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A culminating experience capstone

presented to

the faculty of the Department of Digital Media

East Tennessee State University

In partial fulfillment

of the requirements for the degree

Master of Fine Arts in Digital Media

by

Jarrett McGill

May 2023

Greg Marlow, Chair _____

Jacy Richardson _____

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Chris Wilson

Keywords: animation, game development, career

ABSTRACT

Ready, Fire, Aim! Creating Game Animation in Restraint

by

Jarrett McGill

Just like other artistic disciplines, animators are tasked with bringing characters to life through movement, whether for personal or professional motives. Games are a diverse field that sees a wide range of animation needs, but there lie consistent threads that lead to the success of a video games movements aesthetically and functionally. For aspiring animators there remains one consistent question: what does it mean and entail to create animation in the highly competitive game industry? This culminating experience paper aims to discuss the similarities and differences between student and professional work to highlight the importance and what it entails to work within creative restraints to create quality gameplay animation on demand. By analyzing animations, game development, and personal experience animating in different roles and scenarios, this paper seeks to highlight studio workflows, challenges, and steps to see to the success of an animation while adhering to quality and creative standards.

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DEDICATION

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ACKNOWLEDGEMENTS

I cannot express my gratitude enough to my committee, Jacy Richardson, Todd Emma, and Chris Wilson, and my professional partners, Rocky Newton, Garrett Swanson, and William Cate, for their continued support during my time in graduate school. I want to give special thanks to my chair, Greg Marlow, for being a great and selfless mentor throughout my time at East Tennessee State University. Without his support, I wouldn't have become an animator in the first place, let alone kept pursuing the dream to do so professionally.

My graduate study would not have been the same without the support and friendship of the Digital Media MFA class. Whether it is the random trips to the local restaurants, the karaoke car rides, or the laughter-filled game nights, the time spent with my classmates is something near and dear to me. I wanted to bring special attention to the fellow students finishing their culminating experience research at the same time as I, including Weston Hooper, Maggie Shelton, and Megan Smith. These individuals have made a lasting impact on me personally and professionally, whether that is assisting in changing my shampoo or helping push my artistic abilities further than I believe they could've been. Congratulations to you all.

I wanted to acknowledge my best friends that have supported me as I chased after working in games. Thank you so much to Woomy, Djinn, Gatr, and iBose for being there for me and providing great gaming memories throughout the many years I have been in school. I could not have made it this far without the many nights filled with laughter, phenomenal gameplay, and eSports watch parties. If I ever feel lost, I always know I can return to -623 96 723 or Raleigh with you all. Here's to many more victories.

Finally, I would like to thank my family for their continued support as my educational journey was much more than just me. I couldn't have done this without you.

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Chapter 1. Introduction

Video games have seen a spike in popularity in the past decade. During the COVID-19 outbreak, League of Legends reported a monthly player number of 180 million in March 2022, a 90 million player increase from 2019 (Chen, 2022). In 3D games, animators bring the character to life through movement, whether a walk, run, or even facial acting performance. The issue that comes into play is that games can require tens, hundreds, or even thousands of animations to bring the project's vision and video game to life over the course of an extended period of time. According to a documentary called *Raising Kratos* created by PlayStation Studios, it took nearly five years to develop the reboot of Sony Santa Monica Studio's critically acclaimed *God of War* series (2019). Game development is timely and costly, so animators must work within creative restraints to create quality animation.

3D animation can be viewed from various angles, be approached in different styles, and serve diverse purposes for gameplay. In game animation development, there are different workflows, roles, and boundaries set in place to ensure the quality is consistent and does not negatively impact a game. When talking about the best animation of 2022 and what it takes to produce quality game animation, professional animator Daniel Floyd stated in a video presentation: "... making great game animations means finding ways to strategically constrain scope so you can avoid wasting resources needlessly" (Floyd, 2022, 29:01). A single animation can take anywhere from a day to weeks to see completion, so having the budget to acquire a team of capable animators can substantially increase that completion time. However, this can have a negative impact if the animation set isn't coherent or seen as quality by an audience. Games, such as Mass Effect: Andromeda, have received heavy criticism for neglecting this, with research stating that the animation was "breaking a lot of audience expectations and it is preventing the suspension of disbelief, and it leads to difficulties to immerse themselves in the story and the world" (Nilsson & Lundmark, 2017, p. 6).

The approach of this culminating experience should showcase how a gameplay animator navigates creative boundaries. While there are efforts to showcase what it entails to bring a create vision to life, there is little to help paint the picture with specific examples of what it is like to fulfill a project's technical and aesthetic goals as an animator. In a highly competitive and fast-paced industry, the ability to produce quality animation on demand while working within tight creative constraints is critical for success. Through case studies on successful animation projects, this culminating experience project and paper aim to illustrate what it means to work within creative limitations in the video game industry as an animator to create quality gameplay animation on demand.

Chapter 2. Literature Review

Creating games requires artists from various disciplines, whether it's to create concept art, make environment assets, or create a skeletal rig to move a character model. The game animator brings the character to life through calculated movement using 3D software such as Autodesk Maya or Blender. The animations created by a gameplay animator can range widely from simple idle breathing animations to character run cycles that play on a loop as a player traverses a world to even multi-attack combo moves for taking out enemies. Gameplay animators are routinely tasked with more than just one animation or building an animation set. For instance, some games utilize multiple run animations in cardinal directions and blend between them to create a more intricate movement system, where other titles utilize only one forward directional cycle. Regardless of the task, gameplay animations are created with an emphasis on improving player experience and the game with a focus on responsiveness.

