

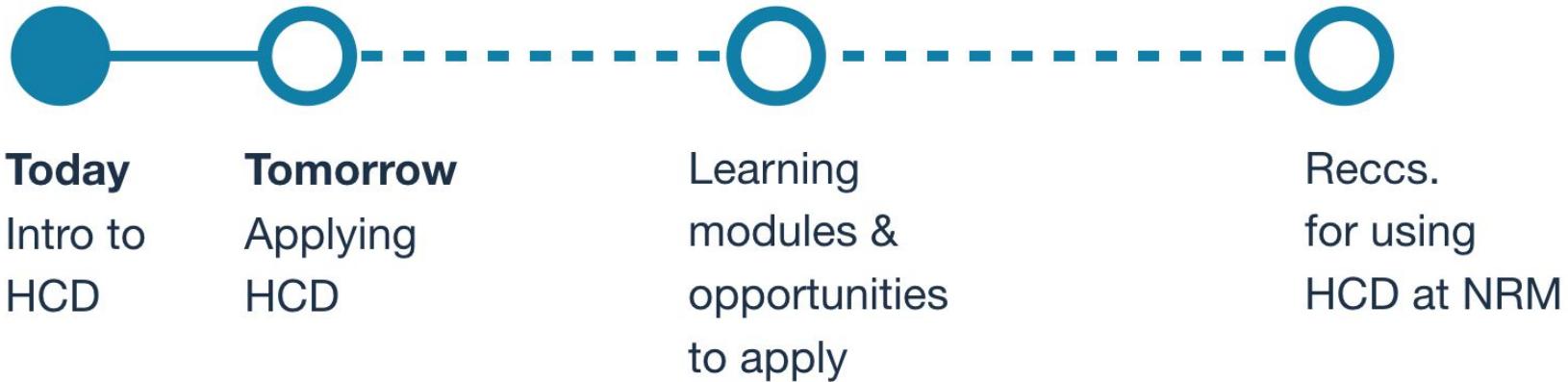
Human-centered design intensive day 1

Melissa Braxton
Colin MacArthur



Brief introduction

- **Bathrooms**
- **Emergency exit**
- **Next break at 10:20**
- **Lunch at 12:45**



Today's agenda

**A few words from the NRM
leadership team**

Getting to know the team

Hopes and fears

- 1. Your name**
- 2. Where you work**
- 3. What you do**
- 4. One hope for our time**
- 5. One fear about our time**

(2 minutes a person. Colin times.)

Current NRM pain points

Write the one or two things that are hardest about each stage of application development. (One thing per sticky note.)

Move sticky notes into clusters.

**Take a larger sticky note and write a
label on each one.**

Use a dot for the one cluster (and label) in each stage you most agree with.

Review of team projects

**Copy your homework answers onto
a piece of chart paper.**

- **What's the solvable problem?**
- **Who has the problem?**
 - What are their challenges?
 - How do we know (e.g., from research, anecdotes, help desk calls...?)
- **Who else is involved?**
- **What will success look like?**

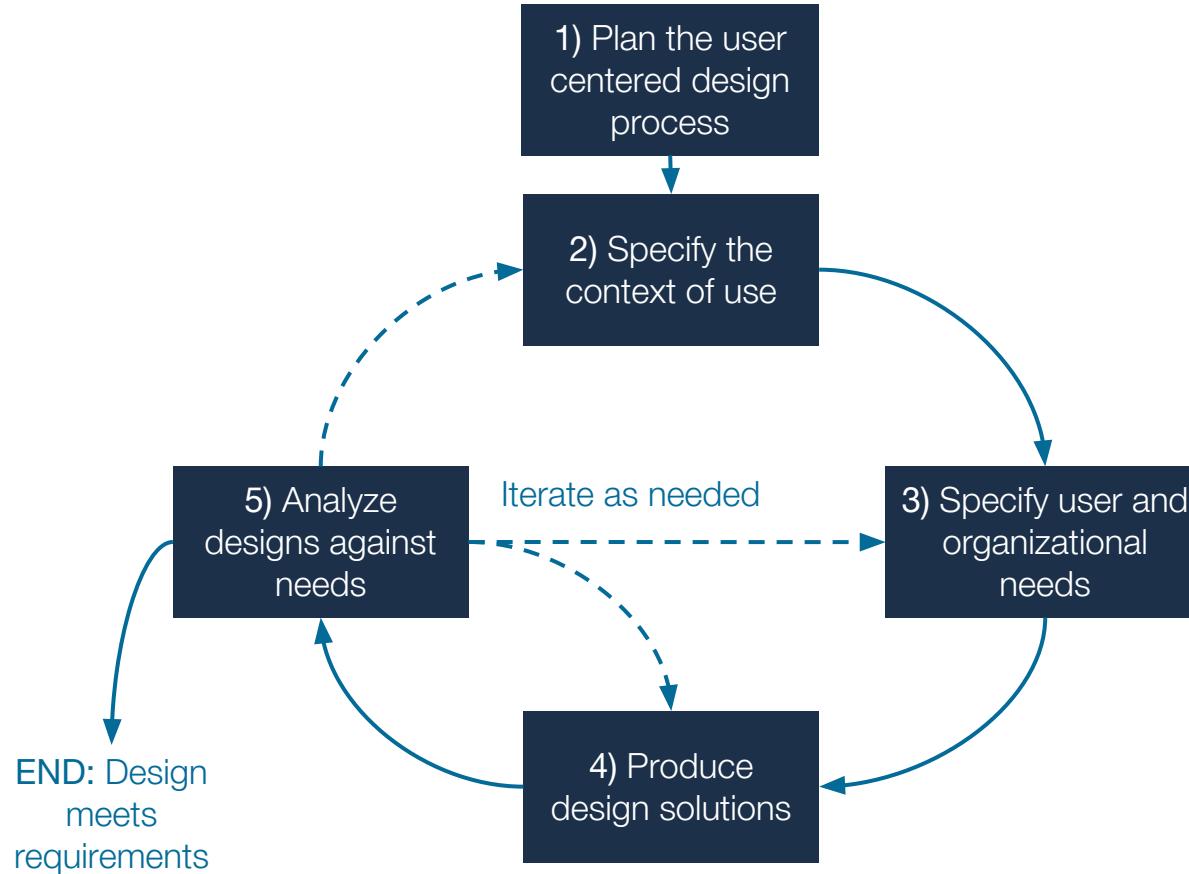
**Share your answers with the group.
4 minutes per group.**

Introducing human-centered design

Introducing human-centered design

Introducing human-centered design

[Human Centered Design] began as “an approach to systems development that aims to make interactive systems more usable by focusing on the use of the system and applying human factors/ergonomics and usability knowledge.”



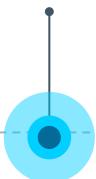


PARKER COUNTY WATERS		NEXT OPS BRIEF 1500			PARKER COUNTY WATERS	
LATERAL	LOCATIONS	LEVEL	RJFC	OTIMA	CHIEF	CHIEF
RIVER	Lee	I				
Grassland	Grassland Reservoir	21.95	I			
Garrison	Garrison Reservoir	5.95	V			
Little	Little Garrison Reservoir	1.95	V			
Piney	Piney River	13.97	V			
Piney	Piney Ft Worth	16.00	V			
Piney	Piney Ft Worth	15.88	V			
Piney	Piney Ft Worth	15.88	V			
Piney	Piney Ft Worth	7.00	I			

What are we designing?

Theoretical Perspectives

We cannot understand an interactive or ecological system by understanding the constituent parts, but rather the interactions among them.

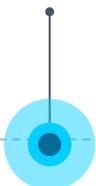


General Systems Theory
– Bertalanffy (1968)

Actor-Network Theory
– Callon and Latour (1981),

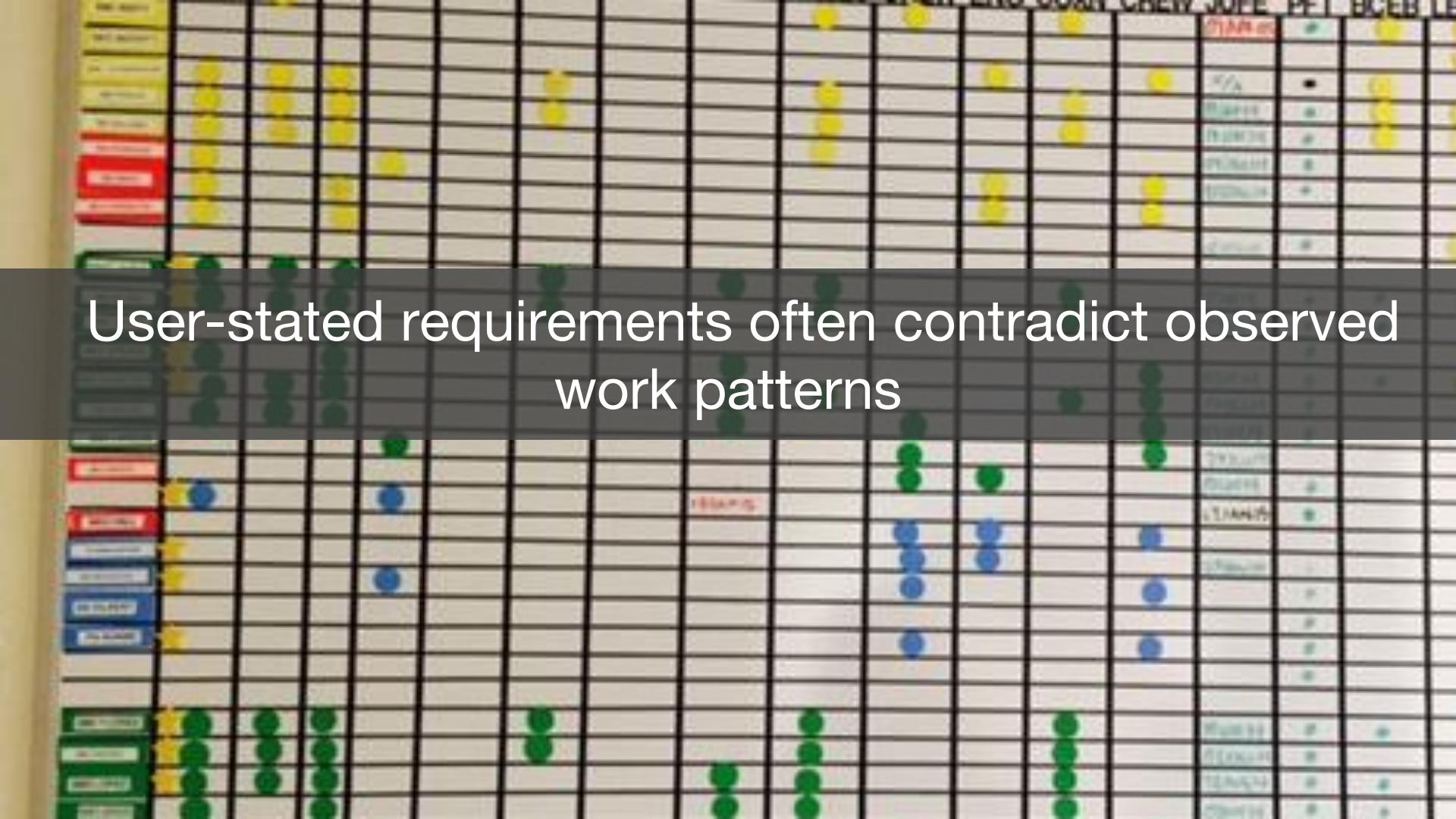


Structure in social systems cannot be presupposed but must be observed empirically as it occurs in the world.



Distributed Cognition
– Hutchins (1991)

Cognitive phenomena are distributed across a number of people and artifacts that interact to accomplish tasks.

A blurred background image of a flight information display board at an airport terminal. The board is filled with numerous flight status indicators, including yellow dots (representing delays or gate changes), green dots, and blue dots, all set against a grid of white boxes.

User-stated requirements often contradict observed work patterns

“The social–technical gap is **the divide between what we know we must support socially and what we can support technically**. Exploring, understanding, and hopefully ameliorating this social–technical gap **is... one of the central problems for human–computer interaction.**”

Ackerman, Mark S. "The intellectual challenge of CSCW: the gap between social requirements and technical feasibility." Human–Computer Interaction 15.2-3 (2000): 179-203.

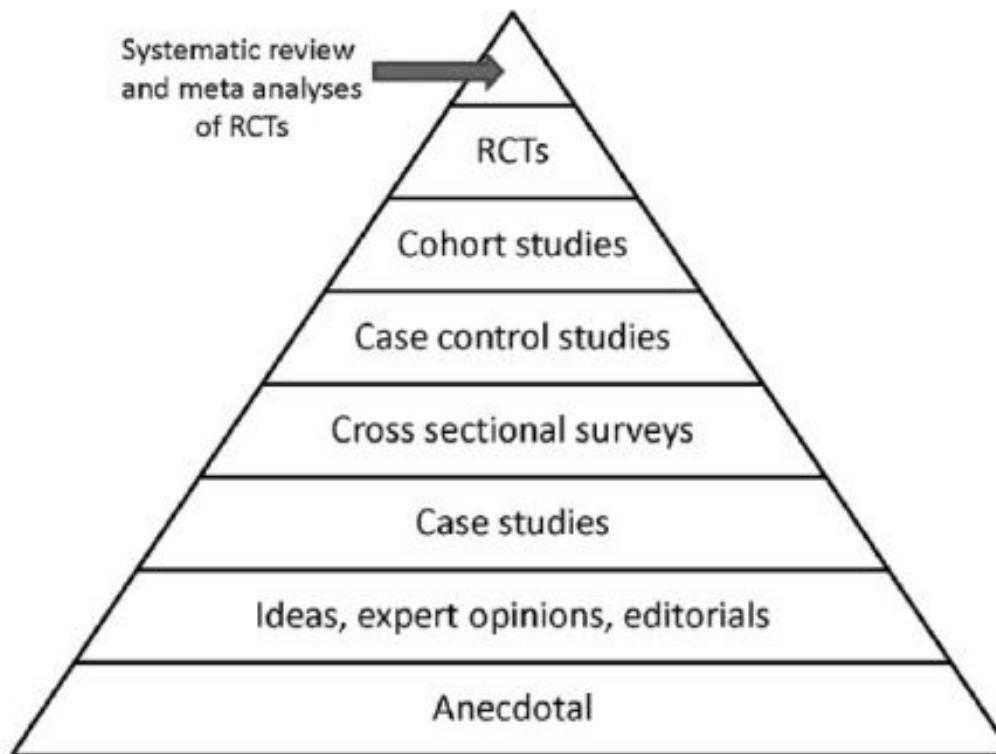
What we hope to achieve

- Close partnership among the user community, designer, product owner/sponsor, and developer
- Iterative design and development with users and stakeholders on the team
- Increased ownership of the “solution” by the agency and the user community
- Integration of transition issues into design and development
- Design that is **evidence-based**

What is evidence?

- A hint, a sign, a trace, a pointer towards truth
- Objective fact, proof, knowledge
- That which justifies belief

The “Evidence Based” Paradigm

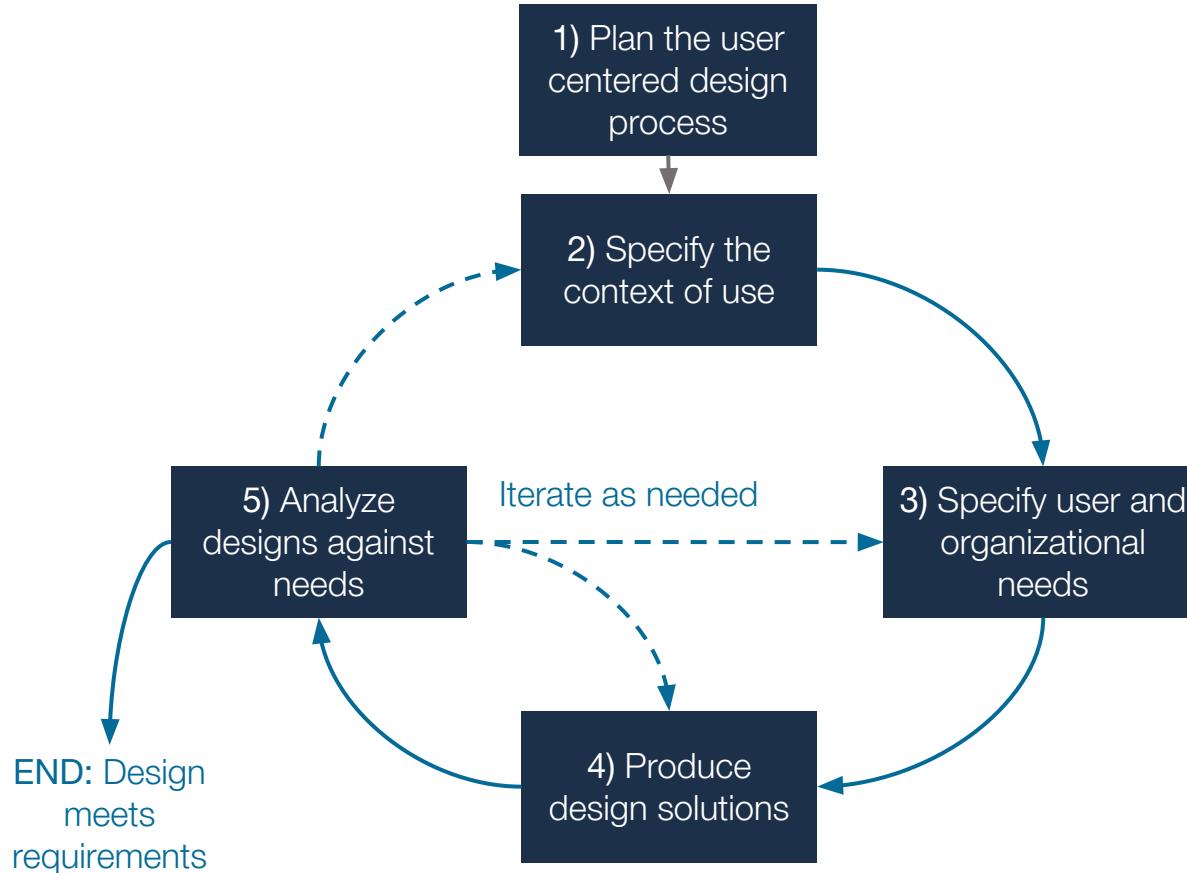


“When a cook tastes the soup, that’s **formative**. When the guests taste the soup, that’s **summative**.

