be briefly described as misogynist, slapstick violent, and cringe-worthy (original title of the series released in 1991), but it stuck in my memory because of the iconic phrases like: "*It's time to kick ass and chew bubble gum, and I'm all outta gum!*" and "*It's time to abort your whole freaking species!*". These catch phrases were already controversial back in the 90s, they became even more controversial now, and I really want to believe that *Duke Nukem* didn't take itself seriously, playing off the stereotype of testosterone-fuelled heroism. It is easy to hate and be violent to "aliens" in games like *Duke Nukem,* but also *Aliens, Area 52* and other games that exploited the same "invader-defender" dynamic cliché. Conceptually, aliens are, after all, "invaders" and "parasites". In *Kodama*, I wanted to turn the tables on what we usually perceive as "parasitic" behavior. From a certain perspective, humans can be also seen as invaders, exploiters, and "aliens" that should be exterminated to protect the vulnerable. Kodama is my feminized version of Duke Nukem turned against humanity.

In *Kodama*, the storyline of the game is dark, upsetting and serious. My attempts at introducing violent slapstick humour was aimed at softening the impeding darkness of the game

and immersing the player into a typical "shooter" behavior: – "Destroy the target, take no prisoners, hesitation is not an option". Simultaneously, I was hoping this would provide a unique perspective to the storyline and open up the room for criticism.

Human NPCs in *Kodama* are easy to dislike and hard to respect: similarly, to how Myazaki portrayed humans in *Princess Mononoke*, NPCs in *Kodama* are driven by superficial, consumerist agendas, and are almost always dumb and gullible. It is expected that the player will get easily annoyed by the human NPCs; it is for that exact scenario they have access to a two-handed hammer (and every human in the game is smashable).

One of the major inspirations behind the main game protagonist (Kodama) was Lovecraftian mythos. A pioneer of Modern Horror and the "father" of Cthulhu, Howard Phillips Lovecraft, invented a very particular flavour of horror and birthed a new kind of Monster: inherently indifferent, omni-powerful, free from any desires or instincts typical to human psychology, driven by goals and motivations that are maddening, and unfathomable by human psyche. Psychologically un-human, Kodama's goals and objectives do not resonate with human NPCs, who see a **monster** in Kodama, and not a **protector**; Kodama is also not susceptible to criticism or sensitive to human opinion.

Slipping into Kodama's role offers the player to temporarily alienate themselves from themselves and typically "human" colonialist-industrialist objectives (such as condo building and development, deforestation, expansion, wealth accumulation); this opportunity also gives the player a chance to take a second look at all of the abovementioned human behaviours and see them from a different perspective, the survivalist perspective of Kodama.

Regardless of the player's personal opinions, motivations or ideologies, Kodama remains true to their character personality, and controls the flow of the game with their set perspective.

For example, if negotiating is pointless or unreasonable for Kodama, this option will not be available to the player. Unavailability of certain choices and story directions, as well as active expression of disagreement with ineffective choices, becomes a tool for character definition and a way to deliver Kodama's position to the player.

Since the game is based on the premise of "what would happen if nature strikes back?", rage, annoyance and anger are heavily reflected in the gameplay. In part, rage is well represented by Kodama's actionable affordances: more than 70% of dialogue options and player actions involve destroying in-game objects or initiating a fight. Turning humans into trees action can only be initiated with battle sequence first. Another way aggression is channeled in the gameplay is through musical accompaniment and sound effects. Music influences and my production/composition approaches will be discussed in detail in the Music section later in the paper.

In pursuit of their quest, Kodama has the option to side with ancient tribal demons or attempt a fruitless gesture of empathy towards human NPCs by considering siding with the angel statue that represents humanity. The statue asserts that humans know what they are doing, and they better be left to their own devices. If Kodama sides with the statue and chooses the path of non-action, they can not progress in the game, as the game itself doesn't offer any options that would reward status quo or inaction. In a sense, the player's attempt at "playing nice" would ultimately rob them of the fun, or frankly of any possibility to progress within the game. Even Kodama themselves reflects that putting down the hammer would be "The worst deal in the history of worst deals". Thankfully, there's also an option to smash the statue to bits.

When it comes to siding with ancient demons or pursuing the main game objective on Kodama's own terms, the outcome of the game does not change significantly, but the player now

has options to experience the game in two drastically different ways. If Kodama decides to be self-sufficient, the player will be experiencing a grind-rich, chaotic whack-a-mole type of gameplay. More individual battles, less shortcuts. If Kodama decides to side with the sinister helpers, the game evolves into mildly disturbing body horror type of adventure.

Siding with the demons unlocks Kodama's ability to see hidden doors and travel into the hidden pockets of the game map, visit prehistoric shrines and demon wormholes. In one of such pockets, Kodama finds the essence of monstrous growth that can be mixed with tree seeds and greatly speed up Kodama's quest. If Kodama chooses to use to pour the mixture of seeds and the essence of monstrous growth into the human water supply later in the game, the main quest could be achieved almost instantaneously.

Game Art

Despite the somewhat aggressive nature of the game storyline, the artistic style of *Kodama* is almost directly opposite of aggressive. The tilemaps use mainly blue and purple-dominant colour palettes; the tile art is pixelated. colourful and non-realistic. Aesthetics were chosen in consideration with two factors: providing a sufficient level of stylistic contrast with other multimodal components that make up the game (e.g.: sound, storyline), and UX constrains: high-contrast tile maps are easier to navigate when it comes to identifying objects on the map, and the blue colour scheme is gentler and easier on the eyes.

Combining serious and dark plotlines with colourful and amusing visual aesthetic is a popular trope in modern animation, especially in Netflix original series like Aggretsuko, BoJack Horseman, Tuca and Bertie, and others. The animated series Aggretsuko, for example, explores topics of workplace misogyny, corporate hierarchy dynamics, and female aggression while portraying the characters as cute, anime-style anthropomorphic animals. The main protagonist

Retsuko is an office worker by day and a death metal vocalist by night; Retsuko relieves her aggression, stress and hatred of her misogynist boss every night after work in a karaoke bar. Combined with the exaggerated aggressiveness of music used in singing scenes, the cute unassuming animation style works well, creating an intentional "shocking amusement" every time Retsuko picks up a microphone. With somewhat similar shocking effect, BoJack Horseman explores dark topics such as family trauma, addiction, death and self-hatred in a visual setting that is colourful, playful and amusing, mixing dark plotlines and silly humour in even proportions.

In both examples mentioned above, the cathartic and often shocking affect is achieved through realizing the stark contrast between unassuming and comfortable visual aesthetic and disproportionally dark storyline. A desire to create similar affect motivated the design decisions behind map and asset design for the Kodama game.

