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Rolling with the Punches: Designing for an Inherently Chaotic Creative Process

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DESIGNING FOR AN INHERENTLY CHAOTIC CREATIVE PROCESS

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DESIGNING FOR AN INHERENTLY CHAOTIC CREATIVE PROCESS

A thesis submitted to the School of Design, Carnegie Mellon University,
for the degree of Master of Design in Interaction Design.

Priscilla Mok, Master of Design 2013

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I’d like to thank my family for their love, encouragement and support throughout the entire process of this thesis. All of you inspire me everyday to do my best work. Ben, for accompanying me through this two-year adventure that was graduate school, I am so thankful for your listening ear, and your remarkable patience as I navigated through the highs and lows of this project. (The surprise cupcakes here or there didn’t hurt either.) Monica and Des, for being such good friends and “idea buddies”.

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How do students and young professionals in different domains currently engage in the creative process? What are some common frustrations people have with their tools and processes, and how are they coping? Combining data from user research, self-reflections, observations from teaching, and drawing on the current literature on creative cognition, this thesis aims to bridge the theoretical findings on creativity with real-world applications, by designing artifacts that will make the creative process useful and accessible to individuals on a day-to-day basis.

ABSTRACT
During the course of a thesis project, people will often ask: “Why did you decide to study this topic for your thesis?” Perhaps it’s a way of politely trying to find out what it is about the topic that compels you to want to study it for one full year. So to begin, I think it’s important to explain briefly the motivation that inspired this project in the first place.
Creativity is a complex, ill-defined concept which researchers have studied using a variety of methods. Most of this research falls into one of two camps:

**INDIVIDUALIST APPROACH**
- Creativity is studied based on Personality traits and cognitive processes

**SOCIOCULTURAL APPROACH**
- Focuses on environmental factors, such as culture, organizational climate, or social dynamics

**EXAMPLES:**
- Taking personality tests measuring traits related to creativity
- Studying pre-existing figures in their respective domains
- Looking at organization-wide policies or how to foster innovation or structural forms

**HANNOVER:**
- Studies often take place in controlled environments using problems that have well-defined solutions already, which is problematic because issues in the real world that require creativity often aren’t clean and clearly defined
- Not sure if these findings relate to people in their day-to-day lives
- Not always applicable to the individual

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**INTRODUCTION**

**INTEGRALISM**

**SOME INTERESTING PROBLEMS FOR DESIGN?**

1. **How to validate or expand on the findings from these two approaches so that they better reflect the experience of an individual going through the creative process?**
2. **How to make the information from these two approaches more useful and accessible?**

**HOW TO DO IT?**

**LARGE RESEARCH METHODS FROM DESIGN:**

1. **Aims for a deep understanding of an individual's experience.**
2. **How can insights from such an investigation inform the design of a process or tool that helps individuals to facilitate or enhance their creative process?**

**NOT JUST DESIGNERS, BUT PEOPLE IN DIFFERENT DOMAINS, TOO.**
The goal of my project was to answer the question, “How can the design of a process or tool that is informed by creative cognition, facilitate or enhance how students and young professionals working in a variety of domains develop creative ideas and act on them?”. To do this, I first broke down the question into sub-questions that needed to be answered.

**Goals of the Project**

- What constitutes a process?
- What are the benefits and shortcomings of designing a process as opposed to other potential design solutions?
- What is creative cognition? How can findings from the literature be applied to the design of a process?
- What are individuals currently engaging in the creative process? Where are the opportunities for design intervention?
- What are the unique needs of students and professionals that qualify them for creative process instruction? What domains in particular would benefit from this instruction?
- How is a “creative idea” defined and measured? Is it the same across domains?
- What are the factors that enable or hinder idea execution? An idea is ultimately worth very little if it is just developed and not acted upon.
- How can the design of a process or tool that is informed by creative cognition facilitate or enhance how students and young professionals working in a variety of domains develop creative ideas and act on them?
- What constitutes a process?
- What are the benefits and shortcomings of designing a process as opposed to other potential design solutions?
- How are students and young professionals working in a variety of domains developing creative ideas and acting on them?

**Scope and Limitations**

Through the investigation of creativity in a situated real-world context, this project aimed to develop a process or tool that supports the work of students and professionals who regularly engage in creative activity and fits into the context of their lives. However, it’s also important to keep in mind that due to some key aspects of this project (such as the limited timeframe, the users I have access to, and the research methods at my disposal) the insights and design concepts from this project are necessarily limited in scope.

- **Not one-size-fits-all**: This project is not meant to be a one-size-fits-all solution that will promote the sudden generation of transformative ideas.
- **I can’t capture thoughts**: Creativity is inherently as much a thinking activity as it is externalizing one’s ideas to the world. Therefore, I cannot study some aspects of creativity to the extent that it can be verbalized or observed.
- **Just students & young professionals**: The final design concepts may be more applicable to just students and young professionals. This group also has access to things that a broader range of individuals don’t, like mentors, tools, and formal education.
This project has the potential to significantly impact the field of design and society at large, but in slightly different ways. For the field of design, this project aids the communication and teaching of the creative and design process, while for society, this project will help people find new ways of investigating solutions to economic and social problems in our society today.

Yet despite the acknowledged importance of this [Synthesis] phase of the design process, synthesis appears magical when encountered in professional practice. The idea of designers as magicians is an intriguing metaphor, because their work is mysterious and the output can be phenomenal and tremendously emotional.

— JanETE EXPLAINING THE MAGIC OF DESIGN

4 Conditions characteristic of society today that make it important to understand how the creative process works:

1. Condition of plenty
   Consumers are inundated with choices. In traditional economies, like cash, reliability, and features are no longer enough to keep a business relevant.

2. Condition of complexity
   Ubiquitous computing is here. Everything is social. Complexity needs to be tamed!

3. Condition of alienation
   If a task can be defined as a series of explicit steps and repeatable loops, it is likely in the distant future there will be an electrical or chemical solution that can do it more effectively.

