

The Infinite Little Box: How Limitations Encourage Creativity



An Interactive Qualifying Project Report
submitted to the faculty of
Worcester Polytechnic Institute
in partial fulfillment of the requirements for the
Degree of Bachelor of Science

May 9, 2014

By Patrick Petersen

Advised by Professor Dean O'Donnell

This report is the work of one or more WPI undergraduate students submitted to the faculty as evidence of completion of a degree requirement. WPI routinely publishes these reports on its website without editorial or peer review.

Abstract

This IQP consists of my work on a Perlenspiel game called *Whither* which I prototyped during a class taught by Professor Brian Moriarty and a look at how limitations can lead to creativity. The first version of *Whither* was coded and designed by Ryan Melville and myself and I continued on my own with advice from Professor Moriarty. The game emphasized limitations which opened artistic possibilities. I then researched other arts which also utilized restrictions to inspire their design. I found that limitations often encouraged creativity.

Acknowledgements

I would like to start by thanking the Interactive Media & Game Development program and the faculty who helped this project to become a reality. Dean O'Donnell, my project advisor, saw this project through and led me in the right direction. Brian Moriarty made Perlenspiel and taught the class which led to the creation of *Whither* and eventually the premise of this project. He also reviewed later versions of the game and assisted in cleaning it up. Britton Snyder, my faculty advisor, helped me out when I felt lost and worked hard to help me assemble a project and find an advisor.

And I'd like to thank the academy, Worcester Polytechnic Institute, which provided me with all the resources and opportunities I needed to make this possible. Specifically, I want to thank campus's Gordon Library for providing such an extensive collection of information available to the students, and another thank you to Research and Instruction Librarian Lynne Riley who showed me how to access these resources.

Last but not least, I would like to thank all of my friends and family who supported me and offered their honest opinions about my work. Without them, I would be nowhere. I especially want to thank Ryan "Chadwick" Melville, my partner from Brian Moriarty's class, who created the first versions of *Whither* with me.

Table of Contents

Abstract.....	2
Acknowledgements.....	3
Executive Summary	5
Literature Review.....	9
List of Figures.....	11
1 Introduction.....	12
2 Theory	14
2.1 Rules of Sculpture and Painting	14
2.2 Rules of Literature	15
2.3 Rules of Poetry	17
2.4 Rules of Theater	19
2.5 Rules of Film	20
2.6 Rules of Music	22
2.7 Rules of Architecture	23
2.8 Rules of Games	25
3 Practice.....	28
3.1 Perlenspiel	28
3.2 Extra Limitations	29
3.3 Whither	30
3.4 Reception	32
4 Results.....	34
5 Conclusion	36
Bibliography	37

Executive Summary

In making my own game, I found that limitations led to the overall design and success of my final product. I worked with Ryan Melville to create *Whither* during Professor Brian Moriarty's Digital Game Design class. Moriarty crafted the Perlenspiel engine to teach students to design games. The idea of the engine was to strip away the unnecessary sections of a game and focus on the core design work. According to Professor Moriarty, the true art of a game existed in the design of the play, not the models, music, or realism. Perlenspiel made these ideas evident and allowed us to focus on designing fun and interesting games. After the class built several games with Perlenspiel, Moriarty assigned us to design a game which followed at least three of five strict impediments. Those five choices were:

1. The grid cannot be longer than sixteen beads in any direction,
2. No glyphs on any beads,
3. Everything must be grayscale,
4. All input must come from either the mouse alone or just the directional/WASD keys and spacebar, and
5. No intelligible words/labels anywhere.¹

Each obstruction posed great challenges, even in the simple engine of Perlenspiel. If we had learned anything, it was that fun games do not need to be complex. After really analyzing the five obstacles, Melville and I realized that a fun game could exist which followed all five. Up for a challenge, we decided to create our game with every limitation offered since we believed it was possible.

With so few game elements to consider, we started by making an interesting core mechanic. After a short brainstorming and experimentation session, we felt satisfied with making the player piece shrink on every movement. Since we had success with a puzzle game in the past, we designed this game to be a puzzle as well. With the fading mechanic and the lost feeling of the puzzle's mazes, we decided to call the game *Whither* as a silly little pun. The end of every puzzle/level was denoted by an empty black square as a goal. We added food pieces to combat withering and walls to impede movement. With these four basic ideas (withering, goals, food,

¹ Moriarty, Brian. "Assignment 11." *IMGD 2900: Digital Game Design*. 29 Nov. 2012. Web. <http://users.wpi.edu/~bmoriarty/imgd2900_12/a11.html>.

and walls), we designed our prototype. Due to the many limitations the game adhered to, we could not use instructions but instead designed the game to teach the player every mechanic through experimentation. Making an end was the hardest part and we simply let the player die on the final level, giving them a hopeless feeling. Even though it was agreed that the ending of our game needed work, our prototype of *Whither* was a great success. It was even used as a large part of the class's final exam. This led me to wonder what other artistic endeavors might benefit from auxiliary rules and focused ideas.

Art exists in a wide variety of mediums. The artists form this art from these raw media with the tools their trades allow. The challenge for an artist lies in communicating the intended ideas through the indirect expression of art. But even with artistic ability, one may become lost attempting to express an imagined conclusion. Thus, art inherently places restrictions on itself to subtly guide ideas. Every art form comes with constraints, which artists blend with ideas to produce art. Tim Taylor summed this up in his defense of photography as art, saying, "Photographic images are formed instantaneously; that is one of the limitations of the art. But it is a limitation in the sense that a composer is limited by certain existing sounds, a writer by available words, a painter by certain paints."² The hurdles of art act both as challenges and assistance.

Every art comes with its own set of limitations. Paintings confine the artistic space on a two-dimensional field. That flat canvas then receives colors, carefully placed, to create a piece. Different paints and brushes lend themselves to different styles and purposes. Sculptures allow for work in a three-dimensional space, but limit possibilities to what is physically achievable. Structural integrity is vital to a sculpture and without it the art would literally collapse. Size, shape, and material all play an important role for a sculptor. Novels provide very dissimilar hurdles to authors, but hurdles nonetheless. A book cannot talk even when filled with dialogue since writing exists as visual speech. Novels must dictate stories to the audience in a comprehensible series of events. The words, sentences, and paragraphs need to flow properly to illustrate the artist's ideas and the events described must also build upon each other logically to form the entire piece. Poetry follows these rules but adds the importance of pulse, line length, and rhyme. Some types of poetry, like sonnets, are particularly complex. Theater and film allow for ideas to be acted out, incorporating several arts all together as one. Music must be

² Taylor, Tim D. "Choices and Limitations: Photography as Art." *The New York Times*. 3 September 1989. Web.

represented aurally, arranging sounds into an organized tune. Varieties of instruments, keys, melodies, and rhythms play important roles in composing pieces of music. Architecture, like sculpture, is a physical art, but with important functionality. Beyond creating the solid structures, architects design the spaces within too. A building must not only be pleasing to look at and have decent stability, but offer usability to some desired purpose. Games are built on rules which restrict the player's actions. Whatever medium the game inhabits, be it a sport, tabletop game, or video game, the game designer must form rules for the players to follow.

Many artistic movements began by breaking away from the established norms of a medium, like impressionism in the late nineteenth century.³ The film industry expressed the importance of purity and restriction with a movement called Dogma 95. A set of ten rules outlined what made a Dogma film and it reminded me greatly of the Perlenspiel assignment. Dogma films were very basic and avoided cinema cosmetics in any way possible. These films strived to revitalize the art of cinema instead of always relying on special effects to woo audiences. Similarly, a movie entitled *The Five Obstructions* experimented with recreating a short film using five sets of interesting design obstacles. The results of the experiments showed greater success and creativity with tighter restrictions and vice versa. Architecture can also benefit from simplification and the observance of the art's core purpose. The functionalism movement focused on the idea that the designs of a building should originate from the building's purpose.⁴ Cluttered designs not only lose visual impact but can endanger those using the structure. Architects must be rational with their decisions and make the right choices for everyone. Some games also found unexpected purposes as interactive stories and such. Gaming has been looked at through many angles to broaden the spectrum of possibilities. Challenges to design games which fit unexpected themes made designers look at all of the possibilities and discover remarkable ideas.

With these ideas in mind, I continued work on my game, *Whither*. The original game did not provide enough difficulty or variety. To maintain the limited nature while still expanding the gameplay, I mixed elements of mechanics together and applied the core idea of withering to the walls food and goals. Even without the assignment officially restricting the design, I wanted to

³ "Impressionism." *Impressionism.info*. Web. <<http://www.impressionism.info/info.html>>.