It is common for J-RPG style games to combine multiple artistic styles for different scenes and uses within the game. For example, a hand-drawn character avatar portrayed in a more detailed view may appear in dialogue windows, while a pixelated sprite version of that same character is reimagined and stylized to fit the map dimension constrains. A similar approach was utilized in Kodama: The Judgement Day. The pixelated version of Kodama character is designed to occupy 48 by 48 pixels, with as little detail as possible, while the hand-drawn portrayal of the same character is visualized in a way that would draw on aesthetics of Japanese animation style, while also subverting it.

In Japanese animation, it is easy to tell female and male characters apart by the way they are illustrated: over-sexualization of female characters in Japanese visual novels and some animated films is dramatically emphasized in almost grotesque body proportions. Male

characters are usually drawn fairly conservatively and are rarely the subject to the same body proportion over-exaggeration.

Kodama is not human, so they are not subject to the gender binary. Kodama, is, however, a feminized character, and they do have some feminine features. In all hand-drawn instances of Kodama, the features that would tell the most about their gender expression are shaded or concealed, not only to maintain the ambiguity, but also because the shaded effect helped to further de-humanize the character and shroud them in the veil of mystery.

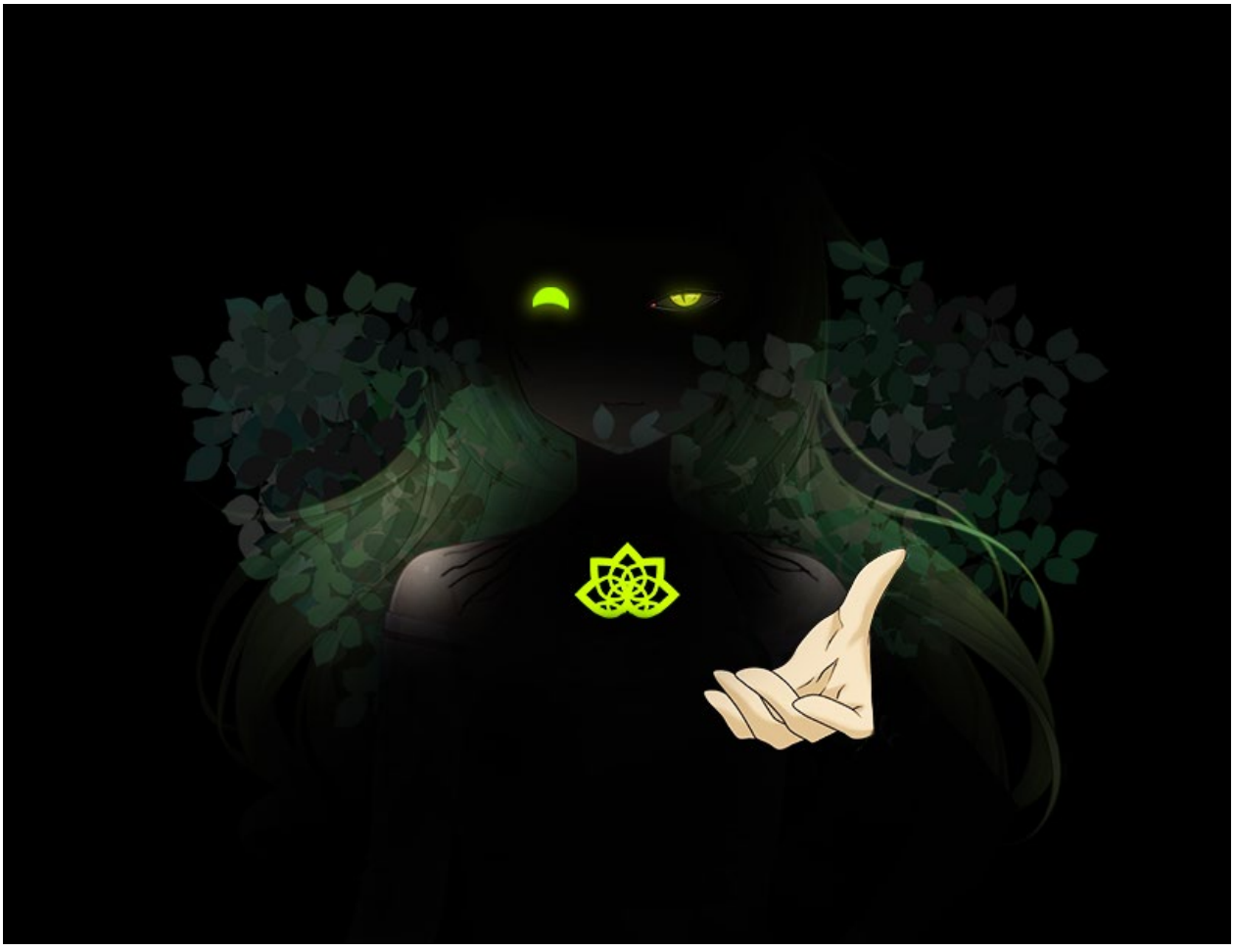

Figure 6: Kodama The Judgement Day Game Cover

Music

A lot of music ideas that powered the soundtrack arrangement came from an attempt to create an additional level of depth to the game that could interplay with other multimodal channels, and dynamically enhance the content already present in the game in the form of game art and story. This process made me think about in-game music a way I never thought about it before; as a sonic accompaniment to the player's actions that facilitates and dictates the mood and pacing of the game itself.

As the player proceeds through the game, music themes and effects are both ephemeral and pervasive: they permeate the fabric of game narrative, and yet, in most cases are not immediately noticeable or focal to the narrative of the game. We often expect video game music to be seamless – to act as a background arrangement to the player's exploration curiosity, gently provide feedback on game choices and "highlight" actionable objects by the sounds that indicate "interactability": often more pleasant pitches for "actionable" objects, and less pleasant pitches for "inaccessible" game objects.

From a development perspective, musically arranging a video game is a highly structured process of assigning meaningful sonic categories to the in-game objects: NPC characters have different interaction sound effects compared to game items, and battle themes and effects are usually more aggressive, triumphant and fast, as opposed to the calmer and more reflective "exploration" themes and sound effects.

The sound creates a mapping matrix that provides an additional layer of game navigation, and what's interesting is that, subconsciously, the player recognizes this. Furthermore, the player strategizes, responds to, and navigates by this meaningful sound matrix within the game when other cues are unavailable or do not provide enough context. For example, a very common player behaviour is to hit a quick save button once they hear a "battle" theme, even before they had a

chance to visually investigate their environment. Another common sound-influenced in-game behaviour is to leave alone the game object that emanates "inaccessible" sounds, while being on the lookout for possible game objects or mechanics that could make the object accessible in the future.

In a sense, in-game sounds aid in shaping behavioural conditioning and help to learn the game similarly to how Pavlov's dogs are conditioned to respond to the sound of the bell accompanied by the meal: they create certain in-game expectations tied to sonic cues.
For example, in the zombie game *Left4Dead*, once the player hears a woman crying in the dark – they know that they must stay vigilant and attentive to the source of the crying because it indicates the close proximity and direction to the "witch" – a monstrous female-looking abomination that is incredibly fast and powerful and cannot be taken down without teamwork.