4. Condition of decay
   Things tend towards disorder. A lot of things are broken or about to break. For example: Education, Government, Health Care.

These conditions result in economic and social issues (such as the replacement of jobs with robots or the broken health care system) that are becoming increasingly difficult to solve without innovation and creativity. To move society forward and solve these problems, we need to understand how the creative process works.
After thinking of some initial research phases and activities I needed to conduct, I created a proposed timeline for this project. However, I also included a timeline here of how events actually unfolded, for comparison.
I examined a broad range of work—from scholarly articles to books geared towards the general populace—to gain a better understanding of the current state of creativity research. The following is a review of a selected number of these works, as well as their design implications for the project. The works are organized around three contextual frames: creative processes, creative cognition, and creativity strategies.

BACKGROUND

CREATIVE PROCESSES

Educational researcher Mel A. Rudich proposed in 1987 a classification system for working about various aspects of creativity called:

THE 4 PS OF CREATIVITY

PRODUCT: What makes something creative?
PROCESS: What makes you thinking creative?
PRESS: Environmental and cultural factors that affect creativity.
PERSON: What makes the person creative?

I examined a broad range of work—from scholarly articles to books geared towards the general populace—to gain a better understanding of the current state of creativity research. The following is a review of a selected number of these works, as well as their design implications for the project. The works are organized around three contextual frames: creative processes, creative cognition, and creativity strategies.
over the years, creativity researchers and working professionals have produced numerous models of the creative process. It’s hard to review them all, but a few stood out:

**EXPLAINING CREATIVITY**

**R. Keith Sawyer, 2009**

For R. Keith Sawyer (creativity researcher at Washington University in St. Louis), his model was developed by integrating aspects of and stages from other researchers’ models:

1. **Finding & Formulating the Problem**
2. **Acquiring Knowledge Relevant to the Problem**
3. **Generating Potentially Related Information**
4. **Taking Time Off for Incubation**
5. **Generating a Large Variety of Ideas**
6. **Combining Ideas in Unexpected Ways**
7. **Selecting the Best Ideas, Applying Relevant Criteria**
8. **Externalizing the Idea Using Materials and Representations**

Sawyer emphasizes these:
- Several stages may not happen nonlinearly.
- A project will probably have several mini-project phases before the big project.

For Harvard psychologist Shelley Carver, her model is similar to Wiig’s model, except with an additional implementation stage where one is trying to bring the idea to a wider audience.

**Implications for Design**

- Most models of creativity clarify model of the original model proposed by Wiig in 1976.
- Several researchers have expanded or elaborated on some stages.
- Many researchers stress that the process likely happens in a nonlinear fashion.

**Creative Cognition**

Another area I wanted to look at for this project was creative cognition, largely because of my background in neuroscience and also to gain a more thorough understanding of the different stages of the creative process.

**What’s Creative Cognition?**

The ability to be creative doesn’t require some special brain functions, but rather uses quite normal mental processes everyone has.

**Everyone can be creative!**

"Everyone can be creative! Has the potential to"

**One of the first works I looked at was:**

**Creative Cognition**

KAREL A. KINS, THOMAS W. WARD, STEVEN M. SMITH, 1995

Creative thought as a function of normal human thought processes, and we can study these processes...

**One Argument?**

We construct mental photographs all the time. Though they may not be considered “creative” by others, they are original (at least sometimes).

They also present their general framework for creative cognition, called the

**GENEPORE**
They also provide an overview of the cognitive psychology-based research conducted in creative cognition so far, going in-depth and looking at some of the mental processes involved in idea generation.

**Conceptualization**
- **Idea Generation:** Taking the concept of “creativity” and extending it

> **EXPLANATION**

But how does creative cognition play a role throughout the creative process?

**Your Creative Brain**

Carnon believed that the main difference between highly creative people and others is that creative people are better at understanding and explaining what something could be.

**Brainsets**

Carnon referred to these brain activation patterns.

![Image](image-url)

**Implications for Design**

- Studies of brainsets for in-depth information.
- Understanding how these brainsets go deep in the creative process.

**Brainsets for the Creative Process**

- **The 7 Brainsets that make up the CREATES model:**
  - **Connect Brainset:** Forming connections between disparate ideas.
  - **Social Brainset:** Social planning, making decisions, and logical problem solving.
  - **Emotional Brainset:** Linking thinking visually and imagining what if? scenarios.
  - **Affective Brainset:** When ideas are opening up one’s mind to new information.
  - **Transform Brainset:** When ideas are turning out negative feelings or a disadvantage into creative works.
  - **Evaluate Brainset:** When ideas are investigating whether an idea will be useful and appropriate.
  - **Stream Brainset:** When ideas are building on new thoughts and actions coming together harmoniously, such as the process of being "in the zone." (Stream Brainset)

Riding with the Punches

JAMES L. ADAMS (Author of Conceptual Blackboxing)

"EMOTIONS LEAD, NOT FOLLOW." (Offers us how to feel, whereas actions are to take)

Interchangingly, Carnon also looks at the role of emotions affecting the creative process.

Have these brainsets apply to the creative process? She takes these at the end of her book about how these brainsets apply to the creative process.

Related to cognition is the role of affect (e.g., emotions) on the creative process.

**Implications for the Creative Process**

- **Carnon’s CREATES model is an application of thinking about morphological ecology**
- **Get involved in the creative process**
- **If doing creative work does involve switching between brainsets,**
- **There’s an opportunity to design things that support a variety of these mental processes** (e.g., the first step supports idea evaluation & facilitates working in the zone (stream brainset)).
**CREATIVE STRATEGIES**

I also asked the interviewee what I call “creative strategies”, which are strategies, which are strategies, a strategy, an individual, group, or organization can undertake to be more creative. ... But is it even possible to boost someone’s creativity?