⁴ "Functionalism." *Encyclopædia Britannica*. 11 Apr. 2013. Web. <<http://www.britannica.com/EBchecked/topic/222115/Functionalism>>.

retain the style *Whither* began with. The game gained much needed difficulty and became more symbolic with the idea that everything withers eventually.

Restrictions can be helpful and hurtful. Designing something while keeping the core ideas in mind greatly help in the creative process and success of a product. All art comes with obstacles and adding a few more can start a project in the right direction. There lie infinite possibilities within even the tightest boxes of rules.

Literature Review

- Axelrod, David B. “Formal Poetry and the Sonnet.” *Poetry Doctor*. 2011. Web. 19 Apr. 2014. < <http://www.poetrydoctor.org/sonnet-lesson/>>.

This webpage described poetry with specific detail covering the sonnet. It was useful in defining poetry and the sonnet while describing the usefulness of limitations. The ideas in this lesson were poignant to this paper’s topic.
- “Bernini.” *Simon Schama’s Power of Art*. Dir. Clare Beavan. BBC, 27 Oct. 2006. DVD.

This video series analyzed the life and art of famous artists, this episode was specifically about Gian Bernini. This resource was only helpful to this paper in understanding sculpture better.
- Danielewski, Mark. *House of Leaves*. New York: Pantheon Books, 2000. Print.

This novel demonstrated creativity which followed auxiliary rules. It helped to show how rules can evolve artwork.
- *Gone Home*. The Fullbright Company. 15 Aug. 2013. Video game.

This computer game demonstrated a game restricted to storytelling in an interactive world. It was useful as an example.
- Bernard, Jonathan W. “The Minimalist Aesthetic in the Plastic Arts and in Music.” *Perspectives of New Music*. Vol. 31. 1993: 86-132. Print.

This article described minimalism in art and the process of minimalist creation. It was not useful since it largely spoke of minimalism as the abstract genre, especially with paintings and sculpture, not as an examination of the art form’s core purpose.
- Malan, Ruth and Dana Bredemeyer. “Less is More with Minimalist Architecture.” *IT Pro*. October 2002: 46-48. Print.

This piece described how smart conservatism in architecture would result in more impactful designs and better project management. It was helpful and relevant as it observed the true purpose of architecture and how stripping away excess could open an architect’s mind to better decisions. Some parts of the article were obviously designed as instruction for architectural students but the points remained valid.
- Raskin, Richard. *p.o.v.: A Danish Journal of Film Studies*. “Aspects of Dogma.” 2000. Print.

This article examined the purposes and effects of Dogma 95, including a reprinted manifesto and vows, analyses of official Dogma films, and interviews with key players during the movement. This piece was extremely relevant and offers a more in-depth look at restrictions in film, specifically connected to the Dogma 95 movement.

- Sarkeesian, Anita. “Tropes vs Women in Video Games.” *YouTube*. 2013. Web. < https://www.youtube.com/playlist?list=PLn4ob_5_ttEaA_vc8F3fjzE62esf9yP61>.

This video series explored the stereotypes and tropes pertaining to women commonly utilized in video game design. Good points were made but this resource was ultimately unhelpful for the content of this paper. It looked at the creative limitations in many games but did not explore how limitations could lead to creativity in any way.

- Sterne, Laurence. *The Life and Opinions of Tristram Shandy, Gentleman*. Kingdom of Great Britain: Ann Ward, 1759. PDF.

This novel showed what resulted when a book followed few rules. It was a relevant example for art without much restriction.

- *The Five Obstructions*. Dir. Lars von Trier and Jørgen Leth. Koch Lorber Films, 2004. DVD.

This film documented Lars von Trier and Jørgen Leth as they created obstructions for and filmed Leth’s many recreations of *The Perfect Human*. This resource was particularly helpful as it looked directly at the effect of limitations on creativity as a film experiment.

- Zimmerman, Eric. “Humanity's Last Game: The Game Design Challenge Final Championship.” Moscone Convention Center, San Francisco, California. March 2013. Conference session. < <http://gdcvault.com/play/1017715/Humanity-s-Last-Game-The>>.

This resource discussed Eric Zimmerman’s Game Design Challenge which placed big name game designers in a competition to design a game according to creative theme. This was a useful resource since the challenges and resultant games showed the many creative possibilities which arose from restricted ideas.

List of Figures

Figure 1: <i>The Treachery of Images</i> by René Magritte	12
Figure 2: Marcel Duchamp's <i>Fountain</i>	12
Figure 3: <i>Damned Soul</i> by Gian Bernini.....	14
Figure 4: <i>Champs de Mars. La Tour Rouge</i> by Robert Delaunay	15
Figure 5: A page from Mark Danielewski's <i>House of Leaves</i>	16
Figure 6: <i>Sonnet XXVII</i> by Shakespeare	18
Figure 7: A cathedral floor plan (5-nave, 7&9-transepts, 8-dome, 13-alter).....	24
Figure 8: Boxed-In Puzzle by Melville and Petersen, a Perlenspiel ‘bead game’	29
Figure 9: The withering mechanic with fade effect and gray background	30
Figure 10: Level depicting withering, food, walls, and goal	31
Figure 11: <i>Whither</i> title card.....	32
Figure 12: A level before (top) and after (bottom) some movement depicting withering wall, food, and goal mechanics.....	34

1 Introduction

Art expresses ideas and emotions in creative ways. By definition art requires an imaginative transformation of one thing into another. A painting, for example, is not actually a landscape, person, bowl of fruit, et cetera, but an arrangement of colors on a canvas. René Magritte



Figure 1: *The Treachery of Images* by René Magritte

depicts this idea in his painting, *The Treachery of Images* (Figure 1), with the French description, “This is not a pipe,” on the very painting.⁵ Sculptures are simply stone, not the people they may represent. Even abstract art embodies more than its medium by expressing abstract ideas, like emotions. But a medium does not inherently convey thoughts to people. Someone, an artist, must utilize their imagination and skill to reform the medium in a way which will deliver further thought.

An artist’s largest obstacle to overcome is that creative transformation of material into thought. Ideas and mediums are things anyone can come across. Buying art supplies requires no skill or imagination, but turning those supplies into something else requires some creativity and talent. Even by simply giving an idea to something, like Marcel Duchamp’s *Fountain*,⁶



Figure 2: Marcel Duchamp's *Fountain*

creativity transforms material into art (Figure 2). Every idea can be represented by some form or another. Imagining physical objects starts simple, thinking of an apple as a sphere with a stick, to more complicated, harder to define shapes, such as humans or landscapes. Knowledge of the goal holds the same importance as the goal itself. Abstract ideas can be just as, if not more, challenging. Red often denotes anger but can also symbolize love, and lines may signify movement or separation. Different people will interpret things differently, especially between cultures. Communicating through abstract art can pose a true challenge. Knowing where to go

⁵ Magritte, René. *La Trahison des Images*. 1928-29. Oil on Canvas. Los Angeles County Museum of Art, Los Angeles, California.

⁶ Duchamp, Marcel. *Fountain*. 1917. Readymade. Tate Modern, London.

and having the skills to get there are necessary, but the creativity involved, the path taken towards the goal, can change everything.

Creativity is essential but difficult to harbor. Often, creativity is viewed as an innate skill which some people naturally have and others do not, but creativity can be brought about in a variety of ways. Sometimes an artist will start with a very definite goal in mind as a guide which can streamline the process. Other art starts without any intended goal. The latter method is often harder since the artist begins without direction. Too many possibilities can overwhelm the artist and stall the artistic process. This is shown in *Sunday in the Park with George*, when George (the grandson) feels lost and does not know what his art should be. Dot insists that he should stop worrying and make a choice, even if that choice does not seem perfect, saying, “I chose, and my world was shaken- / So what? / The choice may have been mistaken, / The choosing was not / You have to move on.”⁷ Limited scopes, especially at the beginning of projects, give the artist a springboard to launch ideas from. Infinite possibilities can suppress creativity and limitations can set it free.

⁷ Sondheim, Stephen. *Sunday in the Park with George*. 1984. Musical.

2 Theory

2.1 Rules of Sculpture and Painting

Sculpture forces the artist to express himself with a physical medium. With subtractive materials like stone or wood, the sculptor carves away unwanted pieces to shape a desired form. Already, two large obstacles present themselves. First, the artist must be able to express his ideas with a three dimensional form, like a person or an animal. To convey more complex thoughts and especially emotions like fear or happiness, the sculpted figure usually must fit some context.