Figure 7: Left4Dead: Witch Cry

While from a development perspective, sound mapping remains a practical choice for better user experience (enabling an additional level of interactive navigation affordances that the player could rely on to make sense of the game), game composers might approach the composition from a different, emotional-affective angle. A great game soundtrack should first and foremost facilitate immersion, and aid in creating a coherent atmosphere that enhances storytelling.

Staying informed and aware of both perspectives (practical and artistic) is where the main challenge of a great composition lies: sound must both remain subconsciously "guiding" the player while doing so seamlessly and tastefully without drawing too much attention to itself, unless the game demands otherwise. But then again, there is a myriad of examples of games that take sound out of its "seamless" ephemeral zone, making it the forefront of the gaming experience. *Portal 2*, for example, pleasantly surprised players with operatic singing turrets, adding a certain level of comedic effect to the gameplay.

Figure 8: Portal 2: Turret Opera

It's important to note that there doesn't seem to be a consensus on the best practices of composing music for video games; partially it is because music is heavily involved in creating immersion and enhancing storytelling which, in turn, is context-specific and depends on the goals and objectives of the game. No two game artifacts are truly the same; game development is perhaps the only art form that cannot be reproduced identically unless it involves copying the actual game code. With the right tools, painting and graphic styles can be imitated and matched closely by two professional artists; musical themes can be recreated nearly perfectly by two professional musicians; but when it comes to developing game artifacts, the possibilities of creating meaning at the intersection of various modes and sub-modes are so vast – they produce a myriad of affective connections and combinations both conscious (that the developer intended) and subconscious (that developer did not intent consciously). This is because the multimodal toolset of the game artist is incredibly broad and constantly expandable thanks to the ever-evolving flexibility of technology. A few decades back, computer systems (and sound cards) were so basic that the player had to decide whether to run a game with music or sound effects. Today, thanks to technologies like WebGL, a player can manipulate sound data in browser games.

Despite the compositional possibilities for game artifacts being practically endless, there seem to be certain common practices and standards in composing for games. These practices seem to be adapted from other moving media like film, or a homage to how the sound was managed in vintage games.

Many 3D games enamoured with the idea of immersive cinematic realism, for example, tend to lean towards more orchestral arrangements and higher quality production sounds (inspired by the film medium) in order to maintain better immersion: *Skyrim*, *Grand Theft Auto,*

Mass Effect, *Dragon Age*, *Portal*, and other triple-A 3D titles. Titles that use more stylized graphics and controls (pixelated 2D or sometimes 3D), on the other hand, tend to lean towards more digitally synthesized, vintage electronic and 8bit sounds. Even though modern computer sound technology has evolved immensely since the times of vintage arcades like *Pac-Man Original* (1980) and *Super Mario Bros.* (1985), where the iconic synthesizer sounds were really the product of technological limitations, vintage electronic "blips" and "bloops" make occasional fashionable comeback, while firmly remaining in the heart of the culture. Now, of course, they are digitally sampled, enhanced and produced in lossless audio formats.

When it comes to the structural specifics of game music composition, it differs greatly from the way a musician would approach composition but stays closer to how music is usually composed for film and television. A musician/songwriter envisions a composed piece as a complete work: with introduction, buildup and resolution. A game composer, on the other hand is more likely to approach music composition from the perspective of effects, themes and musical moods that can be seamlessly looped. In a sense, game themes are meant to exist outside of time constrains; it shouldn't matter how much time it takes for the player to explore a zone or "room"; music should not cut off and disrupt the immersion. In part, this compositional approach also can be traced back to technological limitations in vintage gaming: it was much easier to procedurally generate and loop music in arcades rather than attempt to introduce any kind of playback technology. Procedural generation of sounds also saved space, which used to be crucial for the video game market. As a teenager, I remember that even up until year 2000, my game purchases were dictated by whether I can run them on my system. In the good old times of floppy disks, the smaller was the game – the more accessible it was.

For modern game titles, space is no longer a significant limitation, and this modern game soundscapes vary from dramatic full-production operatic pieces (Turret Opera) to more familiar (albeit higher production value) looping synthesizer music pieces. The spectrum between realistic and electronic music composition in games, is of course, broad and vast. Especially when it comes to indie games that tend to be more experimental and adventurous than triple-A titles and can afford deviating from the beaten path. But the general trend remains consistent: in terms of music composition, game artifacts are either staying true to its original form (inspired, but no longer limited, by technological contains) by employing procedurally generated, "synthesized" music loops and effects, or attempt to adapt composition strategies from other moving mediums such as film or theatre.

Interestingly, there seem to be certain genres of music that get largely ignored by game developers (both indie and triple A) altogether, unless they are meant to reinforce certain situational effects or emphasize a point. For example, more song-like pieces that include vocals and lyrics are rarely used in video games outside of cutscenes and final credit titles. In part, this is because lyrics add another multimodal dimension to sound and diminish the value of subtlety, thus disrupting immersion. Also, musical pieces with lyrics are harder to loop, in the sense that they make the very act of looping in itself very obvious, removing the illusion of timelessness. But there are more genres of instrumental music that don't seem to find much traction in music composition for games. Perhaps, because there was not much precedent for those genres to land within modern music composition practices. More extreme subgenres of heavy metal music, for example, usually do not appear in games, although, they might seep through into the occasional TV show.

I will again, draw attention to the Netflix original series *Aggretsuko* that I have already mentioned above in the context of comedic aggression. Making comedy out of death metal genre expression is the trademark feature of *Aggretsuko* series. In fact, this is how I found out about the series in the first place: my fairly regular, mainstream friends (who are also *Netflix* binge-watchers) that aren't familiar with extreme metal, described the series to me with a kind of surprised, pleasant shock: "the music is very fast and aggressive, it sounds like a wall of fast-paced noise, the vocals are extreme and harsh, and it's funny when these sounds come out of a cute anime fox". For my friends, extreme metal is an ephemeral genre: it's not on the radio, it's not pronounced in mainstream culture. Despite extreme metal being around for decades, seeing the musical genre being incorporated in TV series makes some feel like they are encountering something new and unique. In truth, however, it is the ever-changing cultural media landscape that offers new opportunities for exploring forms of expression that were deemed too extreme or inappropriate before.