R.S. Nickerson provides a few good points in his book chapter:

- **Encourage creativity by rewarding creativity.**
- **Drive Motivation, Commitment.**

He first reviews 2 areas of literature:

- **Creativity**, attitudes of creativity (self-confidence, motivation, creativity, enjoyment)
- **Intechnical**, instructions of creativity (teaching, creativity, theory)

The interviewee suggests that it’s hard to tell if programs and classes are effective or not, so it’s worthwhile to continue research into it.

However, Nickerson believes that in the end, what truly matters is the difference in an individual with reasonable intelligence and potential.

And Adams talks about different types of blocks that impede our ability to conceptualize a problem and solve it creatively.

**4 CATEGORIES**

1. **Perceptual blocks**
   - prevent us from perceiving the information needed to solve the problem
   - e.g., seeing a problem from various viewpoints

2. **Emotional blocks**
   - stems from factors such as failing, self-criticism, or being judged by others

3. **Categories**

   - **Perceptual blocks**
   - **Emotional blocks**

These are areas that are important in creativity.
another opportunity I see is to make strategies more accessible and actionable to help people overcome sticking blocks in the creative process.

Adams talks about different types of blocks that impede our ability to conceptualize a problem and solve it creatively.

4 CATEGORIES OF BLOCKS

1. PERCEPTUAL BLOCKS
   - prevent us from perceiving the information needed to solve the problem.
   - e.g. solving a problem from useless subplots.

2. EMOTIONAL BLOCKS
   - stem from such things as taking risks, facing up to something, or being judged by others.

3. CULTURAL/ENVIRONMENTAL BLOCKS
   - are the result of the social/cultural environment we are in, e.g. taking (socially) beliefs as assumptions.

4. INTELLECTUAL/EXPRESSIVE BLOCKS
   - involve not using the right mental strategies or not being able to record/express the ideal properly.
   - e.g. using a diagram to show a mental process.

Adams goes on to discuss various types of BLOCKBUSTERS.

A BLOCKBUSTER ATTITUDE

We ask too many questions in adulthood because we are afraid of losing knowledge.

THINKING FLATLY AND HIERARCHICALLY

Lists are a good way to expand and adapt to conceptualize lots of different ideas.

WORKING ON THE RIGHT PROBLEM

We tend to work on problems that aren’t confusing and are the most apparent; sometimes we have to find the root highimpact problems.

THINK ABOUT THINGS IN TERMS OF

These attributes help break out of a mental rut and see things in a new light.

SMART THINKING

WHAT’S SMART THINKING?

An example of how to think.

HOW TO DO THIS?

1. DEVELOP SMART HABITS
   - habits can be useful or detrimental to our productivity and working.
   - we get a lot of benefits by removing triggers and replacing it with another action.

2. ACQUIRE HIGH-QUALITY EXPERIENCE
   - we only remember a small portion of what we experience, so we need to be proactive in influencing how we remember information.

PROCESS

1.1. We categorize all attention to 3 things at a time and filter out more than 5.

IMPACTS FOR DESIGN REVIEW

Envision Brainstorming sessions for mental imaging and imagining (what-if scenarios)

Imagine the floor plans for your house.

Imagining a normal holiday spot.

CONNECT Brainstorming connections between disparate ideas.

Vivid association

Alternate uses for

MAKE

THINK

SHOWER

CONSIDER

WEIGHT

RAW TEXT
Since my final design concept may be a process or tool that aids people in their creative process, it was also important to understand the tools that currently reside in that space, and to know what types of experiences their design affords, their limitations, as well as opportunities for improvements.

**TOOLS AUDIT**

Some of the creativity support tools I looked at included...

- [EXPLORATORY RESEARCH](#)
- [PREPARATION](#)
- [INCEPTION](#)
- [ILLUMINATION](#)
- [VERIFICATION](#)
- [LIMINATION](#)

**WHAT DOES IT ALL MEAN?**

*There are many aspects of creativity, and even an individual and the design concept could potentially address cognitive, creative, and meditative or affective parts of an individual's experience.*

*Many books and studies have stressed good reputation on how to be more creative; however, my design concept could potentially make this information more accessible and available, particularly in terms of helping people overcome their stumbling blocks.*

*Rolling with the Punches*
I sent out a survey fairly early on in the research process to gather interest and recruit participants for future research activities. But more than that, the goal of the survey was to understand the nature of people’s frustrations with the creative process (by seeing what they would change about it, for example), what types of tools and interactions make up their process, and their general attitudes about their own perceived level of creativity.
From the surveys, I was able to recruit some participants to interview more in-depth about their creative process (I also turned to personal contacts as well). During the interview session, I used the “directed storytelling” method described by Shelley Berezin, where a participant tells a personal story of an experience from their past. The goal of conducting these interviews was to understand more deeply the types of frustrations people encounter in their process, situations and places where they feel most creative, and gain insight into their notions and self-perceived level of creativity.

**INVESTIGATIONS**

**Participants**

Some interesting folks I talked to...

**Highlights**

A few highlights from the questions I asked...

- Thinking outside the status quo.
- Nothing challenges and working within constraints.
- “It’s a lot that since like... cleverness.”
- The ability to think of something new.

**Findings**

- People don’t fully understand how the creative process works, and therefore don’t feel empowered to realize their creative potential.
- The survey showed that people (particularly those in non-design fields) felt they were not reaching their creative potential.

**Why?**

- Often asked to take their own creative process, people gave themselves lower ratings didn’t seem realistic that the creative process involves both idea generation and execution. They justified their ratings by saying...

  1. I’m better at implementing things.
  2. “I have to rely on my team to figure out ideas. I don’t have ideas on my own.”
  3. “I can’t do stuff.”