Figure 3: *Damned Soul* by Gian Bernini

If the viewer cannot interpret the context behind the sculpture, the artist will not be able to represent what he hopes. Gian Lorenzo Bernini was a skilled sculptor who could amazingly recreate emotion in stone, such as in his piece *Damned Soul* (Figure 3),⁸ for which he burned himself and observed his expression in a mirror.⁹ The sculptor is also limited in size and shape. To carve a full size human, the artist needs to first find a block of material larger than a real person. Sculpting a scene requires scaling down, using separate pieces and then placing them properly, or finding an enormous slab of sculpting material. Additionally, physics must be taken into account when sculpting. One cannot make a cloud out of marble and expect it to float or sculpt a man

balancing a dozen cars on his hands and expect it to stand up. Some mediums, like metal, are stronger than what they represent and can appear to do the impossible, but the nature of the sculpting material is critically important.

Paintings are another type of art limited naturally, but not as severely as sculpture. First of all, a painting is a two-dimensional arrangement of pigment. On one hand, expressing ideas in two dimensions leaves out a dimension people experience every day, but at the same time it lets artists represent things more abstract and abstractly. Emotions can be connected to colors, so a

⁸ Bernini, Gian Lorenzo. *Damned Soul*. 1619. Marble sculpture. Palazzo di Spagna, Rome.

⁹ "Bernini." *Simon Schama's Power of Art*. Dir. Clare Beavan. BBC, 27 Oct. 2006. DVD.

painting with a lot of reds and blacks may convey anger or hate without even producing a solid picture of anything. Also, since paintings are two dimensional, any image of a three dimensional object would require artificial shadows to seem realistic. But reality is not always the answer, especially in painting. Many styles of painting such as Impressionism, Fauvism, and Cubism break away from the real world to convey ideas abstractly. Robert Delaunay for example used the abstract Orphism style in *Champs de Mars. La Tour Rouge* (Figure 4) to depict Paris.¹⁰ In these cases, the painter must use colors, shapes, and layout to their advantage in guiding the audience's mind.



Figure 4: *Champs de Mars. La Tour Rouge* by Robert Delaunay

The physical limits of painting arise from the type of paint used and the painting method. Various brushes most often pick up paints and rub them onto a surface, but that is not always the case. Sponges can be used to give an image texture and shape, or paint can be dropped onto a canvas from a high point. Watercolors are interesting in that they inherently can be added to paper in a variety of ways. An artist could wipe the paint right where he pleases, or add water to the paper first and put paint into it, creating intricate, natural shapes. The nature of these mediums offers many possibilities.

2.2 Rules of Literature

Literature is the written art medium. These basic rules limit an artist's expression by forcing him to inscribe words on something for others to then read and interpret. This is not far off from direct expression which usually comes from dialogue. Literature utilizes the same language as speech but through standardized representation. The words on a paper have no sound, they cannot be heard, but when a written word is seen, people hear that word in their heads. Be it a novel or a poem, written words help convey thoughts from one person to another.

¹⁰ Delaunay, Robert. *Champs de Mars. La Tour Rouge*. 1911-1923. Oil on canvas. The Art Institute of Chicago.

Novels are, “an invented prose narrative of considerable length and a certain complexity that deals imaginatively with human experience, usually through a connected sequence of events involving a group of persons in a specific setting.”¹¹ Further restrictions on novel writing come from genre choices. Fantasy requires magic and fantastic scenarios impossible in our world. Mystery novels make readers wonder as the truth of certain events are slowly revealed through clues and hints. Historic fiction takes real people and places from the past and allows the author to manipulate events and add new characters. Each genre choice limits what the artist may write, narrowing their scope of possibility. Beyond subject limitations, an author can also pick a point of view to write in, be it first-person, third-person, or even second person which is chosen rarely. These voices can even be omniscient, clueing the reader in on more information.

Some novels have few rules guiding them, like *The Life and Opinions of Tristram Shandy*.¹² This title would often break away from what the audience expected and frequently spoke directly to the reader. Other novels add rules to the book, creating interesting patterns and themes. Mark Danielewski’s *House of Leaves* has a plethora of auxiliary rules.¹³ One of the most notable features is that every time the word ‘house’ appears in *House of Leaves*, it is printed in blue ink. Similarly, ‘minotaur’ is always printed in red. The story in *House of Leaves* is rather complex and has several different narrators or writers, including editors. To denote what text is written by each person, a different font is used. The density of the text also matches the pace of the story. Sections where the story moves slower have larger blocks of text, while the fast pace parts of the novel spread the words out and arrange them on the page differently. At first glance, *House of Leaves* appears to be a mess, but every aspect has a purpose and a rule (Figure 5).



Figure 5: A page from Mark Danielewski’s *House of Leaves*

¹¹ Burgess, Anthony. “Novel (literature).” *Encyclopædia Britannica*. 25 May 2010. Web. <http://www.britannica.com/EBchecked/topic/421071/novel>.

¹² Sterne, Laurence. *The Life and Opinions of Tristram Shandy, Gentleman*. Kingdom of Great Britain: Ann Ward, 1760. PDF.

¹³ Danielewski, Mark. *House of Leaves*. New York: Pantheon Books, 2000. Print.

2.3 Rules of Poetry

Poetry is literature with emphasis on sound and rhythm.¹⁴ There are so many rules to choose from when writing poetry that the creative choice of picking limitations can seem endless. A common choice is to write rhyming poetry. Rhymes limit what words can be used after one another and it even disallows the use of specific words in a certain way. No line intended to rhyme can normally end with words like orange, purple, angel, or month. Also, the restriction to rhyme requires use of certain words which may carry meanings that do not fit the subject matter of the poem. Some artists relied instead on the sounds of their poetry instead of real words to describe ideas. These sound poems, like Kurt Schwitters' *Ursonate*,¹⁵ did not need established words to express their meanings.

The other common poetry limitation is meter. By restricting the meter, poems fall into certain rhythmic patterns. Meter is made from the feet in a line of poetry. A foot is usually two syllables but can occasionally be one or three. The first part of meter is line length. Pentameter for example is five feet, or ten syllables. That means an artist must write a line of poetry with only ten syllables. This limits what words can be used based on their length. In order to fit enough information into this tiny, limited space, smaller words need to be manipulated creatively. This is especially true when the beat of a meter is introduced. This second part deals with stressed and unstressed syllables in a foot. An iambic foot, called an iamb, is an unstressed syllable followed by a stressed one. Words like "away" and "restrict" are iambic since their first syllable is unstressed followed by a stressed one. There are many other beat patterns including the opposite, stressed followed by unstressed, which is called a trochaic foot. By choosing one beat to use over and over or a specific pattern of beats, the poem is further limited in the words available. With these two factors working together as metrical rules along with rhyming rules, writing a poem becomes increasingly challenging. Yet there are even more rules which can be added.¹⁶

¹⁴ Nemerov, Howard. "Poetry (literature)." *Encyclopædia Britannica*. 12 Jan. 2014. Web. <<http://www.britannica.com/EBchecked/topic/466108/poetry>>.

¹⁵ Schwitters, Kurt. *Ursonate*. 1922-32. <<http://www.ubu.com/sound/schwitters.html>>.

¹⁶ Axelrod, David B. "Formal Poetry and the Sonnet." *Poetry Doctor*. 2011. Web. 19 Apr. 2014. <<http://www.poetrydoctor.org/sonnet-lesson/>>.