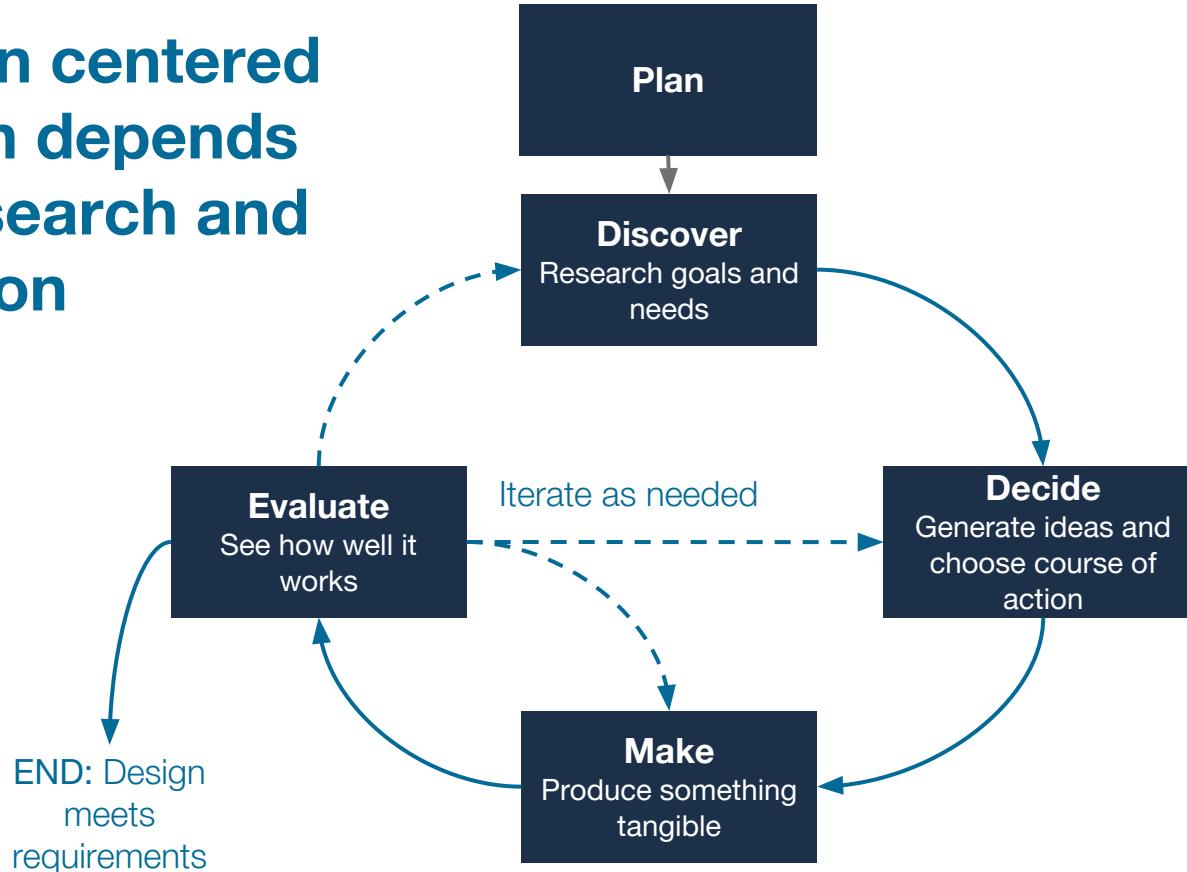
Design and Science

- “Scientists try to identify the components of existing structures, designers try to shape the components of new structures.”
- *Alexander, C, Notes on the Synthesis of Form, Harvard Univeristy Press, Cambridge, Mass. (1964)*
- “The scientific method is a pattern of problem-solving behaviour employed in finding out the nature of what exists, whereas the design method is a pattern of behaviour employed in inventing things...which do not yet exist. Science is analytic; design is constructive.”
- *Gregory, S A Design Science, in Gregory, S A (ed) The Design Method, Butterworth, London (1966)*
- “The natural sciences are concerned with how things are...design on the other hand is concerned with how things ought to be.”
- *Simon, H A, The Sciences of the Artificial, MIT Press, Cambridge, Mass. (1969)*

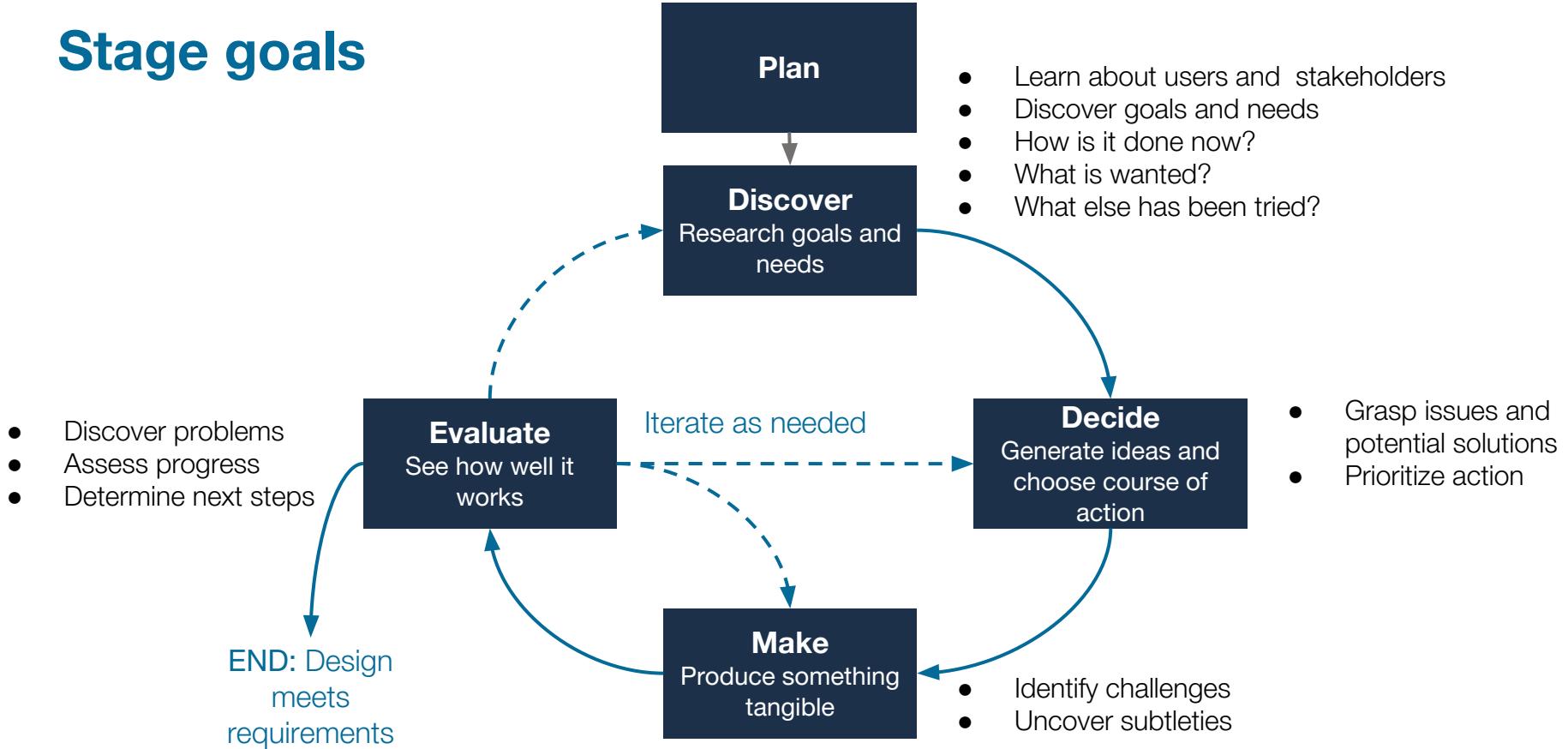
Design methods



Human centered design depends on research and iteration

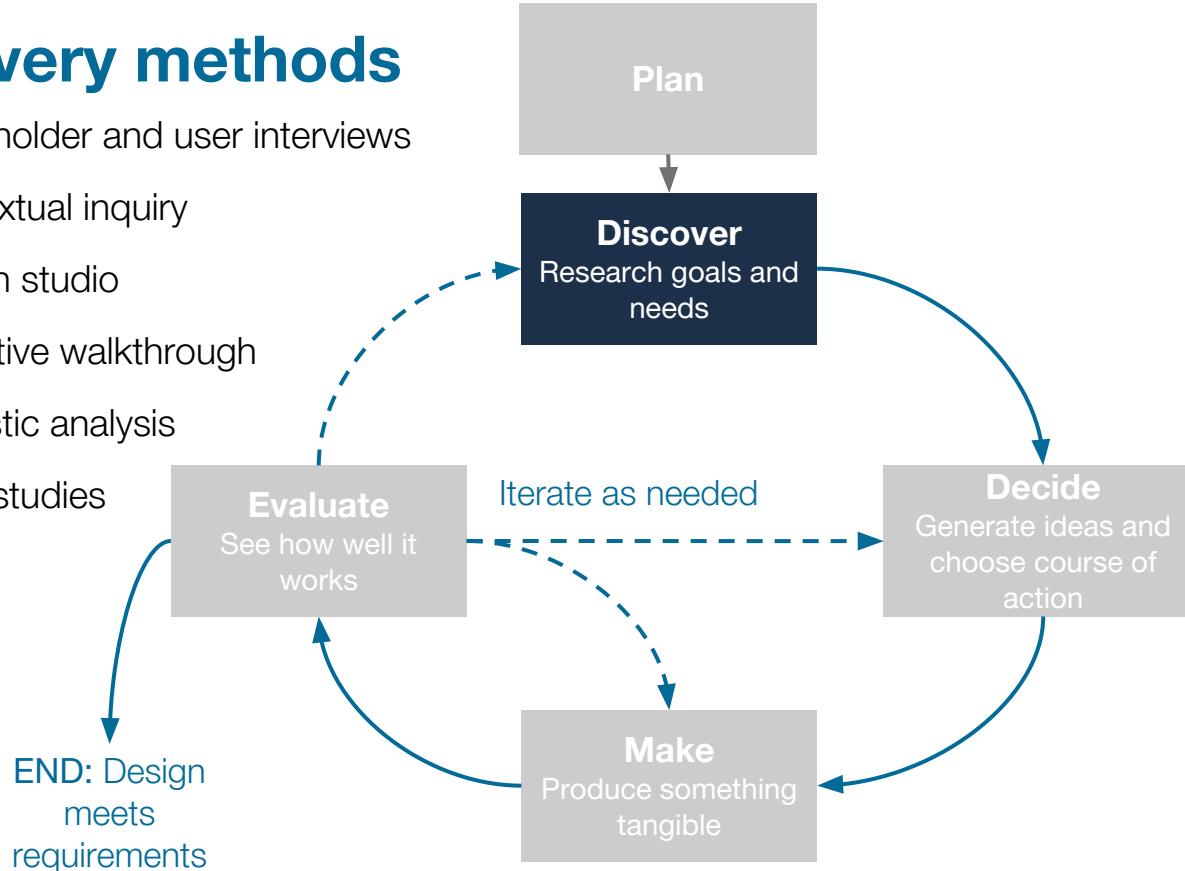


Stage goals



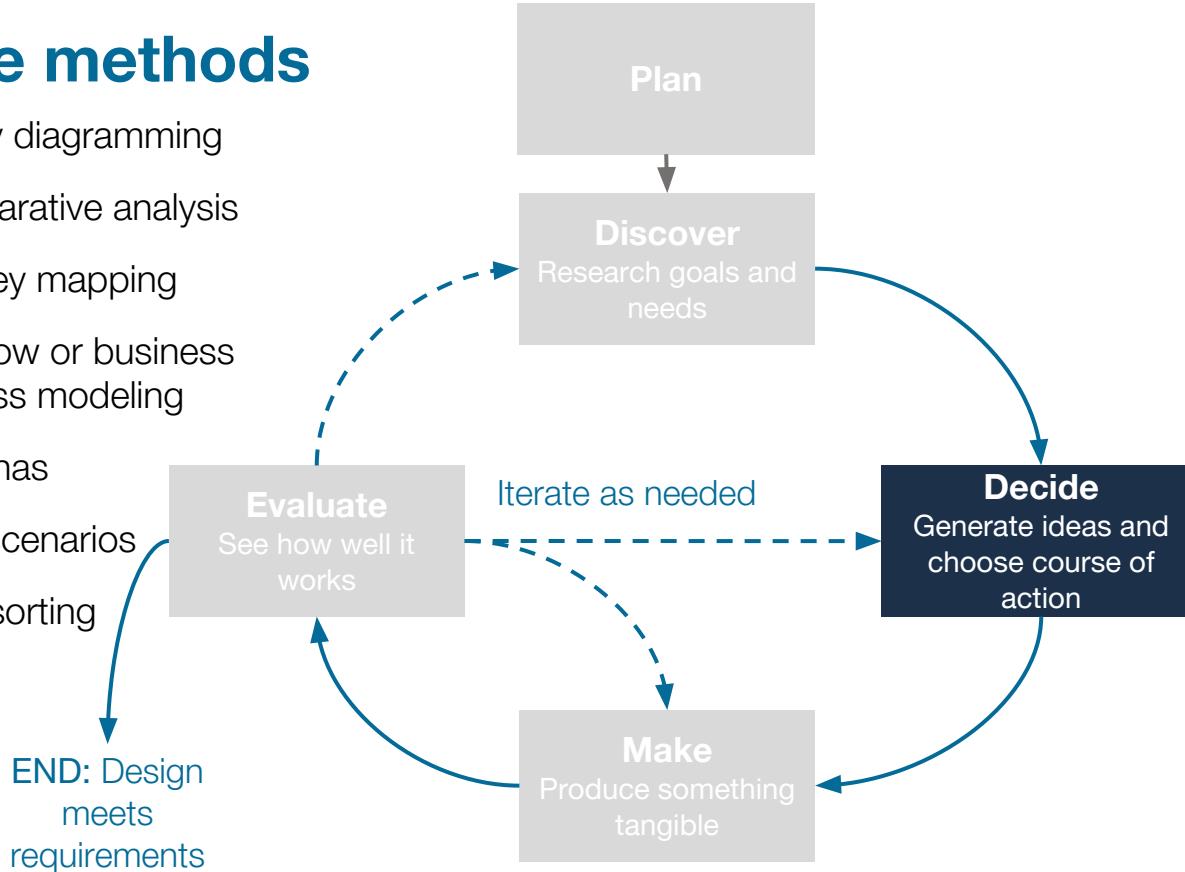
Discovery methods

- Stakeholder and user interviews
- Contextual inquiry
- Design studio
- Cognitive walkthrough
- Heuristic analysis
- Diary studies



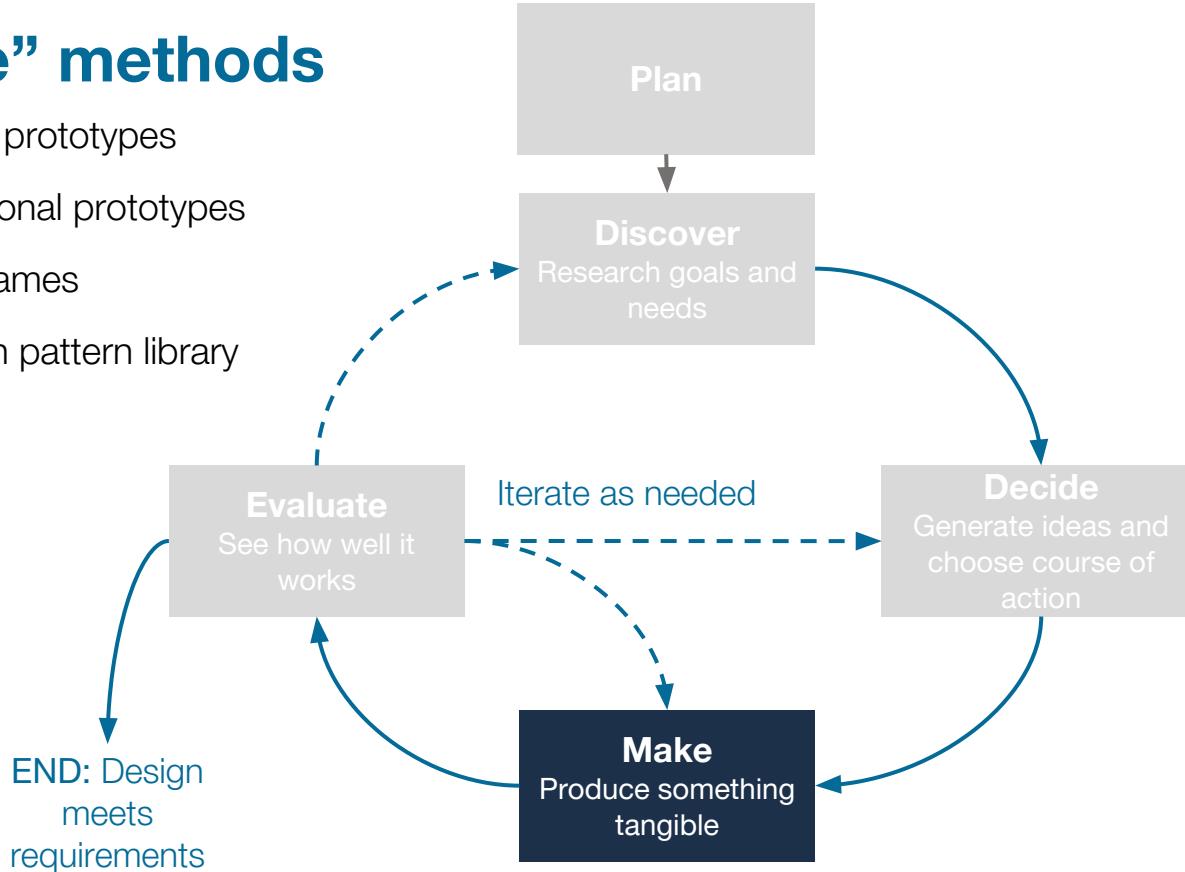
Decide methods

- Affinity diagramming
- Comparative analysis
- Journey mapping
- Taskflow or business process modeling
- Personas
- User scenarios
- Card sorting