Defining Quality Animation

There are arguably three traits necessary to consider a game animation as quality. These include being technically sound, mechanically sound, and having a good audience response. Apple animator Jonathan Cooper writes in the book *Game Anim*, "While there are certainly a lot of overlap and shared skills required to bring a character to life in any medium, there are many unique technical limitations, and opportunities, in the interactive artform" (2021, p. 1). A technically sound animation or animation set is free of any technical issues, such as no unusual feet sliding, motion popping, strange blending, or awkward transitions, and overall feels fluid and responsive if used in a game. Technically sound animation should be fun to play with, utilizing those principles of animation to elevate, and not hinder, the gameplay.

Body mechanics is the understanding of how the body works and responds to physical activity. For instance, when you throw something, you use your entire arm, including your hand, shoulder, and more. It is vital for game animation to be mechanically sound as the movements can be seen and analyzed from various angles (Root, 2020). This concept is a cornerstone of gameplay animation as animation is a study and illustration of movement, so any action needs to be believable. This knowledge comes from trial and error and studying life to execute in an animation utilizing the principles to guide towards bringing out aspects of an action. When asked in an interview how they made the facial animation appear realistic in *Detroit: Become Human*, facial animation supervisor Marie Celaya responded, "Eyes carry the weight of a performance. They are the window to the soul and actors use them to indicate the interior life of a character. Darting looks are critical not only for realism but to convey emotional depth" (Cooper, 2021, p. 194). This depth of understanding of body mechanics can elevate a good animation to a quality, mechanically sound one.

The last indicator for quality gameplay animation is simply a positive audience response achieved by being appealing or fun to play with. This could come forth in the form of positive feedback from an audience via online or in-person dialogue or through awards or recognitions, such as the Annie Awards or Academy of Interactive Arts and Sciences awards for animation. While not being awarded for the animation specifically, game rewards, such as the game of the year, can be seen as an indication of good gameplay animation as it is one of the many facets utilized in the game's design.

Working Within Creative Restraints in Games

Games can span multiple years to create and require collaboration from various disciplines to create a unified vision, so creative restraints are placed in order to create the

multitude of assets needed for the final shippable product (Sakurai, 2022). Leads can create crib sheets for artists to reference to help keep style and technical details the same. Crib sheets are cheat sheets commonly used for studying for students, with reports of up to 91.8% of students seeing improvements in learning material from their use, so these can make an excellent resource for artists on characters, game design aspects, and more (Bredican et al., 2020). For gameplay animators, a crib sheet can include a biography of the character they are animating, gameplay details, personality references, and animations needed. The animation list can detail only the animation's use or go into more technical detail, providing information on how many frames it needs to be, creative notes, what it blends into and from, and more (Sakurai, 2022).

Prioritizing the quality of all the assets is more important to focus on with the number of animations needed for some projects. Due to creative and time constraints, animators must be flexible to tackle more mundane tasks, such as idles, instead of focusing primarily on showreel work. Animators will receive a schedule and deadlines for animations needed; thus, creatives cannot get stuck working on a single piece endlessly to minimize wasted efforts. By the beta phase in development, all animations should be seen as "shippable." After that, there will be conversations on where resources shall be allocated to increase specific animation's quality (Newman, 2021). The overall creative goal is to have animations free of aesthetic and technical bugs reported by a quality assurance team or others.

Situational and environmental constraints can alter creative aspects in the rapidly changing game development environment. Environmental constraints have been more frequent due to the COVID-19 pandemic restricting physical contact with team members, thus hindering quick collaboration, and resulting in working together remotely using applications such as Zoom (Brynes et al., 2021). Situational constraints can include gameplay changes or bugs that alter or

hinder animation. In Apex Legends 10th seasonal update, one of the characters named Rampart received the feature to run and gun with her turret ability instead of being only stationary (Respawn Entertainment, 2021). Due to this change, the developers had to allot time to craft new animations and change her state machine to include animations for the updated use of the ability, thus restraining them creatively from other projects. Collaboration, awareness, and adaptability can help navigate these outside influences that influence creative restraints.

Chapter 3. Methodology

This study consisted of case studies of observations of my professional and student animation pieces and work environments to illustrate the measures to create an animation under quality and creative restraints. The professional case studies dive into my roles as a lead animator and an animator under leadership. The animations examined under the student development section were created with similar restrictions as seen in the professional development sections to fairly compare similarities and differences. These educational animations include animating for a contest and completing an animation test with a lead animator from a professional game studio.

Chapter 4. Slotting Into Creative Restraints



Figure 1 - Spellcraft Logo

Spellcraft is an upcoming free-to-play competitive strategy game by One More Game where players collect and command heroes to fight opponents using their abilities while also casting spells to alter a battle (2021). Drawing inspiration from real-time strategy games, autobattlers, and even fighting games, the focus of the game is on its unique, personality-driven characters and their interactions. For this project, I animated two different and distinct characters featuring different body types, gameplay mechanics, personalities, and more. For this culminating experience capstone, I will focus my discussion on one of the characters: Reset, the robot tank.



Figure 2 - Reset Keyart

Reset the Bullwark is a delightfully angry machine that uses his rocket-boosted arms to bash into, his rocket-boosted feet to fly toward, and his explosives to blow through his enemies (*Spellcraft*, 2022). Don't let his casually angry floating trick you; he can teleport instantly. He is classified as a tank in the game, boasting large defenses to absorb aggravated assaults from other heroes on your team. For his gameplay, Reset attacks with both fists and all his rockets, and his ability explodes enemies in his vicinity. This character and more are currently in active development, being tweaked as weeks go by with testing and experimentation. That is all to say that the information presented in this culminating experience could be different than what is present in the final release or even future updates of the game.



