

# Research as design



Artwork by Jeffrey Chang

## Resource packet

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## Check this out — It's the Research as design resource packet.

**This compilation is intended as an active toolkit to support your research process by introducing the design thinking elements.** The guide is not just to read – go out in the world and try these tools yourself. In the following pages, we first outline each mode of a human-centered design process, and then describe some specific methods that can be introduced in your research process. These process modes and methods provide a tangible toolkit which support the seven mindsets — shown on the following page – that are vital attitudes for a design thinker to hold. At the end you will find several worksheets used during the Research as design workshop.

**The resource packet is based on the d.school bootleg document,** which captures some of the teaching from the “design thinking bootcamp,” our foundation course. We have also added some elements that are specific to the research process to help you enrich your research journey. The methods presented in this guide are culled from a wide range of people and organizations who have helped us build the content we use to impart design thinking. We thank all the people who have contributed to the methods collected in this guide.

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**We welcome your reactions to this guide.** Please share the stories of how you use it in the field. Let us know what you find useful, and what methods you have created yourself – write to:

[researchasdesign@gmail.com](mailto:researchasdesign@gmail.com)

Cheers,  
Research as design team

# About the Research as design workshop

***“Play with your research. Because research is too important to be taken seriously!” - Amanda Cravens***

We have developed a series of workshops that introduce interdisciplinary graduate students to how design thinking may be used to better design their research. This workshop focuses on design methodologies specifically adapted for generating research ideas and designs in more creative ways. The workshop starts from the premise that while there are similarities and differences between design and research as ways of thinking, many of the tools and methods developed for design in other contexts can be fruitfully transferred and applied in the process of designing and conducting academic research. Five main areas of focus include:

- (1) problem finding and framing
- (2) multi-disciplinary team building
- (3) ideation/brainstorming
- (4) prototyping/testing and
- (5) storytelling.

Students come away with a new perspective on “doing research” as a creative endeavor as well as an analytical one.

Our full day workshop is an experiential "learning by doing" chance to explore the similarities and tensions between design thinking and analytic research. The workshop begins by mapping elements of the design cycle to the research processes students are familiar with, and drawing out differences that exist in research traditions across disciplines. We then introduce and practice concrete methods, tools, and exercises to allow students to play with their research and encourage out-of-the box thinking and creativity. Students also leave the workshop with a resource packet of methods and tools that serves as a reminder of what they did and a reference for when they are stuck in their research in the future and want inspiration for using design thinking to innovate out of the obstacles .

The workshop (intended to run approximately quarterly, 4 total over the 2011-2012 school year) is open to all research students (PhD or masters level) and post-docs at Stanford, though we will specifically target those in interdisciplinary graduate programs.

# About the Research as Design team

**Marilyn Cornelius** is a 4th year PhD student in E-IPER and a Stanford Interdisciplinary Graduate Fellow. She studies residential energy use reduction through the lenses of design and behavioral science. She has applied design in an experimental setting and is now applying it as part of a hybrid ethnographic methodology for studying barriers and innovations in energy use reductions. She has taken a couple of design classes and is co-teaching a design class in Spring 2011 (ME/ENVRES 380: Collaborating with the future: launching large-scale sustainable transformations).

**Amanda Cravens** is a 2nd year PhD E-IPER student whose research focuses on designing and evaluating visualization software to support collaborative environmental decision-making and conflict resolution processes. She was introduced to user-center design methods in a previous life as an information architect and web designer. At Stanford, she has enjoyed a software-focused d.school class (Liberation Technologies) as well as the SGSI Adventures in Design Thinking. In her dissertation, she hopes to use design thinking as one theme to knit together software design, facilitation practice and meeting design, and research design.

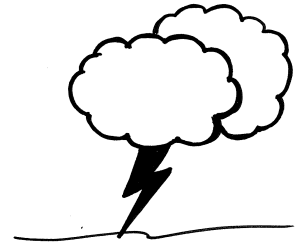
**Nicola Ulibarri** is a 1st year PhD E-IPER student, a Stanford Graduate Fellow and National Science Foundation Fellow. Her research is on drought planning and management in the southwestern US. She is also interested in reconceptualizing policymaking as a design process. She took the d.school's bootcamp class in Autumn 2010.