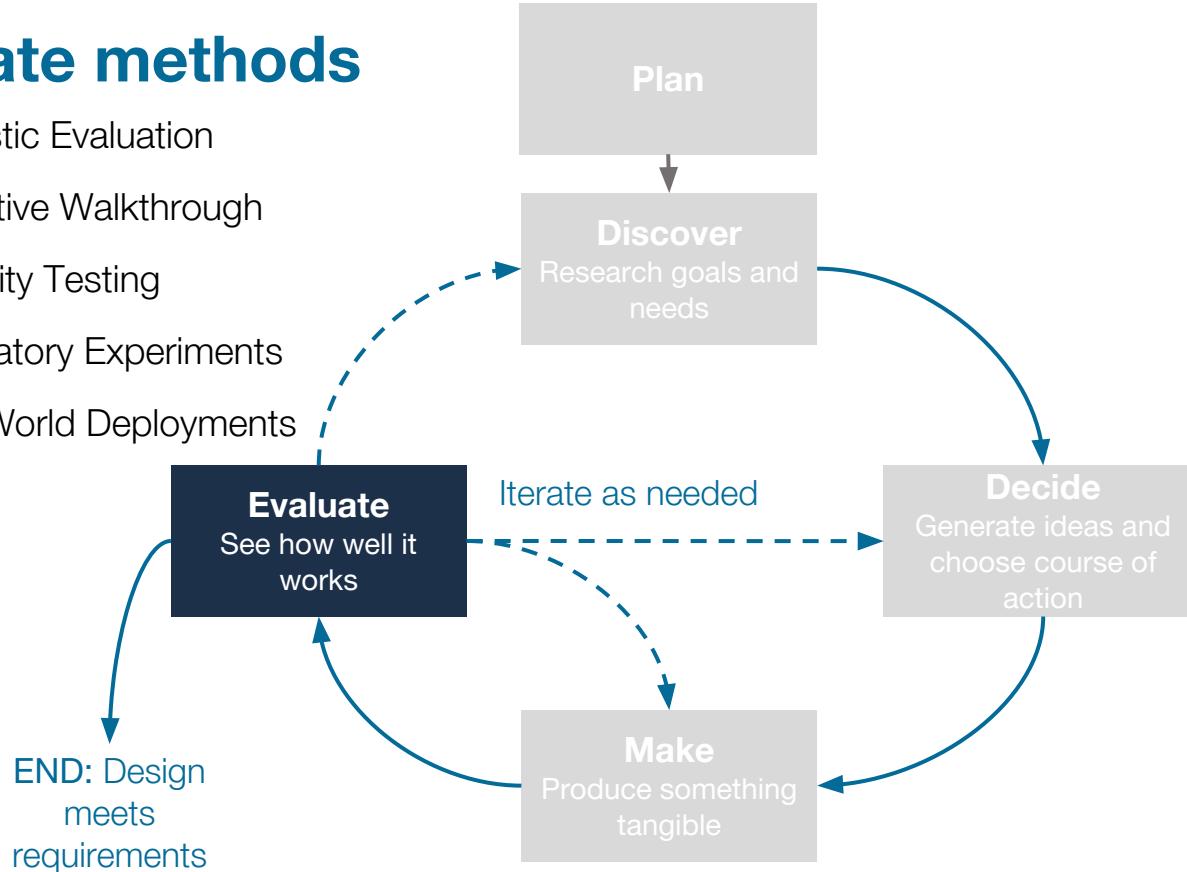
“Make” methods

- Paper prototypes
- Functional prototypes
- Wireframes
- Design pattern library



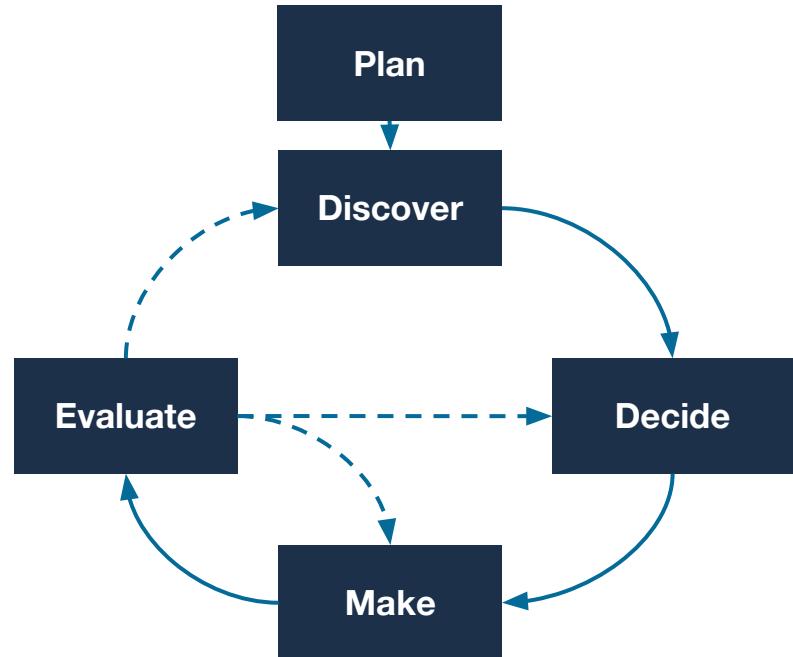
Evaluate methods

- Heuristic Evaluation
- Cognitive Walkthrough
- Usability Testing
- Laboratory Experiments
- Real World Deployments



Evaluation drives iteration

- If problems are in user performance, you probably need to return to prototyping, or the “**make**” phase.
- If problems are in conceptual model and how users understand it, you probably need to return to the **decide** phase.
- If problems are in usefulness or appropriateness, you probably need to return to the **discover** phase.



Break

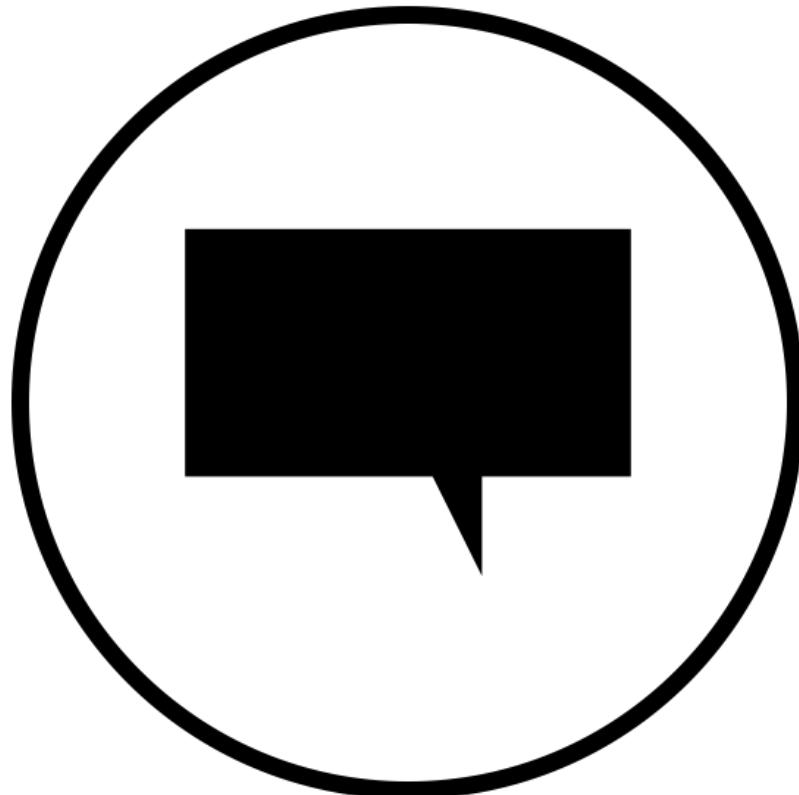
Introducing discovery research methods

Overview of interviewing, contextual inquiry, observation

“The first rule of user research: never ask anyone what they want.”

Hall, Erika, and Jeffrey Zeldman. Just enough research. A Book Apart, 2013.

Interviews



Created by Curve
from Noun Project

Stakeholder and user interviews

What

A wide-spanning set of semi-structured interviews with anyone who has an interest in a project's success, including users.

Why

To build consensus about the problem statement and research objectives.

PHASE	TIME REQUIRED
Discover	1-2 hours per interviewee

How to do it

1. Create a guide for yourself of some topics you'd like to ask about, and some specific questions as a back up. Questions will often concern the individual's role, the organization, the individuals' needs, and metrics for success of the project.
2. Sit down one-on-one with the participant, or two-on-one with a note-taker or joint interviewer, in a focused environment. Introduce yourself. Explain the premise for the interview as far as you can without biasing their responses.
3. Follow the conversation where the stakeholder takes it. They will focus on their priorities and interests. Be comfortable with silences, which allow the stakeholder to elaborate. To keep from getting entirely off course, use your interview guide to make sure you cover what you need to. Ask lots of "why is that" and "how do you do that" questions.
4. If there are other products they use or your product doesn't have constraints imposed by prior work, observe the stakeholders using a [competing product](#).

Examples from 18F

- "[Tips for capturing the best data from user interviews](#)" Ryan Sibley.
- "[Build empathy with stakeholder interviews, part 1: Preparation](#)." Andrew Maier.
- "[Build empathy with stakeholder interviews, part 2: Conversation](#)." Andrew Maier.

Applied in government research

No PRA implications. The PRA explicitly exempts direct observation and non-standardized conversation, 5 CFR 1320.3(h)3. See the methods for [Recruiting](#) and [Privacy](#) for more tips on taking input from the public.

Limitations

1

Interviews provide insight into what people say they'll do, which can be different from what they'll actually do

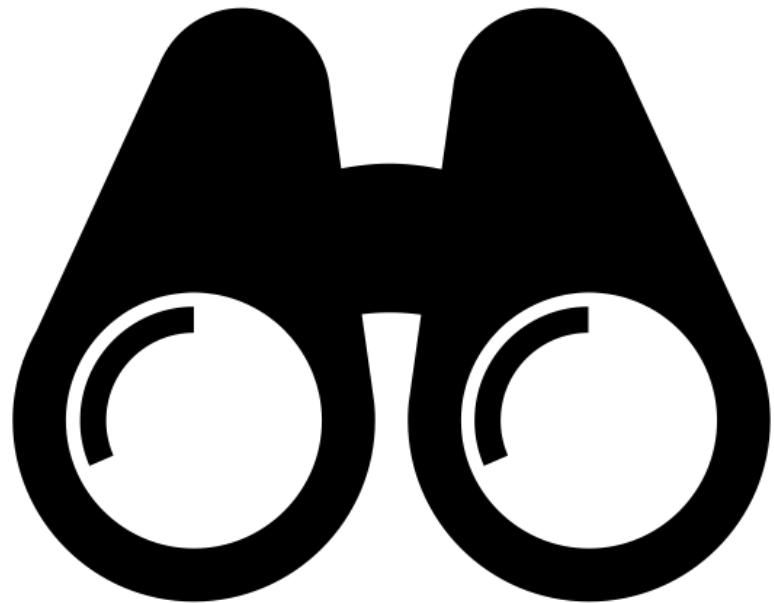
2

Memory is fallible.
How we think things happened may be different than how they actually happened.

3

Not everyone can design.
Conversation can easily wander to hypothetical solutions—focus on users' current experience.

Observation



Created by Nikita Kozin
from Noun Project

Observation

What, when, and why?

What: Watch what users actually do in context.

Why: When the situation is difficult for users to describe in interviews or discussion (particularly true for expert users).

When: When you have a way to view users in context. This could include watching users on video, via live screensharing, or being with them in the field.

Useful at any stage in the HCD process, but your project phase may shape where you focus your observation.

Observation: How?

0. Prepare

- Articulate your research questions and the events and activities that you hope to observe.
- Bring a clipboard, pencil and pen.
- Note your assumptions and expectations.

1. Place yourself in a good location

2. Watching, listening and noting

- Separate what you see and hear from your interpretations.
- Focus on taking notes, but don't tune everything else out.
- Time is data and the more data the better.
- Make your observations independently.

Observation worksheet

18F Field Observation Worksheet

START TIME:

TRIGGER:

 General interest in
cutting xmas trees Want to buy
xmas tree permit

OTHER:

PERSON 1:

PERSON 2:

PERSON 3:

OTHER NOTES

	SAID	DID	_____
<hr/> <hr/> <hr/>			

	SAID	DID	_____
<hr/> <hr/> <hr/>			

	SAID	DID	_____
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OBS. INITIALS:

Observation

What to look for: AEIOU Framework

- **Activities (A)** are goal-directed sets of actions—things that people want to accomplish.
- **Environments (E)** include the entire area where activities take place.
- **Interactions (I)** are between a person and someone or something else and are the building blocks of activities.
- **Objects (O)** are building blocks of the environment, key elements sometimes put to complex or unintended uses, changing their function, meaning, and context.
- **Users (U)** are the consumers, the people providing the behaviors, preferences, and needs.

Contextual inquiry



Created by Trident
from Noun Project

Contextual inquiry

What

The product team unobtrusively observes participants at work, with their permission, then asks questions.

Why

To learn how and why users do what they do; to discover needs and attitudes that might not emerge in an [interview](#) to map how tools, digital and otherwise, interact during complex activities.

PHASE	TIME REQUIRED
Discover	1-2 hours per user

How to do it

1. With permission from a supervisor and from the participant, schedule a time to watch a typical work activity and record data.
2. While observing, ask the participant to act normally. Pretend you're a student learning how to do the job. Ask questions to help you understand what the person is doing and why.
3. At the end of the session, explain what you have learned and check for errors.
4. Immediately after, write up your notes.

Example from 18F

A pair of 18F team members visited two Department of Labor/Wage Hour Division investigators as they interviewed home health care workers who were subject to unpaid overtime and other infractions. Since it was a sensitive subject, the 18F team did not question the health care workers directly, but instead asked the investigators clarifying questions in private. 18F staff also made sure that photos did not include faces.

Applied in government research

No PRA implications, if done properly. Contextual interviews should be non-standardized, conversational, and based on observation. The PRA explicitly exempts direct observation and non-standardized conversation, 5 CFR 1320.3(h)3. See the methods for [Recruiting](#) and [Privacy](#) for more tips on taking input from the public.

For internal folks, get permission from the right level of management. If participants could be under union agreements, contact the agency's labor relations team.