In the Aggretsuko series, the incorporation of death metal music and harsh signing is meant to affect the viewer and give a suitable voice to the protagonist's rage. Retsuko sings in harsh, raw vocals when her patience runs thin, affected by omnipresent workplace misogyny and mistreatment. Inability to build a life in the modern social landscape, disrespect on the workplace, long working hours, and creative unfulfillment are the things that awaken a death metal diva in Retsuko. This kind of aggression release, although is not embraced socially, is safe, therapeutic and accessible. It also has a comedic effect because it proves to be a creative, honest and unfiltered response to abuse and mistreatment that "hides in plain sight": in office workspaces, in the morally degrading comments of the boss, in the pervasive, steady layers of misogyny ingrained in corporate context. This is the kind of response that we are not expecting

to see in the media. The perceived professionalism (but in reality, veiled abuse) of the office space and the extremity of the rage response displayed by Retsuko are so drastically opposite on the emotional spectrum that they create a cognitive dissonance and a kind of affective shock akin to nervous laughter. We know that Retsuko's reaction is unprofessional, but we also know it's justified and valid, and is exercised outside of professional context (in karaoke bars, washrooms, at home). This expression of rage is meant to critically point a finger at the façade of corporate "professionalism", perhaps encouraging the viewer to make their own critical conclusions of what constitutes as "violent" and "barbaric" even if it's hidden under a narrative of workspace ethics.

Figure 9: Aggretsuko (video), Netflix Original Series, compilation of all metal scenes

I wanted to create a similar effect in *Kodama: The Judgement Day*. I wanted to point the finger at the barbaric capitalist exploitation of natural resources hidden under the narrative of industrial

expansion. It is a part of industrialization myth that natural resources are "bottomless" and meant to feed consumerist fantasies and behaviours. Forests become foundational resources for city infrastructure development (condos, tools, production materials), water, land and airspace are a subject to zoning and belonging to corporations and companies. Consumerism keeps perpetuating the myth that "colonization" and cultivation of natural resources is both a necessity and a hallmark of advanced industrialist society. Yet, almost 100,000 condominiums in Toronto are empty (Wong, 2018), making it clear that the "industrialization game" is not a subject to supply and demand or bettering living conditions for the members of society, but a game of influence, domination, and control. According to Sigmund Freud, in *Civilization and Its Discontents*, since the beginning of human civilization, nature posed a direct threat to humanity's survival; it is the goal of survival and better environmental adaptation that acted as a catalyst for the invention of science and technology, as well as bore the industrialization myth. But the capitalism-driven resource exploitation without unbiased scientific research leads to catastrophic consequences that, ironically, also threaten survival. A series of ecological catastrophes linked to industrialization happened in London in 17th-20th centuries, including *The Great Stink* and *The Great Smoke*, which in turn prompted the rise of Romanticism in literature, music and poetry as an artistic response to industrialization.

Musically, I attempted to respond to modern instances of industrialization (similarly to what Victorian Romanticists did), but I wanted to do it on my own terms: I wanted it to produce affect, and, simultaneously, a therapeutic effect. I used composition and production techniques prevalent in extreme subgenres of metal (black metal, death metal) to compose the game music with slight deviation from the genre expectations driven mainly by personal preferences. Instead of guitar riffs, I recorded a distorted cello for a more aloof and "dignified" sound. There was also

something about the cello shape and material (namely, wood) that kept me creatively grounded and focused on the themes and effects I wanted to produce.

Interestingly, even though one of my initial inspirations behind *Kodama* was Alcest's album of the same name, the sound that I ended up with in my composition was nothing like that of Alcest. Their extensive use of reverb and delay in post-production creates smoother, calmer soundscapes ,while the sound I wanted for this project was supposed to remain "dry" and clear to emphasize aggressiveness. I abstained from recording any vocal soundscapes or textures (which I usually do in my own music), opting instead for nature sounds and rustles with a layer of distortion applied: from leaves and night critters to more recognizably animal sounds such as wolf howls and owl voices. When used tastefully, distortion gives any sound a harsher edge, sometimes with lo-fi quality. Distortion is usually liberally used in black metal for both instrumentation and vocal recordings to give a composition less produced, "fuzzy radio" type of feel. I used distortion in my composition primarily because it gave the overall sound a menacing tone.

Game Experiment #2

‘The Day the Food Stopped Coming’ also known as the Cat Game

The game can be experienced on Collider Hub Website

The game playthrough can be accessed here.

Scope of Work: audio and music, graphics, pixel sprites, maps, character design, code, narrative design, game script

Cat Game is the game I worked on the longest, it is also the first game that felt “right” after almost half a year of exploring different game development technologies, methodologies, concepts and demos. Prior to starting on the Cat Game, I had accumulated a few abandoned game projects that did not appear to survive the test of time: ideas that first seemed attractive, well-rounded and complete (in theory) turned into the kinds of games I was not motivated to finish. In some cases, game ideas were not exciting or clear enough to continuously fuel the motivation that was needed for a long and sometimes frustrating development process. In other cases – I tended to drastically overshoot with game ideas, aiming to match the experiential value of triple-A titles like *Mass Effect*, without the resources or timelines needed to undertake such projects. A third common pitfall for me was trying to go for a certain “effect” (to make the player experience X) without knowing exactly what steps I needed to undertake to make that happen. In my experience, starting a game with the goal of “making player experience X” was almost never a fair approach to creating an enjoyable game artifact. So in the end, I just settled on “telling a story”, handing the players control over their own experiences.

Cat Game started with a simple premise – a domestic cat is hungry and looking for food. The goal was to make a game without a human protagonist; this would allow me to create the kind of game world that would offer the player a different set of actionable options and

affordances. I was inspired by the interviews with the creator of *Journey*, who mentioned that the act of fighting or casually swinging weapons in-game is so common that he wanted to completely disable/discourage this seemingly essential action in his game entirely by not giving his characters arms. I remember, when I was first reading the interview, this simple design choice explanation both allowed me to appreciate games from a new angle and step outside of what I knew about game simulations. Sherry Turkle writes that simulations are attractive, easy to love, and demand immersion. It is difficult to see the outline of a simulation when you are inside it. Like any technology or system, game development process has simulation-like qualities: game engines offer optimized interfaces that make it difficult to own one's creativity and step outside of well-trodden paths and popular choices. Most game templates (Unreal, Unity) come with certain affordances built on the expectations already set by the medium: 3D characters come equipped with guns, game objects have certain physics, textures and mechanics to them. On one hand, these pre-packaged options help to streamline and simplify the development process, on the other – it becomes hard to think outside of the affordances that one has been given.

It is painful to think that everything we know about video game design conventions comes from a series of a few original game projects (that at some point in time made an impact on the timeline of game development), put through continuous process of imitation and UX improvement, and now pre-packaged for designers as design "options". Through tutorials, manuals and "how-to"s, designers are encouraged to stick to tried and true types of games that come with their own genre expectations, such as "endless runner", "platformer", "RPG", while the technology that makes game development possible in the first place, offers much greater planes of possibilities that we can't even imagine without stepping outside of the simulation. I think of it is a constraint, an unfortunate trap of the medium that we often tend to fall back on

what we know games to be like, instead of using our own real environments and inspirations gained from outside of the technological realm as creative benchmarks to the kinds of games we design.