**Adam Royalty** is the Lead Research Investigator at the Hasso Plattner Institute of Design (d.school). Prior to this role he helped found the d.school's Environments Collaborative and K-12 Lab. Besides designing tools that allow people to gain confidence in their creative thinking, he works as part of REDlab in the Stanford School of Education to understand the impact of design thinking. Using quantitative and qualitative methods learned through his degrees in Math and Education Adam started the d.school Measurement and Assessment projects that aims to map the impact design thinking has on peoples creative potential.

**Anja Svetina Nabergoj** is Assistant professor at University of Ljubljana, Faculty of Economics, where teaches design thinking and entrepreneurship courses. Her PhD research was on collective learning and innovation. Recently her research is focusing on the impact of integrating design thinking into entrepreneurship curriculum. She has been visiting at Hasso Plattner Institute of Design since March 2010.

## Show Don't Tell

Communicate your vision in an impactful and meaningful way by creating experiences, using illustrative visuals, and telling good stories.

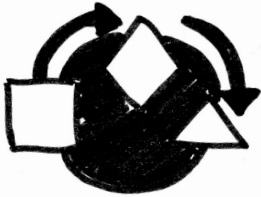


## Focus on Human Values

Empathy for the people you are designing for and feedback from these users is fundamental to good design.

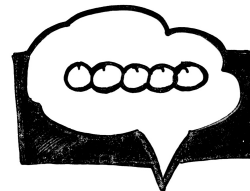
## Craft Clarity

Produce a coherent vision out of messy problems. Frame it in a way to inspire others and to fuel ideation.



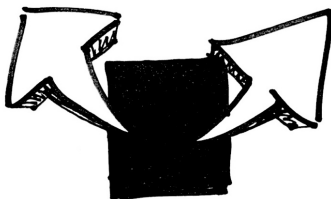
## Embrace Experimentation

Prototyping is not simply a way to validate your idea; it is an integral part of your innovation process. We build to think and learn.



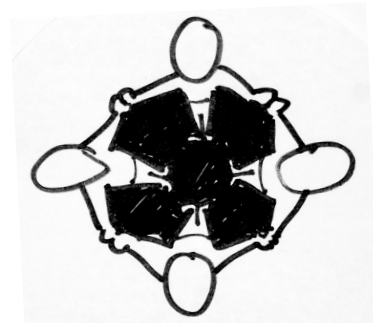
## Be Mindful Of Process

Know where you are in the design process, what methods to use in that stage, and what your goals are.



## Bias Toward Action

Design thinking is a misnomer; it is more about doing that thinking. Bias toward doing and making over thinking and meeting.



## Radical Collaboration

Bring together innovators with varied backgrounds and viewpoints. Enable breakthrough insights and solutions to emerge from the diversity.

# d.mindsets

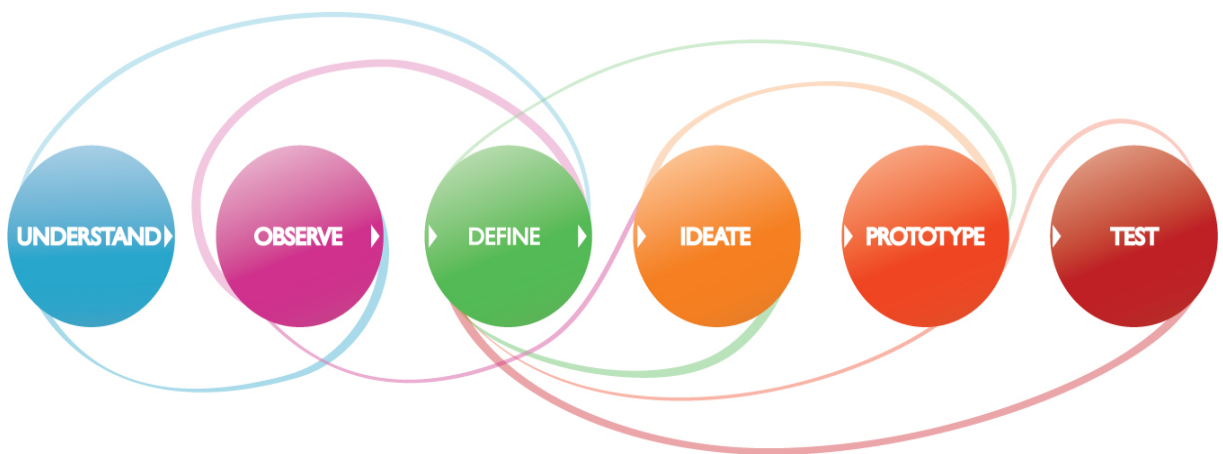
## ***How does d.mindset apply to academic research?***