Contextual inquiry

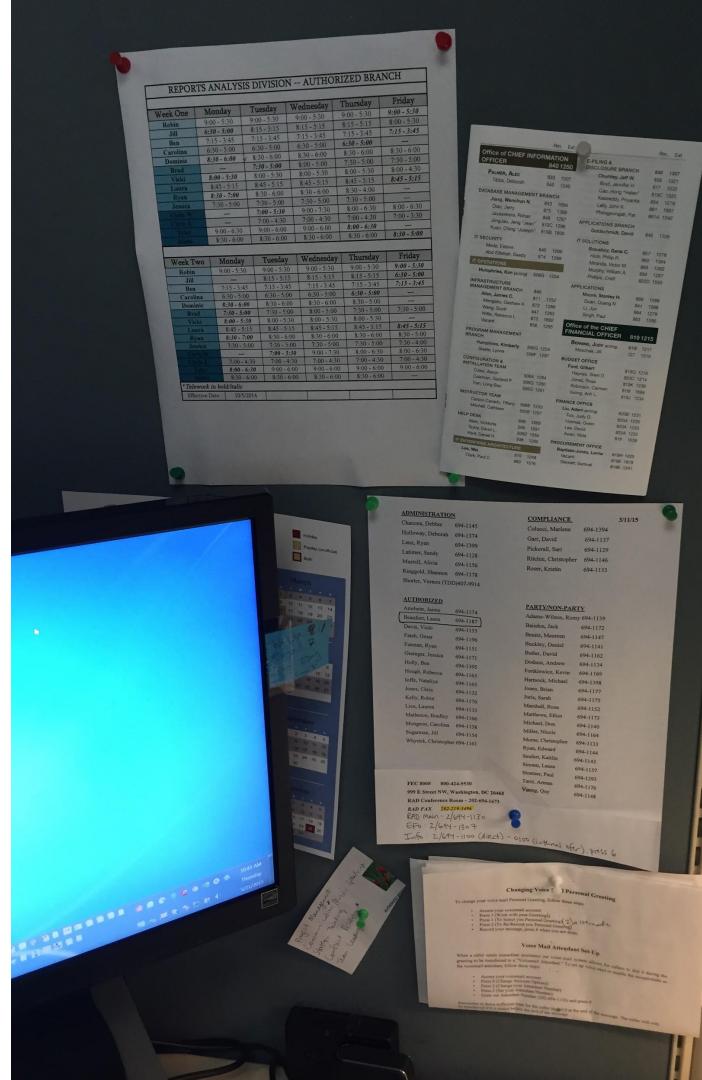
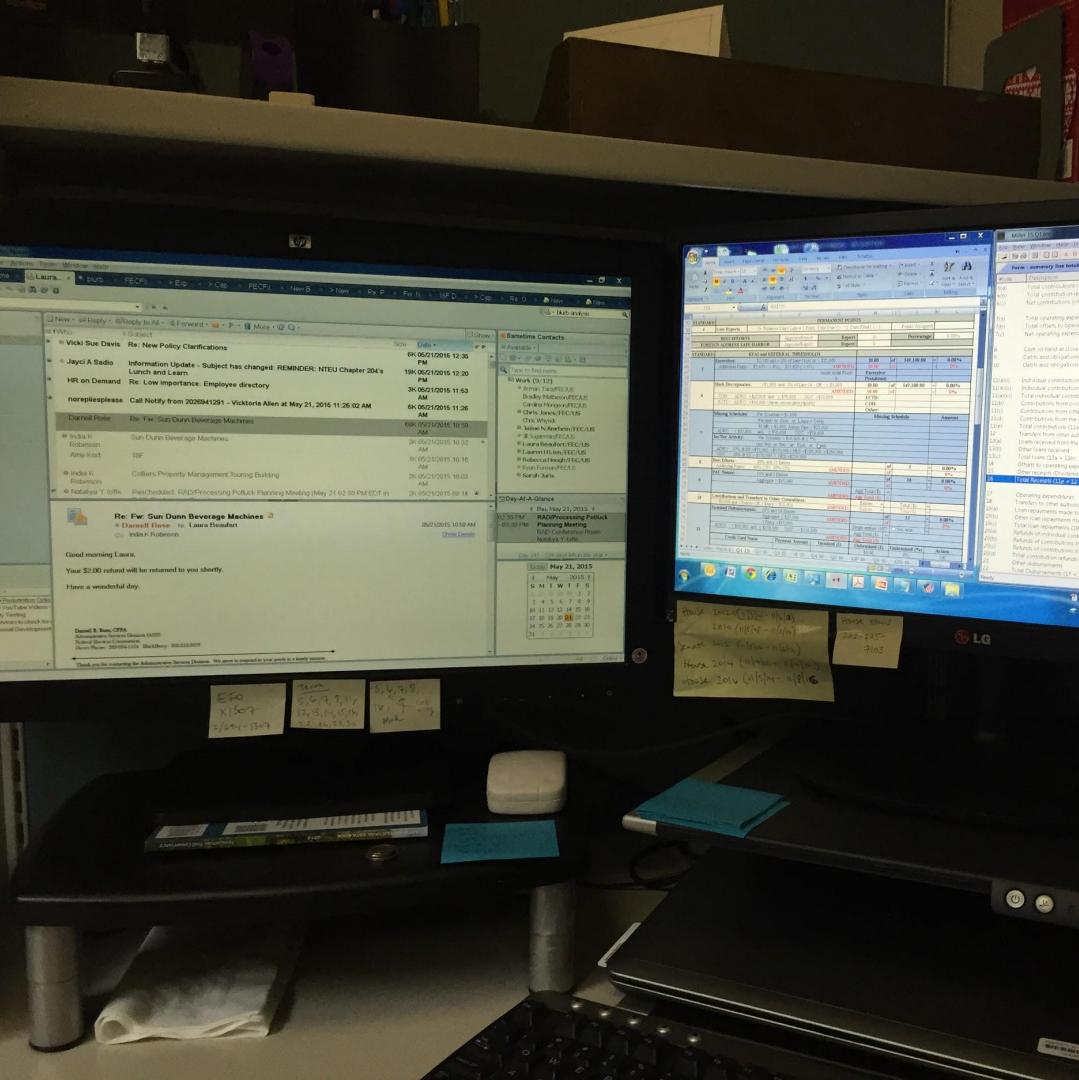
Observation in the field

Focus on:

- The tools people use.
- The sequences in which actions occur.
- People's methods of organization.
- What kinds of interactions they have.



Goodwin, Charles. "Professional vision." *American anthropologist* 96.3 (1994): 606-633.



Overview of qualitative data analysis

**Now you have all these notes, what
do you do with them?**

Goals of qualitative data analysis

1

Identify the **diversity** of possible behaviors and ideas

2

Find **patterns** of common co-occurring behaviors

3

Explore possible **explanations** for those behaviors

Goals of quantitative data analysis

1

Identify the **frequency diversity** of possible behaviors and ideas

2

Be confident about how that **frequency varies among different groups**

3

Gather strong evidence for **what causes what**

Affinity mapping

1

Note taking

2

Transcribing

3

Cluster finding

4

Cluster labeling

Notes from an interview

Notes from participant 1

So, how are you going to use these data?

How are you going to go about making this into a map? ORR is going to make a map as well. Their goal is to get it completed by April for the 1NYC university. So, now they are also planning to create this map of their projects. We'll piggy back on that. A local map, not an OEM map. We're probably not going to meet the agri deadline. How do you work together on this. They have a contractor, Arcatis, who's created the tracker and we're going to upload the data into the tracker, but it will be housed at their office.

It would be a spreadsheet like this. As long as everything is organized according to how their tracker is, it should n't be an issue. This is the whole mitigation table. For this, it is organized by project, then the location.

Notes from an observation

18F Field Observation Worksheet Forest Service ePermitting

START TIME: 11:38 TRIGGER: General interest in cutting xmas trees Want to buy xmas tree permit OTHER:

PERSON 1: customer PERSON 2: staff PERSON 3: OTHER NOTES

SAID DID saw thing, return & → SAID DID just one? have to wait for person for CC

SAID DID ok → SAID DID give permit processes transaction

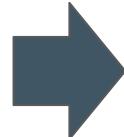
SAID DID we've → SAID DID goes

SAID DID <u>saw</u> thing, return &	SAID DID just one? have to wait for person for CC	SAID DID _____	SAID DID _____
SAID DID <u>ok</u>	SAID DID give permit processes transaction	SAID DID _____	SAID DID _____
SAID DID <u>we've</u>	SAID DID <u>goes</u>	SAID DID _____	SAID DID _____

Transcribing notes to stickies

How are you going to go about making this into a map? ORR is going to make a map as well. Their goal is to get it completed by April for the 1NYC university. So, now they are also planning to create this map of their projects. We'll piggy back on that. A acit map, not an OEM map. We're probably not going to meet the agri deadline. How do you work together on this. They have a contractor, Arcatis, who's created the tracker and we're going to upload the data into the tracker, but it will be housed at their office.

It would be a spreadsheet like this. As long as everything is organized according to how their tracker is, it should n't be an issue. This is the whole



*ORR creating
the map -U1*

*Goal: Create
map by April
-U1*

*Planning
[interviewee]
will piggy
back -U1*

*Aracatis,
contractor,
will do the
work -U1*

A smattering of notes

U39 is interested in what cropping opportunities will be available due to climate change

we have that kind of computer power at the national labs - U13

when we do send data sets, there's almost always a phone call how should i be using it , how should i not be using it. -U30

The volume of data is monstrous. To localize it, you're running sophisticated analysis on the global output, or you're running a regional weather model. -U03

we use from the global climate comparison, CMET5, vetted for PNW, a researcher used a process to try to adapt that regional down to the specific topography. he goes through the downscaling, one of several things it does, topography, it looks at hundreds of variables. -U15

On the data side, big data aspects are insane, making existing data sets more open -U21

"At different stages of action, you need different levels of information" -U12

Moving notes into clusters

U39 is interested in what cropping opportunities will be available due to climate change

when we do send data sets, there's almost always a phone call how should I be using it, how should I not be using it. -U30

we have that kind of computer power at the national labs - U13

On the data side, big data aspects are insane, making existing data sets more open -U21

"At different stages of action, you need different levels of information" -U12

we use from the global climate comparison, CME15, vetted for PNW. A researcher used a process to try to adapt that regional down to the specific topography, he goes through a lot of things... one of several things it does topography, it looks at hundreds of variables. -U16

The volume of data is monstrous. To localize it, you're running sophisticated analysis on the global output, or you're running a regional weather model. -U03

Labelling clusters

Takes time and processing power to downscale models

we have that kind of computer power at the national labs - U13

On the data side, big data aspects are insane, making existing data sets more open -U21

The volume of data is monstrous. To localize it, you're running sophisticated analysis on the global output, or you're running a regional weather model. -U03

Moving more notes into a cluster

Takes time and processing power to downscale models			
they have to downscale that to a regional rain gauge, that's going to take a lot of computer power, and we wait in 15 minute intervals for 100 years, their biggest problem is computer power. -U13	it takes them years to run the models, and you're paying for that time. It's very expensive to get the data at the scale to make that at that scale. -U13	"An ensemble is a real effort, you can't just do that fast and dirty." - U25	. Reams and reams of data. The model itself; each individual runs with 7 terabytes. Not something that your average everyday water manager would know how to run - U21
a researcher used a process to try to adapt that regional down to the specific topography, it looks at hundreds of variables. -U15	The volume of data is monstrous. To localize it, you're running sophisticated analysis on the global output, or you're running a regional weather model. -U03	we have that kind of computer power at the national labs - U13	can give us hourly output at the kilometer grid scale. It's still pretty big. They can run it for four. It's just a computational issue, but it takes more more horsepower, which is time and money. -U03
On the data side, big data aspects are insane, making existing data sets more open -U21	Google and Microsoft are falling over themselves to give us processing time, it still takes a fair amount of babysitting to get these runs out. -U28	we use from the global climate comparison, CMETIS, vetted for climate change, and we try to adapt that regional down to the specific topography, he goes through the downscaling, one of several things it does, it goes hourly, it looks at hundreds of variables. -U25	

Assembling and labelling more clusters

Sub-activities: science translators lead ●

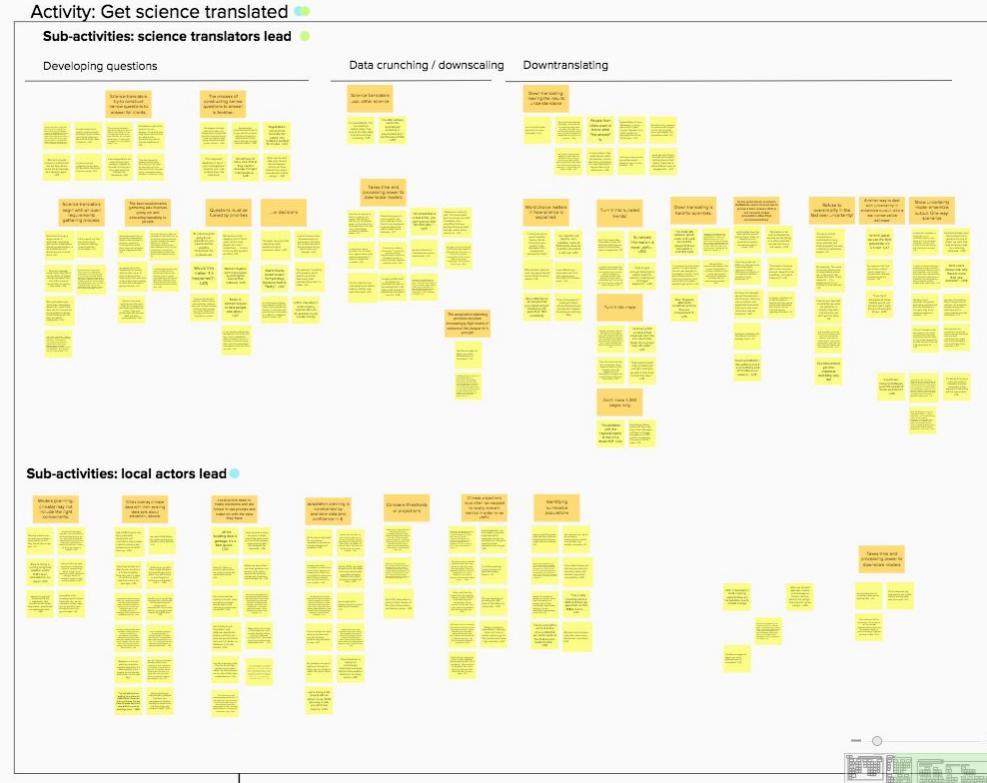
Developing questions



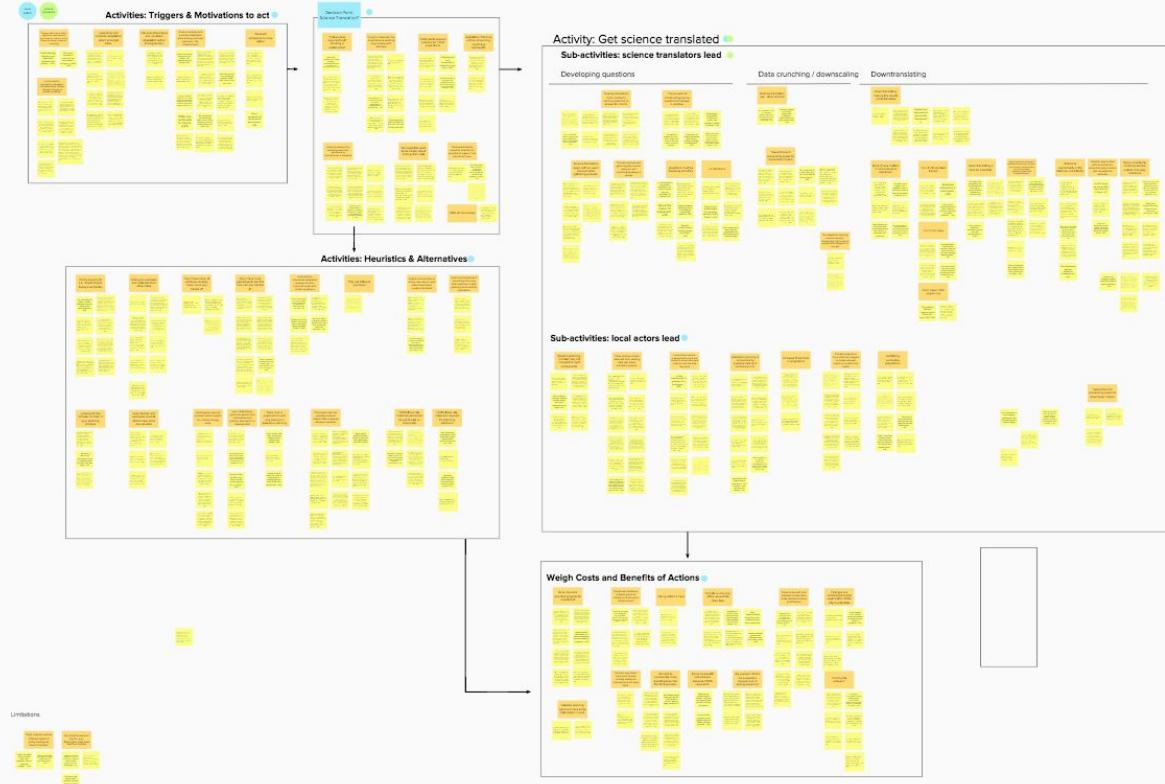
Data crunching / downscalin



Assembling and labelling more clusters



Assembling and labelling more clusters



Affinity mapping

1

Note taking

2

Transcribing

3

Cluster finding

4

Cluster labeling

Key qualities of design research

Good design research is



Many
participants



One-on-one
sessions



Focus on
behavior



Systematic
analysis

Good design research is



- Audience divided into **segments**
- Speak with **five or more** users per segment
- Don't forget **frontline**, general **public** and others indirectly affected

Good design research is



One-on-one
sessions

- Interview or observations** *not* focus groups or committee meetings
- One researcher, one participant, and **silent observers**
- Place, time and researcher that build **trust**

Good design research is



Focus on
behavior

- Observing, not asking,**
when possible
- When asking, posing **open-ended**
questions
- Avoiding questions focused on a
solution

Good design research is



Systematic
analysis

- Note **raw observations and quotations**, not inferences
- Arrange raw data into **groups**
- Your conclusions are the sentence that **summarizes each group**

Complete the self-assessment for a project you gathered requirements for in the last year.

You won't have to turn in your answers.

Design research quality self assessment

Many participants <ul style="list-style-type: none"><input type="checkbox"/> We documented two or more audience segments.<input type="checkbox"/> We spoke with five or more users per segment.<input type="checkbox"/> We included front line or public users. <hr/> Total checked	 One-on-one sessions <ul style="list-style-type: none"><input type="checkbox"/> We conducted interviews or observations, not meetings or focus groups.<input type="checkbox"/> Each session had one participant, and one facilitator. Observers were silent.<input type="checkbox"/> Participants were comfortable and open. <hr/> Total checked
Focus on behavior <ul style="list-style-type: none"><input type="checkbox"/> We silencing observed users doing their work.<input type="checkbox"/> We asked open-ended questions<input type="checkbox"/> We didn't ask questions that offered possible solutions to problems <hr/> Total checked	 Systematic analysis <ul style="list-style-type: none"><input type="checkbox"/> Our notes were raw quotes and observations not inferences or ideas<input type="checkbox"/> We arranged our raw data into groups<input type="checkbox"/> Our conclusions matched the groups we discovered <hr/> Total checked

**What are you doing well?
What could you do better?**

Lunch

Practicing research methods

Practice interviews

- 1. Write questions.** Now
- 2. Get feedback from your neighbor.**
- 3. Even numbers interview odd numbers.**
- 4. Switch.**

Your question: What's hard about getting a Christmas tree cutting permit? (From new or return purchasers.)

Good design research is



Focus on
behavior

- When asking, posing **open-ended** questions
 - “How do you...”
 - “What steps do you take to...”
 - “Tell me more about...”
- Avoiding questions focused on a **solution**

1. Write questions.
2. Get feedback from your neighbor. Now
3. Even numbers interview odd numbers.
4. Switch.

Good design research is



Focus on behavior

- When asking, posing **open-ended** questions
 - “How do you...”
 - “What steps do you take to...”
 - “Tell me more about...”
- Avoiding questions focused on a **solution**

1. Write questions.
2. Get feedback from your neighbor.
3. Even numbers interview odd numbers. **Now**
4. Switch.

Remember to write interviewee's number on the notes.

Notes from an interview

Notes from participant 1

So, how are you going to use these data?

How are you going to go about making this into a map? ORR is going to make a map as well. Their goal is to get it completed by April for the 1NYC university. So, now they are also planning to create this map of their projects. We'll piggy back on that. A local map, not an OEM map. We're probably not going to meet the agri deadline. How do you work together on this. They have a contractor, Arcatis, who's created the tracker and we're going to upload the data into the tracker, but it will be housed at their office.