A lot of triple-A and indie game titles available on the market fall into predetermined patterns of character and story arcs: an epic fantasy adventure, a retro-futuristic sci-fi with an evil conspiracy, a survivor horror, a shooter. Great games that follow these arcs and somehow manage to reinvent the player experience become highly critically acclaimed titles. Mediocre games, however, that fail to deviate from the well-explored arcs are boring to play. And although we are heavily conditioned to judge games by genre expectations, experimental and indie games consistently challenge the norms that we often think of as "set in stone". There are numerous examples like *Hush*, *Danbur's Dying* and others, where instead of having "powers" or "abilities", players are forced to operate within the protagonists' "constraints" or "weaknesses". In *Danbur's Dying*, the protagonist is a little boy who attempts to survive and avoid troops, so the game involves a lot of hiding, crouching, and staying unnoticed. As much as these kinds of games could seem less fun to play, they facilitate deeper empathetic connections with the game characters and stories, *because* they deviate from the expected game behaviours and "teach" the player to adopt different playing strategies to reach game objectives.

Game affordances and options within *Cat Game* were designed with a typical cat behaviour in mind. In truth, a lot of it was adopted from cat memes. Memes are perhaps the most underappreciated form of internet folklore that many people would consider juvenile and lacking cultural value. However, what is interesting is that historically, early comic books have occupied a similar position and status in society before they were recognized as an art form. The first versions of comic narratives were printed in Victorian newspapers and contained gags or

political satire. Rising to the ranks of an art form was a gradual process for comic narratives, but their status was largely solidified after cartoonist Art Spiegelman released *Maus* in 1980. *Maus* dealt with holocaust themes by re-envisioning Jews and fascist Germans as mice and cats. It is perhaps due to the cultural heritage baggage, which is central to the *Maus* narrative, that the comic was proclaimed to be a work of high artistic value.

In the near future, I can imagine memes gradually ascending into higher cultural status just like comic narratives did, since most memes already carry relatable political and cultural content: memes shared by first nations folks reflect on the nature of cultural appropriation and white privilege, memes of political nature that are created and shared by activist groups express opinions on the status of contemporary politics and political events. What is most fascinating is that, through creating affect, constant resharing, and virality, memes help shape and reinforce cultural perceptions and public opinions. And so, memes partially inspired me and helped me to observe and summarize the public perception of quintessential cat behaviour.

Figure 10: Cat memes, an example

A secondary stream of inspiration came from observing the actual physiological affordances of cats: they don't have opposable thumbs - therefore they can't grab objects; they also can't pick fights with animals larger than them, and cats' attention spans are very limited. Player affordances in the game were largely determined by the realistic affordances of cats and related exciting activities such as walking, exploring, eating, looking for food, playing, throwing up food and fur balls, loudly complaining and so on. There was only one extra cat ability included in the game which is probably outside of the affordances of a real cat –reading. Then again, science doesn't deny the possibility of cats being able to read – we just can't reliably prove it.

Since the game was designed from the cat perspective, the feline protagonist needed a specific set of goals and motivations that would loosely compose the main game story quest. Quest for food seemed the most obvious cat-like objective, although in order to make the player experience richer and more interesting, the human NPCs or helper characters had to be unavailable for help, or available in very limited roles. This basic set of ideas that informed one another determined the initial set of protagonist affordances and laid the foundation of the *Cat Game*.

A lot of characters and places in the *Cat Game* are inspired by and designed after real situations, people, environments and places. For example, the actual protagonist – Cat (with capital "C") is modelled after my cat, who currently lives with my best friend since I do not own or rent a home in Toronto. Cat is an intense high-energy black Bombay mix; his curiosity knows no boundaries. A lot of the cat behaviours in the game are programmed after my cat's actual behaviours, including his tendency to barf on important school documents, drink water from the toilet, and leave scratch markings on everything that stands in his way.

Most empty apartment buildings and abandoned objects in the game are modelled after my friends' houses and their stories. This is partially what gave the *Cat Game* the kind of liveliness and realness that helped to carry on with development. For example, one of the buildings Cat can wonder into in search for food, is designed after my friend's apartment. When the Cat walks into the apartment, the music that starts playing in the background is my friend's music – *Fire Escape* by *Service Animal*. I found *Fire Escape* especially resonant with the melancholic feel of desolation I wanted player to experience in the empty apartment as the player attempts to uncover what happened in it.

A lot of quests in the game involve unraveling and discovering personal tragedies and stories. Sometimes these appear in quest objectives, but most often, these stories come alive in the background. It is up to the player whether they want to pay close attention to these stories or not, but the pieces of the puzzles are all there. A focus on personal storytelling is perhaps how a lot of political content bled into the game, although it was not originally intended to be there. Judith Butler and numerous other philosophers, sociologists and writers emphasize an undeniable direct connection between the personal and political. For example, one can of course see homelessness as a personal tragedy, but behind the layer of personal, there are always socio-political circumstances that enabled this to happen.

Storyline

Cat begins its journey in the house of its owner, unable to find sustenance. The primary objective of the cat quickly becomes scouting the house. Dissatisfied with the long absence of his owner Karen, Cat decides to venture outside of the house in order to investigate the streets for any kind of edible options. In a desperate predicament, Cat dives into a garbage bin and finds an

electronic key tag. Upon further investigation it appears to be that the key tag is from a strange building without windows. Inside the building is what looks like experiment lab with a lot of questionable items inside. After satisfying his curiosity, Cat wanders outside to promptly find out that humans seem to be completely gone from the streets, and most apartment units are unlocked. As Cat proceeds with the investigation of humanity's disappearance (in reality, all he is looking for is food), he may piece together some basic facts and find out the truth that involves public resistance, political negligence, corporate dishonesty, social injustice as well as half a dozen of personal tragedies and stories that compose the fabric of the post-apocalyptic narrative of the game. Cat may mutate, gain useful abilities and perspectives, as well as snacks and toys.

Figure 11: Cat Game, 'A rat toy with a nasty grin'

Despite the general heaviness and lingering melancholy of the game storyline, situational humour is well represented in the *Cat Game*, yet the humorous spotlight is firmly fixed on Cat and his interactions with in-game objects, situations, and NPCs. In part, I was aiming for a “Feast in the Time of Plague” feel. *A Feast in Time of Plague* (Russian: “Pir vo vremya chumy”) is an 1830 play by Russian poet Aleksandr Pushkin. The plot concerns a banquet in which the central figure taunts death with a toast "And so, O Plague, we hail thy reign!". The story is based on Act 1 of John Wilson's play *The City of Plague*. In Russian common speech, this phrase implies that a situation or predicament (for instance, a plague) becomes so inescapably dire, that instead of attempting to mitigate it, people emotionally give up and start celebrating their last moments, while waiting for the inevitable resolution (in the case of the plague – death).