**The thing is, these people are going through the creative process; they just don’t know it.”**
Here is a table showing how my exploratory research findings applied to the various stages of the creative process using an adapted version of Sawyer’s process model:

<table>
<thead>
<tr>
<th>Stage of the Creative Process</th>
<th>Exploratory Research Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquire Knowledge and Techniques</td>
<td>Establishing knowledge and understanding through interviews and observations.</td>
</tr>
<tr>
<td>Generate Ideas</td>
<td>Identifying potential ideas through brainstorming and ideation sessions.</td>
</tr>
<tr>
<td>Evaluate Ideas</td>
<td>Evaluating the feasibility and impact of ideas through prototyping and user testing.</td>
</tr>
<tr>
<td>Develop and Execute</td>
<td>Testing and refining ideas through user feedback and iterative design.</td>
</tr>
</tbody>
</table>

Example:
- **Acquire Knowledge and Techniques**: During my research, I found that understanding the user needs and pain points is crucial for developing effective ideas. This helped me to identify areas where existing solutions were lacking, leading to the development of innovative ideas.

From a synthesis of the data from the exploratory research phase, four main themes emerged:

1. **Dynamic Interactivity**: Users require a high level of interactivity and engagement, which can be achieved through interactive interfaces and dynamic content.
2. **Personalization**: Customization is key to enhancing user experience. Users value personalized content and features that adapt to their preferences.
3. **Accessibility**: Ensuring accessibility is crucial for ensuring a wide range of users can benefit from the product.
4. **Ethical Considerations**: Addressing ethical issues, such as privacy and data security, is essential to build trust and foster long-term user relationships.

These findings were integrated into the design of the final product, resulting in a more user-centric and effective solution.
Exploratory Research

Themes for Design

Optimizing

Design better tools the way people work and organize their information to help them be more efficient.

Empowering

Empower people to learn about their own process, how it’s related to the creative process, so they are in more control over how they work.

Empathizing

Support the emotional aspects of the creative process, such as frustration, motivation, fear, and joy.

Connecting

Leverage social networks of real or virtual communities to help people create their “creative network.”

Rolling with the Punches

After coming up with these design themes, I proposed 3 potential design concepts that I felt fit well with the themes, and that I could describe to get feedback from users. These 3 initial concepts were...

SECRET SAUCE

A service to help you learn about tools, workflow, and a process driven analyst in your field + recommendations

PERSONAL CREATIVE NETWORK

Get people in your social network to help with their ideas + feedback on how to do it.

IDEA TRACKER

Track progress of various ideas and utilize them.

WHAT’S NEXT?

Based on the design themes, what should I focus on?

How do the design themes work together?

These questions were used to create the next phase of generative research and to arrive at a conclusion.
In general, generative research involves treating users like co-creators or collaborators in the research process, to create artifacts that can creatively express their innate needs and desires while still grounded within the context of my original research question. To do this, I designed three activities that were delivered in an activity workbook-style format, which would enable participants to complete the activities on their own time, without working under the time constraints of a workshop.

The three activities were:
- Collage activity
- Participatory Design activity
- Concept Validation activity

The broad goal of creating these workbooks was to understand what were the relationships between the four design themes, as well as which theme to emphasize moving forward.

**WORKBOOKS**

**WHAT:** Physical co-creation activity workbook along with collage kit

**WHERE:**
- 6 participants and 3 pilot participants

**WHEN:** February 2018

**WORKBOOK COMPONENTS**

- Tell me a story... Collage creation activity
- Write what you think it will do... (participatory design activity)
- What will you use this?... (concept validation activity)

**QUICK + SIMPLE**

- For giving the collage images
- Write it down, double check it
- Share your collection of images related to the creative process and various emotional imagery

**WHAT TO DO:**
- 1. Have participants write down a tall format (5x7”) back for their response
- 2. Participants make a collage with their writing and images
- 3. Write participants to create their own images and/or concepts

**TELL ME A STORY... (COLLAGE ACTIVITY)**

**GOALS**

1. Understand how the 4 design themes (from Exploring Research) intersected with each other.
2. See how various aspects of a participants’ process played a role in their current process, or might play a role in their ideal process which might point to a need to focus on one of the design themes more.
3. Discover what people believe is missing from their current process that makes it less than ideal.

**HOW IT WORKED**

- Participants were asked to create 2 collages—one depicting their creative process (based on a project they worked on in the past that they felt was difficult) and another collage to depict their ideal creative process (which could be about the same project, or a different one they have yet to start).
- They were also asked to depict various dimensions of the project, such as:
  - The process of the project
  - Nature of the interactions with people
  - Tools and resources used

**HIGHLIGHTS**

- Nature of the interactions with people
- Tools and resources used

**SEE EXAMPLES ON FOLLOWING PAGES!**

**INTEREST MEMES:** Actually a good research tool.
I used a collection of images from people without names (random ones that sparked emotion) for sure at the elements in my collage but the ones turned out to be quite well-related by my participants, who were mostly non-German enough to appreciate them, and who felt the themes represented some of the emotions they felt very well.
I wish there was...  
(PARTICIPATORY DESIGN ACTIVITY)

GOALS
1. See what design concepts people feel would be most useful to their creative process (is an app? a space? a device?)
2. See which design themes I should focus on more, based on the concepts generated by participants.

HOW IT WORKED
Participants were asked to think of something that they wish existed that would help with their creative process.
* Participants filled out a mood lib that served as an overview of their concept.
* Participants then were asked to describe their concept in more detail, including intended users and context of use.

HIGHLIGHTS
1. What do you wish existed that you feel would help with your creative process? (Is there anything?)
2. I wish there was a program that could do data organization really well.
3. I wish there was an app that would recommend recipes really well.
4. I wish there was a time machine that would make travel really well.

See examples on following pages!
PARTICIPANT A (SOFTWARE ENGINEER)
"I wish there was a..."

Based on the core functionality of the development project, the app will help generate questions to make the requirements of the project clearer.

"I wish there was one Guy that existed that would do requirements collection really well."

PARTICIPANT B (CREATIVE PROF / STUDENT)
"I wish there was a..."

Areas of inquiry in robotics along with their relationships and connections.

Will show the top papers related to an area of inquiry determined by the crowd.