It would be a spreadsheet like this. As long as everything is organized according to how their tracker is, it should n't be an issue. This is the whole mitigation table. For this, it is organized by project, then the location.

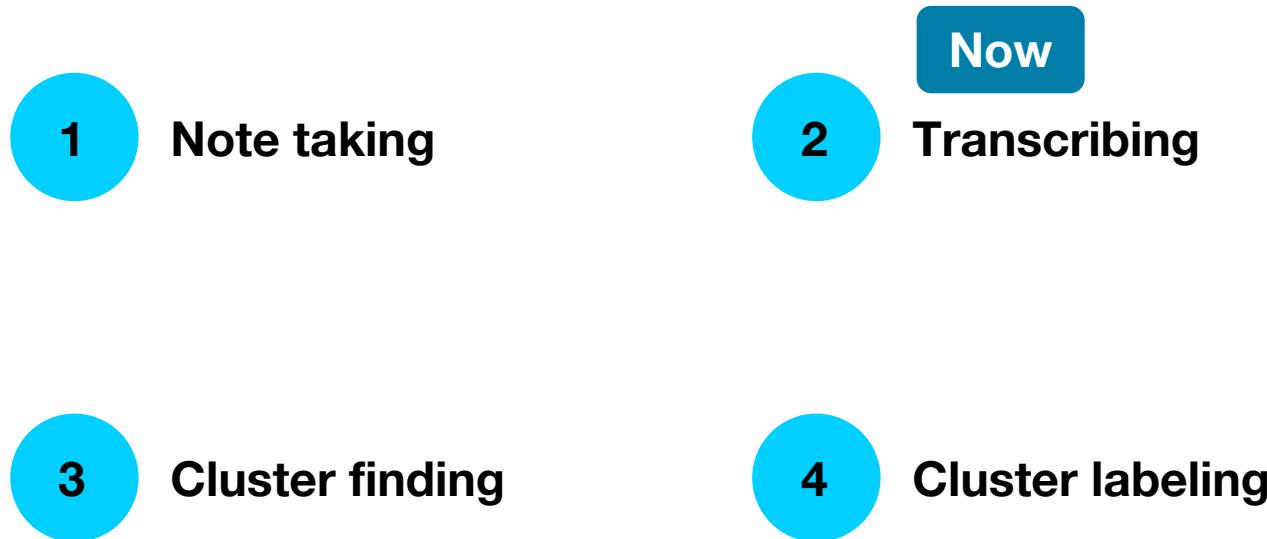
1. Write questions.
2. Get feedback from your neighbor.
3. Even numbers interview odd numbers.
4. Switch. Now

Remember to write interviewee's number on the notes.

Mini break

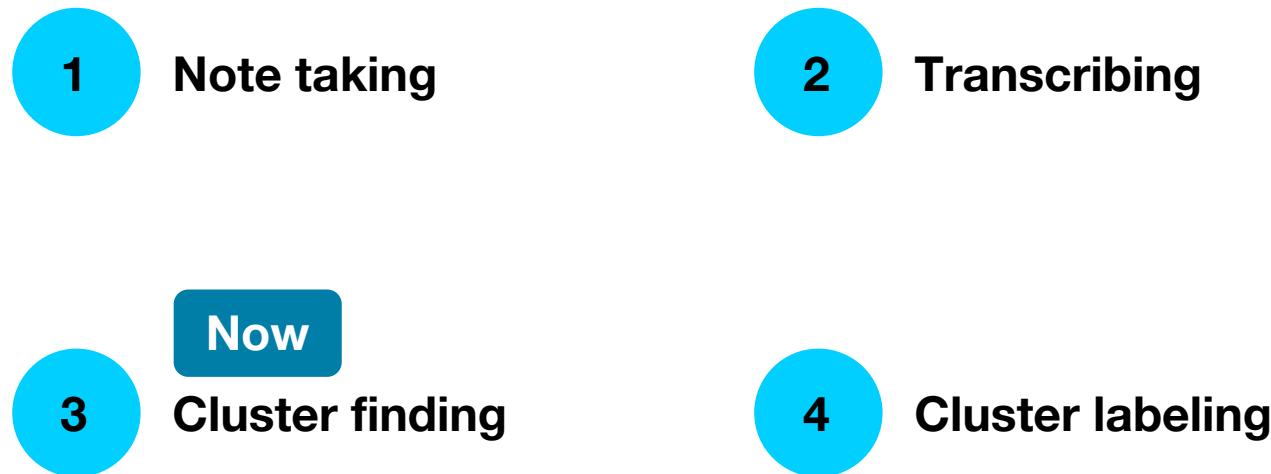
Practice data analysis

Affinity mapping



- **The exact words people say;**
avoid summarizing
- **One per sticky note**
- **Put participant's number on each note**

Affinity mapping



**As a team, move notes that support
the same conclusion into groups.**

**Try to have more than two
participants' notes per cluster.**

Affinity mapping

-
- 1 Note taking
- 2 Transcribing
- 3 Cluster finding
- 4 Cluster labeling
- Now

**As a team, label clusters with a
conclusion supported by those
stickies.**

Break

Human-centered design intensive day 2

Melissa Braxton
Colin MacArthur



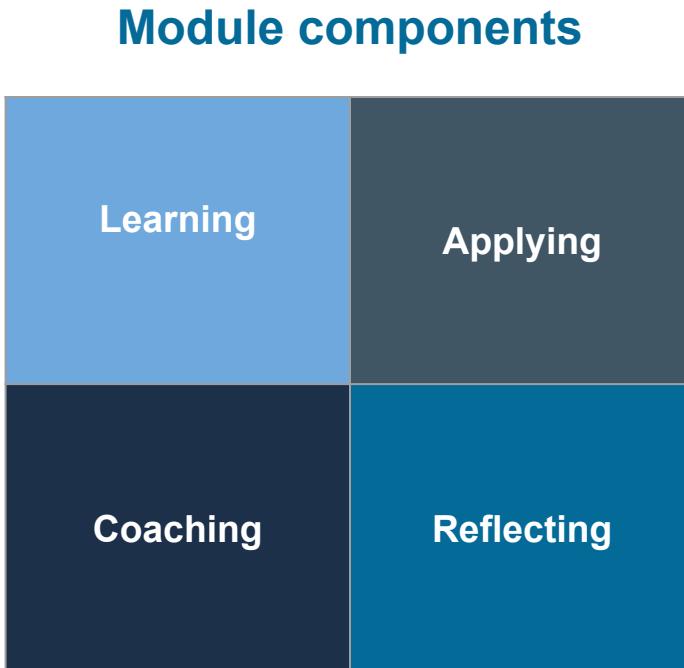
Brief introduction

Today's agenda

9:05-9:35a	Logistics
9:35-10:20a	Human-centered business process modelling
10:20-10:30a	Break
10:30-12:00p	Challenges to conducting design research
12p-1:15p	Lunch
1:15-3:15p	Discovery planning time and consulting
3:15-3:30p	Break
3:30-3:45p	Discovery plan share outs
3:45-4	Workshop retro

Logistics

We've broken the next few months into 2 modules. Each module has 4 components:



Module 1 - Planning and conducting design research



Learning

11/14-11/15: 2-day intensive
+ optional reading



Coaching

1:1 remote sessions



Applying

11/21-spring 2018: Planning
and conducting a discovery
research sprint
(we are here!)



Reflecting

Reflection exercises
throughout and a retro at the
end of the module

Module 2 - Translating research into action: Visioning, framing, and decision making



Learning

Webinar week of 1/1/18
+ optional reading



Coaching

1:1 remote sessions that you'll
schedule with us



Applying

1/1/18-1/29/18: Creating your
product roadmap



Reflecting

Reflection exercises
throughout and a retro at the
end of the module

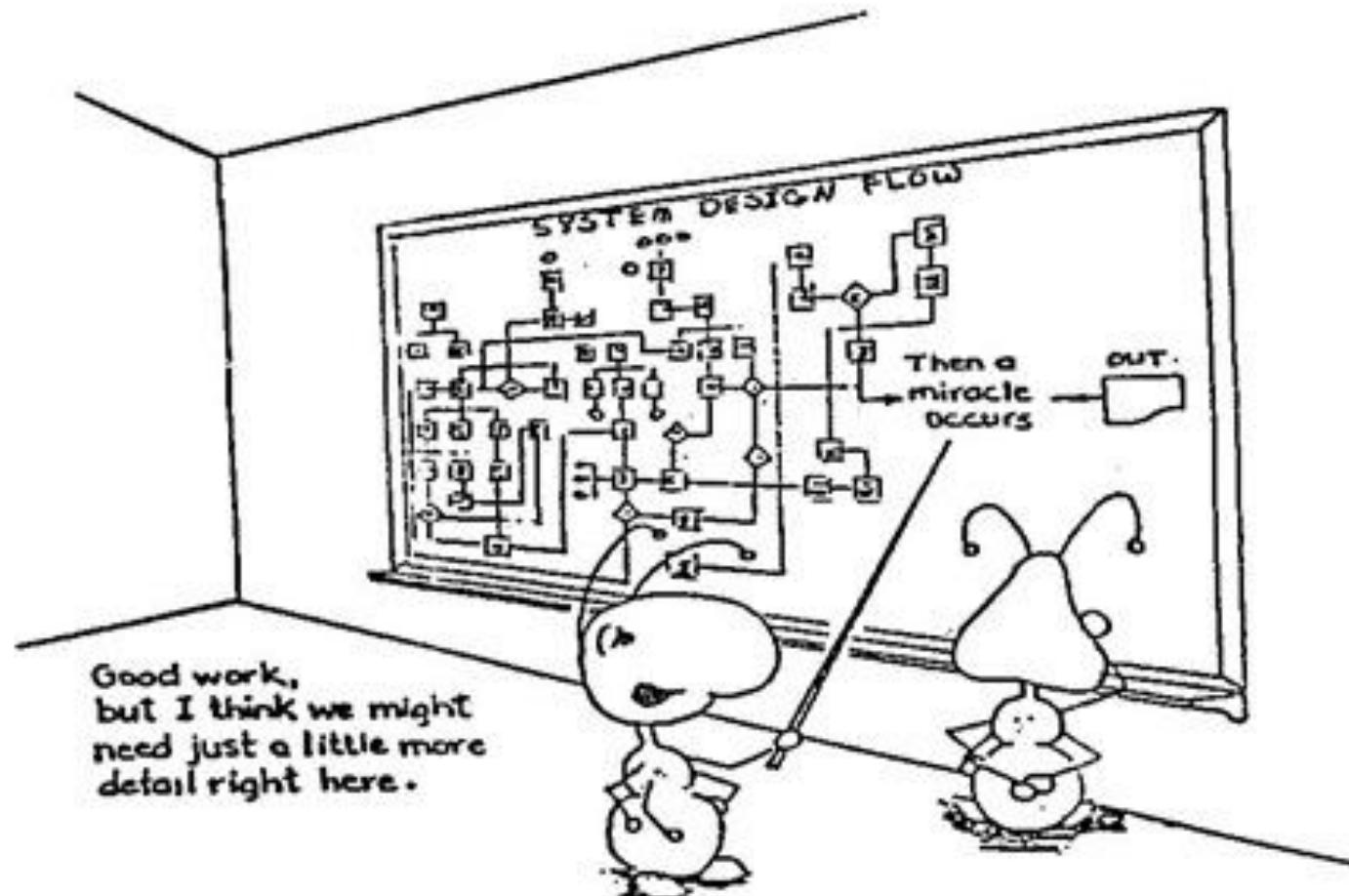
Here's how we'll communicate

- **How to get in touch:** Slack @melissabraxton; email melissa.braxton@gsa.gov
- **Deliverables:** You can upload your deliverables to **Slack**.
- **Reading:** Most reading will be in your book, **UX Research**. I'll link to or upload any additional reading in slack.
- **Webinar:** We'll use **Adobe Connect** to connect. Stay tuned for emails re: scheduling.
- **1:1s:** You can schedule a 1:1 meeting with me [here](#).

Slack is also a great place for you to discuss readings and questions with your peers and me!

Slack demo

Human centered business process modeling



“A good model is salient, accurate, complete yet parsimonious, and understandable.”

White S. and Miers D., BPMN Modeling and Reference Guide, 2008.

Models are tools that facilitate communication around a concept or problem by providing an artifact that makes hidden phenomena explicit.

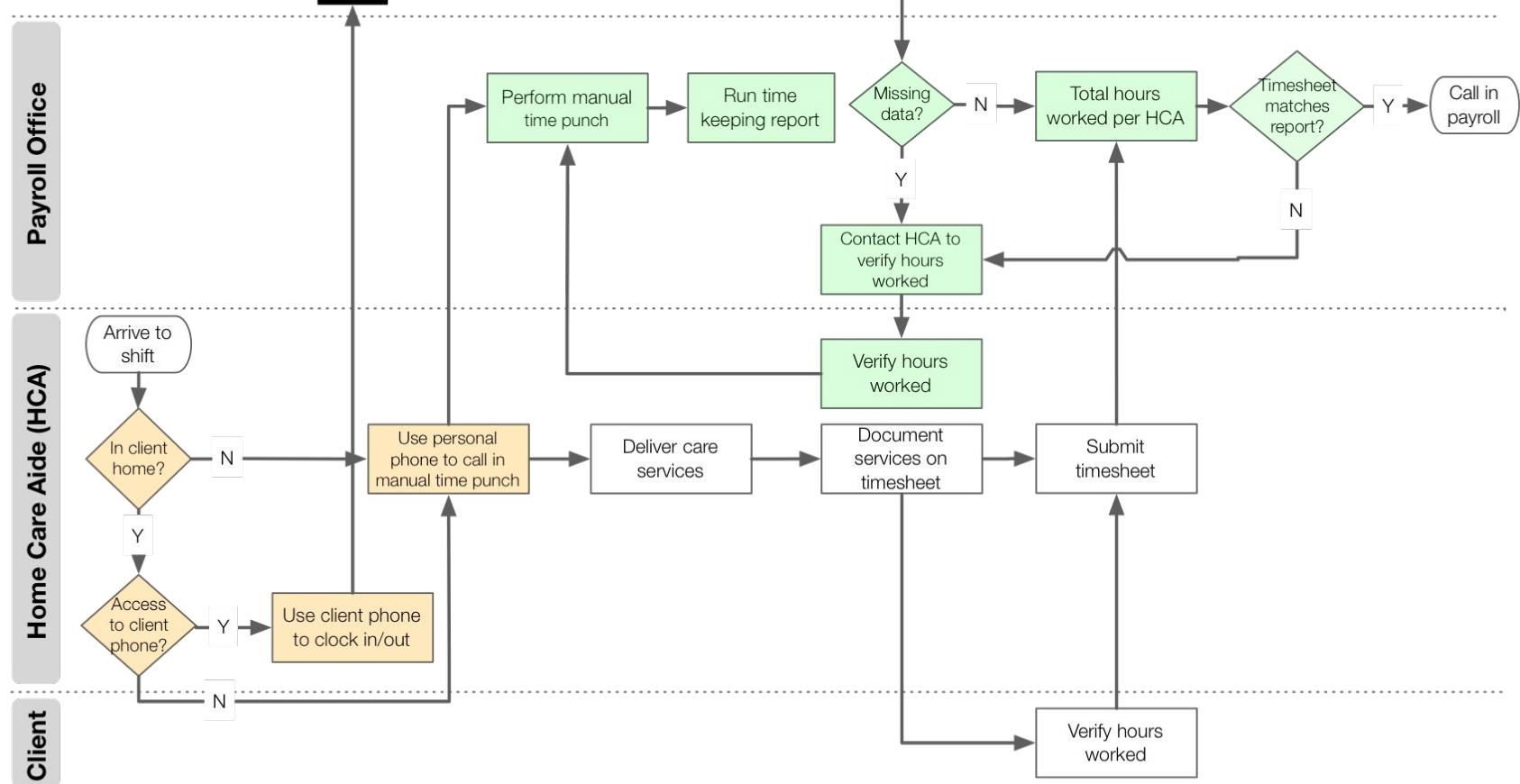
When the phenomenon under design is social, “representation problems take on new dimensions.”*

*H. A. Simon, *The sciences of the artificial*.
Cambridge, Mass.: MIT Press, 1981.

Benefits of human centered business process modeling

- Makes work explicit
- Enables formative evaluation of new design concepts, early in the design process
- Focus on information flow helps bridge the gap between software design and development
- Co-created models serve as boundary objects between analysts and users

“As-is” workflow



“To-be” workflow

Payroll Office

Automated system records hours and delivers time keeping report

Run time keeping report

Missing data?

Notify HCA of time punch needs

Total hours worked per HCA

Timesheet matches report?

