Cultivating Creative Problem-Solving Through Limitations and Constraints

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CULTIVATING CREATIVE PROBLEM-SOLVING
THROUGH LIMITATIONS AND CONSTRAINTS

Arts-Based Research
Submitted in Partial Fulfillment
Of the Requirements for the Degree of
Masters of Arts

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School of Art and Design
Art Education

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has been approved as meeting the requirement for the Degree of Master of Arts in College of Performing and Visual Arts in School of Art and Design, Program of Art Education.

Accepted by the Committee:

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ABSTRACT


This arts-based research explores how limitations and constraints impact the creative problem-solving process. Analyzing creative problem-solving processes is used to gain an understanding of how creative thinkers navigate unique situations or obstacles. This research focuses on the deconstruction of nine creative artworks. A specific process for generating limitations is discussed producing a starting point for creative artistic development. This arts-based research study relates to developing an understanding of how *Cultivating Creative Problem-solving Through Limitations and Constraints* impacts an individual’s philosophies while attempting to find a solution to a problem or task. If we utilize creative problem-solving techniques, we may be able to use constraints and limitations to foster skill development allowing us to reach goals and overcome obstacles. Limitations that are set before us can force us to make decisions and cultivate skills and creative talents. Limitations may also help us accelerate our skill development and turn us into powerful creative problem-solvers.
# TABLE OF CONTENTS

PREFACE .................................................................................................................. 1
How to Fit a Square Box into a Round Hole ................................................................. 1

CHAPTER I: INTRODUCTION ................................................................................. 3
Introduction .................................................................................................................. 3
The Importance of Limitation ..................................................................................... 7
Explanation of Relevant Terms and Concepts ............................................................ 8
Creative Problem-Solving ......................................................................................... 8
Divergent Thinking and Convergent Thinking .......................................................... 8

CHAPTER II: LITERATURE REVIEW ................................................................. 11
Purpose ...................................................................................................................... 11
Limitation as Liberation ........................................................................................... 11
Creative Thinking ..................................................................................................... 13
Seven Characteristics of Creative Thinking ............................................................. 13
Limitations as a Key to Creativity ............................................................................ 14
Creative Problem-solving Research ......................................................................... 20

CHAPTER III: RESEARCH STRATEGIES, METHODS, AND PROCEDURES ...... 23
Random Selection .................................................................................................... 24
Procedure .................................................................................................................. 26
Data Collection ........................................................................................................ 26
Data Analyzation ..................................................................................................... 27
Limitations ................................................................................................................ 29

CHAPTER IV: ......................................................................................................... 30
Description of Work ................................................................................................ 30
Deconstruction of Works on Limitations .................................................................. 32
Limitations One through Nine .................................................................................. 32
Findings and Data Interpretation ............................................................................ 40
The Role Limitation Played Within my Series of Nine Works .................................. 40

CHAPTER V: ......................................................................................................... 44
Conclusion, Implications, and Recommendations ................................................... 44

REFERENCE LIST: ............................................................................................... 47
LIST OF FIGURES


Figure 2 Riding Lawnmower Prototype, Jon-Michael Willert 1993 ........................................................................... 6

Figure 3 Phil Hanson, Bruce Lee Karate Chopped Paint 166” x 95” Embrace the Shake [Video file Image]. (2013, February). Embrace the Shake. Retrieved October 13, 2016, from https://www.ted.com/talks/phil_hansen_embrace_the_shake?language=en ...................................................... 14


Figure 8 Random Word Generator - Creative online tool to generating randomized words for brainstorming. Retrieved January 20, 2016, from http://www.textfixer.com/tools/random-words.php .................................................................................................................................................. 24

Figure 9 Number Generator 1-9 | Random Number between 1 and 9. Retrieved January 11, 2016, from http://numbergenerator.org/randomnumberbetween1and9................................................................. 25

Figure 10 Random Thing Picker. Retrieved January 14, 2016, from http://andrew.hedges.name/experiments/random/pickone.html ............................................................................................................. 25
LIST OF TABLES

Table 1 Barden, M., & Morgan, A. (2015). A beautiful constraint: How to Turn Your Limitations Into Advantages, and Why It's Everyone's Business. Hoboken, NJ; Wiley Inc. ...................................................... 16

Table 2 ............................................................................................................................................. 26

Table 3 ............................................................................................................................................. 27

Table 4............................................................................................................................................. 28
PREFACE

How to Fit a Square Box into a Round Hole

This action research explores how setting limitations on a creative process is used across disciplines. The idea is supported by examples exploring how creative problem-solving within limitations has been utilized to develop solutions to unique problems. The Apollo 13 mission to the moon may be one of the most famous examples of creative problem solving within limitations. After experiencing mechanical difficulties that forced the cancellation of the Apollo 13 mission, the astronauts had to return to earth. Due to the damage that the spacecraft endured the astronauts were forced to move into the lunar module. The lunar module was designed to sustain two people for 36 hours. The lunar module now needed to hold three astronauts for a total of 96 hours. Every time the astronauts exhaled the CO2 started to build up to dangerous levels. With limited time and materials, NASA and the astronauts needed to create a solution to this problem. Essentially, they had to” fit a square box into a round hole” with an extremely limited amount of supplies (one roll of gray duct tape, to LCG bags, two hoses from red suits, two socks, and one bungee cord). In figure 1 an actual photograph of the air filter they created inside of the lunar module along with a picture capturing the astronauts constructing the filter with limited supplies. As a child, I found this story to be inspiring and displayed the eminence value that creative problem-solving skills hold.
In most situations, I like having total control over what is going on to avoid any uncertainties. I think that creative problem-solving through limitations allows me to let go by not having total control over a situation. For me, working within limitations creates a restrictive environment that is calming. I am hoping that by doing this research I can answer questions that I have unconsciously been searching for my entire life. I want to understand how limitations impact creative problem-solving. I also want to understand how limitations affect the process and final product of art making and creativity as an artist and as an educator. I hope that this research will also allow me to develop a deeper understanding of something that has had a lasting and influential connection with my life.

For the purpose of this study, I have chosen to mainly focus on setting fundamental limitations and constraints that relate specifically to developing a body of work by setting parameters prior to beginning a body of work. These restrictions are meant to be a starting point they are not intended to create barriers that an artist cannot break through. We are often told to think outside of the box. The idea of the box does not have to be as constricting as we think; the box can simply be a starting point from which we will allow our thoughts to manifest and grow.
The box can expand to fit more concepts ideas and thoughts once we are ready to move on. The box can open and allow ideas to grow and branch out in new directions. The box can just act as a foundation or a starting point. The box makes it possible to see what we have to work with and how our ideas can grow and expand from a starting point.
CHAPTER I

INTRODUCTION

Cultivating Creative Problem-solving Through Limitations and Constraints.