Figure 3 - Reset Crib Sheet

Spellcraft featured various characters and assets that needed to be animated, so multiple artists were brought on to tackle the animation needs. The production utilized crib sheets for each character an animator worked on to assign tasks and ensure animation consistency. These sheets contained a lot of details and boundaries regarding animation, including personality references, naming conventions, core gameplay animations, and more. The animation list also included various technical specifications, such as frame ranges, if it loops, if it blends from any animation, and creative notes on what the execution of the animation should look like. After reviewing the sheet, the animator meets with the lead to discuss the specific character and gameplay nuances

while brainstorming and providing additional information on the creative goals and boundaries. For new animators joining the team, the crib sheet is extremely valuable as it allows them to focus on what they do best: animate. As game productions become larger and larger, this asset seemingly automates the process and helps keep teams on an aligned path.



Figure 4 - Reset Heart Face

While this might seem restraining, this sheet served as a guide in finding nuances to bring out the personality and appeal of Reset. These boundaries force the animator to think of how to utilize the character's traits or rig features to showcase who the character is or how they would do certain actions. One of the standout features found through exploration and the provided references was switching his face quickly as if it is an LCD screen. This trait is used throughout the animation set to express the character's personality, whether to showcase Reset's happiness with a heart after winning a round or to demonstrate his power and control with an arrow before performing a hook punch in that direction. These animation choices are what helps Reset stand out among the cast, which is vital given the limited number of animations the character has.

Even though these restraints are present, it does not mean they are always set in stone. The creative notes for Reset's attack signified him blasting his fists into the enemy's face with rockets with some flair after the explosion, such as a backflip or spin back into place. After being inspired by Sojourn's mechanical animations seen in *Overwatch 2*, I pitched a different idea for the attack where Reset does two roundhouse punches to then summon a powerful explosion that pushes him backward. This idea utilized the reference of *Iron Man*'s weaponry and strong posing while also using the ideas mentioned in the crib sheet about changing expressions as seen in the small robot from *Big Hero 6* with Reset's sudden expression changing. The pitch was approved and worked without issue in gameplay though it changed from a single registering attack to a triple. A large part of its approval stemmed from that even though it strayed from the crib sheet, it remained within the boundaries of the character and fit within the technical requirements.



Figure 5 - Reset's Ability from First Phase to Final

The success of this pitch illustrates what quality animation in *Spellcraft* was; movement that was mechanically and technically sound while also being appealing, fun to play with, and cohesive with other elements. There was a process to help achieve this standard. The animations would be initially sketched out as a rough set, or 'blocked out,' and then approved for more detail once the most appealing and mechanically sound option was found. The lead animator designated whenever the animation met different stages of quality from any animator until it was shippable. This is important to note as this distinguishes that while both team members are

animators, the lead helps ensure quality, style consistency, and effectiveness across a team or movement set.



Figure 6 - Various Reset Minipose Ideas

This rapid development iteration design philosophy adopted by One More Game was crucial in achieving this quality bar (Wyatt, 2020). The approach was utilized to achieve quality animation while I was a part of the production. The result was posing various ideas for animations and being comfortable with shifting gears or re-evaluating ideas during the development process. I went through different ideas for Reset's awaken animation that plays at the start of a round. One of these versions was one where he flies in and scans the area, finding his targets in front of him before he starts to fight, highlighting his aggressive nature. After some more experimentation and discussion, we decided to shift to something that had more readability in the limited and restricted frame range the animation had while still tying to his personality, alluding back to the explosive egg movement seen in his ability. This animation showcases how creative boundaries can be utilized to find the best quality and creative option.



Figure 7- Reset's Second Hit in his Attack Animation

This emphasis on appeal is shown in the body mechanics as well. Reset is a machine, so his movements had to be robotic in nature. For instance, during Reset's attack and ability, he utilizes his rocket jets on his feet to catch himself with minimal overshoot, showcasing his control and advanced capabilities. Alongside this, Reset can swing his other arm with a weighty impact in his attack while keeping one planted in preparation for his blast attack, bouncing off the idea that only a mechanical and advanced character could do this. These acting selections are subtle and still work within the creative boundaries but are vital in achieving appeal.

Being fun to play with is just as important as showing character personality. Reset's walk initially utilized a movement speed of 124 centimeters per second. It came to light through testing that increasing the movement speed made Reset more fun to play and helped bounce off the idea that he is a teleporting tank, allowing him to get in and out to do bursts of damage. While this caused some changes to the animation to be quicker and floatier with less emphasis on the fidget seen in the walk, it still worked within the creative boundaries and was still technically and mechanically sound. This tweak made for a more enjoyable player experience and worked within the creative boundaries. During development, things can change, whether that's a camera change, pose tweak, or movement speed change. Other situational constraints that can, and frequently will, occur in larger productions are shifts in plans. As mentioned in the beginning, I worked on two characters. Due to a schedule shift, one of them got shifted back. Alongside this, some new animations were requested to help bring more nuance to the characters, such as victory and defeat mini poses. Game development is not a linear path. Creative guidelines help keep an artist grounded in these moments.

Spellcraft showcases the traditional way in game animation to work within creative restraints and meet quality standards coming into a project. While the game is still in production, feedback from the team and play-testers regarding the animations has been positive thus far. Quality was defined throughout to ensure animations were all up to a shippable quality. The quality animation was created under clearly defined boundaries to ensure gameplay mechanics, technical specifications, and animation stylization were consistent across the work of many. These boundaries can shift if it means a more enjoyable gameplay experience. Overall these are the walls for animators to work within and think through to create unique hero animation for a diverse cast of characters.

