

CREATIVITY

An in depth exploration into
the creative process

By Aparna Sud

RESEARCH APPROACH

In my quest to discover how might we enable creativity in a business context for innovation purposes, I set out with the aim to breakdown the concept of creativity and approaching it from different perspectives taking the following steps in doing so:

1. **DEFINING CREATIVITY** - the concept of creativity can be elusive. Creativity means different things to different people. There's no one way to define the concept, but understanding the working definition of creativity depending on who you speak to is very valuable in deconstructing the highly individualized process.

2. **CODIFYING THE CREATIVE PROCESS** - in attempt to better understand the creative process within a business context, I wanted to first understand if there was a way to codify creative processes from different fields. If there were commonalities, similarities across different creative disciplines that could then be applied to a business context. In attempting to systemize the creative processes, I interviewed individuals from art, music, dance, and design disciplines.

3. **IDENTIFYING PROMOTERS AND INHIBITORS OF CREATIVITY** - in interviewing creatives from different disciplines, certain factors from a physical space perspective and mental space began to surface from my research that either promote or inhibit creativity. In better understanding these, opportunities emerged for constructing and simulating the optimal creative environments.

4. **UNDERSTANDING COGNITIVE CONSTRUCTS OF CREATIVITY** - I also wanted to understand what happens in the brain during creative processes. To see if a neural framework could be used in systemizing the creative process or at least lend itself to building the mental environments and space for creativity to flourish.

5. **PROPOSING APPLICATIONS OF CREATIVITY FOR BUSINESS INNOVATION** - lastly I weaved together insights from the design research of creative processes and applying it outside of the business context.

In the process, I began to uncover problem areas in companies where creativity was stifled to map out how creative interventions may help in solving some of these issues. My aim was to understand any obstacles, factors that need to be accounted for when applying research findings to innovation and in doing so map out the "opportunity area."

As a result of my research, I came away with a broader and deeper understanding of both a ripe inner or mental headspace as well as an external or physical environment for creativity. Factors emerged that could contribute and help design a world within large corporations where creativity could flourish. Doing so could provide a channel for creative energy to be transformed into business value. Creating an outlet for employees, a place for them to be creative and be inspired could not help improve employee engagement, but could also serve as a launchpad for breakthrough ideas to surface that could propel companies into the future.

The opportunity that emerged from my research was to become a "creativity" coach if you will, with the toolkit to consult business executives seeking to regain creative confidence as well as innovation teams looking to adopt new technologies, employee trainings, and spaces which could improve creative output.

From my research, I found creativity to be a highly personalized journey. What works for one individual may not work for another. Therefore, one could imagine individuals seeking to increase their creative confidence and expand their creativity beyond just a business process like design thinking which they know. To do so they may look to take on the services of a hypothetical "creative coach" similar to how athletes may enlist a personal trainer to deliver a personalized training regimen when preparing for a big race.

Furthermore, the themes that surfaced from my research as key pillars to align towards included **Imagination, inspiration, freedom, and focus.**

Next semester I plan to flesh out my opportunity space keeping true to design principles above.

ORGANIZATIONAL IMPORTANCE

Creativity is an impending critical skill set for businesses that can serve as a long-term advantage, allowing them to sustain their competitive advantage in the new VUCA era amidst volatility, uncertainty, complexity, and ambiguity. Customer needs are changing and the market is becoming increasingly competitive at a faster rate. In order to propel forward, companies have to tap into employees' creative potential, without which there is no basis for differentiation between company A and B.

By and by large companies underutilize their biggest asset: human capital. As a line item, people represent a company's major and sometimes biggest liability, yet if employees were encouraged to "create" rather than to just do, companies could reap the benefits of millions of dollars worth of personalized intellectual property.

INDIVIDUAL IMPORTANCE

We're shifting from a matrixed, corporate hierarchy model, where people make other people machines, to a living management model, one that is defined by an organic system that evolves, adapts, and is interconnected. In such a system, everyone plays a pivotal and impactful role. It's a microcosm of a culture, and in any culture, people exhibit a human desire to make and create.

Economist Dan Arielle, comments that efficiency is less important than meaning at work. As we shift from an industrial revolution to knowledge economy, meaning is becoming an increasingly important factor for people when they decide which job offer to accept.