"I wish there was an area of research that would answer the research questions really well."

Would You Use This?

Concept Validation Activity

Goals

① Capture peoples feedback and thoughts about high-level design concepts
② Find out, even if people did not like an overall concept, if they still experienced a need that had informed the concept in the first place.

How it worked

Participants were shown three storyboards that illustrated how the design concepts I designed at the end of the Exploratory Research phase might be used. They were then asked if:
- Would you use this? (get initial reaction)
- Have you ever experienced a need to...
- How would you improve it?
Rolling with the Punches

SECRET SAUCE

1. There is a team designer who is talking to a student about how they can use their skills to create positive change.

2. The student is sitting on a chair with a laptop in front of them. They are discussing the project.

3. The student is standing next to a whiteboard. They are writing notes and discussing the project.

4. The student is standing in front of a mirror. They are talking to themselves.

5. The student is sitting on a couch with a laptop on their lap. They are discussing the project.

6. The student is standing in front of a computer screen. They are discussing the project.

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38. The student is standing next to a whiteboard. They are writing notes and discussing the project.

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At the end of the day, I collected a mountain of data. And since these design-based research methods yield data that isn’t as straightforward as surveys and interviews, it’s probably good to talk about how I analyzed all of it.

First, I compiled all responses into one GO-page document, organized by participant and then the various responses to the activities.

- For the collage, I entered notes and quotations for each of the aspects I was looking at (i.e., process, challenge).

Next, I looked for commonalities and patterns in the data, specifically in the following “buckets”.

Since the goal of this research phase was to find out how the design themes interacted with each other and which ones pop people’s heads brain, I organized the first two buckets of data into charts like this.
As I was completing this whole process, I was keeping track of HUNCHES I was having while immersed in the data:

**HUNCH 2:** Things to pay attention to:
- Collaboration/Networking
- Key people/pieces
- Different perspectives
- Data discovery

**HUNCH 5:** Problems when
- Trying to understand a domain where they need to put into practice what makes sense.

**HUNCH 8:** Many people want
- Parental guidance in their creative process.

In my experience, people did a lot of thinking as they worked to help them make decisions and plans. A few people also talked about difficulties in the brainstorming design activity.

I was also keeping track of ideas for final design concepts that cropped up from time to time (more on those later).

Remember, one of my goals for this phase was to see how the design themes interacted.

**FOUNDERING:**
- People involve
- Build & Resources

In other words, people’s intuitions with their resources and people resulted in outcomes.

**RINGING:**
- Directing key influence
- Seem like people have reviewed
- Details
Finding this perspective gave me a way to make sense of the data. Here are some findings:

**Findings**

- The research participants had a good understanding of the factors influencing their work, and they were able to identify and discuss them in a meaningful way. They felt that the process was transparent and fair, and that their feedback was taken into account.

- The role of the facilitator was important in facilitating the discussion and ensuring that all participants had the opportunity to share their views. The facilitator also helped to ensure that the discussion remained on track.

- The participants felt that the process was engaging and informative, and that they benefited from the experience.

**Conceptual Framework**

- The main issues that participants were concerned with involved:
  - Trust & Privacy
  - Understanding the context
  - Understanding the data

- The participants felt that the process was effective in helping them to understand their situation and the factors influencing it.

- The facilitator played a key role in helping participants to articulate their concerns and understand the implications of their findings.

**What does it all mean?**

- The research process was effective in helping participants to understand their situation and the factors influencing it.
- The facilitator played a key role in helping participants to articulate their concerns and understand the implications of their findings.

**Conclusion**

- The research process was effective in helping participants to understand their situation and the factors influencing it.
- The facilitator played a key role in helping participants to articulate their concerns and understand the implications of their findings.
WHAT DOES IT ALL MEAN?

one of my first findings was that:

- [Image 37x62 to 623x523]
- [Image 748x73 to 1320x523]

FOCUS: EMOTIONAL ASPECTS OF CREATIVITY

In Generative Research, I decided to focus a bit more on the emotions. Why?

1. I could address the “root” problems that are causing the emotions, but the tools people use and with which they interact change from situation to situation, so it’s better to help them allocate and balance out their emotions (i.e. make realistic of an idea).

2. Simply capturing yet another productivity tool to capture ideas, for example perpetuates the “magic bullet” myth that this one tool will help lead to a magically better creative process.

3. In the TBIH phase, there was an opportunity to design something that provides emotional support.

In other words, the experience of an individual moving through the creative process is affected by their skills/knowledge, tools, and situations, and their interactions with these issues in these areas result in either positive/negative emotions.

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After I completed the Generative Research phase, I reviewed all of the concepts that I thought held potential moving forward. Some concepts, I came up with earlier in the project—others I had quickly jotted down on a post-it as I was analyzing and synthesizing the data. Some of these concepts are presented here:

I ended up developing and fleshing out the following 4 concepts:

**Secret Sauce**
A unique way to help your team synthesize data from your team.

**Hall of Shame**
A physical space.

**Establish Creative Partnership**
Through e-mail communication.

**Enable Reflection + Analysis**
Sometimes that helps people reflect on their process, look back at what worked, and evaluate their team.

Why 4 concepts? I decided to push forward with 4 concepts because I wanted to convey that there is no one correct final solution or answer to my research question. Instead, I wanted to share that understanding and advancing my creative process is complex, and the concepts—which address the design themes to different extents—are just a few ways of approaching the question.
HOW DID I CHOOSE THESE 4?

I initially based my decisions on gut instinct (how well I felt the idea would work with my design themes). I confirmed later that they did with this chart.

SECRET SAUCE

EMPOWERING
To what extent does the design concept empower people to understand their own process?

CONNECTING
To what extent does the design concept connect people together in a creative network?

OPTIMIZING
To what extent does the design concept connect people to better tools/knowledge to help them be more efficient and skilled?