Chapter 5. Developing Creative Restraints



Figure 8 - World to Build Logo

As stated on World to Build's website, "World to Build is an online voxel-based sandbox game where players can create worlds and designs in a 3D environment, create their own personal avatar, learn script-based programming, make friends, and build their wealth with an interactive online economy (2018)." The game's main focus is on allowing players to create up to their imagination, whether that's parkour maps, custom cosmetics, or something else. The main demographic of players tends to skew towards a younger generation of gamers, but all ages and walks of life are welcome and encouraged to experience the game and create.

I was brought onto the team for Spellcraft to create gameplay animations for characters with established creative boundaries. For World to Build, I was brought on to reimagine and reenvision the existing locomotion and emote animation to a new style. I was the only animator on the project, so I served as a theoretical lead as we navigated envisioning what this new motion would look like. More emphasis was set on creating a style guide rather than a crib sheet, as there is more flexibility in technical and mechanical requirements with fewer moving pieces involved. While this might be intimidating to establish, quality throughout the set is crucial. To ensure the likelihood of achieving that, I worked with the team to set creative boundaries.



Figure 9 - World to Build's Playtest World

To best navigate how to approach this task, the first thing that was established was creative restraints. This is important to set in stone early as it helps keep the set coherent and make sure that there aren't any animations that feel out of place. While anyone can play the game, the game is targeted towards a younger demographic. After much discussion, we ultimately decided to go with a more stylized animation approach seeing that other games for this age group featured more cartoony animation, including titles such as *Fortnite*, the *Sims*, and *League of Legends*. In the animation set, we wanted to take elements from those inspirations and utilize overshoot, pushing of poses, and squash and stretch principles while not being over the top or character specific, showing the goofy and fun nature of the game. This animation style bounces off the other elements utilized in the game, such as the stylized site and voxel aesthetic.



Figure 10 - World to Build's Various Outfits

As previously mentioned, one of the most important reasons why these creative restraints are in place is because anyone can play the game, be any person they want to be, and have fun however they want to. While there were attempts to make the animation more distinctive, this would lead to the player insinuating some personality traits. Asymmetry, the absence of balanced proportions, is a large reason why people associate personalities to characters in posing. If a character turns to the right with their head and chest held high, one might think they are confident or happy. While this doesn't seem like a big deal, it would hinder the player experience seen in sandbox games, where players have a lot of control to create whatever they imagine. Symmetry was utilized frequently in the animation set to alleviate this alongside the previous elements mentioned.



Figure 11 - World to Build Old vs. New Run

The locomotion set was the start of setting what the quality standards looked like in motion. The first animation prioritized in the set was the run cycle as it would see the most use out of all the movements. Since showcasing a distinct personality was out of the picture, our main way to achieve appeal was to push the poses and make them feel fun and full of energy. This meant the run cycle needed to be quick and allow for a large amount of distance traveled, so we went to the drawing board on how to execute this and fit within the creative restraints. Through much exploration, it was found holding poses and having the character have a lot of hang time in the upward motion would meet the technical and mechnical requirements. This creative decision made the avatar feel energetic and personable with simple, but pushed poses, utilizing squash and stretch and straying away from super realistic motion. This design philosophy was used in the other locomotion. Ultimately, this run served as a checkmark for technicality and mechanics across the set to create cohesion.



Figure 12 - World to Build Old vs. New Sit

We bounced off this design ideology in the locomotion and emphasized simplicity but fun energy for the emotes. The non-interactive emotes, consisting of a wave, clap, angry gesture, and sit, all feature only a few poses but hold on them for a lengthy amount of time with similar squash and stretch and overshoot seen in the locomotion. These mundane actions took some playing around to get just right as we spent time trying to explore them in a more playful and energetic way. The sit animation was a notable example of this as the first pass, while depicting a character sitting down, did not have the energy or stylization previously seen in the other animations. After some iterations and suggestions from the team, the current version thrusts the player into the air with some hang time before plopping into an idle. While these animations are lengthy, the emotes can be canceled at any time, thus not hindering the player experience and still working within the creative boundaries of the style guide.



Figure 13 - World to Build Train Emote

The locomotion and emotes were released separately. This was due to finishing one set fully before starting on the other, but it also helped us see what the response to the new motion would be from the players. The locomotion was released to a positive response, with comments in the public Discord server praising how smooth and playful the player animations were. This indicated that we were on the right track creatively, technically, and mechanically and the restraints set were working. Given this response, we kept the same design ideology with the emotes. Once these were released, a similar response was received, saying the animations were 'sweet' and matched the bubbly nature of the avatars. Overall, these two sets worked in conjunction due to sticking to these constraints and ensuring consistency.



Figure 14 - World to Build High Five Emote

The animation process was not seamless and contained moments of situational and environmental constraints. The largest constraint overall was time. The emote set needed to be finished by the end of 2022 as I needed time to work on the student development aspect of this culminating experience. This meant that, while I would love to spend more time on the animations, I had to get them to that theoretical beta level of development efficiently and effectively. The simplistic nature of the moves helped this as the motions typically held poses and were symmetrical, requiring extra effort to figure out how to spline and polish the motion. This helped achieve a higher quality while not hindering the production timeline.

World to Build showcases the importance of setting up creative boundaries and quality standards if you are in charge versus slotted into a project with pre-established ideals. Games are more than just games; they are universes. Games need to stand out in the competitive video game market, and animation is a great way to find that charm to do so. While the two are drastically different games, Spellcraft and World to Build both utilized creative restraints to not hinder artists, but instead enable them to make quality gameplay animation that fits with the respective game's vision, universe, and brand.