Call in payroll

Y

N

Submit timesheet

Arrive to shift

Use Agency phone clock in/out

Deliver care services

Document services on timesheet

Check timesheet against hour report

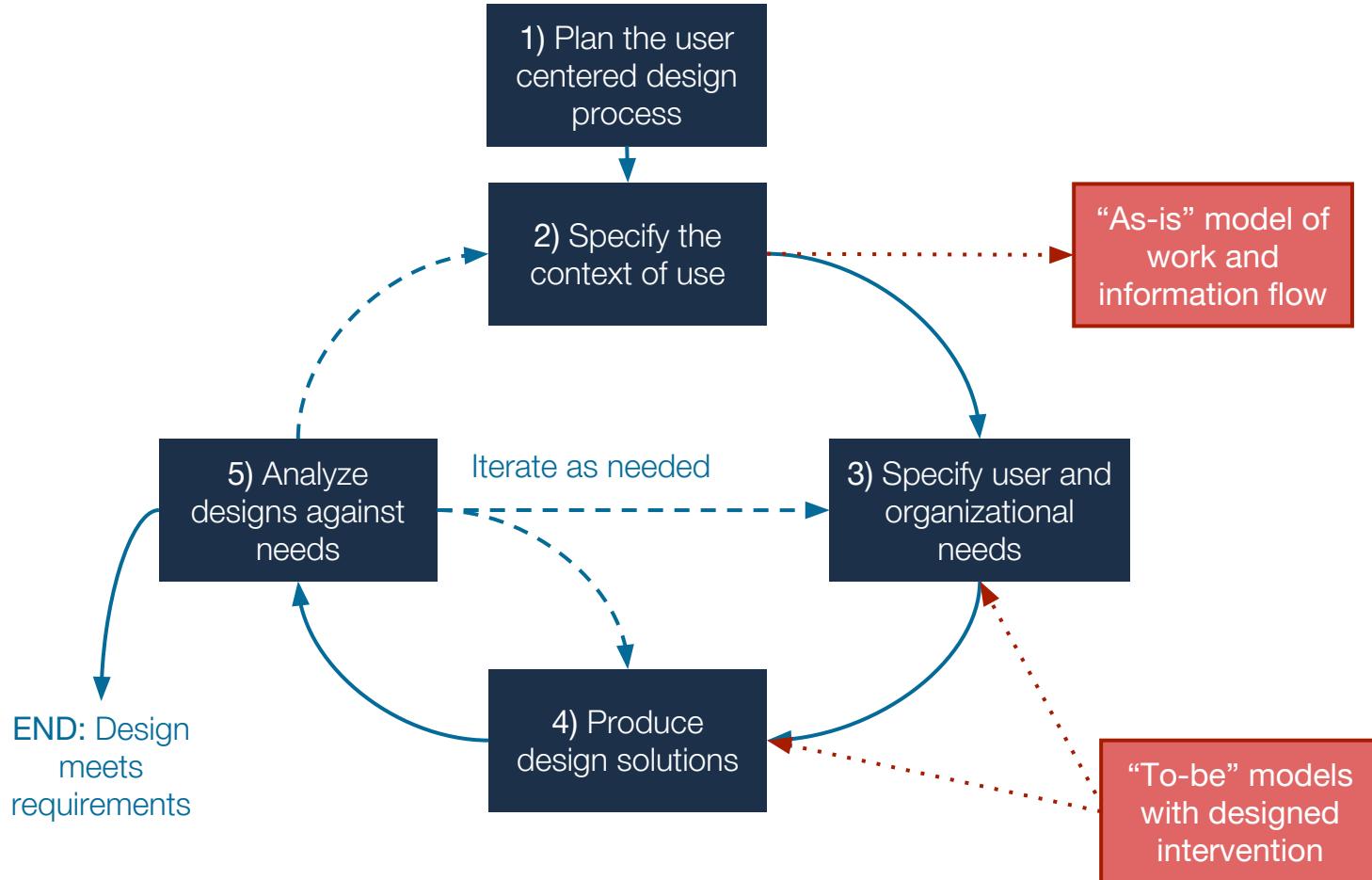
Timesheet matches report?

N

Verify hours worked

Y

Home Care Aide (HCA)



“...those scientific objects which both inhabit several intersecting social worlds and satisfy the informational requirements of each of them... These objects may be abstract or concrete. They have different meanings in different social worlds but their structure is common enough to more than one world to make them recognizable, a means of translation. The creation and management of boundary objects is a key process in developing and maintaining coherence across intersecting social worlds.”

**How will we know human centered
business process modeling when we
see it?**

Key qualities of human centered business process modeling

 Put users at the center	 Co-design with users
 Focus on information flow	 Formative evaluation

Human centered business process modeling



Put users at the center

- Encode data from interviews and observations with actual users.
- Focus on human tasks, rather than system actions.
- Frame models in terms of users' desired work product.

Human centered business process modeling



Co-design with
users

- Walkthrough as-is models with real users to validate their accuracy.
- Iteratively co-design to-be models with users and stakeholders.

Human centered business process modeling



Focus on
information flow

- Information flow constrains workflow. Integrate information “requirements” with workflow tasks.

Human centered business process modeling



Formative evaluation

- Evaluate a design's impact on users' workflow up front.
- Prioritize design decisions on the benefit to users' workflow.
- A model is almost never “done.” Revise models in response to new learnings from usability testing.

Limitations

1

A lot depends on the analyst's skill and experience. Procedural models prioritize transactional work over tacit knowledge, which analysts must work to uncover.

2

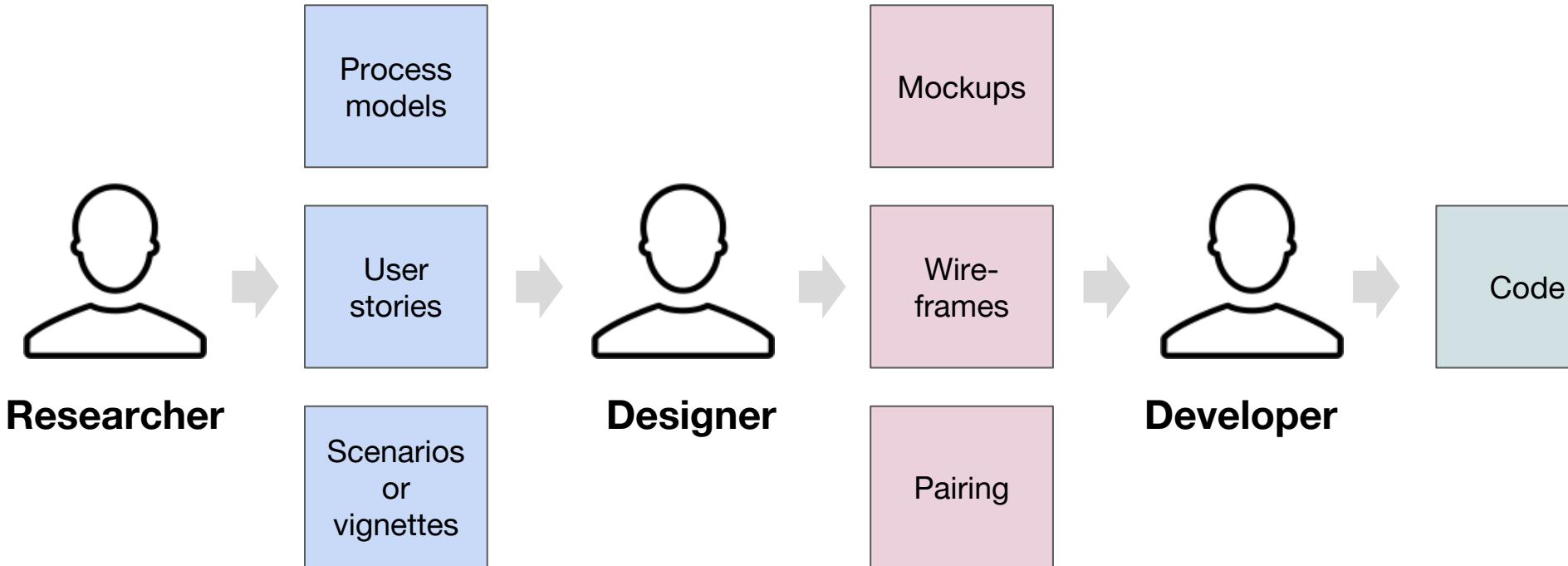
Models may hide real complexity and do not represent all issues, for example, organizational cultural issues, that must be considered in design.

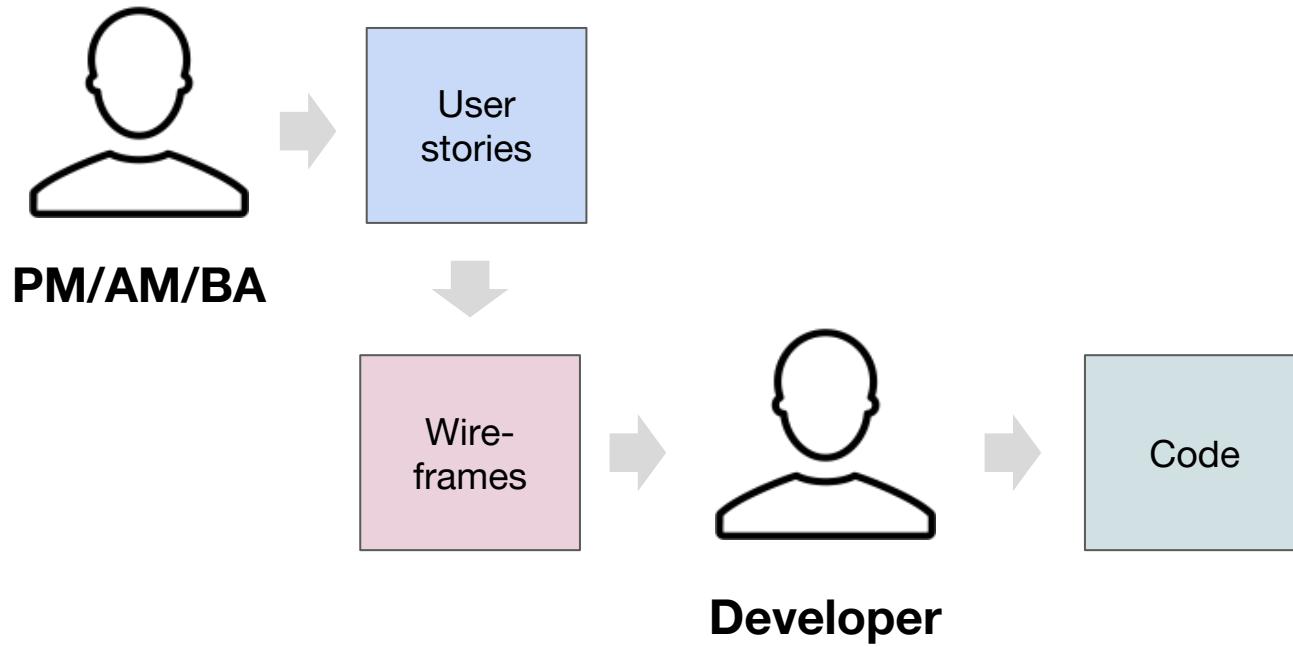
3

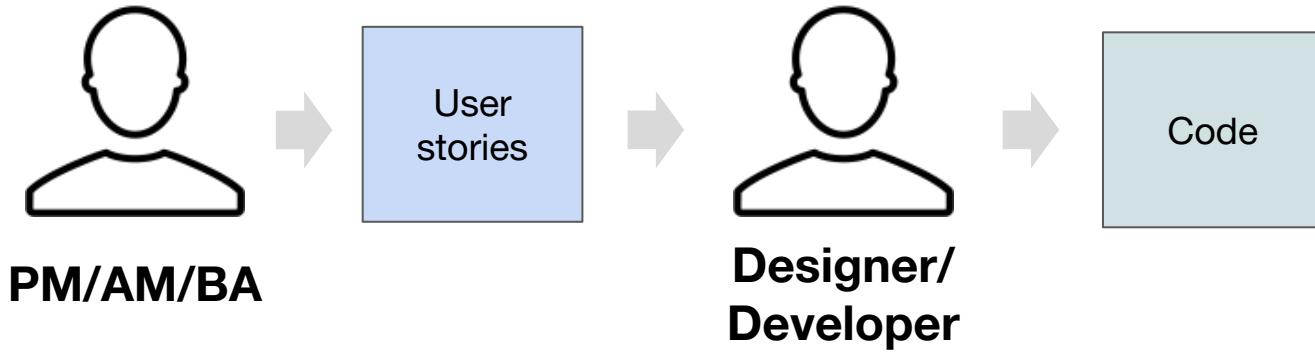
Models may have a short shelf life. Models are snapshots of the work environment taken within a relatively short time. Avoid losing touch with the individuals working in the environment.

Design research challenges

Communicating design research to developers







Design research and the SDLC

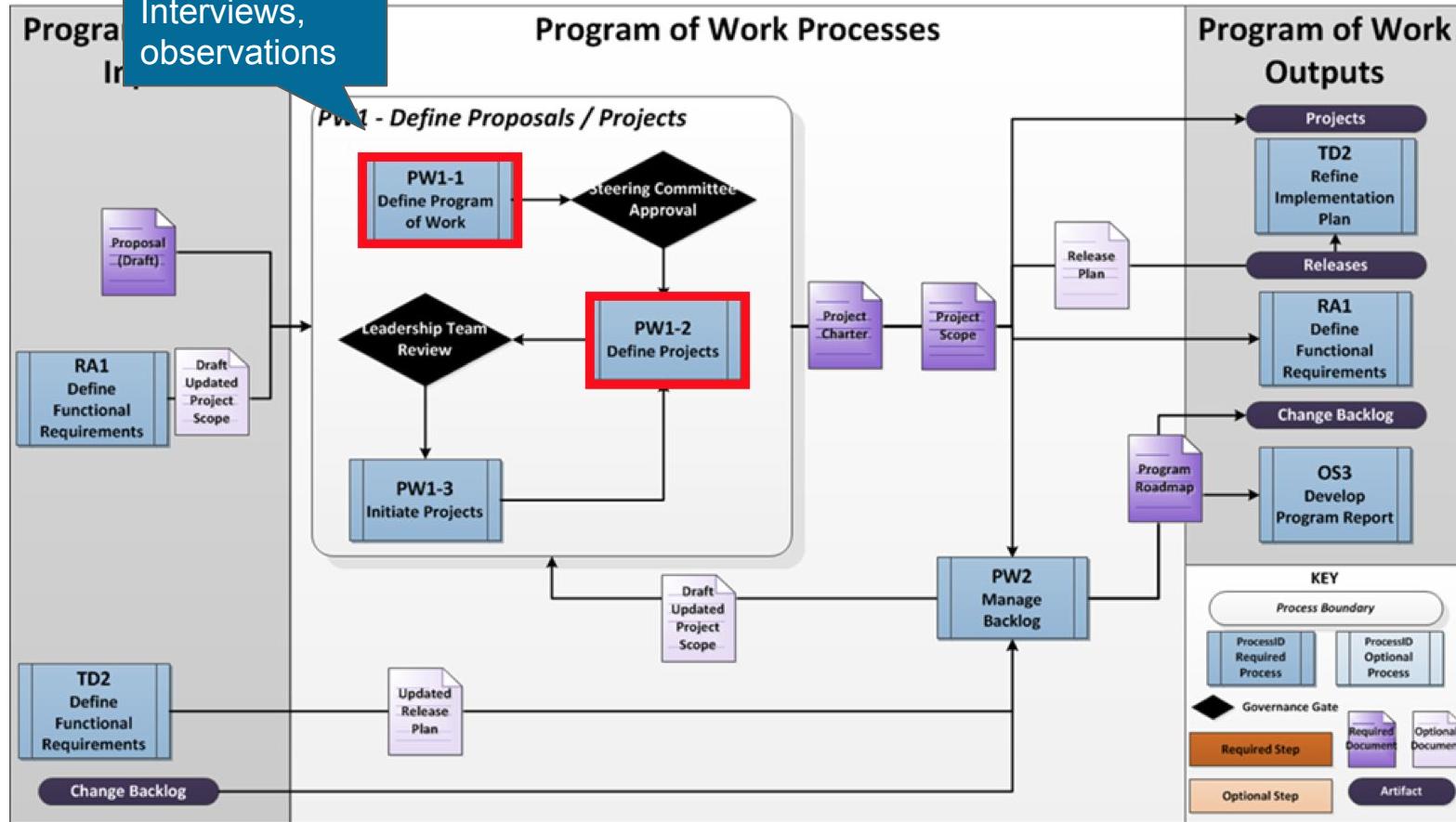
Which phase does design research happen in?

Table 1: NRM SDLC's Six High-level Stages

Program of Work	Requirements Analysis	Technical Design	Development / Testing	Deployment	Operational Support
The <u>Program of Work Stage</u> is where program needs are identified, prioritized, and scheduled to be worked on.	The <u>Requirements Analysis Stage</u> is where program needs are decomposed into functional requirements that will drive solution development.	The <u>Technical Design Stage</u> is where functional requirements are translated into technical requirements and development tasks.	The <u>Development and Testing Stage</u> is where new and modified application code is created and finalized to meet functional requirements.	The <u>Deployment Stage</u> is where new and modified application code is built into a release package and deployed to production servers.	The <u>Operational Support Stage</u> supports users in their operations of applications and where production applications are maintained.