FRAMEWORK

In order to better understand how creativity is applied across the spectrum, I looked into different creative processes from artists to designers to musicians to dancers. I was hoping the commonalities I found would lead me to a better standard working definition of creativity in order to demystify the term creativity.

In my interviews, I designed questions that were not leading questions so as to not allow my biases to come into play when conducting research.

That said the working assumptions founded the basis for my work outlined in this paper and are important to highlight:

- Creativity is essential to the innovation and design process.
- If innovation and design can be reduced to a process then anyone must be able to do it, human or machine.
- Originality is a skillset, practice, rather than a talent or process.
- Creativity is innate in all human beings, as a soul pursuit, but it can be developed as a skillset through practice and process.
- By increasing individual creativity, the creative output of the individuals that comprise a team can also increase as a result.
- Innovation is introducing something "new, useful, valuable to an organization or its customers, thereby creating value for the firm."

The fundamental standpoint I adopted, assumed the perspective of the brain as a muscle. A muscle needs to be flexed in varying ways in order to develop a certain skillset., such as creativity.

Furthermore, prior work had thus since only considered a organizational perspective when applying creativity to the business context. But for the purposes of my research, I chose to take an *individual* lens to dissect the creative process with the intention to apply learnings to the business world. My ultimate goal was to discover insights that could lead individuals within organizations to cultivate their creativity and employers to tap into this potential as a strategic asset.

RESEARCH APPROACH

To start my research, I sent out an anonymous questionnaire around the value, role, and definition of creativity. I deliberately sent it out to people in my network, who were in creative fields because I wanted to get a baseline gauge of the population I was trying to better understand across the spectrum.

- When you hear the word creativity, what mental imagery immediately comes to mind?
- On a scale of 1-5, how creative do you consider yourself? When answering the above question, who (if anyone) did you compare yourself to?
- Think of the last time you felt highly creative, describe that feeling. What were you doing?
- Think of a time period when you felt not creative at all, why did you feel that way? What triggered those feelings?
- Think of a time period when you felt not creative at all, why did you feel that way? What triggered those feelings?
- Do you believe creativity is a talent or skill-set? Why?
- In your opinion, what is the role of creativity in business?
- Do you consider creativity an art or a science? Why?
- How important do you think creativity is to the innovation process?

With 62 responses to my survey, many of which were short-answer, I gained a better sense of what questions were missing and gaps in knowledge that needed to be filled to understand creativity on a deeper level. The survey answers gave me valuable insight into enablers, inhibitors of creativity within fields of design, innovation, art, music, and dance as well as mental models for creativity.

As a second stage to my research, I conducted interviews with creatives from different fields/disciplines/professions.

Scientific method (1)
Artistic process (1)
Musicians process (2)
Design (UX, UI, research) process (6)
Entrepreneurial process (1)

I asked them the following questions to take a deeper dive into the creative process in particular:

Exercise

- What's the mental image that first comes to mind when you think of creativity?
- Can you complete a Mind Map of creativity?

Process

- Do you always follow the same process or does it differ? Can you walk me through your design process?
- Are there activities you do in your free time that help you in the workplace to get better at the design process?
- Where do you draw your inspiration from?

Creativity

- On a scale of 1-10 how creative would you say you are at work? What would it take to increase that number?
- Thinking of the last time you felt most creative. What were you doing?
- What's your ideal space for design work?

Role; Future of Design

- Do you think anyone can be creative? What would they need to do so? Do you think anyone can be a designer or practice design?
- How do you think design + innovation relate?

SYNTHESIS - SURVEYS

DEFINING CREATIVITY

The mental model of creativity among “creatives” is surprisingly very traditional. Interviewees imagined colors, abstract shapes, messiness. One artist described a “quintessential painter eccentric painter”, a madman who’s completely “inside his own head and even a little bit selfish.” Many noted thinking outside the box and imagination as key components to creativity.

By in large, creativity varies in meaning and understanding depending on the individual. This both attested to the highly personal nature of the act as well as indicates the opportunity to redefine creativity in a standardized way.

“A person who is fearless, a problem solver someone who “colors outside of the lines”.

Someone who is unique who’s imagination has no limitations.”