Chapter 6. Implementing Creative Restraints

I've been in college for eight years, starting back in 2015. Throughout those years, I saw my most success professionally in the last three years. This was due to a shift in my ideology in my approach to projects. Breaking into the game and animation industry is extremely difficult due to how competitive it is to get a job, so candidates must find ways to stand out. The reels that have stood out and inspired me the most are ones that not only have great shots but purposeful animation. Achieving this comes from considering various questions: what am I trying to showcase? Who is this character that I am working with? How would they go about doing this action in this context? Is it going to be in a game engine? By doing this, a student can change a simple body mechanics piece to a game animation of an experienced, cocky soldier running through an obstacle course with ease in Unreal. These questions guide the artist in setting up creative boundaries and reflect those seen in a production pipeline. This is not done to hinder a student but instead allows them to use that creative freedom more effectively. This helps them have a definitive purpose for their work rather than just making something look good or for a grade.

Ultimately, implementing creative boundaries as a student allows for a deeper understanding of not only the character, but the tasks at hand when working professionally. As indicated in the previous chapters, I have had to work within limitations as a part of a team and create limitations as leading a team to achieve visual unity. This is becoming ever-important with the emphasis on branding today so companies can stand out and be recognizable with just a glance due to cohesion. This is why it is important to approach animation with the same mindset to achieve similar effects.

For the student development section of my study, I participated in the 12th annual World of Warcraft Student Art Contest in the animation category for which I created a two-hit combo attack over the course of a month. The contest detailed various elements and restraints to work under, including prompts, frames-per-second, camera angles, and more. I utilized a free cyborg rig and spear model found online for these animations. I depicted the character doing a magical spear throw into a slam combo attack animation for the contest animation.

Following this, I worked on a shot with Joel Finney, a lead animator at Giant Squid. I was given a prompt for an animation assignment to simulate creating something for a game as seen in the previous case studies that I worked on for a month. I was tasked with creating a movement ability animation. I used similar restraints featured in the Blizzard contest, including frames-persecond, character rig and tools, and camera angles, amongst other elements. Through iteration and conversation with Joel, I eventually landed on creating a movement ability where they throw the spear into the ground to jump on to propel themselves up to great heights and float downwards using that mystically spinning.



Figure 15 - Study Animations

One of the creative restraints that wasn't specifically outlined was style as the previous winners in the animation categories differed in aesthetic choices. I depicted this motion with a more naturalistic animation style, exaggerating some aspects such as timing and squash and stretch. Alongside this, some of the placement pieces featured characters with distinct

personalities, whereas others did not. After some thought, I depicted this motion with a more naturalistic animation style, exaggerating some aspects such as timing and squash and stretch. I ultimately did decide to not give this character a specific identity, such as an aged cocky but noble knight, and approach the animations as if they are on a player avatar that might have access to various skills, so they are trained and comfortable with their abilities. This helped narrow the boundaries more and focus on what and how an expert might do this action.

The interesting thing to note is that both projects measure quality differently. While an animation assignment features someone to bounce off and see if a quality bar is being hit, a solo test doesn't exactly have that same luxury awarded freely. However, we can still maintain and measure quality to an extent by having strong mechanics. As a student, understanding body mechanics is key to showcase as it is a core focus in gameplay animation. This meant this animation I had to utilize various references to ensure I was planting the feet right, body parts lead properly, and overall, just ensuring the action was believable even though the acts were mystical. Alongside this, Joel suggested and emphasized cleaning up the main body parts depicting the action, such as the chest and hips, and not overly worrying about the small details, such as the fingers. This helps saves time while promoting quality and cohesion overall as seen in navigating making larger sets of animations.



Figure 16 - One Frame Switch

While these weren't going in a game, I still had to think of what these animations convey from a technical standpoint. This was heavily emphasized when working with Joel while getting feedback on my work. These study animations are lengthy but are still approached from a gameplay state of mind. The idea here is that both are 'strong' input animations, with one casting a spear that sticks into the target and pulls them back for another attack if landed for a devastating slam, whereas the other is a charged super jump to get over a tall obstacle. There are still some ways to save some time to get the player back in the game quicker. The most evident is visible in the animation assignment through suggestions from Joel. The character is seen holding the spear behind their back, which would take some time to rotate around quickly. To alleviate this issue, the spear is rotated quickly 180 degrees so the weapon is in the right rotation to be thrown into the ground quickly. This decision keeps the animation snappy while also showcasing the understanding of technical restraints seen in game animation commonly to make sure that animations are responsive, and if they are long, are rewarding.

Throughout the process, I kept bumping into issues working with the restraints set. While I was working on the Blizzard piece, I got great suggestions for how the spear could react or come back during the cast. One of the recurring notes I got was to have it spin in a wide circle instead of fast in place. While this might have been interesting visually, this could've been read as another attack. This could not work as the boundaries previously stated called for strictly a two-hit combo, and this idea implementation could have the animation read as a triple attack instead. Alongside this, this motion might have not worked in the different camera angles required as the poses utilized only allowed for a sliver of room for the spear to be visible, so stationary worked better in those regards. Navigating these scenarios and creatively executing

with these restraints in mind shows one's ability to create in a world where guidelines are ever prevalent.