Specific types of poems have even more restrictions, like the sonnet for example. This type of poem only allows fourteen lines written in iambic pentameter. Already, the rules seem harsh and difficult to work with. However, a sonnet must also rhyme using a certain pattern, be it Shakespearean, Petrarchan, or Spenserian. Shakespearean sonnets have *abab cdcd efef gg* rhyme schemes, like Shakespeare's twenty-seventh sonnet (Figure 6).¹⁷

<p>Weary with toil, I haste me to my bed, The dear repose for limbs with travel tired; But then begins a journey in my head To work my mind, when body's work's expired: For then my thoughts--from far where I abide-- Intend a zealous pilgrimage to thee, And keep my drooping eyelids open wide, Looking on darkness which the blind do see: Save that my soul's imaginary sight Presents thy shadow to my sightless view, Which, like a jewel hung in ghastly night, Makes black night beauteous, and her old face new. Lo! thus, by day my limbs, by night my mind, For thee, and for myself, no quiet find.</p>

Figure 6: *Sonnet XXVII* by Shakespeare

Petrarchan sonnets all start rhyming *abbaabba* and end with some sestet, like *cdecde*, *cdccdc*, or *cdcdcd*. William Wordsworth uses a *cddece* sestet to end his Petrarchan sonnet, "London, 1802."¹⁸ Spenserian sonnets use the *ababbcbccdcdee* rhyme scheme, like in Edmund Spenser's "One day I wrote her name upon the strand."¹⁹ But there are more rules to be followed about content. Sonnets are supposed to have a twist at the end to make things more interesting. In Shakespearean and Spenserian sonnets the twist comes before the last two lines while Petrarchan sonnets have the twist six lines before the end.²⁰ Even with all these rules in play, sonnets are still a popular form of written art. A student of Aaron Kramer's once asked why anyone would want to write a sonnet and his response illustrated the results of restriction:

[Kramer] pulled a chair into the center of the room. "First," he said, pressing his wrists together, "you are handcuffed by having to write fourteen lines. Then," he said, sitting down to press his ankles together, "you are shackled by having to write with a set meter." Leaning forward to crouch into a ball, he declared, "They put you into a sack called rhyme." Rising suddenly from the chair to spread his arms, he declared, "But think what a magic act it is if you can set you meaning free!"²¹

¹⁷ Shakespeare, William. "Sonnet XXVII." Web. < <http://www.shakespeares-sonnets.com/sonnet/27>>.

¹⁸ Wordsworth, William. "London, 1802." Web. < <http://www.poetryfoundation.org/poem/174797>>.

¹⁹ Spenser, Edmund. "One day I wrote her name upon the strand." Web. < <http://www.sonnets.org/spenser.htm#075>>.

²⁰ Axelrod, David B. "Formal Poetry and the Sonnet." *Poetry Doctor*. 2011. Web. 19 Apr. 2014. < <http://www.poetrydoctor.org/sonnet-lesson/>>.

²¹ Axelrod, David B. "Formal Poetry and the Sonnet." *Poetry Doctor*. 2011. Web. 19 Apr. 2014. < <http://www.poetrydoctor.org/sonnet-lesson/>>.

2.4 Rules of Theater

Theater uses live performance to actively create a coherent sense of drama.²² Like any other art form, theater has rules of its own. Similarly to some literature, theater tells stories to deliver ideas and emotions to the audience. However, theater also maintains the benefits of visual arts and even utilizes sound for dialogue, effects, and music, expressing many ideas in a multitude of forms. Plays must do what is possible though since they force concepts to be acted out on a stage while people watch, unlike paintings which can depict impossible feats. Musicals take this a step further, adding the rule that the story must be at least partially told through song. There are even pieces called sung-through musicals which expand upon the rule, keeping no spoken dialogue but singing every line. This can limit the players in the production since they not only have to look and play their part but sing it as well. One great limitation of theater is its unresolved nature. Actors perform in a theater production and that performance conveys the artistic intent. Since theater requires live performance, the demonstration of the piece to the audience is inherently variable. Mistakes cannot be corrected or undone and perfect quality becomes increasingly difficult. The audience views the art as it is created. This introduces another restriction, this one of timing. The performers can only create their piece when they all have the time and viewers may only see it if they share that free time. Paintings and sculptures can stay in a museum and be admired whenever one sees fit, but a theater production requires timely attendance. This limitation may even restrict the audience for the art since some may not have the right times available.

The rules of drama were outlined by Aristotle's *Poetics* back in 335 BCE.²³ In this work, he extensively discussed what elements composed Tragedy. He stated that Tragedy was an imitation of something serious and complete to some magnitude. The language of Tragedy was artistically embellished with rhythm and melody, some parts in song and others with spoken verse. Tragedy also required representation through action instead of narration and the use of pity and fear as catharsis for those emotions. Aristotle continued, naming six specific parts which embodied every Tragedy. Firstly, since the medium required persons to imitate action, 'spectacle' was needed to visually represent that imitation. To fulfill that imitation, Tragedy also

²² Guthrie, Sir Tyrone. "Theatre." *Encyclopædia Britannica*. 13 Feb. 2013. Web. < <http://www.britannica.com/EBchecked/topic/590186/theatre>>.

²³ Aristotle. *Poetics*. 335 BCE. < http://www.gutenberg.org/files/1974/1974-h/1974-h.htm#link2H_4_0008>.

needed ‘diction,’ or the metrical arrangement of words, and ‘song,’ which Aristotle claimed was a term everyone understood. Next, Aristotle described ‘plot’ as the arrangement of the imitated events, ‘character’ as an agent within the imitation, and ‘thought’ to explain characters and scenes. “In fact, every play contains Spectacular elements as well as Character, Plot, Diction, Song, and Thought.”²⁴ Aristotle also listed their order of importance, starting with ‘plot,’ followed by ‘character,’ ‘thought,’ ‘diction,’ and ‘song,’ with ‘spectacle’ at the end. These thousand year old guidelines are still used today, though not every drama necessarily follows Aristotle’s definition.

2.5 Rules of Film

Film is recorded images projected onto a screen in rapid succession, often depicting a drama.²⁵ For the performers, recording means they may attempt their performance several times and only the best take will be used in the final product. Recorded performance also allows for greater accessibility since the audience may view the performance at any time convenient for them. How the art is observed also changes. During a play, the audience members sit in a seat and watch everything from that spot. Occasionally actors will appear in the audience, immersing the audience in the movement. Film also performs this feat in its own way. Camera angles bring the viewer into the actual scene, looking at the story from within the scene and at several angles. The importance of camera angles became evident after the release of *Citizen Kane* in 1941 which was filmed so drastically differently from typical cinema.²⁶ Film can be edited after the performance is finished which opens an entire realm of possibility. This can correct errors, remove sections, and even add unreal elements. During the 1920s, Sergei Eisenstein and Dziga Vertov demonstrated the potential of ‘montage theory’ which, by juxtaposing two images, would create something greater than the sum of its parts.²⁷ Many modern films use green screens and special effects to include things that do not exist in reality. However, many artists in the film industry have argued against overly processed products.

²⁴ Aristotle. *Poetics*. 335 BCE. < http://www.gutenberg.org/files/1974/1974-h/1974-h.htm#link2H_4_0008>.

²⁵ Murphy, Arthur D. “Motion Picture.” *Encyclopædia Britannica*. 7 Nov. 2013. Web. < <http://www.britannica.com/EBchecked/topic/394107/motion-picture>>.

²⁶ *Citizen Kane*. Dir. Orson Welles. Warner Bros., 1941. DVD.

²⁷ “Eisenstein & montage.” *Montage theory: Eisenstein, Vertov, & Hitchcock*. Web. < <http://faculty.cua.edu/johnsong/hitchcock/pages/montage/montage-1.html>>.

The film industry has had movements attempting to peel away the layers of unnecessary production. In 1995, Lars von Trier and Thomas Vinterberg wrote the Dogma 95 Manifesto as “a rescue action” for cinema.²⁸ “Few events in the history of cinema have polarized film professionals to the same degree that Dogma has.”²⁹ Von Trier and Vinterberg scorned modern films for focusing on cosmetic appearance instead of true substance. Films relied too heavily on technology and special effects and they sought change. To combat the trend of spending large sums of money to render amazing visuals and soundscapes unnatural to the scene, von Trier and Vinterberg composed “The Vow of Chastity.” This vow set ten rules of filming to ensure pure, unadulterated cinema art. They removed the distractions of unrealistic settings, fantasy action, special effects, et cetera.

THE VOW OF CHASTITY:

I swear to submit to the following set of rules drawn up and confirmed by

DOGMA 95:

1. Shooting must be done on location. Props and sets must not be brought in (if a particular prop is necessary for the story, a location must be chosen where this prop is to be found).
2. The sound must never be produced apart from the images or vice versa. (Music must not be used unless it occurs where the scene is being shot.)
3. The camera must be hand-held. Any movement or immobility attainable in the hand is permitted.
4. The film must be in color. Special lighting is not acceptable. (If there is too little light for exposure the scene must be cut or a single lamp be attached to the camera.)
5. Optical work and filters are forbidden.
6. The film must not contain superficial action. (Murders, weapons, etc. must not occur.)
7. Temporal and geographical alienation are forbidden. (That is to say that the film takes place here and now.)
8. Genre movies are not acceptable.
9. The film format must be Academy 35 mm.
10. The director must not be credited.

²⁸ Raskin, Richard. *p.o.v.: A Danish Journal of Film Studies*. “Aspects of Dogma.” 2000: 6. PDF.