Genius. Invention, Talent. And, of course, creativity. These words describe the highest levels of human performance. When we engaged in the act of being creative, we feel we are perfuming at the peak of our abilities. Creative works give us insight and enrich our lives. (Sawyer, 2012 p.3)

I have always been fascinated with creative problem-solving, and its applications throughout many different disciplines. Creative problem solving is a process that aids an individual in finding innovative solutions to life’s challenges and opportunities. Creative problem-solving skills are a crucial ability that each and every individual should possess. Becoming an effective creative problem-solver takes work and dedication. One must first develop an awareness of its existence and begin to deconstruct how they approach such situations. To help myself go on this path of discovery and awareness, I began to look at my life as a holistic timeline focusing on the first experiences I could recollect requiring me to utilize creative problem-solving skills. I have been trying to recall some early childhood experiences in an attempt to discover the origins of my interest in how new ideas are developed. Until recently I did not have an awareness of the interwoven existence of this interest and how it is embedded in almost every aspect of my life. For this arts-based research project, I reflected on the artwork that I produce along with the teaching philosophies and pedagogies embedded in my teaching curriculum for high school studio classes. I noticed a common trend that was hiding in plain sight. I might have noticed it earlier, however I was not asking the right questions or looking for the right answers. For this specific study I developed a list of limitations that force me to work
within a set of boundaries before the act of artmaking begins. A conscious awareness of these constraints act as a foundation for creative problem-solving. The initial set of limitations are not meant to be suppressive restrictions. They are a starting point that create some structure and order within the early stages of development. As ideas develop, they grow and expand away from the fundamental limitations allowing free thought and unrestricted creative production once a vision and confidence is established. If the artist prefers the constraints, they may continue to work with them if they choose. This process has been something that subconsciously arose within my work. I am drawn to the problem-solving challenges that setting limitations provide when trying to make new artistic discoveries or find a new direction my personal artmaking.

Growing up, the two subjects I was most passionate about were art and engineering. I loved the problem-solving challenges that engineering provided, but I also loved the freedom that art delivered. I felt that art allowed me to explore different concepts and allowed for more than one possible outcome without right and wrong answers dominating every aspect. One of the first experiences that I can recall using limitations for creative problem solving was when I was about the age of ten. I have always loved mechanical things and anything that had moving parts. I wanted to understand how things worked and how someone could develop an idea and bring it to life.

When I was a child we had a push lawnmower that was self-propelled. After it became my job to mow the lawn I was envious of neighbors who had riding lawnmowers. I thought they were so mechanically interesting and fantasized about what it was like to drive or operate a tractor. One day I found a wooden pallet in someone’s garbage and dragged it home. After that I
found some old wheels and connected them to the pallet finally strapping everything to the self-propelled lawn mower (see Figure 2). This was essentially the first mechanical prototype I built. This was also my first experience involving creative problem-solving within limitations.

I also believe that this was the first time that I freely chose to create by order of complex system or design. I’m sure there are many activities that I did growing up in school that could relate to creative design, but this one was mine from the start. I remember designing other ways that I could improve my prototype and built several versions that performed with increasing success. This was just the beginning of a path that would lead me to working in the field of agricultural engineering and then ultimately fulfilling my dream of becoming an artist and art teacher. For me this journey of self-discovery includes understanding why I am fascinated by creative problem-solving and especially problem-solving within limitations. This arts based research will include exploring how art is made when the artist does not have total control of each aspect of the design process. These limitations can be set by the artist or manifest on their own if the circumstance presents itself.
The Importance of Limitation

Why do we need limitations more now than ever? Expanding visual and material culture can create roadblocks. There is too much distraction at times to be productive. Creative problem-solving may be more natural when having less to work with, thus avoiding overstimulation. Limitations help us find a focus. Too much to choose from can be paralyzing or overwhelming for those who are not yet confident. Once a foundation is built it can be expanded upon, slowly broadening the spectrum, and having fewer boundaries or restrictions. Limitations also help us filter out all of the unnecessary distractions that can prevent us from developing creative ways to problem solve. Limitations can help us see a distant goal in a more attainable way. Limitations help us learn to problem solve with what we have. Limitations allow us to focus our ideas and push the boundaries once we have mastered a craft. Limitations are an avenue for new discoveries within existing materials. Limitations allow us to find boundaries and work within the confines of rules and laws. Limitations can be time-saving. Limitations can help with collaborative work requiring multiple minds to coordinate the development of a new concept. Limiting the options and materials can also provide a less stimulating environment and allow an individual to create with a focused and relaxed state of mind.

I think that creative problem-solving within limitations helps prepare someone to work within the confines of real life situations. We cannot control every aspect of our lives and we are not able to avoid certain obstacles. If we are effective creative problem-solvers and are able to work within the limitations set before us, we will have the knowledge and tools it takes to overcome challenges.
Explanation of Relevant Definitions, Terms and Concepts

Creativity- The Merriam-Webster dictionary (2016) defines creativity as the ability to make new things or think of new ideas; the quality of being creative; the ability to create.


Creative Problem-Solving

According to research done by the Creative Education Foundation from Scituate, Massachusetts founded in 1954:

CPS is a proven method for approaching a problem or a challenge in an imaginative and innovative way. It’s a process that helps you redefine the problems and opportunities you face, come up with new, innovative responses and solutions, and then take action. The tools and techniques used make the process fun, engaging, and collaborative. CPS not only helps you create better solutions, it creates a positive experience that helps speed the adoption of new ideas. (2013, p.3)

Creative Problem-Solving educator and practitioner, Ruth Noller, described CPS as the sum of its parts: Creative specifies elements of newness, innovation, and novelty. Problem refers to any situation that presents a challenge, offers an opportunity, or represents a troubling concern. Solving means devising ways to answer, to meet, or to satisfy a situation by changing self or situation.

Divergent Thinking and Convergent Thinking

Divergent Thinking- compiling options, looking at the full spectrum of choices, the big picture.

Convergent Thinking- evaluating and narrowing options, sift and thin options, find a focus.

Keith Sawyer author of Explaining Creativity: The Science of Human Innovation (2012) argues, “One of the most obvious differences between intelligence and creativity is that intelligence requires convergent thinking, coming up with a single right answer, while creativity requires divergent thinking coming up with many potential answers” (p.44).
**Limitations** - According to the English Oxford Dictionary (2017) limitations are defined as a limiting rule on circumstance, a restriction. A condition of limited ability: a defect or failing, the action of limiting something.

If we have a conscious awareness of our limitations, we may be able to build confidence and develop the characteristics it takes to become an effective creative problem solver. Fogler, LeBlanc, and Rizzo (2014) define some of these characteristics by stating, effective problem solvers believe that problems can be solved through the use of heuristics and careful, persistent analysis. By contrast ineffective problem solvers think, “You either know it or you don’t.” Effective problem solvers become very active in the problem-solving process: they draw figures, make sketches, and ask questions of themselves and others. Effective problem solvers take great care to understand all the facts and relationships accurately (LeBlanc & Rizzo, 2014). An effective problem solver will develop a mindset that will help them deal with difficult situations. Having this type of mindset takes work and requires that the individual develop specific habits. By having a conscious awareness of limitations, we are also categorizing what we must work with and able to use this to organize our thoughts and intentions.

