

# Building User Interfaces

# Design Thinking from Empathy to Ideas

## Professor Yuhang Zhao

Adapted from Prof. Mutlu's slides

## What will we learn today?

- Design thinking and process
- Step 1: How to empathize with users
- Step 2: How to turn data into insight
- Step 3: How to generate design ideas
- Sketching, conceptual design, storyboarding

# What is *design thinking*?

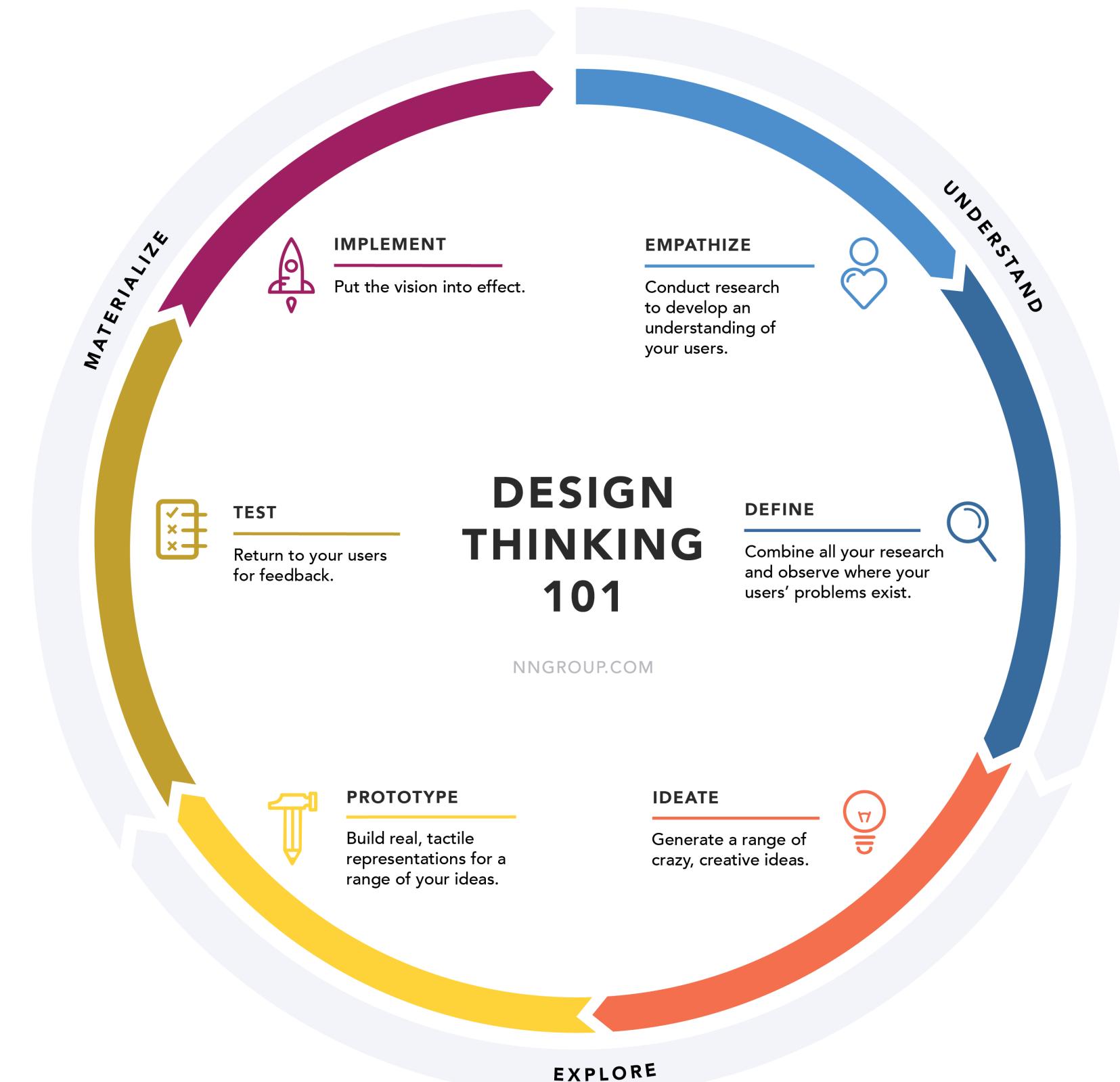


NN/g

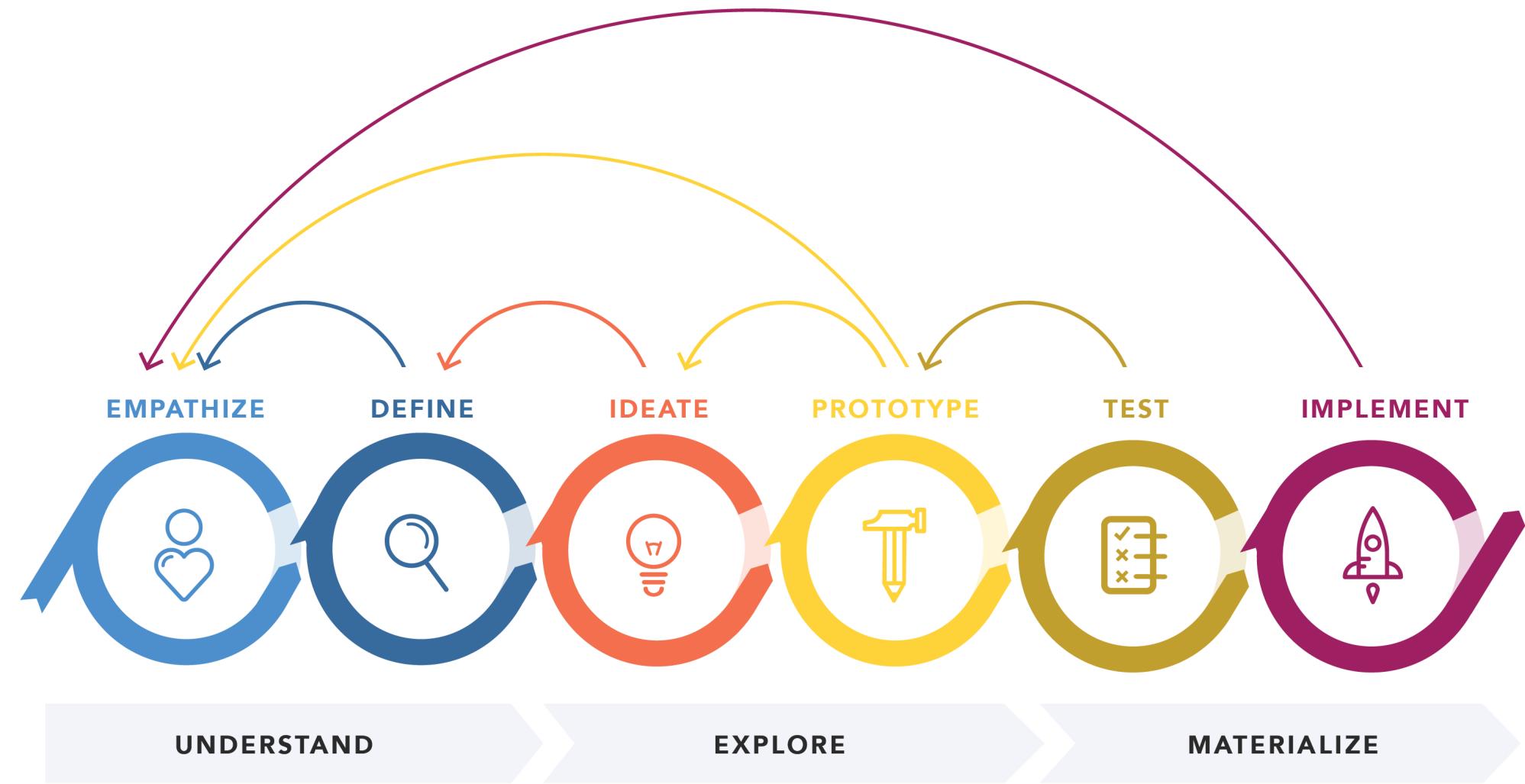
Design Thinking  
101

*Design thinking*<sup>2</sup> has two components:

1. An **approach**: a hands-on, user-centric approach to innovative problem solving
2. A **process**: a 6-phase process to understand problems, explore solutions, and materialize them