Generative research: Interviews, observations

Figure 1: Program of Work Stage



Strategy to include design research

Figure 3: Requirements Analysis Stage

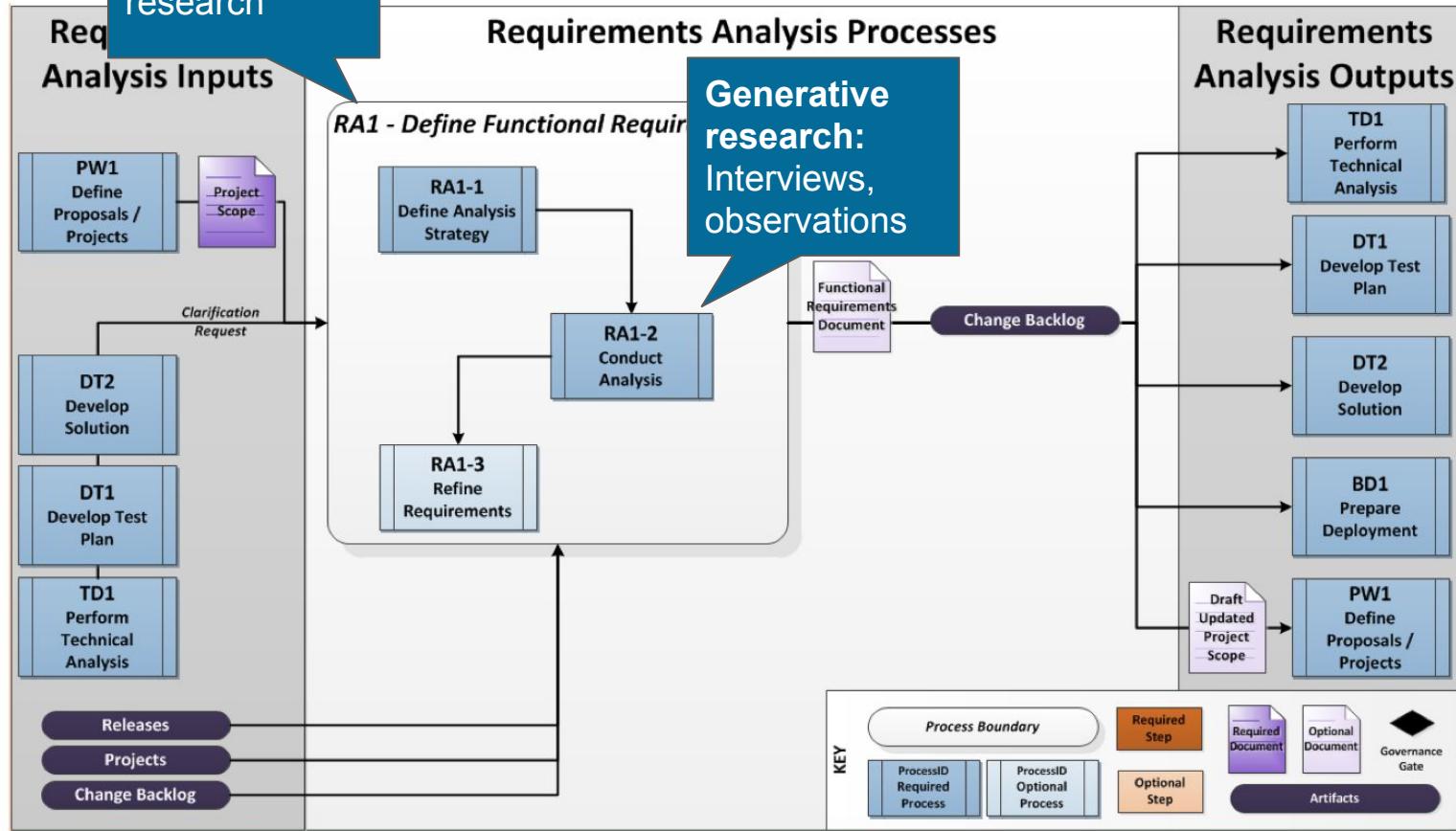


Figure 5: Technical Design Stage

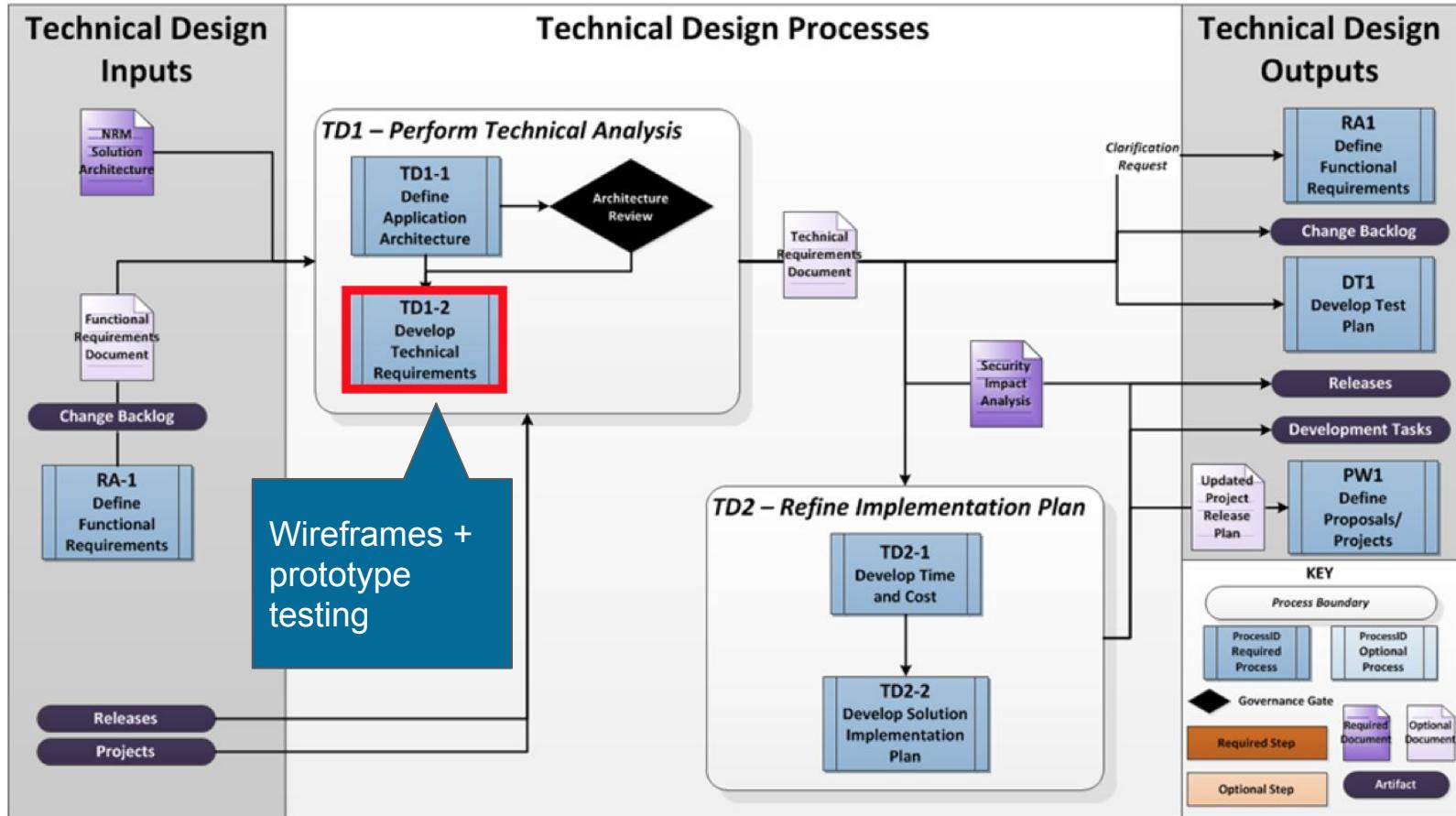


Figure 8: Development and Test Stage

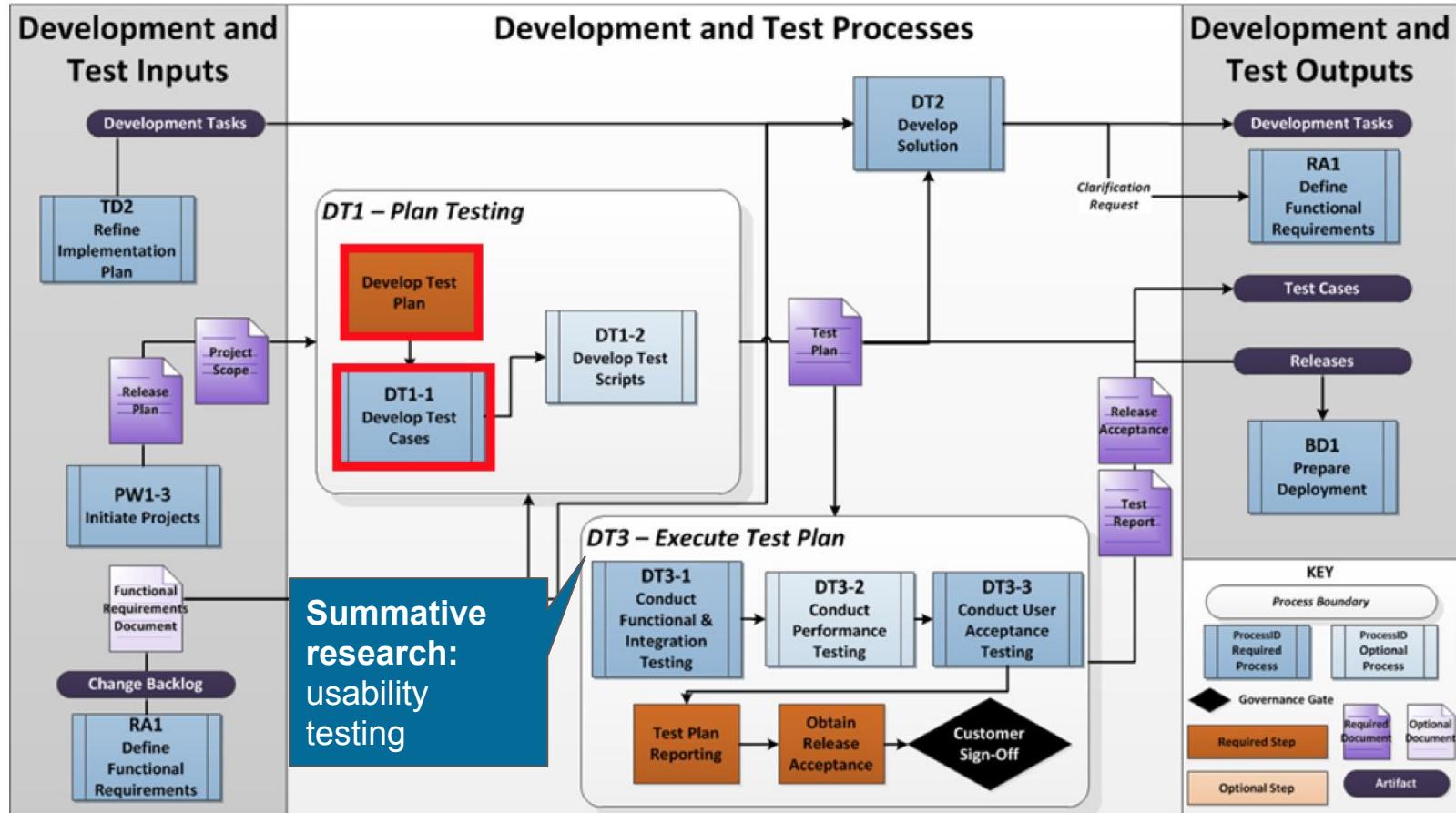


Figure 12: Deployment Stage

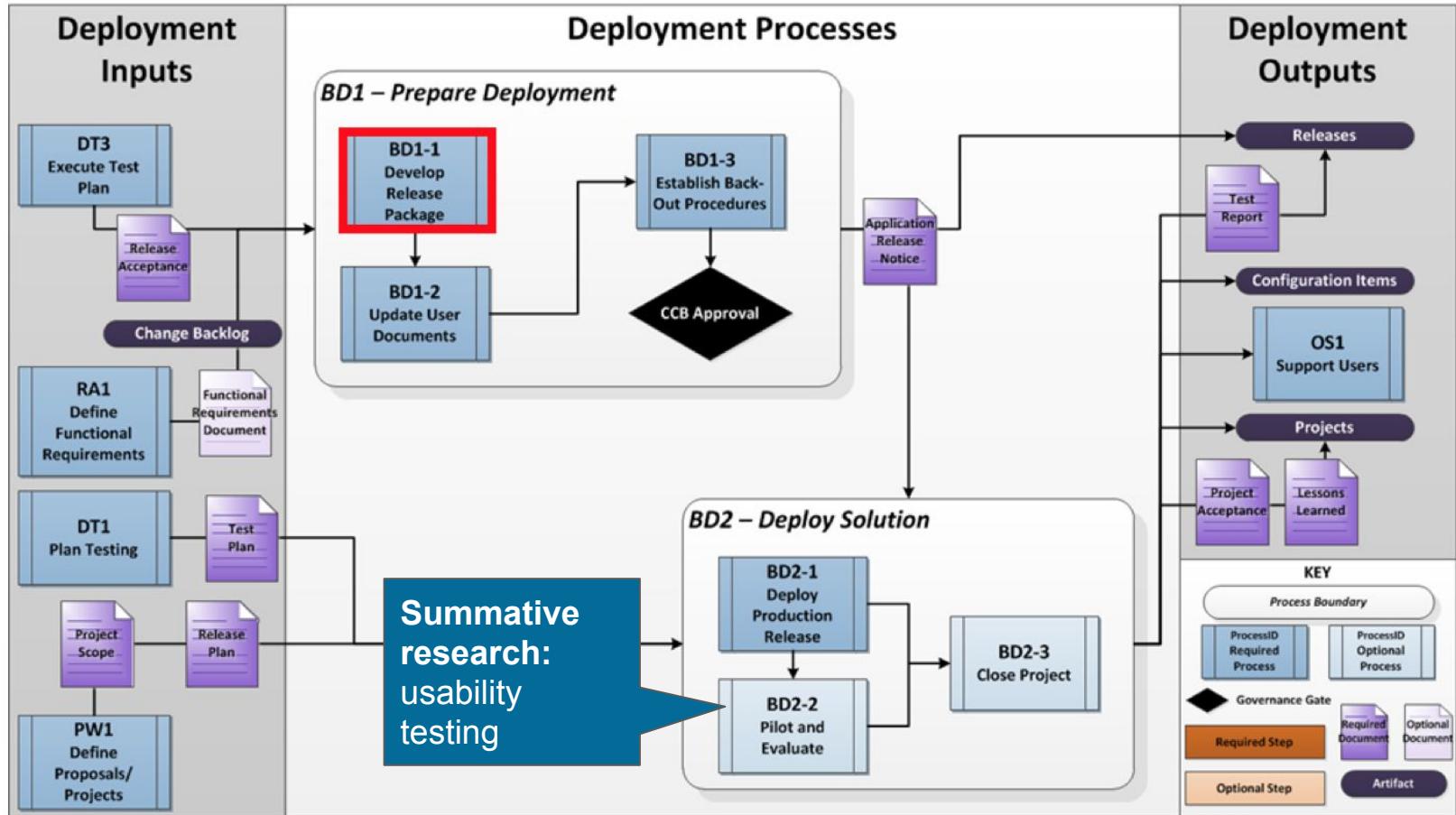
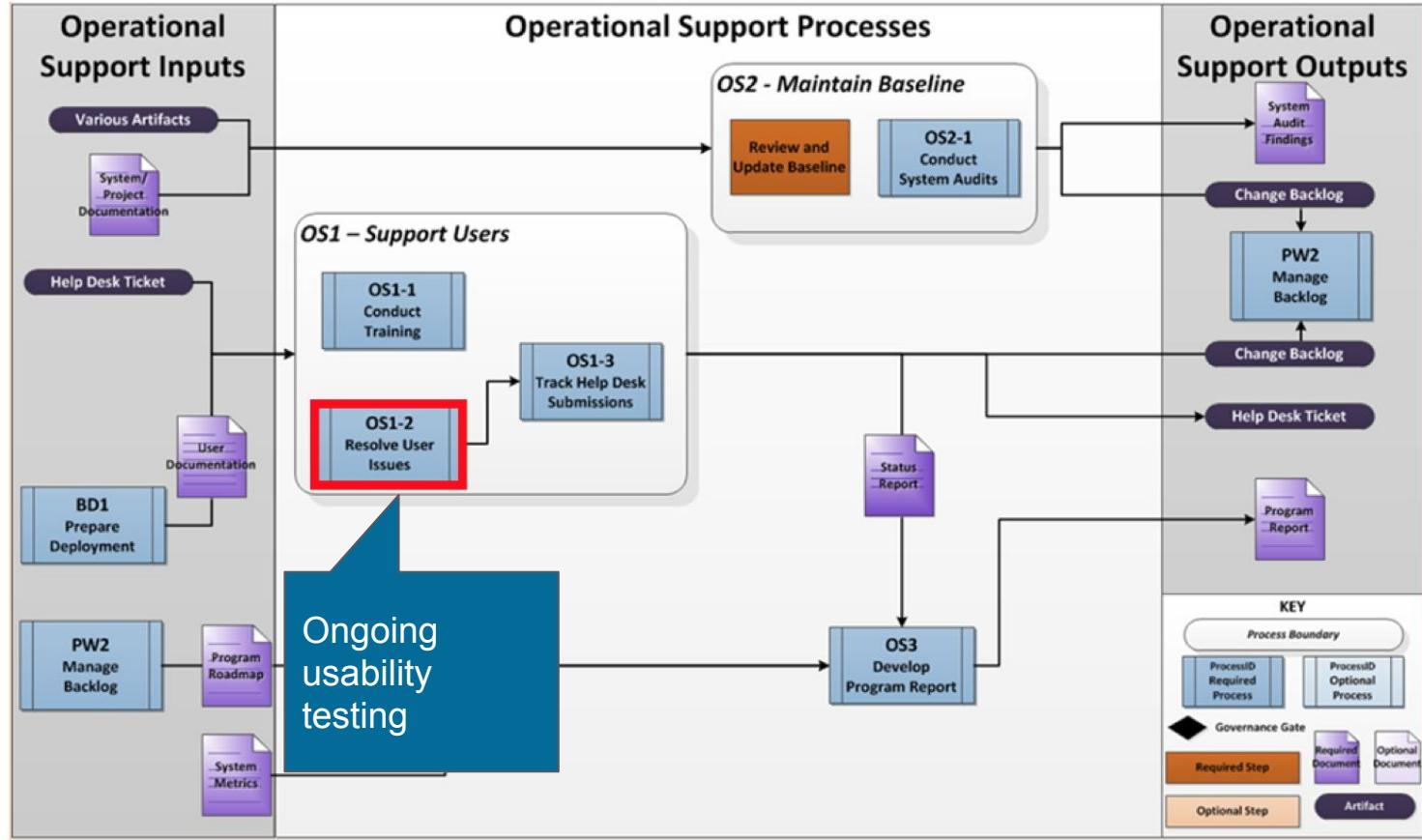


Figure 15: Operational Support Processes



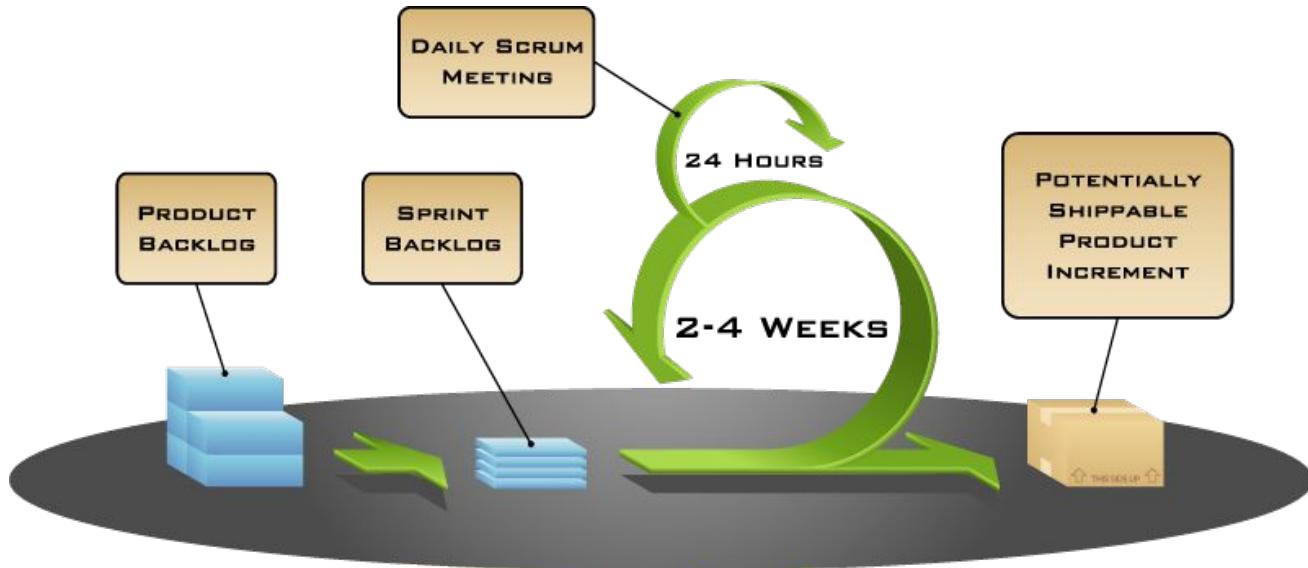
**What might be hard about adding
design research to agile at NRM?**

SDLC stages and HCD phases

Table 1: NRM SDLC's Six High-level Stages

Program of Work	Requirements Analysis	Technical Design	Development / Testing	Deployment	Operational Support
HCD phases:	Discover		Make		
	Decide		Evaluate		
identified, prioritized, and scheduled to be worked on.	decomposed into functional requirements that will drive solution development.	are translated into technical requirements and development tasks.	application code is created and finalized to meet functional requirements.	code is built into a release package and deployed to production servers.	operations of applications and where production applications are maintained.