Barden and Morgan (2015) elaborate, if we want to peruse something with a little more discipline, the concepts, and tools around “path dependence, propelling questions, and the can-if approach” are three that are easy to communicate and utilize what we have (p. 223). As humans, we sometimes get stuck on the same path and do not want to take a risk and stray into the unknown being “path dependent” will stifle our creativity. We need to be willing to take a chance or a risk. If we ask ourselves propelling questions, we can make inspiring connections between bold ambition and our limitations. Once a balance if formed between propelling questions and our limitations true creativity can manifest and grow. Taking a can if approach
also helps to keep an optimistic and open-minded view on what we are doing. A positive mental attitude goes a long way. We tend to be more productive or sincerely engaged in what we are doing when we have positive feelings towards the task we are completing. Focusing on *I can* or *I will* tends to produce better results than focusing on *I cannot* or *I won't*. Initially, it may be hard to look at constraints and limitations as a beneficial factor. This action research is aimed at understanding how limitations can drive creative thought and start a dialog on what it takes to create a structured starting point for creative problem-solving. Limitation provides just enough order and structure to allow an individual with a structured starting point that creates a focus without distractions.
CHAPTER II
LITERATURE REVIEW

Creative Problem-Solving Through the Use of Limitations and Constraints.

*When forced to work within a strict framework the imagination is taxed to its utmost – and will produce its richest ideas. Given total freedom, the work is likely to sprawl.* (Eliot as cited in Brewer, 2015, p.104)

Purpose

Researching how others have used limitations and constraints within their work allowed me to understand how creative problem solving can shape the nature of art making and the development of conceptual ideas. This section is intended to provide examples and explanations on how limitations are used by artists, designers, engineers and business professionals to overcome creative blocks or obstacles. Constraints and limitations find their way into our lives through many different avenues, mostly on their own accord. Often we are desensitized to the interwoven effects that these limitations and constraints have on our lives. With a conscious awareness of this reality, we can develop skills to cope with these uncertainties. If we utilize creative problem-solving techniques, we may be able to use constraints and limitations to foster skill development allowing us to reach goals and overcome obstacles. Limitations that are set before us can force us to make decisions and cultivate skills and creative talents. Limitations may also help us accelerate our skill development and turn us into powerful creative problem solvers.

Limitation as Liberation

Author and researcher Garr Reynolds, in the article *Can limitations and restrictions be liberating?* states that by having a conscious awareness of limitations, we can sometimes use them to our advantage. Reynolds states:
Having grown up in the abundance of the US, I was basically taught that freedom is, among other things, the maximization of choices. The more choices the better. All those choices. All that abundance. 157 kinds of breakfast cereal...how to decide? The freedom to choose, at least on things that matter most, is a wonderful gift indeed. Yet, in our daily lives, we too often burden ourselves with petty choices, unimportant matters, and frivolous decisions. In today’s world we may have political/social freedom (if we're lucky), but often lack ‘a freedom of mind’ the very freedom that can matter most when aiming to construct creative solutions to complex problems. Our minds — even our lives in general — have become complicated by clutter. (2007, p.2)

Our world is often extremely overstimulating to the point where we have learned to filter out much of the chaos that surrounds us. A conscious awareness of known constraints will provide more of a focus. Setting limitations for ourselves or making a list of the limitations set on us can provide a foundation to work from. This arts-based research will discover how to turn limitations into a benefit or reward then we are working towards liberation. Living with limitations and constraints is not necessarily bad. Often these limitations can be helpful or inspiring us to challenge ourselves to think abstractly or more conceptually when a specific problem or obstacle is in our path. With limitations, we can take a step back and have less clutter before us, providing more of a focus. A conscious awareness of limitations will help us problem solve in a more efficient way or may provide us with the eye-opening experience leading to new creative discoveries.

Jasper von Meerheimb and Sachiko Kawamura, designers for Universal Studios Japan (USJ) gave a presentation for Design Matters Japan (DMJ) on the benefits to applying restrictive conditions within creative projects. They argued that limitations can lead to conceptual and innovative outcomes. For artist, designers, engineers and business professionals, the idea of creating great work under constraints and limitations is simply the way the world works. To make use of our limitations we need to change our mindset and not view them as something that paralyzes. John Maeda, (2006) expresses in his book The Laws of Simplicity, “In the field of
design there is the belief that with more constraints, better solutions are revealed. Time, for example, and the sense of urgency that it brings is almost always a constraint, yet urgency and the creative spirit go hand in hand” (p.86).

An artist can apply creative problem-solving tactics to get over creative blocks or use them to develop creative solutions to unique problems or tasks. Seeing how artists, designers, engineers and business professionals have used limitations to their advantage will help to reinforce these assumptions pertaining to creative problem-solving by limitations and constraints.

**Creative Thinking**

Mary Stewart in *Launching the Imagination* (2006) describes seven characteristics of creative thinking. Stewart (2006) also states, “we can actively encourage creative thinking however rather than waiting for inspiration, we can set up conditions favorable to creativity based on observation and interviews, various researchers have noticed the following characteristics and many creative people” (p.116).

Stewarts’s Seven Characteristics of Creative Thinking and (2006, p. 116).

**Receptivity**- creative people are open to new ideas and welcome new experiences.

**Curiosity**- a good designer brings an insatiable curiosity to each project making connections from unfamiliar topics.

**Wide Range of Interests**- with a broad knowledge base a creative person can make a wider range of connections.

**Attentiveness**- realizing that every experience is potentially valuable, creative people pay attention to seemingly minor details. An artist can often see past superficial visual chaos to discern an underlying order.
**Connection Seeking**- seeing the similarity among seemingly distant concepts has often sparked a creative breakthrough.

**Conviction**- creative people value existing knowledge. Since new ideas are often derived from old ideas, it is foolish to ignore or dismiss the past. Creative people regularly consider new possibilities often change the authorities.

**Complexity**- synthesizing all our skills can allow a creative thinker to be fully capable. A creative person needs to combine the rational with the intuitive.

**Limitations as a Key to Creativity**

Multimedia artist Phil Hanson discovered that using limitations was the key to his creativity. After developing a permanent shake in his hands due to years of drawing in a pointilism style Hanson was forced to change his approach to artmaking. This permanent injury deterred him from creating art and put a halt on his creative production. Hanson’s doctor told him to “embrace the shake”. This took him down a new path of personal creative discovery.
Hanson started to create works of art by developing a set of limitations or constraints that he had to work within. Each work he develops has a set of self-imposed limitations. Hanson has explored these limitations using many different forms of media. It was only then that he made this personal discovery. During a 2013 TED Talk Hanson stated,

> As I searched around in the darkness, I realized I was actually paralyzed by all of the choices that I never had before. And it was then that I thought back to my jittery hands. Embrace the shake. And I realized, if I ever wanted my creativity back, I had to quit trying so hard to think outside of the box and get back into it.  

(Hanson, 2013, 3:30)

Hanson began to enforce these constraints by challenging himself to create works of art within the confines of limitation. With these ideas in mind, he started to ask himself some questions that would allow him to make new discoveries. Instead of using a brush he chose to create a painting only using karate chops (see Figure 3).