EMPATHIZING
To what extent does the design solution experience with the conditions people feel when going through the creative process and give them a more realistic perspective of the process?

Rolling with the Punches
WHERE IT STARTED
This concept started off as an idea for a class project looking at the problem of there being so many creative support tools available today, but a lack of a good way to see them all in one place, and more importantly, see which ones work best for a given individual.

WHAT INFLUENCED IT
From my research, I found that students and young professionals differ from seasoned experts in domain knowledge and skills, and report feeling overwhelmed when having to master a new domain quickly, or frustrated when learning new tools.

WHAT IT IS
A platform for discovering new tools, tips, and processes that make up a person’s “secret sauce”.

WHERE IT ENDED UP
The final form for this concept stayed pretty much the same (as a website/platform), though it did move from being a class project to a full-fledged thesis concept.

HOW IT WORKS
1. Explore on your own process by taking the “Secret Sauce” quiz, and finding the results interactive.
2. Based on your profile, get recommendations on what tools/tips to try.
3. Learn about what tools organization, their work. (See member list to try all others.)
"SECRET SAUCE" HOME PAGE

Users see this page when they first arrive on the site. This page explains to the users how Secret Sauce works and gives various incentives for signing up.

1. HOW IT WORKS
   This graphic explains how Secret Sauce works quickly and simply.

2. SIGN ON AREA
   From concept validation, participants noted that if you need to be clear what the benefits of signing up were as opposed to simply browsing as a guest.

3. PEOPLE ON SECRET SAUCE
   Prominent industry leaders can be featured up front to provide an incentive to browse the site.

4. FEATURED MEMBER
   Notable people can be featured more prominently as the main hero image, which also helps boost their credibility and number of followers.

5. SEARCH Widget
   Searches for users in a specific region or in a particular field.

6. RECOMMENDED PEOPLE
   In concept validation, a few people remarked that they would not know who to follow in their field, so this panel provides a starting point. Recommendations are weeded off of people you may know, or industries leaders in the field.
"SECRET SAUCE"
PROFILE PAGE

Users see this page when they click on the name or picture of a Secret Sauce user. This page shows information about the user, such as the tools they recommend.

Profile information gives an overview of who the user is, such as location and position.

Tools area shows what tools the user recommends and uses.

Save bar allows saving tools to various lists like “want” or “already using”.

Secret recipes shows what tips and tricks the user finds useful.

Processes visualization after taking the Secret Sauce quiz, the results are displayed on this user profile page (after being edited and approved).

What's this page? Secret shows more information about a stage of the creative process or inner, and tools that support that stage.
“SECRET SAUCE”
Tool Detail Page

Users see this page when they have clicked on the name of a tool in Secret Sauce. This page shows how users at Secret Sauce are using the tool.

1. SIMILAR TOOLS
   Shows tools that have similar functionality

2. TOOL IMAGES
   Shows images of the tool, which can be either screen shots from search engines or submitted by users

3. TIP EASY-FOOD...
   Shows what stages of the creative process
   members find it the most useful for

4. HOW I USE IT...
   Based on ideas
   and recommendations
   of the tool and their tips
   for how to use it, this
   area compiles some
   of the most informative
   comments about the
   tool favored.
**SECRET SAUCE**

**TOOL PAGE**

This page shows all the tools on the site.

**1. TOP 10 IN...**

Shows the Top 10 tools used by people in a certain field, which is useful for novices trying to figure out where to start learning skills.

**2. RECOMMENDED TOOLS**

Based on the user’s profile (including tools they want to try and/or are already using), recommended tools that might complement their interests are shown here.

**3. FEATURES AREA**

This area can show thematic content such as “tools for traveling creatives.”

### CONCEPT #2

**pilot**

**WHERE IT STARTED**

The initial idea involved designing an “idea buddy” relationship (who is someone you bounce ideas off of).

**WHAT INFLUENCED IT**

In my generative research, I found that students and young professionals often feel intimidated presenting initial ideas to superiors; instead they prefer to reach out to a more intimate network of peers for feedback and validation first.

**WHERE IT ENDED UP**

For the final form of this concept, I decided to design something that would support existing idea buddy relationships because designing and building relationships from scratch would likely be difficult, time-consuming, and unnatural.

**HOW IT WORKS**

The user has up to 10 idea buddies in a private space, and instant ideas arrive there.

### What It Is

A cross-platform tool to help you get feedback on your ideas and share what you’re working on with your idea buddies.

**SIMILAR IDEAS**

- **InVision:**
  - Collaborative platform for design teams to view clickable prototypes of mockups and comment on them.
  - However, it is primarily geared for designers, and doesn’t appear to have chat integrated.
  - Google Docs + Google Chat:
    - Real-time collaborative editing tool and a chat tool that’s integrated into the document editing view.
    - However, it’s difficult to talk about and comment on file types that aren’t native to Google Docs.
Rolling with the Punches

People see this screen if they clicked on an item, which then expands to a larger view.

Comments
Participants can leave specific comments about the work.

Archive
Older items can be dragged to this area for archiving.

Emotions
Allows participants to leave an emotion reaction (e.g., thumbs up, applause) for easy interaction.
**Concept #3: Under the Rug**

**WHERE IT STARTED**

This concept was initially thought of as a website that would allow people to share the work that they are ashamed of or embarrassed about (which could be work from early in a career, something that was rejected or failed, bad ideas, etc.).

**WHAT INFLUENCED IT**

I found that students and professionals sometimes forget that feelings of fear, doubt, and confusion are when engaging in challenging creative work, and a sign that they are operating outside of their comfort zones.

**WHERE IT ENDED UP**

In the end, the final form of this concept involved a physical component — a wall — and a digital component — a website. The wall provides people who work within the same physical space (e.g., a lab, studio, or office) with an opportunity to share examples in a common, semi-private area, whereas the website enables a wider reach.

**HOW IT WORKS**

1. Pin up examples of creative failures locally
2. Discuss examples with others in a humerus, empathetic way.
3. Share with a broader audience via the website.