“Making something beautiful out of chaos.”

“Creativity is a constant process of testing and failing and discovering new things.”

ENABLERS TO CREATIVITY

Individuals were most creative when doing something they enjoyed (like sewing), writing, business ideas, cooking. Many described a flow state of enjoyment, wherein highly focused energy that exudes out of the individual gets directed to the task at hand and the individual is completely immersed in the present moment. The majority of activities that led to a flow state were **solo** activities. This is contrary to popular belief that creativity is primarily a team sport.

“Being in a state of flow, where hours literally slip by. Focused, energized, excited.”

“When I’m fully present in the moment.”

“When I’m in a flow state, in the zone.”

HIJACKERS TO CREATIVITY

Limitations of any kind and distractions pose as an inhibitors to creativity, overwhelming the individual and stifling their process. Stress, lack of energy, time pressure, mundane activity like chores, create the feeling of being fenced in, constrained, and overwhelmed. When asked about the last time they felt least creative, individuals responded with the following:

“I felt stifled - a lack of autonomy, and to some measure, lack of purpose. I think it’s important that there is a common understanding amongst teams about not just about what to do and how, but why.”

“Feeling like a cog in the system, not given opportunity to think outside of the box.”

“I was working a job that was totally regimented, no room to do anything differently in any way.”

“My organized side of my brain sort of hijacks my creativity, because I know I have responsibilities to deliver something even when it may not be flowing naturally”

“Distracted, when there’s too much outside interference”

CREATIVITY AS A TALENT OR SKILL-SET

When asked if creativity was a talent or skill-set, most respondents indicated creativity to be both a talent and skill-set. The consensus was one had to have some natural intuition, ability for seeing the world different from others, but that this ability could also be learned.

“I think it is both. Some of it is instinct but there are exercises that can be done to help bring out more creative ideas. Like rapid list making, mind mapping, image surfing, etc.”

“I think it is a bit of both. I believe that some people are born more creative thinkers than others, but I also believe that it is something that can be developed over time with the proper education.”

SYNTHESIS- INTERVIEWS

THE ARTIST PROCESS

A key takeaway from my in depth interviews was a greater understanding of the artistic process and how it differs from the design process.

Art is fundamentally a human **expression**. Creativity comes from deep within and a artistic medium serves as an outlet. Art can be practiced either as a form of self expression as an outlet for creative energy or with an intent driven expression with the goal to explore or communicate an idea.

The aim of any artistic output is to elicit emotion, for the audience to feel something. However, the measurement of this emotion is highly subjective and only comes at the end of the creative process. As such, the evaluative stage of the artist process is very much internal. Artists have usually no paradigm to follow when producing something of their own creation. As a result, artists are subject to their "inner critic", leading them to a dangerous loop of deep questioning, vulnerability, and fragility. As such, art is a deeply **personal** act.

Art is a conversation between the audience and the artists where the artist is driven by his/her intent to evoke some emotion or question in the audience's mind. The artistic vision motivates and propels the artist forward to producing something out of nothing. In this way, the artist is imagining a world and attempts to recreate that world for an observer, like a gift. There can be an iterative cycle between the artist and audience depending on the field (e.g. music, comedy, dance) wherein the artist becomes a performer and feeds off the reaction of the audience to craft his/her art form.

Furthermore, many artistic endeavours are about repetition and continuous refinement. Artists require a willingness to fail, learn, and try again. There's a certain trust of ambiguity in the artistic process, one that provides the space for something to emerge from nothing.

"I think it's like entrepreneurship... it might come more naturally for some (talent) but anyone can learn techniques and mindsets to allow for more creativity (skill-set)"

"Both, like learning a language, you use it or you lose it."

CREATIVITY AS AN ART OR SCIENCE

80% of participants considered creativity to be an art AND a science, demonstrating the complex nature of the act. One that draws from methodologies of both fields.

"As an art, creativity flows expansively and drives the creative approach. As a science, it allows for seeing the possible in the impossible, expanding the strictures of known scientific laws."

"Thinking outside the box is the common theme but it can occur anywhere on the scale of artistic to scientific. Soft sciences are less measurable, but often make the biggest difference."