The limitations that Hanson experiments with have allowed his work to develop and change over time. He has found more questions than answers and is currently creating work that is created and then destroyed. This way of creating work can be liberating and allow an artist to find new ways of making art and possibly discover an uncommon way forward.

Barden and Morgan express, “Constraints are not the forces of regression or punitive restriction we tend to think of them as. On the contrary, they are liberators of new possibilities, and we need to have a completely new kind of relationship with them” (Barden & Morgan, 2015, p.209). Limitations push us to reflect on what we do and why we do it allowing one to see from a new perspective. Limitations also urge us to behave differently, strengthening, and force us to take risks. They make us search for and find creative solutions in uncommon ways. They provide us with the tools to create new kinds of capabilities. They are the constraints that have the potential to expand our creative problem-solving abilities. The Table 1 provides several
examples of how constraints stimulated people to become better creative problem solvers in different areas of discipline.

Table 1

<table>
<thead>
<tr>
<th>Constraints Simulate us to:</th>
<th>For Example:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Productivity question…</td>
<td>-Unilever’s tomatoes, back-end language</td>
</tr>
<tr>
<td>...what in our past/preset is holding us back?</td>
<td>-citizenM</td>
</tr>
<tr>
<td>...what really matters today?</td>
<td>-Aircraft carrier, Hovding personal airbag, SAB barley</td>
</tr>
<tr>
<td>...whether entirely new possibilities exist?</td>
<td></td>
</tr>
<tr>
<td>Rethink or reframe…</td>
<td>-LPS and ExitTicket, Audi Le Mans</td>
</tr>
<tr>
<td>...how we think about challenge.</td>
<td>-SCF customer-owners, FIFA 13 waiting, Taiwan’s people as natural resource</td>
</tr>
<tr>
<td>...how we see what we have.</td>
<td>-Nike’s water-based glue</td>
</tr>
<tr>
<td>...how we define success.</td>
<td></td>
</tr>
<tr>
<td>Find the benefit in subtraction by…</td>
<td>-McLaren</td>
</tr>
<tr>
<td>...making what we have work harder (efficiency).</td>
<td>-Hue color-only salons, food trucks</td>
</tr>
<tr>
<td>...eliminating unnecessary/superfluous.</td>
<td>-Google homepage, Mojang</td>
</tr>
<tr>
<td>...making simple better than complex.</td>
<td></td>
</tr>
<tr>
<td>Find new ways to augment by…</td>
<td>-Jagger, Industrial Theatre</td>
</tr>
<tr>
<td>...Amplifying what we already have.</td>
<td>-London 2012, Zappos, Mario</td>
</tr>
<tr>
<td>...adding something new.</td>
<td>-Virgin America, Airbnb photographers, BrewDog (crowdfunding) ColaLife</td>
</tr>
<tr>
<td>...forming new partnerships.</td>
<td></td>
</tr>
<tr>
<td>Find or create new kinds of solutions…</td>
<td>-FNB, PHD Source, M-PESA</td>
</tr>
<tr>
<td>...within what we already have.</td>
<td>-Heineken France, Air New Zealand, Warby Parker</td>
</tr>
<tr>
<td>...elevating the overlooked.</td>
<td>-Surf, Nike Flyknit, Air Max 360, IKEA table</td>
</tr>
<tr>
<td>...in entirely new unexpected places or ways.</td>
<td></td>
</tr>
<tr>
<td>Build entirely new systems or business models in</td>
<td>-Netafim, Unilever palm oil</td>
</tr>
<tr>
<td>the form of…</td>
<td>-Rent the Runway, Taiwan education system</td>
</tr>
<tr>
<td>...new virtuous cycles.</td>
<td></td>
</tr>
<tr>
<td>...new ecosystems.</td>
<td></td>
</tr>
</tbody>
</table>


There are many ways that we can interpret limitations that we put on ourselves or interpret the limitations that are out of our control. The above figure provides examples showing Google developers have utilized constraints and limitations. Constrains stimulate us to find the benefit in subtraction. The google homepage benefits from having a simple rather than complex layout. Marissa Mayer, Google executive at the time, revealed why Google’s stark white homepage looks the way it does. Mayer said,

Google.com’s layout, which has changed little since its inception, owes its stark look to Google co-founder Sergey Brin and his limited knowledge of HTML, a markup language for websites used to assemble text and other content to create web pages. (2012, p.1)
Brin developed the simplest web page he could to test out the newly developed search engine while he was a Ph.D. student. According to Mayer (2012), Brin once explained to her why Google’s homepage was so blank. Brin stated, “when I was first building Google I did not have a webmaster and he did not use HTML” (Mayer, 2012 p. 1). The simplistic design stuck and has stood the test of time receiving more traffic than other comparable search engines. I would argue that embracing their limitations was a main key factor Google’s rapid success.

Artist Erik Johansson, photographer and “retoucher”, creates manipulated photographs by using a set of rules and limitations that he must abide by as he works. While photographing, he must always try to visually capture as much as possible with his camera. By capturing as much as possible with his lenses he then has more to work from while using Photoshop and can create more detailed imagery (see Figure 4). He must also take new photographs for each project and not use any from the past. Johansson (2011) elaborated on the rules that he follows by also stating:

The first rule is that photos combined should have the same perspective. Secondly, photos combined should have the same type of light. And these two images both fulfill these two requirements -- shot at the same height and in the same type of light. The third one is about making it impossible to distinguish where the different images begin and end by making it seamless. (p.1)

Johansson utilizes these rules and limitations to guide his creativity. Allowing these rules to guide him, Johansson is creating circumstances that make him want to create art.

Artist Michael Johansson seeks locations that offer a physical space constraint. These locations force him to work within specific boundaries that his found objects must fit within. Johansson approaches each space as if it were a game similar to playing Tetris in real-life. Each object he uses must fit within the chosen space and connect with the objects around it.


Each location that Johansson works with has a new set of constraints or limitations. He is forced to find objects that fit within the space that he is working with. Creative problem solving can be broken down into a specific process. Understanding how this process works is crucial to being effective at finding solutions. Understanding the role of limitations and constraints will also aid in the development of solutions.

**Creative Problem-Solving Research**

Where did research begin relating to creative problem-solving process? How does the idea of thinking inside and outside of the box relate to creative problem-solving? If you search the Internet for “Creative Problem Solving,” you’ll find evidence of many variations, all of which may be traced back to the work that was started by Alex Osborn in the 1940s, developed with Sid Parnes in the 1950s, and nurtured at SUNY Buffalo State and the Creative Education Foundation. The diversity of approaches to the creative problem-solving process that has developed since is a testimony to the power of the idea.

First, we need to discover a better understanding of what creativity means and how it applies to our particular circumstance. People who do not believe they are creative tend to avoid situations where they feel that creativity is essential for their success. This is often due to their perception of what they think creativity is. Changing a tire without a jack will force an individual to find a creative way to improvise with the limitation they are facing. Many other types of limitations can create barriers. Some of them unforeseen, if we develop skills to cope with these situations under controlled conditions when we are faced with external constraints, we can overcome barriers with a better rate of success.