²⁹ Raskin, Richard. *p.o.v.: A Danish Journal of Film Studies*. “Aspects of Dogma.” 2000: 5. PDF.

Furthermore I swear as a director to refrain from personal taste! I am no longer an artist. I swear to refrain from creating a "work", as I regard the instant as more important than the whole. My supreme goal is to force the truth out of my characters and settings. I swear to do so by all the means available and at the cost of any good taste and any aesthetic considerations.

Thus I make my VOW OF CHASTITY.

Copenhagen, Monday 13 March 1995

On behalf of DOGMA 95

Lars von Trier

Thomas Vinterberg³⁰

Von Trier also performed an interesting experiment with his mentor Jørgen Leth in which he challenged Leth to recreate his 1967 short film, *The Perfect Human* five times, each time with a new set of rules. They filmed this amazing experiment and released it as *The Five Obstructions* in 2003.³¹ Each obstruction forced Leth to think outside the box and recreate something in a way he may not have ever imagined. The most interesting results arise from the third and fourth obstructions. The third set of limitations assigned by von Trier are a punishment for failing the previous task and Leth must choose to either retry the previous obstruction or recreate *The Perfect Human* without any restrictions. Leth ends up choosing not to retry and makes the film without limitations. This, Leth admits, posed the greatest challenge of all. Without focus, the project became lost in possibility. The fourth obstruction equally upset Leth as von Trier tasked him to create the film in the pair's least favorite style: a cartoon. Despite their distaste for animation, Leth found a way to tastefully recreate his film while following von Trier's rules. Both were impressed by the success, showing how limiting Leth's freedom could result in surprisingly fresh creativity.

2.6 Rules of Music

Music is vocal and/or instrumental sounds used for beauty and/or expression, usually in accordance to cultural rhythms and melodies.³² Music supports theater, film, and other arts as an

³⁰ Raskin, Richard. *p.o.v.: A Danish Journal of Film Studies*. "Aspects of Dogma." 2000: 7. PDF.

³¹ *The Five Obstructions*. Dir. Lars von Trier and Jørgen Leth. Koch Lorber Films, 2004. DVD.

³² Epperson, Gordon. "Music." *Encyclopædia Britannica*. 19 Feb. 2014. Web. <
<http://www.britannica.com/EBchecked/topic/398918/music>>.

element of the whole, but music can be a standalone art form. Limited to only sound, music is a very restricted medium, yet new music is made constantly. There are many genres of music, further limiting the sounds of each. Sonatas are one example of common yet complex musical structures.

Sonatas are Classical and Romantic music ranging in length from two to ten minutes long. There are three sections of a sonata, the first being the Exposition. This section starts in the main key and transitions into a dominant key, ending with a codetta. Next is the Development which develops the themes introduced in the Exposition. The sonata ends with the Recapitulation section which harkens back to the Exposition, also using two sections but both in the main key.³³

The fugue is another type of musical composition with its own set of rules. This structure also begins with an Exposition, introducing the subject of the piece. This main idea usually enters as a single voice before being answered in the dominant key, accompanied by another voice. A counterpoint, called the countersubject, appropriately accompanies the subject throughout the composition. There is also a pedal-point tone held underneath the harmonies in the piece. The fugue also has an episode which acts as a transition between restatements and can either be similar to or different than the subject and countersubject. The subject can also vary in composition through stretto which overlaps subject voices, augmentation to lengthen the subject, diminution which shortens it, and inversion which reverses the intervals in the subject. Since the subject of a fugue can be transformed within the composition, the imitations of the initial voice change and vary from the main subject.³⁴

2.7 Rules of Architecture

Architecture is the art and technique of designing buildings for both practical and expressive purposes.³⁵ An architect must consider the physical limits of his materials in the reality of the world just as a sculptor does. Even more so, an architect's final pieces must be

³³ Alvira, J. Rodríguez. "Musical Forms: Sonata Form." *Teoría: Music Theory Web*. 13 Nov. 2005. Web. <<http://www.teoria.com/tutorials/forms/sonata01.php>>.

³⁴ Estrella, Espie. "The Fugue." *About.com Music Education*. Web. <music.ed.about.com/od/historyofmusic/a/fugues.htm>.

³⁵ Scruton, Roger. "Architecture." *Encyclopædia Britannica*. 11 Oct. 2013. Web. <<http://www.britannica.com/EBchecked/topic/32876/architecture>>.

functional by other people. Sculptures can be fragile and delicate, but architecture needs to support itself, what it contains, and the weight of people while surviving against the weather. Since architecture has a function in the real world, many architectural jobs come with specific goals in mind. Besides the natural limits of designing a building, a theater hall and a hotel will be designed incredibly

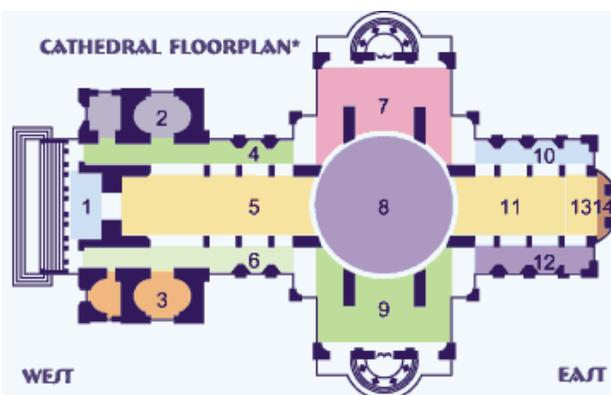


Figure 7: A cathedral floor plan (5-nave, 7&9-transepts, 8-dome, 13-14-altar)

differently. Typically, certain shapes reference various cultures and ideals. Domed ceilings, for example, often signify worldly or even heavenly knowledge and often top scholarly structures. Ornate, floral designs show decadence and wealth, flaunting the status of those owning and using the building.

During the Middle Ages, the Catholic Church used cathedrals to show their dominance.³⁶ The design of cathedrals has many rules and is relatively consistent. They use the cross within the floor plan, having the nave, where the people sit, in the long section of the cross. The main doors into the cathedral are here, at the bottom of the cross, at the end of the nave. Wings, called transepts, stretch to the sides of the cross shape. The clergy resides in the top of the cross where the altar stands. The part of the cathedral representing the top of the cross also faces to the east so that the rising sun will shine through the windows behind the clergy, towards those in the nave. A dome also rests above the center of the cross shaped building (Figure 7).³⁷ Performing architectural feats such as this can be structurally challenging, but those are the restrictions architects place upon their work.

Architects hold great responsibility in that their structures must not only please people visually but offer sturdiness and safety to those inside. Therefore, the core decisions of an architect must concern, “maintaining system integrity – a single, unified overall design, form, or structure; and crosscutting concerns or system properties.”³⁸ To focus on these pivotal areas of work, architects restrict themselves and delegate less important tasks down the chain. The designers and implementers below the architect manage smaller, individual tasks so that the core

³⁶ “The Cathedrals of Britain.” *BBC*. Web. <http://www.bbc.co.uk/history/british/architecture_cathedral_01.shtml>.

³⁷ “The Cathedrals of Britain.” *BBC*. Web. <http://www.bbc.co.uk/history/british/architecture_cathedral_01.shtml>.

³⁸ Malan, Ruth and Dana Bredemeyer. “Less is More with Minimalist Architecture.” *IT Pro*. October 2002: 48. PDF.

of the structure can be assured. By removing himself from excessive detail work and micromanagement, the architect thrives with his own goals. Trying to encompass too many ideas or being absurdly ambitious dilutes every architectural decision set forth. “It is better to err on the conservative side, implementing less, yet taking a few bold steps where they will make a clear difference.”³⁹ Architectural decisions should all be rationalized since building design is a practical art. Controlled ambition is essential to beautiful and safe architecture.

2.8 Rules of Games

The media of games has been defined in a large variety of ways, a concrete definition seeming to be quite elusive. It has even been said that, “Perhaps, as game historian David Parlett warns...any attempt to define the word ‘game’ is a foolish endeavor.”⁴⁰ One obstacle in defining games is that many languages use the same term for play, leaving games without a distinct meaning. Even more so, games can be considered as both types of play and something containing play. Either way, play is an important element of what makes a game. Many other ideas suggest games are active, voluntary, regulated, wasteful, and imaginative. Bernard Suits offers a very succinct definition that, “playing a game is the voluntary effort to overcome unnecessary obstacles.”⁴¹ Chris Crawford suggested that games were made of representation, interaction, conflict, and safety. Greg Costikyan offers a much more artistically centered idea of games, defining them as, “a form of art in which participants, termed players, make decisions in order to manage resources through game tokens in the pursuit of a goal.”⁴² The main points of Costikyan’s definition are the art, decision-making, resource management, tokens, and goal of a game. Taking many different definitions into account, the authors of *Rules of Play*, Salen and Zimmerman, defined a game as, “a system in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome.”⁴³

³⁹ Malan, Ruth and Dana Bredemeyer. “Less is More with Minimalist Architecture.” *IT Pro*. October 2002: 46. PDF.