The world in the *Cat Game* is on its lasts breaths: humanity is extinct, water is polluted, and air is toxic, yet Cat finds a way to adapt to the dying environment (via problem-solving and mutation) without becoming inactive, or being any less cheerful or opinionated.

This seemingly easy-going behaviour is also organic for the protagonist on a psychological level – Cat is an animal and as such, it is impartial; its purpose is to survive and adapt, and while at it, Cat is incapable to fully gauge or internalize the state of hopelessness and ruin or understand exactly what happened in the individual apartment units and buildings it explores in search for food. The bitter burden of understanding is fully laid on the player. For example, in the school building, Cat finds a suicide note and a few items that tell a story of what happened in the school. Cat, however, does not piece the story together – he doesn’t know what bullying is and does not understand what happened in the school. The player, however, is familiar with the concepts of bullying, suicide, discrimination and violence, so the stories they

discover in the game unconsciously stay with them, creating a more complete perception of the game world that they navigate through their feline proxy.

Affect and Emotions

A sense of ephemerality and ghostliness makes up the main fabric of the game world. It reveals itself in perishable in-game objects and little presence-in-absences: empty apartments that still smell like their owners, half-finished cups of tea (glasses eternally half-full), unfinished board games, and plugged-in computers with exposed social media accounts. Post-apocalyptic series such as the *Walking Dead* and other zombie media (games, books) inspired the general feeling of desolation in the Cat Game world. There were many interesting analyses of *The Walking Dead* (both the TV series and the comic); some of them like Canavan's "We Are The Walking Dead" (2017, p.415) identified that the horrific effect of zombies wears out fairly quickly as the series progress, and it becomes evident that the main scare of the series is the unpredictable behaviours of other survivors who were strong enough to stay alive. For example, in season 5 (Terminus) of the *Walking Dead*, the main group of protagonists, while searching for a safer community, become a part of Terminus – a well-protected commune of survivors residing inside of the train station terminal. As the season progresses, we learn that Terminus commune is a group of cannibals that hunt on other survivors by inviting them inside. A similar idea of situations, being darker than what they seem at the first glance, served as a major inspiration for the Cat Game world. The main difference, however, is that the danger lies not in dealing with other survivors or zombies, but in exploring the secrets of desolate environments that were left exposed and abandoned.

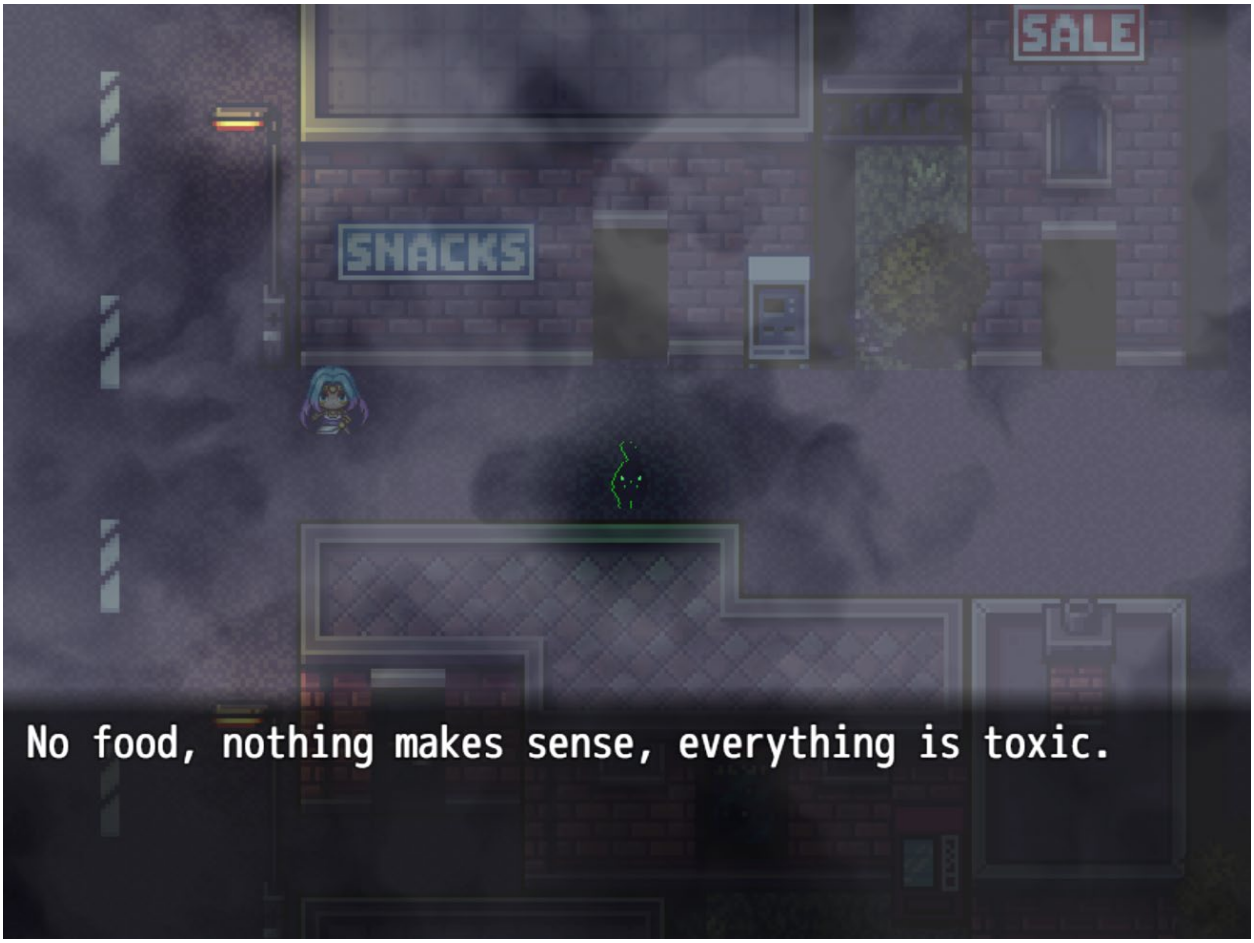

Figure 12: Cat Game, 'Exposing Desolate Environments'

Game Assets

After careful consideration, I decided to juxtapose Music and Graphic modes against the Narrative and Interactional modes to create conflicting messages. Music and Graphics ended up reinforcing each other, as both are colourful, humorous and easy-on-the-eye/ear, while the game narrative and some interactional affordances emotionally would pull the game the other way: dark storytelling, dark in-game options (mutation), and no coherent fighting options.

Like in the *Kodama* game, the assets in *Cat Game* are also created in pixelated RPG style. In my experience, less realistic, colourful graphics help me explore more serious and melancholic scenarios. Particularly in *Cat Game*, graphic maps are overlaid with a subtle green

tint; this decision was implemented later in the game to give the environment a "sickly" feeling. Also, unlike in *Kodama* where most maps are clear, in *Cat Game* I used fog layers to create a feel of abandonment. In the game, the player can expect to find a lot of blood stains; not all of them are actionable items.