What holds people back from tapping into their creative side or believing that they are not or can’t be creative? Fear or fear of failing and looking at too big of a picture are two of the
bigger roadblocks that stifle creativity. If you were to ask the majority of the population most people would agree that failing something is not fun. People also associate failing with bad experience or looking stupid in front of others. Fear is a very familiar feeling for children to have when they are around their peers. Maeda expresses:

There is always a ROF (Return On Failure) when you try to learn from your mistakes. When faced with failure, a good artist, or any other member of the creative class, leverages the unfortunate to radically shifting perspective. A failed experiment by one individual can become another’s path to success. (2006, p.83)

If we look at something as an experience, we can learn from instead of a failure we are more likely to apply what we have learned. We can then apply our learning lessons to future endeavors thus creating a successful work of art or producing a more desirable outcome. Anyone can be creative; it takes work and dedication to be creative, it also takes the correct mindset to allow yourself to flourish. First, we must break away from this psychological condition that holds us back. Looking at too many options is also another barrier. Artist Chuck Close said it best in a 2013 CBS news series called Note To Self. Close stated:

Never let anyone define what you are capable of by using parameters that don’t apply to you. Sign on to a process and see where it takes you. You do not have to reinvent the wheel every day. Today you will do what you did yesterday and tomorrow you will do what you did today. Eventually, you will get somewhere. If you are overwhelmed by the size of a problem, break it down into many bite-sized pieces. (2013, p.1)

The size of the task can often be very intimidating. Having short-term goals can help us meet our long-term goals. Mary Stewart expresses:

Humans are goal oriented, and every action occurs for a reason. When we focus our attention on a particular task, we can accomplish just about anything. Goals help us channel our energy and manage our time. When we reach our goals, our self-esteem increases, which then helps us overcome obstacles. Moreover, with each goal met, our knowledge increases. (2006, p.116)

If Chuck Close let his face dysplasia or spinal artery collapse get in the way of his art making, he would not the well-known artist he is today. There are many obstacles we will face in
life. If we adequately prepare by having a conscious awareness of our limitations and constraints, we will be able to prepare for the future and become confident, creative problem solvers with a better knowledge of developing creative and innovative solutions.
CHAPTER III

RESEARCH STRATEGIES, METHODS, AND PROCEDURES

As an artist, teacher, and researcher I must uncover how the three are linked by my personal teaching pedagogies and philosophies. As an artist, limitations act as a starting point for me to develop ideas and experiment with concepts that are not under my total control. As a teacher, the limitations and constraints that are put forth within each lesson act as a starting point to build a student’s confidence and allow for creative problem-solving skills to develop. As a researcher, it is my duty to constantly improve upon my practice.

This arts-based research study relates to developing an understanding of how “Cultivating Creative Problem-solving Through Limitations and Constraints” impacts an individual while attempting to find a solution to a problem or task. For this study, I have chosen to look at how these concepts are embedded in my personal philosophies and how artists, business entrepreneurs, inventors and other creative thinkers have utilized specific strategies to overcome and find solutions to creative problems. My research strategies, methods and procedures relate back to a journey of self-discovery. The idea of Cultivating Creative Problem-solving Through Limitations and Constraints can be broken down into several questions. I am trying to discover how limitations and constraints can cultivate creative problem solving when given a task. I am not looking for a conclusion that has a yes or no answer. This arts-based research has retrospectively analyzed my specific problem-solving processes within a set of limitations in a qualitative manner that utilizes a blend of methodologies including action research, arts-based research, A/r/tography and autoethnography. For each personal artwork, I
have devised a set of initial constraints before beginning the work. Some of these initial constraints were be chosen by random selection by chance or chosen by individuals other than myself. These limitations act as a starting point but will not shape the entire body of work.

This study seeks to find the answers to the following questions:

· What role does limitation play within the body of work I am developing?
· How do limitations create a foundation for new discoveries and the development of innovative solutions to unique problems?
· How do limitations allow us to find a focus within our work?
· How do limitations save time and act as a springboard for creative development?

By way of limitations and constraints, this arts-based research will include exploring how art is made when the artist does not have total control over the initial materials that are being used along with the development of a preliminary idea or theme.

Random Selection: Methods used for Setting Limitations and Constraints

All nine works had to abide by specific criteria shown in Table 2. At the start of each semester I used Random Word Generator to create a list of three random words that had to be considered while creating each work. The example shown in Figure 8 displays the words that
were generated for the first work that was created for this series. All of the words for each work are displayed in the triangulation matrix in Table 3.

Once the theme words are generated I used a number generator to select the amount of clay parts that the sculpture will be made up of. The computer then chooses 1,2,3,4,5,6,7,8, or 9. For example, first sculpture that was created was made up of three clay parts as illustrated in the Number Generator figure 9. One sculpture from each semester is made of multiple parts fused into one. Table 3 displays how this was broken down.

I have 175 glazes in my studio. I generated a list of the glazes and used “Random Thing Picker” to generate a result as show in Figure 10. The computer chose “Laguna Cream Glaze” with my set of limitations I then had to use that glaze for all nine works of art.
Table 2 List of Limitations and Constraints

<table>
<thead>
<tr>
<th>List of limitations and constraints</th>
<th>Constant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Each work must be made from the same clay body.</td>
<td>Laguna Dover White</td>
</tr>
<tr>
<td>Each work must be glazed using the same glaze.</td>
<td>Laguna Cream</td>
</tr>
<tr>
<td>Each work must contain locally found plant fibers.</td>
<td>Wetland Shrub Fibers</td>
</tr>
<tr>
<td>Each work must incorporate natural rope fibers</td>
<td>Various Diameters of Twisted Manila.</td>
</tr>
<tr>
<td>One out of nine must incorporate a found synthetic fiber.</td>
<td>Thin nylon parachute.</td>
</tr>
<tr>
<td>Each work must have some sort of direct connection with the one another work in the series.</td>
<td>The same elements evident when displayed. A viewer should be able to pair them from influence.</td>
</tr>
<tr>
<td>Each semester before I begin a new set of three works I will let the computer randomly choose a theme or concept. Utilizing Random Thing Picker, Random Word Generator, Or using Dictionary Random Selection Search Engine Methods.</td>
<td>Themes are categories within a triangulation matrix with a specific theme and two sub theme categories.</td>
</tr>
</tbody>
</table>

Procedure

I have individually and holistically analyzed the nine works created for this series. The nine works were developed over the course of three separate semesters starting in spring 2016 and ending in the spring of 2017. All the data came from the nine artworks and the art making process of setting limitations. All nine have been completed I have retrospectively looked at how the specific limitations were used as a driving force for each artwork. I have also been using drawing and photographing as a research tool for documentation. Using the triangulation matrix, drawings, and photo documentation I will be able to answer my research questions by showing what has been done within chapter four and drawing conclusions in chapter five.