⁴⁰ Salen, Katie and Eric Zimmerman. *Rules of Play: Game Design Fundamentals*. Massachusetts Institute of Technology, 2004: 72. Print.

⁴¹ Salen, Katie and Eric Zimmerman. *Rules of Play: Game Design Fundamentals*. Massachusetts Institute of Technology, 2004: 75. Print.

⁴² Salen, Katie and Eric Zimmerman. *Rules of Play: Game Design Fundamentals*. Massachusetts Institute of Technology, 2004: 78. Print.

⁴³ Salen, Katie and Eric Zimmerman. *Rules of Play: Game Design Fundamentals*. Massachusetts Institute of Technology, 2004: 80. Print.

Games can harbor many different arts within them too. Many of the modern 3D video games tend to mimic reality and aim for a sense of realism within virtual worlds. This leads game designers to incorporate architecture as part of their design. But more than just buildings, game designers create natural environments. Designing nature adds more restrictions to the architecture since the design must not seem artificial. Environments and characters are also painted to look a certain way. Most video games also feature sound design. This includes music, ambient sound, and sound effects. The music must match the feel of the game, the themes, and the situations the player enters. Ambient sounds help develop the environment and sound effects cue the player. Each sound has a purpose and a context, both of which restrict how the sound is designed. These restrictions are much like those on sound in film, but none of them come directly from the scene. Sounds in games are recorded and/or mixed before being placed in the context, unlike film which can record environmental sounds on location. Also like film, many games have cinematics and cutscenes which are filmed virtually. Even board games require artistic design and often sculpting. Besides the different arts which compile a game, the game is art too.

Games explored limitations with titles such as *Gone Home* which looked at video games as an interactive tool for storytelling.⁴⁴ *Gone Home* fully invested itself to telling a story while requiring the audience to participate in order to progress the plot. Most games employ a goal to motivate the players, but *Gone Home* simply used story. Games like this blur the lines between film and game by looking at the purpose of a video game from a different angle. Even theater has appeared in the world of gaming. In 2003, Joseph DeLappe reenacted an episode of the popular sitcom *Friends* live over *Quake III Arena*.⁴⁵

Game designers further explored the limits of games in the ten year experiment at the Game Developer's Conference called the Game Design Challenge.⁴⁶ Led by Eric Zimmerman, game designers accepted challenges to design interesting games according to a yearly theme. Much like the obstructions Lars von Trier imposed on Jørgen Leth, Zimmerman constrained the game industry by forcing them to design games dissimilar from what already existed. These restrictions led to imaginative ideas pioneering the way for future games like *Gone Home*. The

⁴⁴ *Gone Home*. The Fullbright Company. 15 Aug. 2013. Video game.

⁴⁵ Mirapaul, Matthew. "Take That, Monica! Kapow, Chandler!" *The New York Times*. 3 Mar. 2003. Web.

⁴⁶ Zimmerman, Eric. "Humanity's Last Game: The Game Design Challenge Final Championship." Moscone Convention Center, San Francisco, California. March 2013. Conference session. <
<http://gdcvault.com/play/1017715/Humanity-s-Last-Game-The>>.

Game Design Challenge successfully explored what games could convey to an audience and the surprisingly wide array of possibilities left unexplored in this relatively new medium.

3 Practice

3.1 Perlenspiel

I took a class taught by Professor Brian Moriarty entitled Digital Game Design. The course aimed to communicate what was truly vital to a game. In this class we learned what it meant to design games instead of simply creating assets or typing code. Professor Moriarty started by introducing his definition of a game, “A game is a toy with rules and a goal,”⁴⁷ which surprised us due to its simplicity. He then revealed his just as simple game engine, Perlenspiel, which he appropriately refers to as a *gameclavier*,⁴⁸ “a software instrument for studying and composing digital games.”⁴⁹ The true beauty of Perlenspiel is the restrictions it places on the designer. Perlenspiel is simply a grid with cells called beads and a status line, all running on JavaScript, nothing more. But somehow Perlenspiel was meant for designing games. The visual art added to Perlenspiel games can be nothing but a few size, color, and symbol/glyph choices. The code behind Perlenspiel is remarkably straightforward too, allowing even artists with little to no coding experience the opportunity to gain the technical prowess for this engine very quickly. Suddenly the class was not separated into art students or tech students, only design students. Anyone could sit down and type up simple game ideas. Perlenspiel felt like a canvas that came with paints and brushes or a piano with scale sheets; potential game designers could sit and experiment without needing years of practice. Perlenspiel could be a *gameclavier* because of its limited nature. The true art of a game lies in the creative design of the play. The class focused on designing games without the usual distractions of 3D models and auxiliary programs.

Professor Moriarty informed us that everyone would be making seven original projects from scratch. Considering the games made in other classes, Moriarty’s claim seemed unrealistic even for professional game designers. He assigned each student to build a toy with Perlenspiel before the next class. When we returned successfully with our new toys for the next class we understood how Perlenspiel would allow us to build fresh designs so quickly and easily. Professor Moriarty then instructed us to form pairs to complete all of the future assignments

⁴⁷ Moriarty, Brian. “Lehr und Kunst mit Perlenspiel.” Game Developer’s Conference, San Francisco, California. 5 Mar. 2012. Keynote lecture. <<http://www.ludix.com/moriarty/lehr.html>>.

⁴⁸ Ibid.

⁴⁹ Moriarty, Brian. “Welcome to Perlenspiel.” *Perlenspiel*³. Web. <<http://users.wpi.edu/~bmoriarty/ps/index.html>>.

together. I teamed up with Ryan Melville who I had worked with in another class. He was a tech student and I was an art student, but while working in Perlenspiel both of us designed, coded, and made art.

3.2 Extra Limitations

We made games successfully and Professor Moriarty pointed out that we designed true ‘bead games’ as he hoped (Figure 8). For Professor Moriarty to qualify something as a ‘bead game,’ every square had to have a distinct function and no beads could be simply picture elements. Perlenspiel existed to focus on game design, not visual design. Perlenspiel games with complex sprites and backgrounds defeat the underlying purpose of the engine. Professor Moriarty assigned the students to design their last game for the class. We were to create an original, abstract bead game that did not borrow from classic designs since many projects ended up be simple reproductions of common games. There were a few general requirements such as the game must be for a single player, there must be a title, it must have sound and/or music, it must run smoothly, there cannot be spoken/sung words. These requirements were typical and unchallenging, mostly preventing students from finding loopholes in the assignment. The real challenge appeared when Professor Moriarty introduced the design restrictions. Of the five limitations, each pair of students had to choose at least three which their game design had to follow:

1. The grid cannot exceed 16 beads in either dimension at any time.
2. No glyphs are allowed in any beads.
3. Only white, black or shades of gray can be used in the grid, background or status line.
4. The game can use either the mouse or the keyboard for all user input, *but not both*. If the mouse is used, the mouse wheel cannot be used. If the keyboard is used, only the space bar and WASD/arrow keys can be used, and the WASD keys must work the same as the arrow keys.

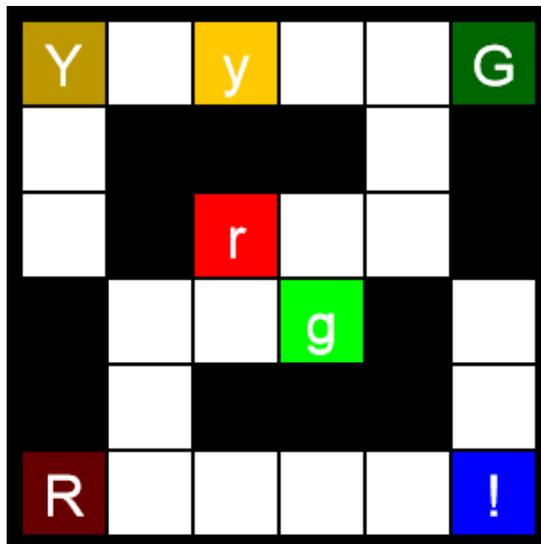


Figure 8: Boxed-In Puzzle by Melville and Petersen, a Perlenspiel ‘bead game’

5. No intelligible words, initials, labels or numbers in any language can appear anywhere, except for the game's title in the status line.⁵⁰

Melville and I felt confident in designing a bead game, but choosing which three restrictions to follow posed a real challenge. To make the best possible choice, we considered what core elements actually fashioned a game and turned back to the game definition Moriarty told the class in the beginning. By that definition, a game only needed to be a toy with a goal. None of Professor Moriarty's extra constraints ruled out the creation of either and we realized that an enjoyable game could be made under all of the restrictions. We excitedly decided to design a game which followed all five limitations.