Music

Music was composed to sound nostalgic and easy on the ear. It is almost entirely all synth-based, with acoustic drums (instead of electronic drums that are used in many modern electronic productions) – the use of which gives all theme loops a more natural, 80s feel. Musical themes change depending on the zone and have their own evolving logic. For example, all laboratory zones/rooms have the same track/loop playing except for main synth melody which is different for every lab and is mainly responsible for creating a distinct association/flavour for each lab. A bright and compressed synth patch for the astrology lab creates an association with twinkling stars, and a hollow synth patch with reduced hi-end for the biological lab aurally creates association with water.

Most musical themes in the *Cat Game* are inspired by classic 8-bit gaming themes (explorative, cheerful, fun) but with modern sound production. In a sense, the soundtrack is meant to make the game feel more game-like, as if intentionally breaking the fourth wall, and reinforcing the understanding that the player is indeed playing a game. As if implying: "you are playing a video game, here's a predictable game-like 8-bit sound for you".

Breaking of the fourth wall is a very common device in film as well as video games like *The Secret of Monkey Island*, *Batman: Arkham Asylum*, *Metal Gear Solid* and many others. This device usually involves a game character acknowledging or reflecting on situations that happen

within the game by addressing the player, therefore breaking an illusion of immersion. I break the fourth wall a few times during the *Cat Game* to communicate to the player that they, in fact, are not Cat, but for the duration of the game, embody the same set of in-game affordances, albeit perhaps slightly different goals. When the player attempts to make Cat interact with a fire hydrant, Cat quickly responds: "Righty. I'm not a dog, mate", indicating that Cat is well aware of the player playing the game.

Each zone theme track was composed to communicate something about the chosen zone: labs themes associatively reflect the lab mood through the choice of synthesizer sounds, while the sewer zone soundtrack has synth sounds imitating gurgling sewer water. Some zone tracks, of course, are composed in a more generic way, for example the intro track ("titled *Business as Usual*") – it is meant to communicate the normality and routineness of a generic, uneventful day.

It is worth mentioning that the soundtrack for *Cat Game* changed during the development process, evolving from horror-inspired eerie dark ambient themes to hypnotic synthesizer melodies. When it came to dark ambient suspenseful soundscapes and melodies, I found that the musical direction ended up reinforcing the dark, horror-like narrative a bit too much. Ambient or minimalist soundtracks in video games like *Silent Hill*, *Resident Evil*, *Dead Space* work best for building suspense or tension that would eventually resolve in unexpected action scenes that meant to overwhelm (scare) the player with more dynamic action music or sound effects. Regulating these buildup-release episodes is one of the tools in a developer's toolbox that help create tension and suspense in horror-themed games. *Cat Game* has no action scenes, and dark ambient music as a backdrop did not work simply because there was no "release" to the buildup tension.

I wanted the soundtrack to facilitate exploration and add a feeling of progression or motion to the player routine. That is why synthesizer-based electronic music worked so well. With the use of filter envelopes and/or arpeggiation on electronic melodies or bass lines, it is relatively effortless to end up with the kind of soundscape that can feel seamless enough, yet hypnotic and evolving at the same time.

Figure 13: Cat Game, 'I'm not a dog, mate'

The only exception to the cheerful musical backdrop in the *Cat Game* experience, however, is a song that is included in the neighbour's apartment zone. The song's title is *Fire Escape*, performed by Alon Shenfield. Alon has graciously agreed to feature his song in the game.

In triple-A titles, it is highly atypical to include background sounds or soundtrack compositions that drastically disrupt the immersive sonic fabric woven by the background music in preceding zones or a title track, so it is rarely done for the sake of preserving an even player

experience. The only notable exceptions to this are in the title credits at the end of the game. In the *Cat Game*, such disruption of sonic fabric actually happens intentionally at the very beginning, as the song chosen, in a sense, reflects the true atmosphere of the game, bypassing the cheerful 'game' experience for a moment and giving the player an indication to pay attention and treat the electronic cheerful backdrop that is present in other zones as a kind of façade. In a way, the inclusion of the abovementioned song breaks a sonic fourth wall. Below included are the lyrics of *Fire Escape*:

I can't remain, I can't remain indifferent in the face of doubt
My head, my head, my head is overflowing, and the words are spilling out
I can't remain, I'm staring at the future and it's slowly changing shape
And here I am, with one foot in the doorway and one foot in the fire escape

I can lose it all
Serenade the wall
Let my voice dissolve into silence
Waste away down here
In this atmosphere
When the smoke will clear
They will find us.

I can't explain the temporary comfort of the afterglow
I can't stand this pixelated version of the life we used to know
I'm here again, I always try to reach the unattainable
And here I am, my pockets may be empty, but my heart is full

Much like *Cat Game* served as an eerily prophetic mirror to the upcoming pandemic, *Fire Escape* sang by Alon hit the bull's eye in the underlining feeling behind *Cat Game* as I was

developing it. From the instrumentation and Alon's distant and somewhat dissociated vocal performance to the song's lyrics. What is incredibly interesting, is that Alon was inspired by completely different (not apocalyptic) themes as he wrote this song, but his creation struck a completely different set of emotional strings in me as an artist. Similarly to how creative the intent of Alcest's *Kodama* evolved and affected the development of *Kodama: The Judgement Day*, Alon's *Fire Escape* was instrumental to understanding and emotionally connecting to the feeling I wanted to capture in the *Cat Game*. This is also a proof of how in multi-media artifacts, surrounding multimodal context can alter the interpretation of its composite pieces.

Conclusion

Throughout this applied experiment in game development, I arrived at several useful conclusions that encourage me, and I hope for my readers to reconsider the current relationship between game scholarship and game development industry and to promote more hybrid, well-rounded cross-media research into video game artifacts and their affective powers. Some of these findings and conclusions would relate more to the development side of game development, while others – purely to the academic research side, but it is vital to consider and account for both in order promote the production of the new knowledge and interdisciplinary scholarship that, as noted by Jarvinen and other foundational game scholars like Ian Bogost, is largely missing from the academia at the moment.

First, there is an undeniable link between Multimodal Studies and Game Development Studies, even though Multimodal Discourse Analysis studies are not as closely associated with Game Design Studies in the current state of game scholarship. Multimodality is vital to be accounted for because we, humans, have been always processing information multimodally, and

all interactive technology from Apple Watch to Fitbit is designed to be multimodal by nature. Multimodal design in HCI is a translational process, where meaning crosses mediums and dimensions, transcends domain-specific terms and evolves, emanating from a human to a device and vise versa. From scheduling apps to health trackers and games – all those technologies are built on multimodal principles. All interactive technology, including gamified apps and games is multimodal by default, and there is a massive body of industry research dedicated to exploration of multimodal design decision-making through the disciplines of UX Design, UX Engineering, Product Design and Software Development. Multimodal Interaction also should be regarded as its own field of scholarship on the intersection of Communication Studies and Human-Computer Interaction and dedicated to studying multimodal design patterns and its impact on affecting behaviour formation and conditioning behavioral patterns.