Data Collection

Data collection and documentation is done by keeping a photographic record of all works in progress and utilizing drawing and sketching as a research tool. Rayala (1983) stated, “there are many examples where an image conveys important information and ideas more clearly,
accurately and effectively than words or numbers” (p.59). Drawing and sketches have been a way for me to capture information and data that I may have missed if I only used photographs. Drawing allowed me to slow my ideas down and look at what is happening in the past, present, and plan or work things out for the future. I have also kept a record of the limitations for each work of art and how they were generated. I have created a triangulation matrix to organize general information about each artwork. The triangulation matrix has helped to aid in the deconstruction of my limitations in relation to my artmaking.

**Data Analyzation**

**Table 3 Data Analyzation**

<table>
<thead>
<tr>
<th>Time</th>
<th>Spring 2016</th>
<th>Fall 2016</th>
<th>Spring 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limitations Sculpture</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td># of clay parts 1 through 9</td>
<td>3</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>One sculpture in each semester will be made from multiple clay parts fused into one.</td>
<td>3 into 1</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Sculpture display orientation and composition</td>
<td>Hanging</td>
<td>Free Standing Pedestal</td>
<td>Free Standing Pedestal</td>
</tr>
<tr>
<td>Theme generated by computer/random selection</td>
<td>Shell</td>
<td>Tower</td>
<td>Triple</td>
</tr>
<tr>
<td>Sub Theme / Computer Generated</td>
<td>Retro</td>
<td>Slinky</td>
<td>Bind</td>
</tr>
<tr>
<td>Sub Theme / Computer Generated</td>
<td>Tangle</td>
<td>Bundle</td>
<td>Radiate</td>
</tr>
</tbody>
</table>

Table 4 Displays the recorded times spent on each work. Time spent brainstorming, sketching, and planning is all done before the production phase. Production time includes
working with the materials and problem solving as I execute the intended production plan. The timetable shows the condensed version of my journal records. This method usually helps aid in calculating the sale price of the work once complete.

**Time Table**

**Table 4 Time Table**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Spring 2016</th>
<th>Fall 2016</th>
<th>Spring 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limitations Sculpture</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Planning and Brainstorming Time (Hours/Minutes)</td>
<td>5H 40M</td>
<td>4H 50M</td>
<td>6H 15M</td>
</tr>
<tr>
<td>Production Problem-solving Time (Hours/Minutes)</td>
<td>11H 25M</td>
<td>9H 50M</td>
<td>17H 15M</td>
</tr>
</tbody>
</table>

For each work I have retrospectively deconstructed how the series started in relation to how the series ended. I first looked at the data in a linear fashion similar to a timeline of creation or artistic events then made comparisons by using a triangulation matrix in Table 3. The limitations I set forced my work to be viewed as a series of connected events. I hypothesized that limitations can provide an artist with a focus. Fewer resources to choose from forced me to think more critically and creatively about what I have available to work with. I also spent much more time planning and the act of artmaking was streamlined with little issue on how to proceed. I expect that limitations are a way to get over a creative block and allow an artist to get to work even if it is just experimentation.
Limitations

Calculating the exact time for each work is difficult. I am sure that problem-solving through earlier works has made it easier for me to execute later works. There are many times that I am thinking about what I plan to do during the day but not actively working with the materials or recording ideas in a structured format. I think it may be hard to see how far reaching the specific limitations and constraints I am setting are impacting my artmaking. Deciphering validity may be difficult for others who see the results because they were not witnessing the artmaking first hand. I hope to remedy this by show the documentation process and providing visual examples for some of the works that show the process. I hope this will provide more transparency.
CHAPTER IV

DESCRIPTION OF WORK AND DATA ANALYSIS

This chapter provides an analysis of the data that was collected for all nine works created using the limitations methods of development. I will first describe the process for developing each work to provide a visual and descriptive timeline of how each artistic event occurred and progressed into a new work. All the works are linked and meant to be viewed as a holistic series of nine. They will be deconstructed individually and also holistically. This study seeks to find the answers to the following questions: What role does limitation play within the body of work I developed? How do limitations create a foundation for new discoveries and the development of innovative solutions to unique problems? How do limitations allow us to find a focus within our work? How do limitations save time and act as a springboard for creative development?

Description of Work

The nine works were created from spring of 2016 to spring 2017. Spring 2016 marks the beginning of the creative problem-solving phase and navigating the materials with specific set limitations and concluding in the spring of 2017. All the sculptures were first influenced by the general list of limitations and constraints that must remain a constant for the nine works (see Table 2 Chapter III). The other figures and tables within Chapter III break down how the study was organized and data was collected.
Figure 11 Limitations 1, 2 & 3 Jon-Michael Willert Ceramic and Fibers 2016
Deconstruction of Works on Limitations

Limitations 1: Shell. Retro, Tangle. Three into One.

While researching and sketching ideas for Limitations 1 I used the three theme words to guide my research and overall form and display orientation. I wanted the main form to somehow resemble a shell that I found while on my first vacation to Italy with my wife. I also wanted it to resemble an object that had a retro design. I remember seeing retro Buck Rogers toy ray gun at an antique toy store about ten years ago. I regret not purchasing it every time I think of it. I hope that by incorporating this into my sculpture I will then be able to finally let go of not making the right choice at the time. Tangle was used to guide the locations of the negative space within the form and how the natural rope fibers would weave in and out wrapping around the form and ultimately using it to suspend the sculpture within the air. The clay form was made from three main clay parts fused into one form.

Limitations 2: Tower, Slinky, Bundle. Three Main Clay Parts

Limitations 2 was formed in a vertical orientation from the bottom up similar to the same construction methods use in skyscrapers. I attempted to use the words in a literal sense. The word tower inspiring the idea that the form would be tall and tower over the other sculptures in height. I used the rope fibers to wrap and weave around the sculpture in a way that would be symbolic of the helical spring Slinky toy invented by Richard James in the early 1940’s. The natural clay fibers create the four small bundles at the top of the sculpture representing how bundles of wheat were harvested by hand. All of the natural plant fibers were ones that I went out and foraged for harvesting them myself. Finally, when stacked the two top clay parts are woven together. They could not be fused because they needed to remain as three separate clay parts to follow the initial limitations.
Limitations 3: Triple, Bind, Radiate. Four Main Clay Parts

Limitations 3 was made from four main clay parts. The first theme word was triple. I wanted to focus on the idea of three. I made a large heavy base out and three smaller clay parts that would attempt to be the focal point or transition from the man-made parts to the natural fibers radiating out of each opening expressing another one of the sub theme word. I then chose to zig zag tie and bind the fibers to create the main shape of the organic form. When I think of nature I think of odd numbers. I wanted to create a form that was very free flowing and tried to hide the fact that there were four clay parts.
Figure 12 Limitations 4, 5 & 6 Jon-Michael Willert Ceramic and Fibers 2016
**Limitations 4: Earth, Variation, Ladder. Seven Clay Parts into One.**

One of the limitations for this study requires that one sculpture from each semester must be made from multiple parts fused into one. The number generator chose that this sculpture would be made from seven parts that then needed to become one main object. I created seven separate vessels. One large vessel acted as the main form that all the other smaller parts would connect to. As I continue to use the three guiding words in a literal sense I then used potting soil to make the connection to earth and incorporated plants and small rocks to symbolize a small ecosystem or and earth like location. The word variation guided me as I created each ceramic piece on the wheel ensuring that all seven would be unique along with choosing seven different types of plants creating more variations. The difficult task was figuring out how to incorporate the word ladder. In a literal sense a ladder allows for someone climb and reach an area they would not be able to get to without the device. Plants often use the objects around them to climb and grow. I attempted to use the natural plant fibers to create a sturdy frame. I then used the rope fibers to make steps or pathways for the plants to creep along and follow.