**WHAT IT IS**

A physical (and virtual) place to share your creative failures, learn from the experiences of others, and celebrate the emotional ups and downs of creative work.

**SIMILAR IDEAS**

- **Difficult Ideas**
- **Big Think**
- **Under the Rug**

* A collection of blog posts discussing radical (and sometimes “bad”) ideas from thinkers worldwide.

However, these ideas are only submitted by experts, there’s no way for many others to contribute.

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**UNDER THE RUG: PHYSICAL DISPLAY**

This is the physical prototype created for the Graduate Studio Space. It asked for examples of creative failures from students, faculty, alumni, and industry professionals to display in the café area of the studio.

**SUBMISSION**

Each submission included a visual representation of the submission, along with a brief story discussing why it was a creative failure.

**DISTRIBUTION AREA**

Magnets clustered around an area invited people to add their own work.
“UNDER THE RUG” Physical Display

I created custom magnets that would encourage casual commentary from both the contributor and viewers.

The physical display creates a sense of community between people in a shared physical space, by allowing the conversation around what constitutes a “failure” as opposed to “just another idea for the board.”

UNDER THE RUG Website

The website facilitates sharing examples of what creative failure looks like across a variety of domains.

Tagging
Examples can be tagged to facilitate finding something thematic, such as impact, ideas, or work from early on in one’s career.

Featured Examples
Examples of creative failure with particularly interesting or insightful back stories can take the form of a longform article.
CONCEPT #4
CREOS

WHERE IT STARTED
This idea initially started off as a very simple physical wearable that a user would be able to interact with to record their emotional state as they move through the creative process.

WHAT INFLUENCED IT
My Exploratory research findings showed me that people don’t always know they are engaging in the creative process or feel empowered about how to reach their creative potential. Furthermore, my literature review showed that emotions have a significant impact on creativity.

WHERE IT ENDED UP
In the end, this concept not only involved a simple wearable, but also data from sources such as mobile phone, motion sensor, specialized apps for tracking data which would help provide a rich picture of the user’s creative process.

HOW IT WORKS

Counter 1

Emotional Data (IEMI)

Motion Data

User Interface

Activity Data

Tablet

Physical Activity

Emotional Data

Activity Data

Motion Data

Interface

Tablet

Counter 2

Emotional Data

Activity Data

Motion Data

User Interface

Activity Data

Motion Data

Interface

Tablet

Counter 3

Emotional Data

Activity Data

Motion Data

User Interface

Activity Data

Motion Data

Interface

Tablet


WHAT IT IS
A system that tracks your emotions, productivity, and environmental context to help you gain insight into your own creative process.

SIMILAR IDEAS

Effectivio

This is a company founded by an MIT Media Lab professor. It allows for tracking and analysis of productivity and creativity.

tace

This is a tool designed for tracking and analyzing creative output.

CREATIVITY

This article from Fast Company. It offers insights into how creativity can be measured and improved.

"CREOS" INSIGHTS PAGE

A user sees this screen when they see the Creativio system and they click on Insights at the top navigation bar. This screen takes all the data gathered by the CREOS system and presents it in an easy-to-understand format.

INSIGHT CARDS

The core part of the Insights Page are the Insight cards. Each card includes a question, such as "Where am I most productive?" or "When do I feel the most creative?" that can be answered with data collected by Creos.

SUPPLEMENTAL INFORMATION

This area shows the application’s information that explains the measures behind the insights (e.g. You’re more productive at home between 12-2am with low ambient noise level and some soft rock.)
Next, I created interactive prototypes for these design concepts, using the AxureRP rapid prototyping tool. This allowed me to create interactive prototypes that I could have users test. In addition, I also created the physical prototype for the Under the Rug concept in the cafe area of our Graduate Studio space.

I completed some basic evaluative testing with a small number of people. These sessions were informal, and I asked them for their impressions of the prototype, how they thought certain features worked and how they might apply the concept to their own domains. Unfortunately, due to time constraints, the Creos concept was not evaluated; however, highlights from the informal testing I conducted is summarized here.
To contextualize the design concepts, I developed three personas that represent prototypical users. I used the personas to develop three scenarios. The stories illustrate how the design concepts would fit into the context of the users’ lives and describe features of the prototypes that they would likely find useful.

**PERSONAS AND SCENARIOS**

**Meet SALLY, JOE, and CAMERON.**

They met in college, and became great friends. Although they live in different cities now across the country, they enjoy helping each other tackle creative challenges and exploring innovative approaches to moving their ideas forward on their own...

→ How do they do this? Let’s find out!

**SALLY**

Design Graduate Student

**LONG-TERM GOAL:** Become a better designer, connect with other designers in the industry

**SHORT-TERM GOAL:** Want to engage in a design challenge that will demonstrate her skills when interviewing for a job that she aims to start after graduation.

* Still relatively new to her field, finds it frustrating to learn all the tools designers are expected to know.
* She feels she’s not quite as efficient in workflow as her peers — some who have a bit more experience.

**JOE**

Junior Developer at a mid-size startup

**LONG-TERM GOALS:** Become a senior developer, launch his own startup as a Technical Founder in the future

**SHORT-TERM GOALS:** Wants to impress his new manager and coworkers, and get the case that he wishes shipped.

* Still settling into the company, Joe finds it a bit of a learning curve understanding the ins and outs of the company’s processes.
* Finds it tough sometimes writing code in such a collaborative environment.

**Cameron**

Lab Manager at a university cellular biology lab

**LONG-TERM GOALS:** Apply for a Ph.D program next year, improve his overall creative process.

**SHORT-TERM GOALS:** Produce a good research poster for an upcoming conference, get his resume revamped.

* Self-described “data geek”, Cameron likes to use various apps and technologies to track different aspects of his life.
* Balances irregular hours in the lab performing experiments and writing papers with hanging out with his friends.
* Does not consider himself very creative, since he feels the ideas for his experiments came from his P.I. (Principal Investigator)
**SALLY: A SCENARIO**

1. Sally needs to redesign her family website as part of a design assignment from her mentor. She gets an Exploit on target to bring in her friends' websites, and specifically asks for Joe's opinion since he has a bank account there.