3.3 Whither

Without worrying over status text, glyphs, colors, keys, or grid size, we started by designing the game mechanics. In our previous Perlenspiel games, how the game was played was the fun part and the rest just made the game look pretty. Since our resources were so limited, we explored the potential of what we had much more deeply. Every bead in Perlenspiel sat inside a border, but most games removed them for a clean background. We then realized that if we dynamically changed the borders of the game pieces that they would appear to shrink. This single idea, inspired by great limitations, built the foundation for our final project.

By making every bead gray with no borders and the player-controlled bead black with gray borders, the player's piece could appear to change size. The arrow keys moved the character and each step would make the border larger. This made it seem like the player was withering away as he moved (Figure 9). We decided to create a maze game where the player was restricted to a set number of steps to solve each puzzle. As a goal we made a gray bead with a black border. This left an empty black square which we hoped would make the player think your black square should go there. We also needed obstacles, walls to limit where the character could move. Solid white squares became the walls and would form the shape

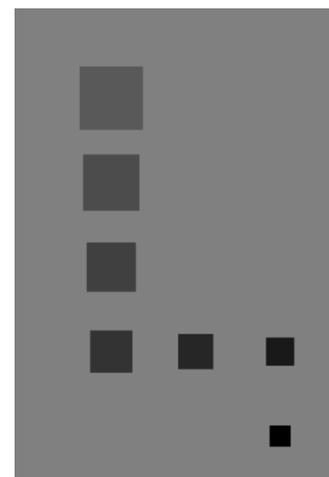


Figure 9: The withering mechanic with fade effect and gray background

⁵⁰ Moriarty, Brian. "Assignment 11." *IMGD 2900: Digital Game Design*. 29 Nov. 2012. Web. <http://users.wpi.edu/~bmoriarty/imgd2900_12/a11.html>.

of the maze. With just these elements, the mazes were very straightforward since our game had a tight size limitation. With more space we could have simply made larger and larger mazes, but in retrospect those levels would have only been longer and less fun over time. To combat the single path issue of our mazes, we added in a food piece which would grow the player, giving him more steps to reach his goal. With these we led players along and gave them sub-goals to reach. To denote food, we made small black squares since they would add some substance to the player. These four simple components, withering, food, walls, and goals, led to the structure of our prototype (Figure 10).

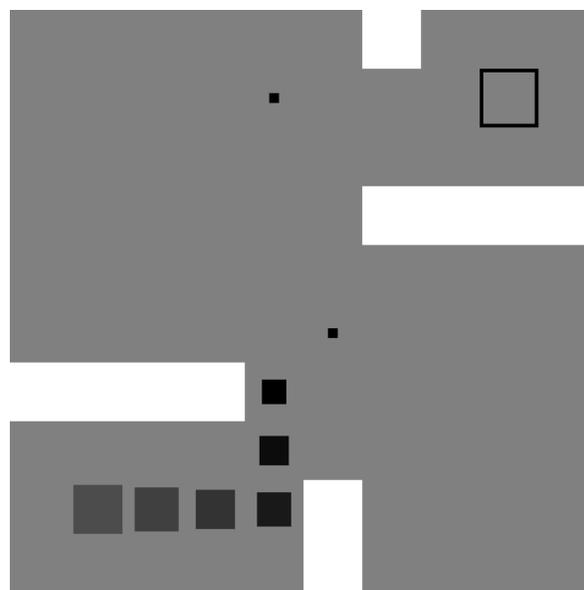


Figure 10: Level depicting withering, food, walls, and goal

Since we could not use any text, the game had to be intuitive so the players could learn without any instructions. We wanted to demonstrate every mechanic by having the player experience them. The first level had just the player and the goal and we prayed that would be clear enough. However, since we could not even instruct the player on what keys to press, we formed a new introduction. The new first level simply opened to a gray screen with the black square. We knew that the player might be initially confused but we felt confident that they would experiment and press a directional key. Doing so would make the square move and get a little smaller. Then the player had to lose, he had to move until his black square faded to nothing to reach the next level. After that, the player would understand the limits of his piece and not take his movement lightly. Soon after, the food piece appears on a level where the player cannot reach the goal by simply walking there. The player's only choice was to take the risk and step onto the small black square. Then they would realize the importance of food in reaching the goals. Later, the walls would appear in a level, directly between the player and the goal. The player would either walk into them and realize they are walls, or avoid them to start with. Either way, the player would have to go around them to reach the goal. The other levels would just be varying complexities of piece layout. For an ending, we made a level with just a goal that the player could not reach followed by a black screen. To make the game pretty without color, we added a

fade effect on the player, emphasizing the withering idea. Originally, the game had no sounds, but Professor Moriarty required each project to use some kind of audio. We picked out dark feeling music which would fit the scene well without cluttering the overall design. Since our game was mysterious and dark, we called it *Whither* (Figure 11). With an ‘h’ in the word it meant ‘where’ and gave a sense of being lost while still looking and sounding like ‘wither,’ which described the main mechanic.



Figure 11: *Whither* title card

3.4 Reception

Melville and I felt proud of our dark, minimalist game which adhered to every restriction Professor Moriarty listed. Each pair of students in the class submitted their projects online and as a presentation, Professor Moriarty opened each one and played it, leaving discussion open to the class. As expected, when Moriarty opened our game he was confused at first. Many other games used the status text or glyphs to describe how to play the game. He then started pressing keys until he saw the black square move. It surprised us how intrigued our professor got from a shrinking square, but he became very curious. But when the square disappeared and the screen went black for a second, Professor Moriarty became equally upset. Our game already invested his interest before the goal was introduced. When the next level faded in, he showed relief and continued playing. Our careful level layout and order coupled with the bead designs made learning the game exceptionally simple.

Overall, the other students liked our game too. The grayscale matched the music to give the game an emotional layer beyond the gameplay. Some people wished the first level did not have to be lost, but Melville and I believed it was an important lesson in the game. We soon found that the puzzles were not difficult enough and perfect paths were easily determined. The ending also seemed lackluster but a better one eluded us. Even so, Professor Moriarty liked our game the most since he felt it exemplified the ideals of Perlenspiel. The engine focused on game design first and so did our game. Professor Moriarty posted *Whither* on the Perlenspiel website

under the examples of Perlenspiel games. Also, Moriarty used our game as a major part of the class's final exam.

4 Results

The first version of *Whither* still needed to be finished and I continued work on the game without Melville. Since my research supported the idea that limitations could encourage creative expression in other arts, *Whither* retained its simplistic nature. My project no longer needed to follow Professor Moriarty's rules, but those rules led to *Whither* to begin with. To stay true to *Whither*'s ideals, all of the original limitations remained in place. Though the game needed expansion, adding different mechanics felt wrong. Instead, the new mechanics came from the old ones. The levels gained complexity by including multiple mechanics. To give the mechanics complexity, I mixed their different elements together. The withering effect mixed with the walls, food, and goal to create three new mechanics (Figure 12). These mechanics ran by fading each object into the gray background slightly with every step of the player. Once the wall, food, or goal color matched the background it would disappear and become unusable.

I introduced these mechanics with the same method as the previous ones. Since the more complicated mechanics built themselves upon other, smaller ideas, the development felt smooth and natural. That worked with introductory levels for each new idea to create simple gameplay progression that flowed from one part to the next.

This flow made learning the game easy and accessible to even non-gamers. Thankfully, the resultant puzzles offered real challenges too. Since important elements would fade away, the optimal path concealment improved radically. The game evolved into a longer, more challenging, and more fulfilling experience.