**Limitations 5 Water, Shadow, Constrict. Six Main Clay Parts.**

For this sculpture I chose to make one main vessel and five smaller vessels. The main vessel symbolized the Big Thompson River acting as the main water source. The five smaller vessels acted as the small water reservoirs that the Big Thompson River supplies. The main plant fiber that is used in every sculpture is a Colorado native wetland shrub. I harvest the fibers before they bloom and sprout new leaves. For this sculpture, I incorporated the wetland shrub fibers into the main form. I then went to five reservoirs all fed by the Thompson River and took a different pant clipping from each. To connect all of them I took the natural rope fibers and made pathways showing a relationship between all of the bodies of water. The distance of each jug in relation to
the main vessel relates to the distance of the reservoir to the main source. The rope fibers also have a single piece of rope that curls around the others. This curling rope represents a simple sine wave and is symbolic for how water reacts to surrounding forces. I tried to tighten all of the rope fibers to constrict them. I tried to constrict all the knots and weave them back and forth so they create a lot of tension. Finally, I use three different lights (white, soft yellow, and soft blue) to create three different overlapping shadows to incorporate the final selected word in a literal sense.

Limitations 6 Theme Words: Wind, Tumor, Polymer. Construction: Six Main Clay Parts.

One of the nine sculptures had to include a synthetic fiber from a found object. My wife had found an old nylon parachute at a surplus store. She purchased it thinking I would be able to use if for one of my fibers projects. The original plan was to make some sort of kinetic sculpture using air currents to move the large pieces of nylon. After spending lots of time failing at this attempt I chose to cut the parachute apart. I originally wanted to keep it as on piece. As I cut it apart I noticed that each piece resembled a wind sock that could be stuffed and bound to create a new shape. I tried to create long polymer connections or what resembles a chain of molecules made up of individual monomers. The two clay bodies are convex partial spheres and have smaller convex shapes of various sizes protruding from the main body symbolizing tumor growth and expansion. The yellow nylon that is protruding out of the convex shapes are intended to inflate and deflate.
Figure 13 Limitations 7, 8 & 9 Jon-Michael Willert Ceramic and Fibers 2017
Limitations 7: Hexagonal, Combust, Mound. Five Main Clay Parts.

Limitations 7 is made from 5 main clay parts with small areas subtracted from the main bodies. The word mound guided the design and form for each main part. When building structures, the word mound reminds me of the Persian structures called Yakhchal. Yakhchal were used as ancient evaporator coolers for subterranean food storage keeping items cold. Their shape closely resembles a tear drop structure or mound. I chose to burn the fibers after binding them together allowing them to partially combust before extinguishing them. To incorporate hexagonal shapes into the forms I drew out a series of connected hexagons resembling hexagonal molecular structures. I chose to cut out the perimeter of the shapes they made so that each one fits back in its place like a puzzle piece. The distance and layout of each extended part creates a scalene triangle when viewed from above. Triangles are an important part of engineering structures and I found that the hidden symbolism created a more calculated and pleasing asymmetrical compositional layout.

Limitations 8: Diverse, Ovate, Crossroads. Seven Main Clay Parts.

Ovate guided the curvature of each form. All seven clay vessels are unique and diverse in shape and size but resemble each other in the curvature of the form. They are also diverse because the rope fibers are all uniquely incorporated attempting to make each vessel distinctive. Each vessel in numbered and color coded. One is the largest and seven is the smallest vessel. This sculpture is viewer interactive and the composition changes. Each vessel slides along a circular path. Vessel one has the largest circumference and vessel seven has the smallest. As the viewer changes the composition and slides the vessels along their individual path they meet at a crossroads. It is up to the viewer to choose a composition that they find astatically pleasing. Vessel one and seven have the two small clay knobs reversed or obtuse at a 135-degree angle
where as two through six are acute at 45-degrees. The difference in angle signifies the beginning and end or largest to smallest. Figure 14 shows the layout of the intersecting paths or crossroads along with the color coordinated circles.

**Limitations 9: Loneliness, Cactus, Plump. Nine Clay Parts into One.**

The final work created for this series shares has a strong connection with the first work that was developed. The first work *Limitations 1* was created from three main parts fused into one along with *Limitations 4* being seven into one. One sculpture each semester had to abide by the same criterion found in Table 2 Chapter 3. I also chose to do this because one of the computer-generated themes was loneliness. This also hinted to me that the sculpture needed to seem in isolation expressing the literal meaning of loneliness. I also thought that it was only fitting to start and end the series with a work that became one single form loosely signifying the beginning and end. The word plump also guided the form of the vessel being short, rounded and stout. I wanted the plant fibers to radiate out from the sculpture in all directions to symbolize
cactus spines. Cactus spines ward off unwanted threats and I wanted the plant fibers to look delicate but also give a sense of protection for all 360 degrees around the form.

**Findings and Data Interpretation**

After sorting and making connections and comparisons from the processes used in developing the series of nine sculptures I found that the planning process was streamlined for the majority of the sculptures. I found that in the development process the planning and sorting of ideas made it easy for me to foresee how the work would relate to previous sculptures. Comparing the first three works to the last three works showed an expansion of ideas and I felt that I was able to make more connections with how I interpreted the three keywords that the computer generated. In the beginning, I felt somewhat restricted working within the guidelines. I also noticed that because I had worked with all the materials and was able to apply my prior knowledge, I became more efficient at planning and producing the work. I was also able to make more connections from one work to another once I was further along because there were more works to make connections with. I also found that as I worked, it was easier to interpret the three guiding theme words for each sculpture. I began to use them as a guide and not feel that they had to have such a literal interpretation. By analyzing each work in a linear orientation, I found that the final three sculptures were developed with more confidence in the idea. I also had more of an emotional connection with the work that I lacked in the past.

**The Role Limitation Played Within my Series of Nine Works**

The role that each limitation played was hard to see at first. In the beginning, the limitations felt like rigid and solid puzzle pieces that only fit together one way. It seemed that there were only a few ways to work with and interpret what I had in front of me. As time went on, I felt that the limitations were no longer rigid and solid puzzle pieces but had now become
something that could shift and change or adapt to serve a new purpose. When I realized this I finally felt that I was not longer confined by them. I felt that the limitations did not need to dominate each aspect of my work.