BUSINESS VALUE OF CREATIVITY

Many considered creativity to be highly valuable in the innovation process and important for businesses to stay ahead of the competition. The common notion was that each individuals in an organization had the potential to be creative, and seek solutions to problems in a different ways.

"It's everything! It's how new solutions to old problems are dreamed up. Every challenge and obstacle in business requires creativity to move through."

"Crucial to innovation."

"Creativity is the silent puppeteer. It is extremely important to all business decisions and operations but is also HIGHLY undervalued."

"It allows for fresh ideas, different ways of seeing problems and solutions, adds a dynamic personality to the workplace, sees people not just as a resource but an integral part of overall success."

THE DESIGN PROCESS

Design, on the other hand, is an art form that incorporates methodologies from the sciences. It allows for rapid feedback from users, allowing for a quicker turnaround time to any change in design. The best designers are able to detach from their ideas and produce something that is useful, functional for a user. Design's primary end goal is to drive behavior change, taking more of an objective lens to their creative process. As such, creativity within the context of design is a way to solve user's problem within a set of constraints.

ART VS DESIGN

To expand upon the differences between art and design: When applying a artistic process into the business world, the essence of creativity gets lost in translation. Art pushes boundaries, asks questions, provokes thinking, explores ideas and concepts. Art is about taking risks, being bold, not shaping the result merely for an audience.

On the contrary, designers has to take him/herself completely out of the end the equation to reduce bias. Creative output from design is driven by the end audience (user), and a designer's job is goes on a quest to understand the how, and the whys of what is occurring in order to improve upon it. In this way, there is something inherently personal about art whereas design is much more objective and limited by constraints. In this way, design borrows from the sciences, can be vigilantly tested and measured through changes in user behavior, and thus allows for a faster iterative cycle than art.

THE ENTREPRENEURSHIP PROCESS - SIMILARITIES TO ART & DESIGN

Entrepreneurship has parallels to both art and design. Like art, entrepreneurship requires bringing an idea to life. Doing so, requires imagination, seeing a vision and then being able to translate that vision for a broader audience. Entrepreneurs like artists are producing something truly original, and thus have no context for evaluation of their creative output until finished.

On the other hand, entrepreneurs like designers require detachment from their ideas if they want their ideas to reach a wider audience. This allows them to quickly iterate on prototypes, half finished expression of ideas, with the goal to acquire user feedback during the creative design process in order to achieve scale.

THE SCIENTIFIC PROCESS - SIMILARITIES TO DESIGN

Design research is very similar to the scientific method wherein individuals are exploring a research question, developing hypothesis, and then testing it in an iterative fashion.

- Start with the topic, research question
- Gather observations
- Develop an inference; hypothesis
- Test a hypothesis objectively by collecting data
- Validate your hypothesis and iterate on this hypothesis for the next test

There's something about being a sponge, starting without any assumptions as a scientists that is similar to starting off with a blank canvas as an artist. However, like design there's typically always a hypothesis to validate or invalidate in science. In this way, science like design has outputs at each stage based on feedback of hypothesis testing and is more a learning process than an expression.

Science unlike art, cannot communicate ideas. It unveils and explains the world that we live in rather than re-defining it. Much of conceptual art is anti-science. There are many things in the real world that are changed or manipulated simply through imagination with art and not science.

FLOW STATES - DISCIPLINED PRACTICE

During the creative process there are points in time wherein individuals feel completely free, when their mental space is void, clear. These states of creative flow are very similar to flow states achieved by athletes. It's almost as if an emptying has occurred that makes room for creativity to emerge. Achieving flow requires a routine, a repeated approach of disciplined practice. During this phase, individuals can lose all sense of time due to a deep focus in their art form. There's almost a separation of the body, where the creative spirit that moves an individual and takes over the body so that muscles are almost moving themselves.

This finding is supported by neuroscience literature that explains that the autonomic, limbic system can be triggered by repetitive activity, habit. In this way, movement in the form of a ritual can allow the brain to rest. As such, any coordination between mind and body, is essential for creativity.