As I have already outlined in the Affect and Emotion portion of the dissertation, games are powerful because they guide behaviour formation, help learning by association, and offer a better, more enjoyable path to behaviour correction. This is purely because humans are complex multimodal communicators and when technology creates a better experiential environment for engagement, users/players can form more complicated association-based connections with the new knowledge. This by extension means that games have an ability to change our minds. Whether it is a feeling of deep care for a fictional character, enhanced understanding of virology, or a deeper understanding of struggles that transgender people experience in society – it is up to the game designer to present the player with a story. In some cases, I have even seen examples of familial storytelling in visual novel games, where personal histories of family members were described in an interactive novel form.

Multimodality is extremely important to consider when we talk about affective powers of gaming systems and technologies, and games are complex multimodal artifacts that emanate meaning on multiple channels. Most game analysis frameworks and models like FDD or Layered Tetrad, although useful, are not detailed enough to provide any practical insight that can help understand game development process better. The Multimodal framework presented and suggested in this study, however, opens up game design theory, helps to understand the game design process better, and breaks down the nebulous and larger-than-life concept of game development into manageable areas that are easier to understand and connect to the existing body of interdisciplinary knowledge (both industry and academic).

For example, MDA framework does not elaborate on how to start writing an affective game narrative or create a pack of assets that attempt to create a certain feeling by stating that "developer should make player feel X". The multimodal framework developed in this dissertation, however, breaks asset creation and narrative writing into communication channels like interaction, sound, and visuals that can be all researched and approached individually. If a developer wants to develop a highly emotionally charged soundtrack that makes player want to cry, there are strategies and methodologies for sound production and composition that the developer or game artist can address to achieve their desired results. If a game writer wants to create a certain style of game narrative, they can start by revisiting creative writing and film literature. It is vital to account for meaning that is being produced at the intersection of multimodal channels, since as my applied game design experiments showed, mediums can amplify, soften or cancel each other out depending on how they are used. It is useful to think of each multimodal channel as a storytelling channel as well: sound, graphics and interaction patterns can all create a sense of movement and progression. For instance, when Cat in *Cat*

Game undergoes mutation, not only he progresses on his quest, but the visuals and sounds also change to accommodate the interaction changes. Map tilesets change, avatars change, as does screen tinting and other mechanics such as in-game lighting. Graphic assets have a story that they tell on their own, and the same goes for the background music.

It is necessary to understand that video games design can start with endless inspiration adopted from fields like music composition, sound design, creative dialogue writing or film studies, but games are also their own medium, and thus come with tangible limitaitons and scalability strategies that are mostly the same across all technologies, but can vary from engine to engine. For example, all video game zone tracks, ideally, should be able to loop in order not to interrupt player immersion. Game asset tiles can come with certain pixel limitations, and game art might have size restriction or best practices employed to reduce and minify game files. When it comes to format accessibility, multiple screen resolutions might need to be supported individually. Games that look great and work on desktop might not necessarily be working the same way on mobile devices or tablets.

When it comes to designing game assets, it is up to the game designer/artist to define their own design strategies and inspirations from cross-disciplinary research in sound studies, music composition, or visual studies. When it comes to technological limitations, however, these are best obtained from developer's literature (which often includes testable examples as well as code snippets). This exemplifies the complementary relationship that should exist between both academia and software development/game development practice, in order to support cross-disciplinary game design research and practice that is both limitless in its intentions, but is also grounded by what is testable, possible and buildable.

My research also outlined a few problematic areas that currently exist in game studies in connection to applied game development practice. Whereas, in literary criticism and film studies, authorship is an established theoretical concept that many analytical frameworks consider, in game analysis, the concept of authorship or developer's intent is not as well-defined. Perhaps partially it is because in the past, there used to be fewer independent developers and more developer teams which complicates the concept of authorship and artistic agency. In the current state of game market, however, more and more independent developers are creating and releasing games, so the concept of authorship and author's intent is worth revisiting. It is important to open up a dialogue about developer's experiences and developer's agency not only to give a more well-rounded overview of the cultural conditions and social circumstances that resulted in development of certain games, but also to address the elephant in the room and talk about games that could not be produced, completed, and finished. Games that were banned, games that were defunded, games that were abandoned by developer teams and games that were picked up and completed by developer hobbyists. Mapping a cultural journey of a game is just as important as mapping and addressing a cultural journey of a novel or a poem. Just like in literature or any other artistic discipline, once the game artifact is released into the world, its interpretation becomes fluid and can no longer be fully controlled by the game designer. It is important to study this journey from the beginning of game development to the moment it reaches the player as objectively as possible.

It is possible that the developer's original intent might get lost in translation once a game reaches the market. It is also possible that once the game transcends into the cultural layer where it becomes a cultural phenomenon, the original design intentions can get distorted and misconstrued. Very often, when game scholarship is disconnected from understanding of what is

involved in development and design process, some of the game aspects can get addressed in a limited and misunderstood manner. These are the kind of consequences that the divide between academia and industry risks producing: esoteric misconstruction of game development practice among game studies scholars, as well as inflamed irritation from the field practitioners. Collision of interdisciplinary practices is necessary in game studies scholarship, and one of the ways to encourage and promote it through facilitating more practice-based research-creation studies that would expose a game scholar not only to theoretical environment of academia, but also to applied software development experience of the industry, where the scholar is encouraged to see the limitations and strengths of both. For the smoothest transition into practice-based research-creation knowledge, academic environment has to shift away from artificial enforcement of disciplinary separatism, and adopt a more fluid, open-minded approach to cross-disciplinary collaborations no matter how "un-disciplinary" or unorthodox these practices may seem to be. As the nature of the knowledge changes, and the perceptions of usefulness of knowledge in society shift, it is harmful and unnecessary to enforce gatekeeping on the formation of new knowledge. In fact, with the current rate of technological progress, this is what makes disciplinary knowledge obsolete and outdated – when traditional disciplinary divisions are artificially set and enforced.

As my game experiments have shown, video games are complex, multifaceted artifacts that are products of culture, time, and networks of influences and inspirations. They can serve as time capsules of creativity, forms of activism, incubators for critical thoughts and ideas, emotional creative outlets, and even as simulations of certain fictional and non-fictional political, social, and humanist concepts and ideas. Games can be artistic socio-political collages taking from other art forms and cultural artifacts like TV series, music albums, animated cartoons,

fields of academic inquiry, humanist and philosophical ideas, dark humour, and successfully allude to and explore multiple concepts under the same title umbrella: from body horror and eco-criticism like in *Kodama*, to cat memes and criticism on how viral outbreaks and climate change policies are politically handled in *Cat Game.*

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