2. She creates a lowframe sketch, and her friends give her some feedback and encouragement along the way.

3. She realizes she needs some stock graphics for her design. She uses SECRET SANCE to see where her classmates are. She takes her graphics from Stockphotos and honestly recommends Renderstock, a site that has good, realistic photos.

4. After completing her design, she uploads another version to her site. She gets an e-mail from Joe to ask if she needs help with her design. She is flattered and decides to ask for a few parts of her design to be developed.

5. She finishes the final touches for her design a few hours before her flight. She decides to take her funny images and make her own good luck. She smiles, and gets ready to pack.
Joe: a Scenario

1. Joe spends the morning chatting a bit and brainstorming with Sally. He talks about his code review—what will be in a few hours. He spends the rest of his time adding some last-minute annotations to his code.

2. His code review—with his manager and another junior developer—turns out to be quite tough. They ask him questions he had never even considered, and they pointed out various areas in his code which could’ve been simplified.

3. Joe leaves the meeting feeling a little disenchanted—his idea is a little buried. He calls about it on video chat through Conflit while answering some of Sally’s questions. On his way back to his desk, he notices a pinboard in the kitchen area.

4. Joe goes over trouble a closer look. His coworker Lee explains that it’s the company’s Under-the-Rule board, where people are invited to post up various examples of failure. Lee points out the code snippet that Joe’s manager had pointed in for his first review, and the two have a good laugh. He comments by putting a sticker on the example: “SUCCESS!!!”

5. Joe feels a bit better, realizing that even his manager had been in his same position. He gets on Conflit quickly to wish Sally a good luck and to download Cameron’s resume onto his computer for reviewing later. He returns to his desk to prepare a plan for rezoning his code.
Cameron: A Scenario

1. Cameron, preparing for a conference next month, uploads a draft of his research poster to Concept for feedback, along with his resume for peer reading.

2. With deadlines to go until he needs to show the next step of his experiment, he shoots off a quick, witty, brain-storming offer for a co-working website that may serve as inspiration for his redesign.

3. In the middle of the day, Cameron gets a message from the CREO system which he has started using to track various aspects of his creativity and productivity, such as how he’s feeling during the process. Since he’s been working on his research paper without really moving forward, he texts back a “5” (out of 10).

4. He checks out his CREO profile online and flips through some of the insights cards. He sees that based on his data last month, he’s been more productive at home at this hour, so he decides to go home to continue his writing.

5. Later on that evening, he gets an email to discuss some findings with colleagues in another state.

6. His colleagues tell him about SWEET SQUEE’s beta site for sharing portfolios between scenarios. He finds it useful for exploring extensions to the cell culture technology he’s been using. Later in the evening, CREO asks how creative he’s feeling again, and this time he replies “5.” He wishes Sally good luck on her interview, and returns to the lab to check up on an experiment.
I had originally defined the success of this project as creating something that resonated with people and improved their development of creative ideas. These characteristics translated into project goals, which I believe I achieved based on the positive feedback that I received from participants during various testing sessions. Nonetheless, I can envision the project extending beyond my initial thesis. In order to improve the fit of the tools for various domains, I would conduct more formal testing of the prototypes, paying close attention to usability issues. In addition, I would conduct more in-depth ethnographic research so I can fine-tune concepts and make them truly work well for people in specialized domains.

Another success of this project is its design framing, which encourages and provokes people into thinking about creativity not as something that has a “quick-fix” solution but as something personal and deeply important. By considering the messy realities of the creative process (such as instances of failure, chaos, and confusion), I hope that people become liberated to search for and reach their creative potential.

In the coming years, creativity and innovation will be an increasingly important topic that will most certainly warrant more attention and study. With ever-evolving technologies in neuroscience, artificial intelligence and machine learning, it’s exciting to think about what the creative process will look like in the next decade. One thing I feel fairly confident about is that despite the new technologies that will insert themselves into our lives in the future, the confusion, chaos and periods of uncertainty that is part and parcel of the creative process will not be going away any time soon. And I think that is a good thing—because it means that we will continue to have opportunities to challenge ourselves and grow through the act of creating things that better ourselves and society.
Reflecting back, this thesis project has been a long and emotionally difficult journey. At times, I doubted why I even decided to take on such an ambiguous topic to study. I think one of the biggest challenges I faced in this project was believing in the validity of the project topic itself. There were many times when I felt embarrassed or scared to talk about the project, because creativity as a topic is so complex and broad. Everyone had an opinion on it, because we are all practitioners of the creative process, which means that there are just so many more chances that your ideas will conflict with their understanding of creativity. In the end, I’m glad I persevered through this challenge, because I wouldn’t have ended up with my final design themes and framing had I chosen to focus at creativity more narrowly or confined myself to studying one specific stage (e.g. just the idea generation stage).

In a way, it’s ironic that this project itself is one that has utilized the creative process, and I can’t help thinking how often the need for the design themes appeared in the process of completing this project. For example, as I was contacting people for examples to place on my prototype for Under the Rug, I felt nervous that my idea would be rejected (particularly by well-established professionals in the industry), and the entire concept would fail. Yet, the whole basis for the concept was to provide a space for people to discuss and share their failures. Talk about irony! In the end though, this project has made me more cognizant of the inherent highs and lows of the creative process, so that in the future, when I encounter a block or a setback, I will be able to accept it more easily as an opportunity to grow. It’s still not easy to do this, but this project has been a major stepping stone in the development and maturation of my own creative process.

References


They loved it! I'm awesome.

They hated it. I must really be bad...

Maybe I'm finally out of the woods...

Does this end??

Yes! I learned a new skill today!

So much work.

I could do this forever!