"When I'm improvising (properly) I'm in a zone, my mind is clear of everything but what I'm playing. It's almost like the music is playing itself." - Mike Shapiro, drummer

"Pixar films are not good at first, and our job is to make them go... from suck to non-suck. We are true believers in the iterative process - reworking, reworking and reworking again." - Ed Catmull of Pixar

CREATIVE COGNITION

THE FUNCTIONAL BRAIN IN CREATIVITY

The creative process as shown to me by research thus far, is highly personalized to the individual. This got me thinking that what makes us so unique as individuals is our brains, how we think, and how our wiring is each so different. This prompted me to look into different cognitive constructs for the creative process to see if there were opportunities to tap into these constructs in order to encourage creativity on an individual basis.

Creativity is a complex cognitive process, that requires the entire brain. The creative process consists of both conscious and unconscious cognitive processes. And there are several working models for creativity. The corpus callosum, the part of the brain that connects the two lobes, is thicker in diameter in people who score highly on creativity tests. Researchers have found that a thicker corpus callosum, the more efficiently the brain synchronizes activities. This idea is increasingly supported by recent brain-imaging technology. So, popular to common belief, creativity is enhanced by an increased use of the whole brain rather than just the right side.

Charles Limb also identified a dissociation in the lateral prefrontal lobe an area that turns off to allow individuals to be uninhibited, fearless during creative endeavours. This deactivated brain area. This deactivated during creative improvisation is also at rest during dreaming and meditation state.

By far one of the most recognized constructs alludes to different types of reasoning during the creative process of:

1. Abductive reasoning
2. Deductive reasoning.

During the beginning stages of the design thinking process, individuals are more apt to flex their abductive reasoning (synthesis; gauge meaning; see the holistic picture). Whilst, the latter half of the design process lends itself to more analytical thinking with deductive reasoning (if this is true, then this must be true).

To dive deeper into divergent, or lateral thinking we can look to Guilford's framework in 1967. He associated the properties of divergent thinking with four main characteristics:

- **Fluency** - the ability to rapidly produce a large number of ideas or solutions to a problem
- **Flexibility** - the capacity to consider a variety of approaches to a problem simultaneously
- **Elaboration** - the ability to think through the details of an idea and create new meanings
- **Originality** - the tendency to produce ideas different from those of most other people

COGNITIVE CONSTRUCTS

In order to better categorize creativity, researcher Graham Wallis developed a common model for creative processes in 1926, a four-stage process that encompasses the following stages:

- **Preparation** - defining the problem; gathering information to understand and frame the problem
- **Incubation** - allowing unconscious processing to occur; stepping back from the problem, a conscious diversion of attention
- **Illumination** - the idea arises or surfaces; as a rush of insights that illuminates the whole picture
- **Verification** - the evaluation process; testing of the idea to see if it satisfies criteria defined in preparation and solves the problem

Wallis' model demonstrates that creativity occurs over time. Most innovation processes follow a linear path, not allowing sufficient time for incubation, understanding of the problem, and synthesis of information.

There seems to be a threshold, once hit, solutions will surface quickly. To hit that threshold time allotted to deep thinking, rumination and space away is necessary. Forgetting, helps make memory space for new neural networks. In this way, creative individuals can overcome functional fixedness, and strengthen new thought patterns.

Another creative construct that is popular in creativity research, describes three networks that are engaged during creative tasks:

- **Executive Attention Network** - requires "laser beam" focused attention; high levels of concentration, on tasks with heavy demands on working memory. This network is especially useful during the actual producing of the creative output.
- **The Imagination Network** - otherwise known as the default network is involved in constructing dynamic mental simulations, imagining alternative perspectives and scenarios to the present. The imagination network is also involved in social cognition, trying to imagine what someone else is thinking.
- **The Salience Network** - evaluates and classifies external information and internal consciousness, allows for dynamic switching between imagination and attention networks, This network identifies the most relevant processing system.

Through the lens of this cognitive construct, we may ask how might we recreate a flux, or flow state that helps individuals dynamically switch between laser like focused attention and imagination?

PRESSING RESET ON BRAIN ACTIVITY

Furthermore, recharging and resetting the brain is crucial for creativity. Wind wandering, unconscious processing allows for proper incubation. Helps to be reminded that will return to the problem. REM sleep is assumed to enhance the integration of unassociated information for creative problem solving. Unconscious thinking is thought to be more associative and divergent and especially relevant to form associations and integrate information. Structuring creative working time with a meditation or a walk, followed by disciplined activities like metaphorical thinking can help spark creative thinking and organize thoughts in constructs that are digestible.