Innovative scientists and interdisciplinary scholars use innovation methods that are familiar to designers, but rarely pay explicit attention to the process of how their ideas developed. Without explicit models or methods for the challenging process of generating innovative research ideas, replicating the creativity of experienced scientists can be difficult for emerging interdisciplinary researchers.

We propose that giving focused attention to innovation methods from the design thinking model can help graduate students improve their ability to create quality research. Specifically, the Stanford d.school's methodology of teaching innovation as a cyclical process that can be followed and gradually mastered will benefit graduate students by giving them tools that allow systematic application of creativity in their own research development.

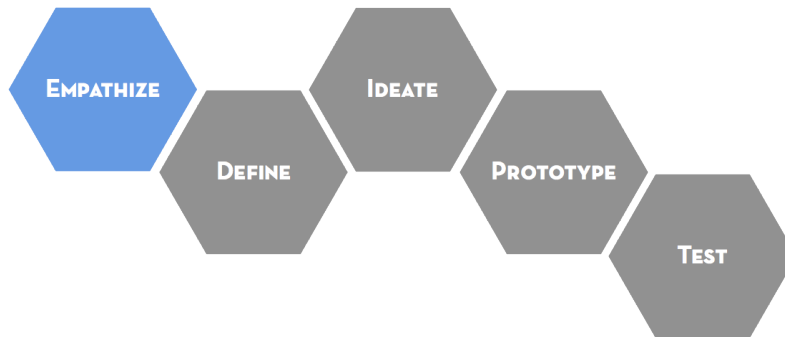
These innovation tools, such as ideation and prototyping, are especially applicable in interdisciplinary research for two reasons. First, design thinking methodology was explicitly developed to work in cross-disciplinary teams such as those that interdisciplinary scholars often find themselves working in. Second, interdisciplinary scholarship tends to be focused on solving complex applied problems, which are the very types of challenges for which design methodologies were originally developed.

The **modes of design thinking** process presented below are described in more detail on the following pages.



# MODE

## Empathize



### WHAT is the empathize mode

**Empathy** is the foundation of a human-centered design process. To empathize, we:

- **Observe.** View users and their behavior in the context of their lives.
- **Engage.** Interact with and interview users through both scheduled and short 'intercept' encounters.
- **Immerse.** Experience what your user experiences.

### WHY empathize

As a human-centered designer you need to understand the people for whom you are designing. The problems you are trying to solve are rarely your own—they are those of particular users; in order to design for your users, you must build empathy for who they are and what is important to them.

Watching what people do and how they interact with their environment gives you clues about what they think and feel. It also helps you to learn about what they need. By watching people you can capture physical manifestations of their experiences, what they do and say. This will allow you to interpret intangible meaning of those experiences in order to uncover insights. These insights will lead you to the innovative solutions. The best solutions come out of the best insights into human behavior. But learning to recognize those insights is harder than you might think. Why? Because our minds automatically filter out a lot of information in ways we aren't even aware of. We need to learn to see things "with a fresh set of eyes" – tools for empathy, along with a human-centered mindset, is what gives us those new eyes.

Engaging with people directly reveals a tremendous amount about the way they think and the values they hold. Sometimes these thoughts and values are not obvious to the people who hold them. A deep engagement can surprise both the designer and the designee by the unanticipated insights that are revealed. The stories that people tell and the things that people say they do—even if they are different from what they actually do—are strong indicators of their deeply held beliefs about the way the world is. Good designs are built on a solid understanding of these kinds of beliefs and values. Engage to:

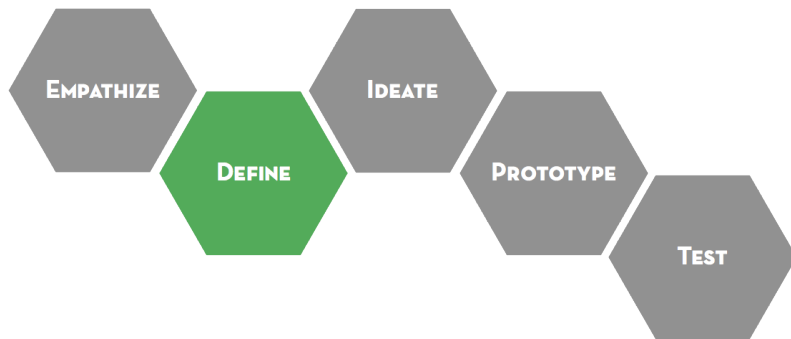
- Uncover needs that people have which they may or may not be aware of
- Guide innovation efforts
- Identify the right users to design for
- Discover the emotions that guide behaviors

In addition to speaking with and observing your users, you need to have personal experience in the design space yourself. Find (or create if necessary) experiences to immerse yourself to better understand the situation that your users are in, and for which you are designing.

# MODE

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## Define



### WHAT is the define mode

The define mode is when you unpack and synthesize your empathy findings into compelling needs and insights, and scope a specific and meaningful challenge. It is a mode of “focus” rather than “flaring.” Two goals of the define mode are to develop a deep understanding of your users and the design space and, based on that understanding, to come up with an actionable problem statement: **your point of view**. Your point of view should be a guiding statement that focuses on specific users, and insights and needs that you uncovered during the empathize mode.

More than simply defining the problem to work on, your point of view is your unique design vision that you crafted based on your discoveries during your empathy work. Understanding the meaningful challenge to address and the insights that you can leverage in your design work is fundamental to creating a successful solution.

### WHY define

The define mode is critical to the design process because it explicitly expresses the problem you are striving to address through your efforts. In order to be truly generative, you must first craft a specific and compelling problem statement to use as a solution-generation springboard.

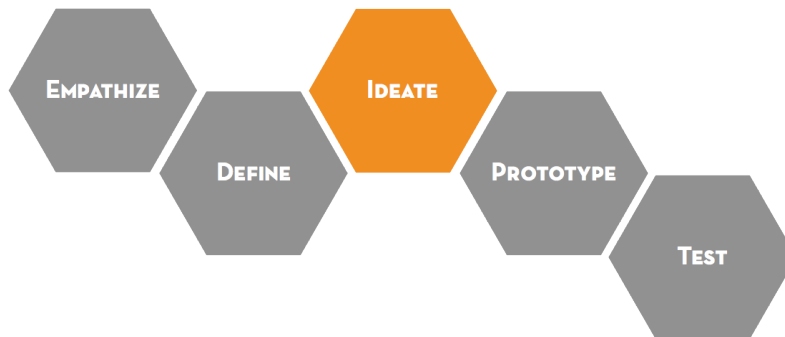
As a test, a good point of view (POV) is one that:

- Provides focus and frames the problem
- Inspires your team
- Provides a reference for evaluating competing ideas
- Empowers your team to make decisions independently in parallel
- Fuels brainstorms by suggesting “how might we” statements
- Captures the hearts and minds of people you meet
- Saves you from the impossible task of developing concepts that are all things to all people
- Is something you revisit and reformulate as you learn by doing
- Guides your innovation efforts.



# MODE

## Ideate



### WHAT is the ideate mode

Ideate is the mode during your design process in which you focus on idea generation. Mentally it represents a process of “going wide” in terms of concepts and outcomes—it is a mode of “flaring” rather than “focus.” The goal of ideation is to explore a wide solution space – both a large quantity of ideas and a diversity among those ideas. From this vast depository of ideas you can build prototypes to test with users.