Figure 17 - Attack Animation Central Poses

Since these are study pieces, situational and environmental constraints did not play a significant role as they do in the studio environment. The situational constraint that remained constant throughout comes back here; restriction of time. Joel mentioned that one of the hardest parts in working professionally is being able to detach from one's work, so we have focus on making animations quality for the player and chasing a mix between the best creative and efficient options. This resulted in me having to choose strategically what motion to animate. I utilized a bunch of simple movements in an unusual and appealing way, such as a character throwing a spear magically for it to pull them back. This saved time from animating super elaborate motion while still being appealing and working within the restraints set. Being

effective and consistent as a student pays dividends as this mindset is key when transitioning to industry work.

These animations featured similarities to restraints in a studio setting. The Blizzard piece shared similarities to *World to Build*, having to set further creative boundaries to help narrow the study further than with the basic guidelines. The animation assignment shared similarities with *Spellcraft*, featuring a lead and animator relationship and iterating to meet that quality bar through trial and error and pushing the piece. Any assignment from school could be morphed or viewed different to appear like task from and work relationship with Joel, so these conditions can be replicated easily as a student. All these sections have the same core similarity of using these boundaries to find the best creative option and striving to make technically and mechanically sound animation in a timely manner consistently. This is ultimately why implementing these boundaries is important as a student as it helps reflect a professional environment.

Creative boundaries are prominent in professional animation to ensure timely quality output, so it is great to consider this when tackling animation tasks as a student. Whether it is setting up personality characteristics, camera restrictions, or story beat requirements, having these restraints help keep a study narrowed and effective. When I first started animating, I neglected this phase and would end with simple stories, characters with no distinct personalities, and lacking poses. With the bar of entry into working in game development getting higher with the increasing access to education and software, students more than ever need to take into consideration these ideas and think of a project's purpose in not only their education but also their professional portfolio.

Chapter 7. Learning from Creative Restraints

Throughout these case studies, there were similarities found amongst the projects regarding how creative boundaries impact an animator at a professional or student level.

Things Change

This culminating experience is titled "Ready, Fire, Aim! Creating Game Animation on Demand" because of a conversation I previously had with my animation lead about the many twists and turns involved in the game development process. In this industry, ideas and concepts are rapidly evolving and changing, resulting in the idea that you simply need to make things happen and react later. Whether this is deadlines getting pushed up, releases getting shifted to later, or overhauling chunks of a project, sometimes you just got to understand that this could happen and be ready to react.



Figure 18 - Spellcraft Playfield

Game animations typically are viewed from any angle as the player can control the character and camera, thus requiring gameplay animators to ensure their animation looks good in all possible directions. Some games, however, utilize a specific camera view, but the same principles apply that the animation should look good from its specified viewpoints. For *Spellcraft*, the game takes place on a chess-like board with a fixed camera view above the playfield, and the characters move on hexes in 60-degree increments. This means that every animation is crafted to that camera, and the posing and silhouette need to read well from those 60-degree increments, starting from 0 and ending at 360. The camera is the constant that every animator works alongside, and one should keep from making any severe changes to it as it can impact the animation drastically.



Figure 19 - Spellcraft Old vs. New Hexagon Rotation

Well, that camera changed. During testing, it was found that having the hexes placed at a flat angle could cause characters to overlap. This made them difficult to select in certain situations. To alleviate this issue entirely, this had to change. This meant the camera/hex had to rotate 30 degrees. While a change of 30 degrees may seem insignificant since we are working with limited angles, that meant all the noodling from one specific angle may not read the same

from this new one. Time then had to be allocated to adapt to this change to retain that quality animation. While this might be frustrating, one needs to understand sometimes these changes are for the better good of a project. This change was to make sure the game retained a positive player experience. This is important as games are meant to be fun, and players are the lifeblood of a game.

This idea of things changing and riding the tides is present in more minor elements, such as in the art piece production phase, as you find new approaches, flaws, or ideas. Whenever I was working on my Blizzard art contest submission, I suddenly realized that the character leads with the opposite foot needed to make the spin slam work from a body mechanics standpoint. My idea changed drastically to remedy this, resulting in having to cast the spear back and use its sudden inertia to pull the character back to be on the correct foot. This new execution, however, helped alleviate another issue where I couldn't rotate in a wide circular moment, otherwise, it would read as an attack or have the spear in the correct rotation needed for the rest of the animation. Both issues were fixed and kept me within the guidelines and quality measures previously set. While I worked through this and ultimately enjoyed the happy accident, this piece provides an example of how things can change on a student level that could easily happen in a professional setting.

Things change. Developing games is a hard and time-consuming process, requiring anywhere from one to hundreds of individuals to create a product. A great game comes from the mountains of problems solved, failures ensued, prospects changed, and ideas expressed. A game animator must understand in their workflow to not be tied to their work and know that wrenches thrown their way are likely for the betterment of the project. Being a better animator and being able to create quality work under creative constraints is more than being good at animation.

Push It!

The phrase "push it!" is a saying that I commonly heard during my studies of animation, meaning pushing a pose and a rig to its limit to increase a pose's strength at a mechanical level utilizing the ideas presented in the principles of animation. On a fundamental level, posing is one of the most important parts of animation, as everything regarding the motion is built on them. It is vital to get the most out of each pose and illustrate how that character would do said action, pushing such things as the line of action, silhouette, and contrapposto to increase its clarity and impact for the overall movement. This was a big focus in increasing the quality of my animation.