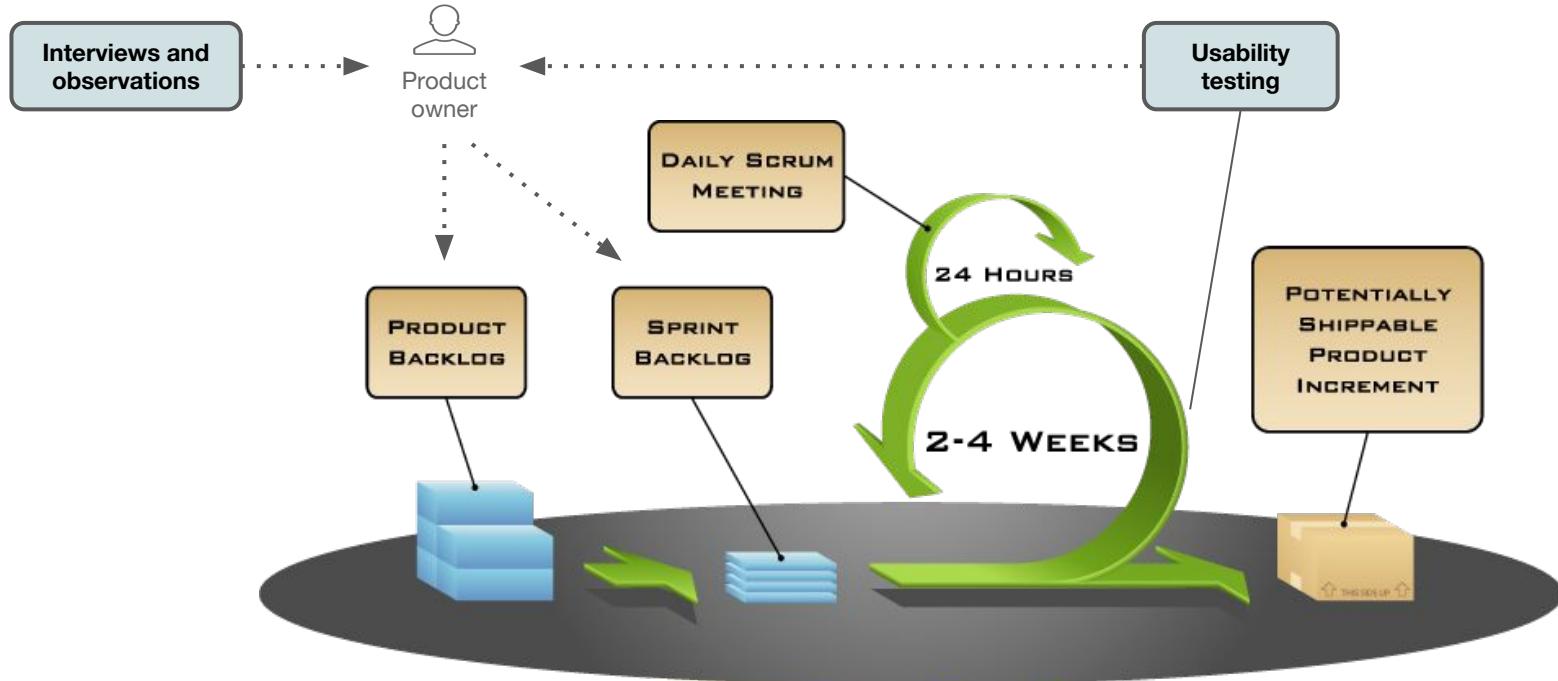
Design research and agile



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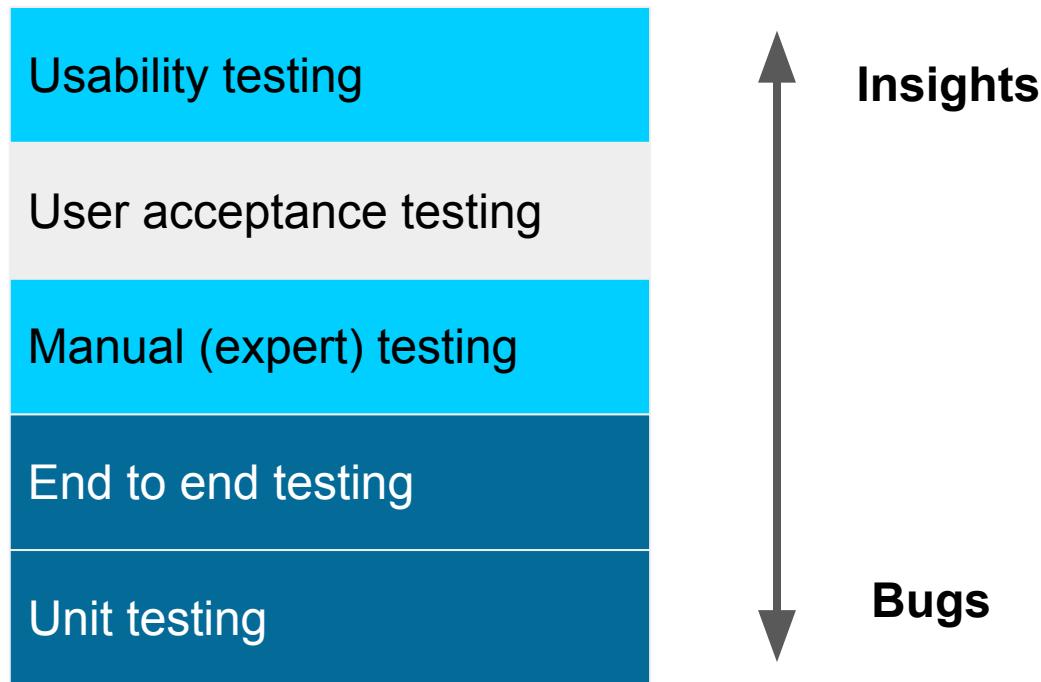


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**What might be hard about adding
design research to agile at NRM?**

Disambiguating types of testing

Tower of testing



Tower of testing

Usability testing

User acceptance testing

Manual (expert) testing

End to end testing

Unit testing

Automated checks that small sections of code output what developers expect.

Useful for catching bugs
Designed by developers
Conducted by the computer at build/compile



Tower of testing

Usability testing

User acceptance testing

Manual (expert) testing

End to end testing

Unit testing

A robot-like computer moves through the application and checks they received expected output.

Useful for broken functionality
Designed by developers
Conducted by the computer at build/compile

Tower of testing

Usability testing

User acceptance testing

Manual (expert) testing

End to end testing

Unit testing

An expert uses the application and spots possible problems

Useful for edge cases and design inconsistencies

Designed by product owners

Conducted by expert testers

Tower of testing

Usability testing

User acceptance testing

Manual (expert) testing

End to end testing

Unit testing

Users say whether an interface meets requirements or not

Useful for establishing whether an requirement is met

Designed by product owners

Conducted by product owners

Tower of testing

Usability testing

User acceptance testing

Manual (expert) testing

End to end testing

Unit testing



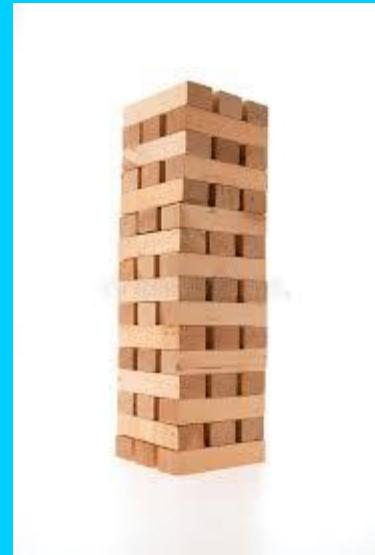
Users try completing a realistic task with the interface

Useful for establishing whether the interface actually helps completing a task

Designed by UX researchers

Conducted by UX researchers

**Engage the whole tower;
not just segments.**



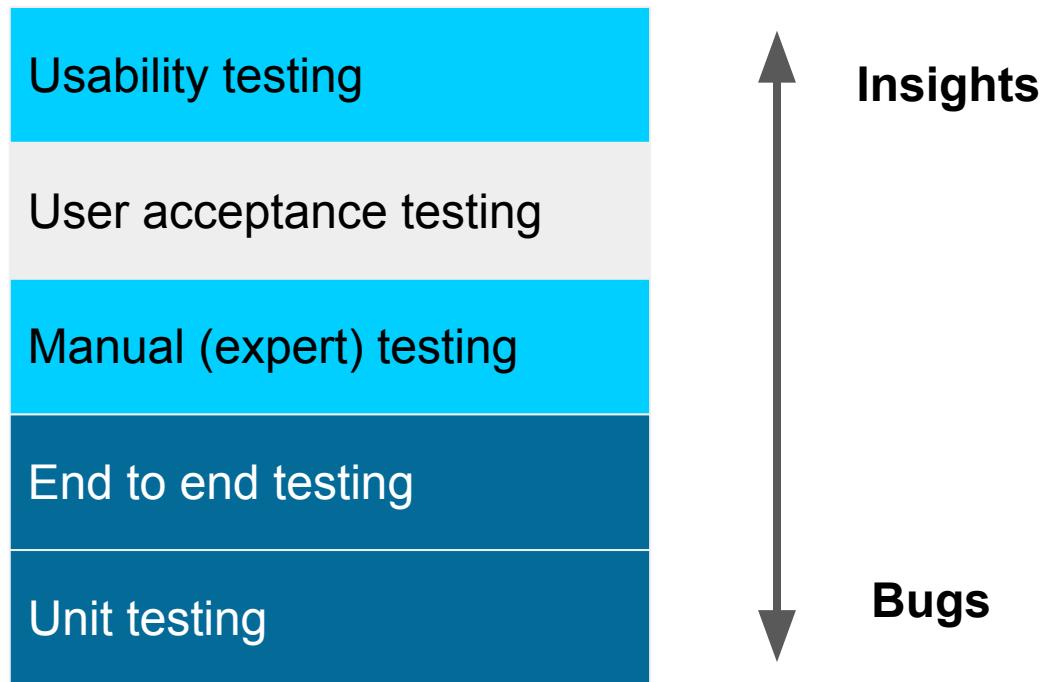
What type of testing would you use?

“I want to check whether it’s possible to move from the beginning to end or the application form.”

What type of testing would you use?

“I want to check whether I can move this user story meets all its acceptance criteria.”

Tower of testing



Lunch

Discovery planning time and consulting

Reminder of what's to come

Week 2 - 11/20/17 | Thanksgiving holiday!

Activities: Finish drafting discovery plan

Deliverables: **Discovery plan**

Reading: UX Research, II.2 - "Good research starts with good questions."

Week 3 - 11/27/17

Activities: Draft research materials, **optional 1:1**

Deliverables: **Research material** (interview script, informed consent form)

Reading: Reading on privacy and informed consent

Week 4 - 12/4/17

Activities: Begin scheduling participants, and collecting data, **optional 1:1's continue**

Deliverables: Post a comment or question re: your experience for discussion in Slack.

Reading: Reading on interview tips and tricks

Week 5 - 12/11/17

Activities: Continue collecting data

Deliverables: Post a comment or question re: your experience for discussion in Slack.

Reading: Reading on qualitative data analysis

Week 6 - 12/18/17

Activities: Analyze data and write up summary

Deliverables: **Research summary**

Reading: None

Elements of a good discovery plan

1/

Research question(s)

2/

Who you hope to talk to

3/

How you plan to recruit people

4/

The methods you'll use

Research question(s)

What's the purpose for your research effort? Begin with a problem, a situation that needs to be changed or addressed, such as:

- Areas of concern
- Conditions that could be improved
- Difficulties that need to be eliminated
- Questions seeking answers

EXAMPLES

Does offering a digital application improve the experience of non-commercial group permittees?

Does it improve the experience of special use administrators who receive their permits?

- What elements (features, data types, etc.) of the application are particularly helpful to these groups?
- What constraints do these groups face?
- What problems will a digital application not solve?

Elements of a good discovery plan

Who you plan to talk to

- Which types of users do you need to talk to to answer your research question(s)?
- How many of each user type will you aim to talk to?

EXAMPLE

We'll aim to talk to 5 people from each of the groups of users that our initial research identified as most important:

Outside the Forest Service:

- Nonprofits and organizations organizing trips to national forests

Inside the Forest Service:

- Special use administrators

Elements of a good discovery plan

How you plan to recruit people

- Describe how you will identify people to invite to participate and how you intend to reach them.

EXAMPLE

We will recruit users via two means: (1) We will use email and phone to recruit users referred to us by stakeholders and subject matter experts, and (2) we will recruit additional users by intercepting them at local forest offices.

The methods you'll use

- Think about factors that will impact your chosen method. For example:
 - Will you have access to observe users?
 - What factors shape how you'll conduct interviews?
 - Would contextual inquiry require travel, making it infeasible?
- Name the research methods you'll use and how you'll record data.

EXAMPLE

We will use the following methods to answer our questions:

- In-person, 1:1 Interviews with Forest Service staff to surface useful attitudes and depictions of process.
- Observation of the permitting process (involving both Forest Service staff and permittees), during which we will note the various forms of behavior at hand.

We will record interviews and observations using field notes.

Characteristics of a good research question

The question is feasible.

The question is clear.

The question is significant.

The question is ethical.

**“The result of formulating questions
is it helps you to circumscribe a
specific area of a more or less
complex field which you regard as
essential.”**

*Agee, Jane. "Developing qualitative research questions: a reflective process."
International Journal of Qualitative Studies in Education 22.4 (2009): 431-447.*

Characteristics of a good research question

The question is feasible.

The question is clear.

The question is significant.

The question is ethical.



Don't bite off more than you can chew. Focus on a particular situation and a particular group (or groups) of people that you have access to.

Characteristics of a good research question

The question is feasible.

The question is clear.

The question is significant.

The question is ethical.

Try and be concise. Focus on what you'll study, and be careful not to include your assumptions or value judgements.

Characteristics of a good research question

The question is feasible.

The question is clear.

The question is significant.

The question is ethical.

“So what?”



Characteristics of a good research question

The question is feasible.

The question is clear.

The question is significant.

The question is ethical.

Think carefully about the how direction of your research will position you in relation to participants and what the implications are for the participants' lives.

**Write your research question on a
sticky note.**

Ask yourself:

- Clear: Will other people understand this question?**
- Feasible: Can I think of a way of answering this question?**
- Significant: Will answering this question change the course of my project?**
- Ethical: Will answering this question hurt people?**

Write a new version of your research question on another sticky note.

Exchange with a neighbor and ask them:

- What do you think this question means?**
- How do you think I would answer this question with design research?**
- Does this question seem important to my project? Is it related to my problem statement?**
- Will answering this question negatively affect people?**

Write a revised version of your question on another sticky note.

Share out: How did your research question change based on the feedback you received?

We'll have until 3:30p to further flesh out our discovery research plans, using the template provided.

STOP!



BREAK TIME

Discovery plan share outs



BEANS

SPILL'EM

Workshop retro

**Take 10 minutes to write down
endings to these sentences:**

“I like...”

“I wish...”

(One thing per sticky note)

Use a dot for the ideas that you'd like to discuss.

What's next?

	What I'll do	What you'll do
Before the end of this week	<ul style="list-style-type: none">- Slack you a link to the calendar for scheduling 1:1s- Slack you re: scheduling the module 2 webinar- Upload these slides to Slack	<ul style="list-style-type: none">- Reflect on your experience over the last 2 days, and post something about your it in Slack
Next week	<ul style="list-style-type: none">- Upload final schedule and suggested reading to Slack.	<ul style="list-style-type: none">- Finish up those discovery plans, and reach out via Slack with any questions!- Schedule a 1:1 if you like

Thanks!

Image credits

Noun Project

Ruslan Dezign

Atif Arshad

Icon Island

Janina Ariteo