### WHY ideate

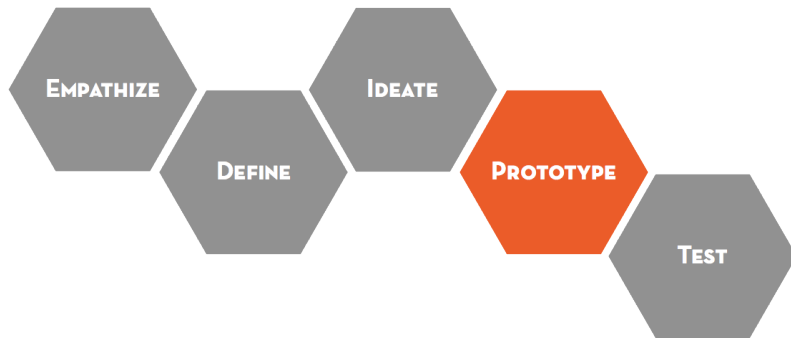
You ideate in order to transition from identifying problems into exploring solutions for your users. Various forms of ideation are leveraged to:

- Step beyond obvious solutions and thus increase the innovation potential of your solution set
- Harness the collective perspectives and strengths of your teams
- Uncover unexpected areas of exploration
- Create fluency (volume) and flexibility (variety) in your innovation options
- Get obvious solutions out of your heads, and drive your team beyond them

Regardless of what ideation method you use, the fundamental principle of ideation is to be cognizant of when you and your team are generating ideas and when you are evaluating ideas – and mix the two only intentionally.

# MODE

## Prototype



## WHAT is the prototype mode

Prototyping is getting ideas and explorations out of your head and into the physical world. A prototype can be *anything* that takes a physical form – be it a wall of post-it notes, a role-playing activity, a space, an object, an interface, or even a storyboard. The resolution of your prototype should be commensurate with your progress in your project. In early explorations keep your prototypes rough and rapid to allow yourself to learn quickly and investigate a lot of different possibilities.

Prototypes are most successful when people (the design team, the user, and others) can experience and interact with them. What you learn from those interactions can help drive deeper empathy, as well as shape successful solutions.

## WHY do we prototype

Traditionally prototyping is thought of as a way to test functionality. But prototyping is used for many reasons, including these (non-mutually-exclusive) categories:

- **Empathy gaining:** Prototyping is a tool to deepen your understanding of the design space and your user, even at a pre-solution phase of your project.
- **Exploration:** Build to think. Develop multiple solution options.
- **Testing:** Create prototypes (and develop the context) to test and refine solutions with users.
- **Inspiration:** Inspire others (teammates, clients, customers, investors) by showing your vision.

Many of the goals of prototyping are shared across all four of the above categories.

We prototype to:

**To learn.** If a picture is worth a thousand words, a prototype is worth a thousand pictures.

**To solve disagreements.** Prototyping is a powerful tool that can eliminate ambiguity, assist in ideation, and reduce miscommunication.

**To start a conversation.** A prototype can be a great way to have a different kind of conversation with users.

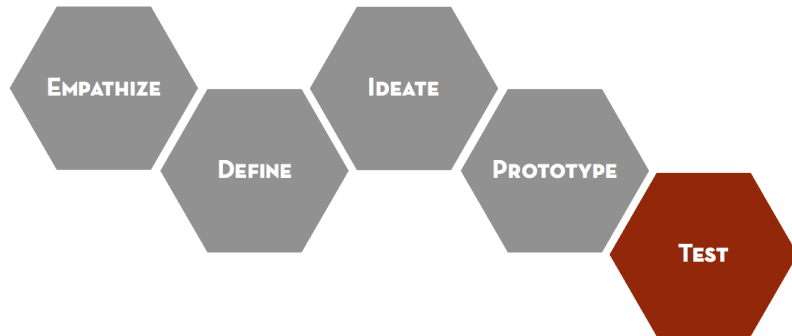
**To fail quickly and cheaply.** Creating quick and dirty prototypes allows you to test a number of ideas without investing a lot of time and money up front.

**To manage the solution-building process.** Identifying a variable to explore encourages you to break a large problem down into smaller, testable chunks.

# MODE

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# Test



## WHAT is the test mode

Testing is the chance to refine our solutions and make them better. The test mode is another iterative mode in which we place our low-resolution artifacts in the appropriate context of the user's life. Prototype as if you know you're right, but test as if you know you're wrong.

## WHY test

**To refine our prototypes and solutions.** Testing informs the next iterations of prototypes. Sometimes this means going back to the drawing board.

**To learn more about our user.** Testing is another opportunity to build empathy through observation and engagement—it often yields unexpected insights.

**To test and refine our POV.** Sometimes testing reveals that not only did we not get the solution right, but also that we have failed to frame the problem correctly.