An oscillation between relaxation and focus in order to be creative. Thus, how might we facilitate this fluid transition between rest and focus?

APPLICATIONS TO INNOVATION

Creative thinking in a disciplined manner can play a real role in innovation. "Creativity and innovation are normally complementary activities, since creativity generates the basis of innovation, which, in its development, raises difficulties that must be solved once again, with creativity...It is not possible to conceive innovation without creative ideas, as these are the starting point." (European Commission 1998).

In order to better understand how creativity is enabled or inhibited within an organizational setting, I also looked into innovation processes at large companies. My hope was that doing so could help me better understand the opportunity space and end application of my research.

Companies, primarily in the B2B market, have less incentive to prioritize the customer and who are in B2B businesses, design research is a hot topic with no direct application on how to use it. They have workshops/training but no output, which facilitates the mentality that design thinking is a waste of time.

If creativity is applied and enabled in a work context, companies would be able to take more diversified risk. They could hedge bets on multiple ideas at once to de-risk investment in one solution and potentially buy time to realize value of the investment. If companies enabled creative thought as a way of free-form opportunity gathering, their probability of finding new product, business, revenue stream could be increased.

I spoke to 5 executives leading innovation units and mapped out my own experiences in the corporate innovation space, drawing experiences from the following companies and sectors in order to better categorize the innovation process:

- AARP
- Pfizer
- GSK - Hive
- CVS Health
- Boston Children's Hospital
- GE - Care Innovations
- OPM, Federal Government
- SFMTA, City Government

TYPES OF INNOVATION

The process for innovation depends on the time horizon for the future solution. There's a different approach if companies are looking for new products, service to serve their existing customer base versus a new business that will be launched 3-5 years down the line. These different frame of minds, play into how creativity is applied in the innovation process as alluded to earlier in this paper.

Breakthrough Innovation process - Opportunity Driven

- Emerging technology area (gather inspiration, insights, knowledge, competition)
- Synthesis, put it together
- White space opportunity
- Apply it to businesses for creation of new
- Generative thinking

In breakthrough innovation, true business innovation, the goal is to understand and deliver what customers WANT in the future, shaping the company's future strategic direction in doing so and preparing the company for technology and market shifts.

Necessity Based, Incremental Innovation process - Problem Driven

- Alternatives to status quo
- Enhancement to find a better way
- Solution; problem solving

In necessity based innovation, the goal is to understand and deliver what customers NEED in the present moment, their pain points and problem areas. Solving for those pain points through creative problem solving is a form of incremental innovation, improving on what already exists and making it better exercising a customer centric point of view. This should be business as usual for company departments but many times an innovation unit is created solely for this purpose, which some could argue is unnecessary is everyone across the organization is practicing design thinking, user centricity.

As an overall construct, the three primary variables to putting together a successful innovation unit include the following:

Structure

- If it's attached to the core business or as a startup on the side operating under governing processes of its own

Types of innovation

- Incremental - necessity based, new products/services
- Breakthrough - new markets, businesses, business models

Type of customer

- Internal (supporting departments across the company)
- External (designing for the customer, future customers)

The process to enable different types of innovation differ as well. Lean startup feedback loop may apply better to improving existing solutions, where data is continually acquired and used to enhance existing solutions. Design processes to think through a solution can also be used in this context. However, when re-creating a reality, design thinking may be the best process in order to map out the potential space of all opportunities.

CHALLENGES TO INNOVATION

In terms of challenges to innovation, based on conversations, companies at least in the health-care sector, B2B businesses, try to incorporate design thinking as a lever for innovation but in actuality it's not grounded in the reality of the operating business.

The GE executive describes this as "innovation theater." Designer Natasha Jen, echoes the same with her talk "design thinking is bullshit," advocating for a more rigorous foundation for business owners to work with in order to incorporate a design first culture across the business.

However, companies are largely political organizations. Motivations of individual employees may hinder uptake of a design first culture where the user's point of view may be misrepresented due to validating pre-determined hypotheses during the design research phase. Design research especially in bigger companies is at risk of confirmation bias, where crafting compelling a storyline behind an idea may leapfrog individuals to rise up the ladder. Egos from senior leaders can also get in the way.