Figure 20 - Attack Animation Pushed Poses

While I worked through my submission for the Blizzard Student Art Contest, I reached out to various other animators for feedback throughout the process. One of the feedback items I got through different passes was to push the poses more, adjusting primarily how the spine flowed into the rest of the body and through the spear via the line of action. Whenever I felt like I pushed it a large amount, I would receive feedback again to push it even more, enhancing the line of action and silhouette in the slightest but noticeable amounts. This included such things as bending the knee or fingers to extend the line of action a tad more. The pose and its purpose were the same in the attack animation, but it was a stronger version of it that told the story of the pose better. Through this project and the contract work, I started to grasp the idea of pushing a pose to the so-called "breaking point" of a pose. This idea became quite apparent how important it is as I transitioned into professional work, as strong posing brings a good animation to a great one in terms of quality. This aspect was extremely helpful when trying to aim for quality animation, as pushed poses can help poses feel better when blending between one another without much sacrifice.



Iterate, Iterate, Iterate

Figure 21 – Animation Assignment Different Ideas

During game production, developers are re-iterating, re-designing, and re-implementing ideas, assets, and more to create their unified vision. This practice is no different whenever it comes to game animation, and this occurred during the creation of the pieces for this culminating experience project. Iteration can come in different and quick ways, whether to block out different ideas, see if things are functional in engine, or simply if ideas are being left on the table. For my animation assignment, I experimented with different ideas based on the prompt because there were many possible approaches to depicting the air movement ability. I blocked out two ideas, one where the character did a simple double jump into the helicopter glide, then another where they throw the spear on the ground and propel off it like a springboard into the glide. After getting feedback, the second idea was approved as it was more appealing, connected better with

the Blizzard piece, and could blend seamlessly from idle from a theoretical input. Through iteration and little time sink, a stronger idea came to light.

Spellcraft was no exception to this process as well and was heavily utilized in the process as first shown in figure 6 in chapter 4. The characters in the game are featured on a base in a signature pose called the mini pose, an important pose that gives a quick glance at the character's individuality. For these, we crafted many different poses to see which brought out the character's personality the best and to further expand upon, knowing that only one would be utilized in the game. Not only does this iteration process help you find better options, it helps you better understand the character and their rig.

Fun vs. Aesthetic

Games need to be fun, so animation needs to find ways to be aesthetically pleasing while not hindering gameplay. This balance was challenged in a couple of pieces created during the project. The most notable example of this was the jump in World to Build. Jumps are a prime example of fun versus aesthetic since depicting the authentic motion would require anticipation before the upward motion, which is not ideal for most gameplay scenarios. Jumps need to feel responsive, and thus needed to be quick. For World to Build's jump, we kept running into the issue where the character would be already in the air but still be doing part of their anticipation action. We kept going back and forth, trying to find a balance, but ultimately a chunk of the animation had to be cut for the best gameplay. The players and play experience are the most important aspect of video games, especially live service ones, so this sacrifice was in the best interest of keeping true to that.



Figure 22 - Reset Old Translate Z vs. Latest

This aesthetic hindrance can be something less noticeable. Reset's attack in Spellcraft features a part where he casts an explosion to blow himself backward. While tweaking this animation, there was a suggestion to keep pushing the blowback past the playable hex so you can really feel the impact of Reset's capabilities. Once it was approved and imported into the game, a strange issue came up. During playtesting and certain scenarios, Reset was hard to target with attacks during the blast, as targeting utilizes the hex space instead of the character mesh. Ultimately, the blast had to be tuned back to stay in the hex to avoid this issue entirely. This was something not expected and balanced through iteration while keeping the idea of the motion intact, just utilizing a lesser extreme version of it.

Set Boundaries

Boundaries in animation aspects, such as keyframe limits or references, are vital to set in stone and make clear early. Whether it is a crib sheet on gameplay and personality details as seen in Spellcraft, a style guide in World to Build, or contest/assignment restrictions or rules, these limitations can help lead to quality animation. These are important to adhere to in production as games can feature hundreds, if not thousands of animations with numerous animators working on said actions on one project. While this study looked at the creation of smaller animation set, these boundaries helped ensure that quality, style, mechanics, and technicality were consistent across the board.

One of the most difficult boundaries that a creative faces is time. As an artist, there is the adherent desire to work on something and make everything you touch the best thing ever created, but typically that cannot be allowed as it could impact not only the rest of your tasks, but the work of others that might need your creation. Focusing on getting it right, pushing and iterating quickly, reacting to changes, and focusing on fun are important when creating within creative boundaries and upholding cohesive quality. While there are times that some assets get more attention than others, such as cinematic cutscenes, there are a lot of assets that need focus as well. A sore thumb sticks out, so every frame matters.

Chapter 8. Future Research

The primary goal of the research was to illustrate what it is like to work within creative restraints in games and create animation on demand in different team sizes and game types. This study doesn't account for the differences and similarities that might be present in the film animation industry. Film studios typically allot more time to complete an animation, allowing for more complexities and rounds of polish whenever it comes to completing a shot. Video game animation typically has a quicker turnaround time depicting less intricate movements, such as runs, idles, and jumps. While using the same medium of animation, the two genres have different goals and purposes, therefore working within similar but different constraints.

This research looks exclusively at animating without the use of motion capture, the process of recording a living being's movement for animation data for use in 3D programs. Motion capture is a popular option in video game animation today, enabling animations to be produced more efficiently while also feeling more organic since they are recorded on live subjects. This study only considered the traditional keyframe method of utilizing reference and manually creating the animation from the starting poses to the final polish. While it saves time, some games, such as popular titles such as League of Legends and World of Warcraft, favor the traditional approach for stylization reasons. Future research could compare the differences and similarities between the two animation methods and the boundaries within each.

Chapter 9. Conclusion



Figure 23 - Old Run Cycle vs. Latest

Creating a defined vision is vital in a branded world. The skill to do so comes with practicing, failing, evaluating, and succeeding in the process. The run crafted for World to Build was one created after countless attempts at creating a run cycle, learning something new with every attempt. Once you understand when something is and isn't working, it helps you comprehend how to make quality movement and what restrictions can be set to ensure it is as such. This vulnerability to retry has resonated with me as game development works on the same ideology. If a project gets it right the first time, it is thanks to learning from the past to help create that possibility.