**How Do Limitations Create Innovative Solutions To Problems?**

Limitations provide a focus and are a constant reminder. They force you to constantly revisit what you have and question your ability to problem solve within those boundaries. The key is having an awareness of the constraints and limitations. This awareness forced me to look for creative solutions to the constraints I was trying to navigate. I spent more time planning and researching ideas looking for creative ways to interpret the three theme words. The majority of the work that I created in the past did not have such deep and interwoven meaning or connection. For the first time, I found myself enjoying talking about the work that I created. Before this study, the main artwork ideas I had were related to what I found aesthetically pleasing but not much deeper than that. I would have some general ideas of what I thought I wanted to do but I never actually planned in a way that provided a clear vision for a final completed work. I would just work and experiment with the materials and see what happened. I was usually happy with what I created but never really had that much to say about it. I did not have an emotional attachment to the work other than being pleased that I found it to have some sort of aesthetic value.

Focusing on the limitations continually provided me with a sense of ownership that I was proud of and confident as an artist. I had not really felt this in the past. I always felt envious when seeing an artist lecture about their work. I felt they had such a deep connection with what they were creating and I wanted to find that for myself. I wanted my work to reflect the things that I saw differently than others. I felt that I needed to provide others with a way of seeing or
interpreting each artistic experience in a way words could not describe. It seemed like there was no other way aside from creating a physical visual and tangible object. I wanted to show the fusion of all these ideas at once. The limitations were constantly reminding me that I needed to keep searching for new ways to use what I had.

**How Do Limitations Help Find A Focus?**

Limitations can provide some guidance and give you a little nudge when you don’t know what to do next. Limitations allow an artist to navigate new materials in a structured manner. The limitations also forced me to plan ahead and do a more thorough job of brainstorming. I also started to question whether there had to be a focus. I felt like this was something I was told always needed to be there. I began to ask myself if there was no emphasis or concentration was there still value in work I was creating. For so long I tried to find ways to create work that seemed to have some sort or deep sense of meaning or philosophical connection to my vision as an artist. At this same time, I finally felt like I found a way to creatively show a vast amount of ideas within one work that was difficult for me to explain in words.

**How Do Limitations Springboard Creative Development?**

Limitations gave me a starting point acting as a foundation for growth. I was able to jump right into figuring out what I wanted to create. I found that the limitations allowed me to find creative ways to experiment with the materials I had to use in a way that was structured. This structure created an order that I seemed to be lacking in the past. I never felt like I was wasting time or paralyzed by the thought of what to do next. I got excited when I found a new way to use my materials. I felt like I was making discoveries. Some of these discoveries were physical discoveries that can be seen in the work that I developed. I also made personal discoveries and learned about myself and my philosophies as an artist and creative problem solver. I also began
to question why I did things a specific way and felt confident in looking for new ways creative ways to navigate life situations. I felt that just because something was always done a specific way did not mean that it needed to stay that way. I was never willing to take the risk in the past for fear of failure and wasting time trying something that might be a total catastrophe. In the end, all nine have been developed using the set limitations as a guide for problem-solving. I think that creative problem-solving within limitations helps prepare someone to work within the confines of real life situations. We cannot control every aspect of our lives, and we are not able to avoid certain obstacles. If we are effective at creative problem solving and can work within the limitations set before us, we will have the knowledge and tools it takes to overcome challenges. In the past I always liked sticking to things that were predictable. This seemed to create a safe zone that helped to avoid the anxieties that go along with uncertainties. Setting limitations have forced me to let go of scenarios that gave me a lot of control. I have slowly found my new creative problem-solving methods to be more liberating than I had originally intended. I have learned to embrace this method and not fear the uncertainties.
CHAPTER V
Conclusions, Implications, and Recommendations

Focusing on limitations and constraints within any situation is a valuable way to orient yourself with the issues placed before you. I think that this method of planning would be a good challenge for any artist to attempt. The organization methods could also be utilized at times to streamline creative development if those tactics would benefit the artist’s circumstances. I do not feel that I would want to use this method for every work I create. There were times that I felt my creativity was suppressed because of the set limits. I think it is a healthy way to challenge and reset your way of thinking. I believe that it could also help people who work as a team. Having an awareness of your limitations can help you realize where you are at and where you want to be.

I think creating limitations can also help an artist move forward if they are struggling with the idea of what to do next. I think that this method would be beneficial for people who are trying to navigate new materials and learn about a subject that may be foreign to their current state of creating. I am still reflecting and uncovering the far-reaching implications of how constraints and limitations are woven into our everyday lives. When I give my classes a new assignment there is usually some sort of prompt. To my students this prompt acts as a limitation or starting point. Now that I have revisited the idea of creating work and not choosing all the variables I have a better understanding of how my students may feel when I give them a new assignment. I think as teachers we spend so much time trying to find a harmonious balance in our classrooms that often we overlook smaller details that have big impacts.

For the purpose of this study, I have chosen to focus on setting fundamental limitations and constraints that relate specifically to developing a body of work by setting parameters prior to beginning a body of work. These restrictions were intended to be a starting point. They were
not intended to create barriers that an artist cannot break through. We are often told to think outside of the box. The idea of the box does not have to be as constricting as we think; the box can simply be a starting point from which we will allow our thoughts to manifest and grow. The box can expand to fit more concepts ideas and thoughts once we are ready to move on. The box can open and allow ideas to grow and branch out in new directions. The box can just act as a foundation or a starting point. The box makes it possible to see what we have to work with and how our ideas can grow and expand from a starting point.

Nature does a good job of describing how the idea of starting inside the box can work. A small seed is planted in a pot, the pot symbolizing the box. The seed will eventually germinate and begin to grow to expand from the pot. The container acts as a starting point and allows the seed a safe place to grow and develop confidence and expand. At first, the plant may be very fragile and delicate, but eventually, the root system will grow and strengthen. The plant itself will become more robust as it ages. The same can be said for a newly planted tree but once it grows and is established the tree becomes very healthy and stable with the capability of withstanding much of what Mother Nature will throw at it. The same can be said for a child developing creative problem-solving skills within the art room.

How do limitations build confidence? How can an educator provide a platform where limitations enhance the vertical articulation of an art education curriculum? If an art educator creates a set of limitations for their students they may provide students with a platform that will result in a more desirable final product. Although this may seem like it is very confining and does not allow for exploration, this is just a starting point. If done correctly by loosening the limitations or eliminating them over time the young artists will have the confidence it takes and the problem-solving skills required to think more conceptually and creatively when faced with a
challenge. The individual who acquires this particular set of competencies will then be able to use the limitations that are outside of their control to their advantage. The individual that has the capability to problem solve within these constraints will have an easier time figuring out a creative solution to a unique problem or challenging life situation.

With so much focus on thinking outside of the box, we are often easily lost with too much to choose from. Sometimes we are often not prepared to make creative problem-solving decisions because we do not yet possess the skill to do so. If a student tells me, they cannot do something I always respond, "not yet, but soon you will be able." If we utilize limitations and avoid the assumption that a creative idea will strike us like a bolt of lightning, we will find ourselves making new discoveries and find interesting paths to take.

In the future, I plan to always try to look at the limitations as factors and variables that need to be considered while working. I do not plan to always follow such a structured and rigid strategy for creating artwork or when lesson planning. By doing this study I was able to learn a lot about myself and the far-reaching implications that limitations have on our lives. Taking the time to stop and consider these variables is a responsible way to approach a situation put forth your best attempt.
REFERENCES