Jonathan Rwers, leading design strategy for the SF government, speaks to the importance of having the right leadership in place. In most big organizations, leadership holds "baggage. How do you get them to see the world in a different way? The actors are closed off." To overcome the bias they have, you have to get them to see a vision.

Blair Corcoran, a design strategist within the US government alludes to the difficulty in education across the company. Her agency is hired internally to train individuals across the to complete a design thinking workshop training. AARP has a similar vision for exposing design thinking methodologies to their employees.

However, there are challenges to this approach. Once individuals get back to their respective departments, they're many times the only one practicing design thinking and barriers of educating colleagues as well as retaining the new way of thinking, framing problems pose as big hurdles they need to overcome.

Carissa from GE also notes that getting individuals to practice this type of thinking regularly can be a challenge from a longer term perspective. A 3 day workshop training is little exposure in the grand scheme of developing habits and changing one's mindset and thinking.

Most design research in big companies is about confirmation bias; crafting a compelling storyline but there are ethics and implications to this. So, before a designer can communicate this vision, they must see the future state, see a different reality than once that already exists.

OPPORTUNITY SPACES

In consolidating, synthesizing, and mapping out opportunity spaces I came to four main principles I sought to adhere to, namely: Imagination, inspiration, freedom, and focus. The opportunity spaces I wish to explore next semester include physical spaces, education frameworks, and technologies that encourage the four tenants above.

My potential solution spaces will be to make creativity more accessible in a business context through technology, education, and space. These tools will help companies better leverage the creative potential within their workforce and give employees a creative outlet while at work.

“Main objectives of a creative thinking process is to think beyond existing boundaries, to awake curiosity, to break away from rational, conventional ideas and formalised procedures, to rely on the imagination, the divergent, the random and to consider multiple solutions and alternatives” - Candy 1997, Schlange and Juttner 1997

PHYSICAL SPACE - FREEDOM AND FOCUS

From my interviews, I found space, surrounding to be an important factor to cultivating creativity. One that is difficult due to its variable nature, depending on the creative ritual of the individual. The space can be shared but also has to be unique to the individual. The space should promote sharing, as creativity as a human output needs to be shared.

However, sharing is deeply vulnerable. So sharing needs to be supported with a non-judgmental environment, one that evokes a sense of safety, allowing individuals to take risks and share freely. Thus, further exploring constructs within physical space that can promote different types of thinking, making, and sharing can be an interesting opportunity space.

*“Creativity requires a sacred space”
- Jonathan Tilley*

STIMULUS - INSPIRATION AND IMAGINATION

Fresh stimuli is constantly coming into our world view on a daily basis. Some of it lands, stays, some of it is fleeting, transitory, but how much of it is rich? What if we created an environment, a mental space, for individuals to more easily connect the dots, synthesize, and see meaning.

- How might we design our brains and environments in a way to allow for connections, synthesis, and new ideas to occur?
- How might we facilitate deeper thought processes in a modern day society by feeding our brains richer stimulus?

In today's world we consume so much information that's filtered. In tandem, we are increasingly consuming visual information and becoming dependent on our visual sense. The rate at which we can consume information is so fast, that we don't even stop to think if and how we may have created the information we consume differently.

IMAGINATION

Imagination can be defined as the area between perception and understanding. As being able to see with our mind's eye. As dreaming up an alternate reality. The very concept of imagination has its basis in the future. The future that is variable and unpredictable yet limitless and boundless.

As such, our minds, the home of our imagination, is a wondrous and fantastical place. One where we can be truly free, limitless, without bounds. So then how may we re-create that in the real world – and is it even possible? To create a space of genuine inhibition, stripped of judgment, rules, without any resource constraints. In our minds, a vision is preserved, upheld, left untouched from destructive forces. But in attempt to make our vision a reality, our vision assumes form, meaning, definition, and purpose – it becomes real. Through the act of creation, there is gratification in producing the tangible – as well as a confidence gained in trying.

Imagination is the fuel to the creativity and aanvas for testing out ideas. Thus, this begs the question how might we can look to the figments of our imagination as a sources of inspiration?