Ultimately, this culminating experience showcases the measures to create quality animation in a creatively challenging and growing industry. Guidelines in animation are not meant to hinder a gameplay animator, but to help guide an individual or team of animators to create an animation set that is cohesive and evenly dispersed in quality. While this sounds like a practice exclusive to those in the industry, students can replicate these ideals in their projects. These restrictions are important to set early and stick to throughout, whether in a production or classroom setting. By doing so, you have the greatest chance as a creative to create the quality work and achieve the vital principle of appeal.

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APPENDICES

Appendix A: World to Build Engagement Letter

East Tennessee State University College of Business and Technology DIGM MFA Culminating Experience Project

Engagement Letter

2/2/2023

Happy Ninja Games

Attn: Garrett Swanson, Founder

Dear Garrett Swanson,

Thank you for agreeing to work with me on my culminating experience project for my Digital Media MFA degree. Yours and Happy Ninja Games' participation in the project has provided me with the opportunity to grow and share that growth with fellow and future game artists. During this collaboration, I was able to provide digital animation for video games. I request your permission to share what I've learned through a showcase of the emote and player animation from the title *World to Build* through means of a presentation and paper.

Project Goal: The primary goal of this culminating experience project is to illustrate animation development in games. This material will be used as credit and defense for the project.

Project Objectives: The objective of this culminating experience project is to showcase what it is like to work with creative restraints in animation for games. This project will highlight studio workflows, challenges, and steps to see to the success of an animation while adhering to quality and creative standards.

Permissions of the Parties: To ensure a successful project, the following permissions will be requested of Happy Ninja Games:

- Showcase screenshots of World to Build's animations in the culminating experience project paper that resides on ETSU's Digital Commons database starting in April 2023
- Demonstrate iteration of animation through playblasts, renders, and screenshots of any version of the animation for the presentation and paper
- Talk about the animation process and workflow of World to Build's animation
- Speak about how the game is played based off information revealed to the public (i.e., articles, public videos, social media posts)
- Document changes that impacted animation progress or timeline (i.e., rig updates, finding the style, etc.)
- Present animations in a closed, private defense to thesis committee at the end of March 2023
- Showcase animations as part of an open gallery scheduled for April 2023

Faculty Involvement: A committee has been formed consisting of Digital Media faculty members to see to the success of the culminating experience project. These faculty members serve as advisors to the project, evaluating the student's progress and assigning the final grade. As such with the student, the faculty members operate on the principle of strict confidentiality regarding the project.

Again, thank you for your willingness to participate in this important education experience. I look forward to the success of *World to Build* and the future endeavors of the team and company. If you agree with the goal, objectives, permissions, and other conditions of this project as outlined above, please sign, and return as indicated below. Thank you.

Sincerely, Jarrett McGill

Jarrett McGill Jarrett McGill

Dewitt Sommer

Garrett Swanson, Happy Ninja Games

2/2/2023 Date

2/2/2023

Date

Appendix B: One More Game Engagement Letter

East Tennessee State University College of Business and Technology DIGM MFA Culminating Experience Project

Engagement Letter

2/2/2023

One More Game

Attn: Jamie Winsor, COO

Dear Jamie Winsor,

Thank you for agreeing to work with me on my culminating experience project for my Digital Media MFA degree. Yours and One More Game's participation in the project has provided me with the opportunity to grow and share that growth with fellow and future game artists. During this collaboration, I was able to provide digital animation for video games. I request your permission to share what I've learned through a showcase of the animation of one character from the title *Spellcraft*, Reset, through means of a presentation and paper.

Project Goal: The primary goal of this culminating experience project is to illustrate animation development in games. This material will be used as credit and defense for the project.

Project Objectives: The objective of this culminating experience project is to showcase what it is like to work with creative restraints in animation for games. This project will highlight studio workflows, challenges, and steps to see to the success of an animation while adhering to quality and creative standards.

Permissions of the Parties: To ensure a successful project, the following permissions will be requested of One More Game:

- Showcase screenshots of animations for Reset in the culminating experience project paper that resides on ETSU's Digital Commons database starting in April 2023
- Demonstrate iteration of animation through playblast renders and screenshots of any version of the animation for the presentation and paper
- Talk about the animation process and workflow of Spellcraft's animation
- Speak about how the game is played based off information revealed to the public (i.e., articles, public videos, social media posts)
- Document changes that impacted animation progress or timeline (i.e., camera angle change)
- Present animations in a closed, private defense to thesis committee at the end of March 2023
- Showcase animations as part of an open gallery scheduled for April 2023

Faculty Involvement: A committee has been formed consisting of Digital Media faculty members to see to the success of the culminating experience project. These faculty members serve as advisors to the project, evaluating the student's progress and assigning the final grade. The committee has previously been invited to the Game Lab testers program and fulfilled the requirements for entry. As such with the student, the faculty members operate on the principle of strict confidentiality regarding the project.

Again, thank you for your willingness to participate in this important education experience. I look forward to the success of *Spellcraft* and the future endeavors of the team and company. If you agree with the goal, objectives, permissions, and other conditions of this project as outlined above, please sign, and return as indicated below. Thank you.

Sincerely, Jarrett McGill arrett McGill 2/7/2023 Jarrett McGill Date (Feb 7, 2023 09:41 PST)

Jamie Winsor, One More Game

Date

VITA

JARRETT MCGILL

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