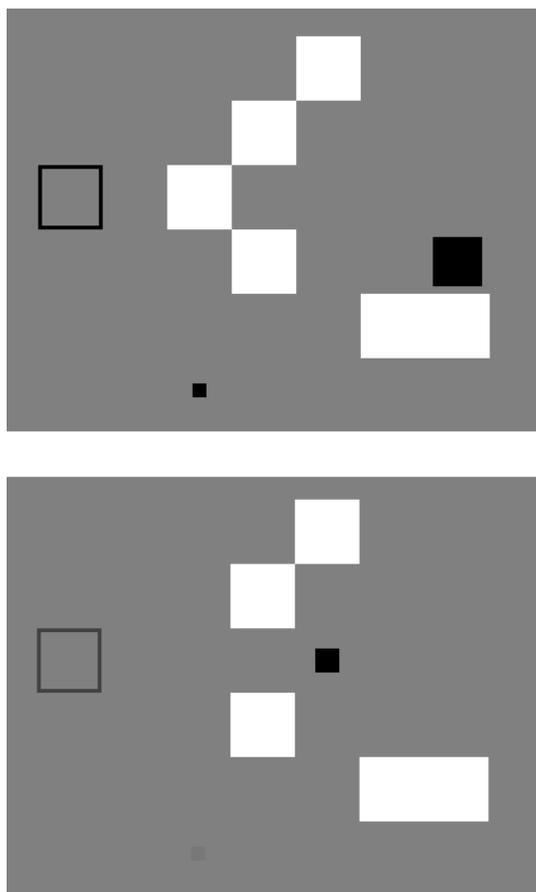


Figure 12: A level before (top) and after (bottom) some movement depicting withering wall, food, and goal mechanics

Besides expanding the possibilities of level design and gameplay, the new mechanics emphasized the underlying theme that things wither away. Not only would the player wither, but so would his obstacles, his sustenance, and his objectives. The central idea became less specific and more generalized, opening it up to further interpretation and connection with the player. Some paths led players to demise with false hope and distractions while others required thoughtful planning with some trial and error. These ideas would hopefully convey to the audience and offer meaningful impact.

5 Conclusion

Restricting art can lead to creative discoveries and new possibilities. Without limitations, artists can become lost, but people like Lars von Trier and Brian Moriarty understood that limitations offered guidance. By focusing on the core purpose of the product, an artist can develop refined pieces with original ideas. Those wishing to create films might look towards Dogma 95 in an attempt to bring out the real art of the medium. The process also allows for anyone to create a film without the need for expensive equipment. Artists also should not fear obstructions which seem to impede them as they may find creative ways to compromise with the hindrances they despise. Artistic hurdles even provide guidance when no inspiration can be found. Without some guide, a work may become cluttered and unfocused. Game designers especially benefit from observing the true purposes their medium may entail since the field is still young. Keeping a basic focus can prevent art from falling into destructive tropes and overused patterns. Even games as simple as *Whither* need constant attention to assure they will not deviate into something unintended. Maintaining strict confinements can reveal the secret possibilities within.

Bibliography

- Alvira, J. Rodríguez. “Musical Forms: Sonata Form.” *Teoría: Music Theory Web*. 13 Nov. 2005. Web. < <http://www.teoria.com/tutorials/forms/sonata01.php>>.
- Aristotle. *Poetics*. 335 BCE. < http://www.gutenberg.org/files/1974/1974-h/1974-h.htm#link2H_4_0008>.
- Axelrod, David B. “Formal Poetry and the Sonnet.” *Poetry Doctor*. 2011. Web. 19 Apr. 2014. < <http://www.poetrydoctor.org/sonnet-lesson/>>.
- Bernini, Gian Lorenzo. *Damned Soul*. 1619. Marble sculpture. Palazzo di Spagna, Rome.
- “Bernini.” *Simon Schama’s Power of Art*. Dir. Clare Beavan. BBC, 27 Oct. 2006. DVD.
- Burgess, Anthony. “Novel (literature).” *Encyclopædia Britannica*. 25 May 2010. Web. < <http://www.britannica.com/EBchecked/topic/421071/novel>>.
- *Citizen Kane*. Dir. Orson Welles. Warner Bros., 1941. DVD.
- Danielewski, Mark. *House of Leaves*. New York: Pantheon Books, 2000. Print.
- Delaunay, Robert. *Champs de Mars. La Tour Rouge*. 1911-1923. Oil on canvas. The Art Institute of Chicago.
- Duchamp, Marcel. *Fountain*. 1917. Readymade. Tate Modern, London.
- “Eisenstein & montage.” *Montage theory: Eisenstein, Vertov, & Hitchcock*. Web. < <http://faculty.cua.edu/johnsong/hitchcock/pages/montage/montage-1.html>>.
- Epperson, Gordon. “Music.” *Encyclopædia Britannica*. 19 Feb. 2014. Web. < <http://www.britannica.com/EBchecked/topic/398918/music>>.
- Estrella, Espie. “The Fugue.” *About.com Music Education*. Web. < musiced.about.com/od/historyofmusic/a/fugues.htm>.
- “Functionalism.” *Encyclopædia Britannica*. 11 Apr. 2013. Web. < <http://www.britannica.com/EBchecked/topic/222115/Functionalism>>.
- *Gone Home*. The Fullbright Company. 15 Aug. 2013. Video game.
- Guthrie, Sir Tyrone. “Theatre.” *Encyclopædia Britannica*. 13 Feb. 2013. Web. < <http://www.britannica.com/EBchecked/topic/590186/theatre>>.
- “Impressionism.” *Impressionism.info*. Web. <<http://www.impressionism.info/info.html>>.

- Magritte, René. *La Trahison des Images*. 1928-29. Oil on Canvas. Los Angeles County Museum of Art, Los Angeles, California.
- Malan, Ruth and Dana Bredemeyer. "Less is More with Minimalist Architecture." *IT Pro*. October 2002: 46-48. PDF.
- Mirapaul, Matthew. "Take That, Monica! Kapow, Chandler!" *The New York Times*. 3 Mar. 2003. Web.
- Moriarty, Brian. "Assignment 11." *IMGD 2900: Digital Game Design*. 29 Nov. 2012. Web. <http://users.wpi.edu/~bmoriarty/imgd2900_12/a11.html>.
- Moriarty, Brian. "Lehr und Kunst mit Perlenspiel." Game Developer's Conference, San Francisco, California. 5 Mar. 2012. Keynote lecture. <<http://www.ludix.com/moriarty/lehr.html>>.
- Moriarty, Brian. "Welcome to Perlenspiel." *Perlenspiel*³. Web. <<http://users.wpi.edu/~bmoriarty/ps/index.html>>.
- Murphy, Arthur D. "Motion Picture." *Encyclopædia Britannica*. 7 Nov. 2013. Web. <<http://www.britannica.com/EBchecked/topic/394107/motion-picture>>.
- Nemerov, Howard. "Poetry (literature)." *Encyclopædia Britannica*. 12 Jan. 2014. Web. <<http://www.britannica.com/EBchecked/topic/466108/poetry>>.
- Raskin, Richard. *p.o.v.: A Danish Journal of Film Studies*. "Aspects of Dogma." 2000. PDF.
- Salen, Katie and Eric Zimmerman. *Rules of Play: Game Design Fundamentals*. Massachusetts Institute of Technology, 2004. Print.
- Schwitters, Kurt. *Ursonate*. 1922-32. <<http://www.ubu.com/sound/schwitters.html>>.
- Scruton, Roger. "Architecture." *Encyclopædia Britannica*. 11 Oct. 2013. Web. <<http://www.britannica.com/EBchecked/topic/32876/architecture>>.
- Shakespeare, William. "Sonnet XXVII." Web. <<http://www.shakespeares-sonnets.com/sonnet/27>>.
- Sondheim, Stephen. *Sunday in the Park with George*. 1984. Musical.
- Spenser, Edmund. "One day I wrote her name upon the strand." Web. <<http://www.sonnets.org/spenser.htm#075>>.

- Sterne, Laurence. *The Life and Opinions of Tristram Shandy, Gentleman*. Kingdom of Great Britain: Ann Ward, 1760. PDF.
- Taylor, Tim D. "Choices and Limitations: Photography as Art." *The New York Times*. 3 September 1989. Web.
- "The Cathedrals of Britain." *BBC*. Web.
<http://www.bbc.co.uk/history/british/architecture_cathedral_01.shtml>.
- *The Five Obstructions*. Dir. Lars von Trier and Jørgen Leth. Koch Lorber Films, 2004. DVD.
- Wordsworth, William. "London, 1802." Web. <
<http://www.poetryfoundation.org/poem/174797>>.
- Zimmerman, Eric. "Humanity's Last Game: The Game Design Challenge Final Championship." Moscone Convention Center, San Francisco, California. March 2013. Conference session. <
<http://gdcvault.com/play/1017715/Humanity-s-Last-Game-The>>.