<sup>2</sup> NN/g Design Thinking



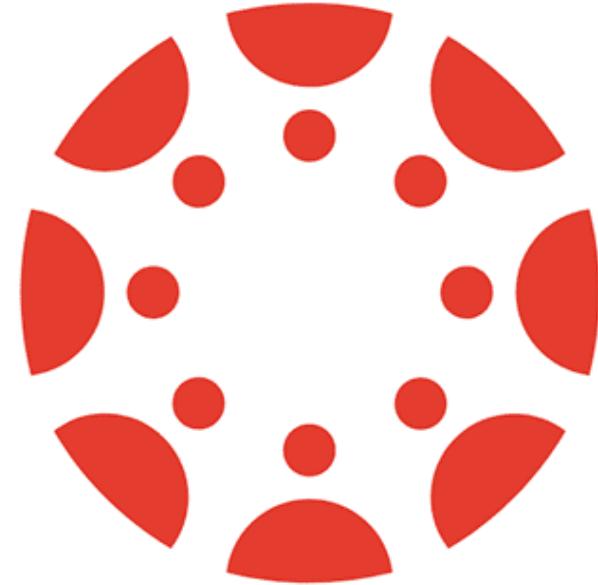
<sup>3</sup> NN/g Design Thinking

## Takeaways

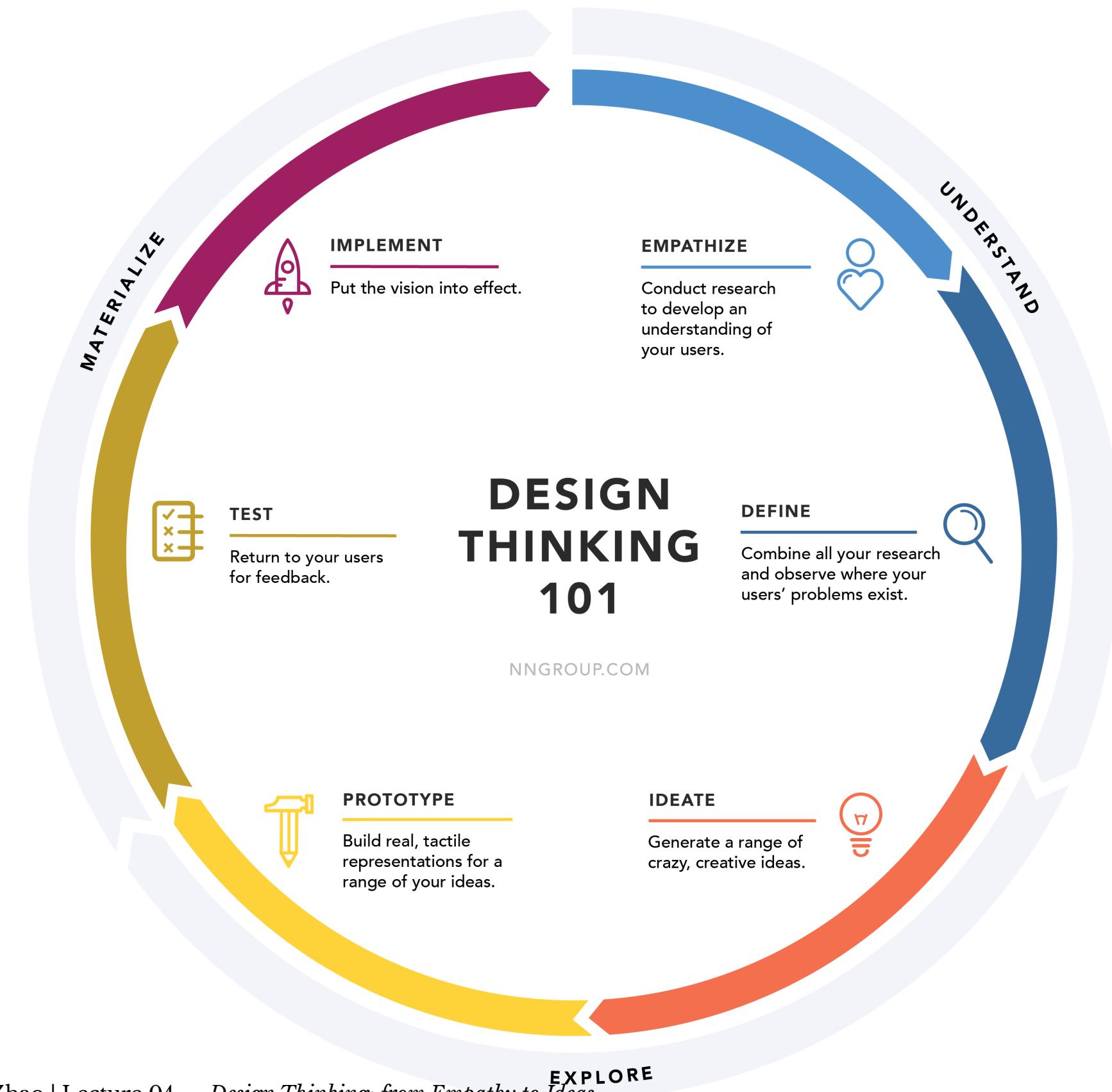
1. Approach problems like a designer
2. Follow a process

# Quiz 1

Complete the Canvas quiz.



canvas



# **Empathize**

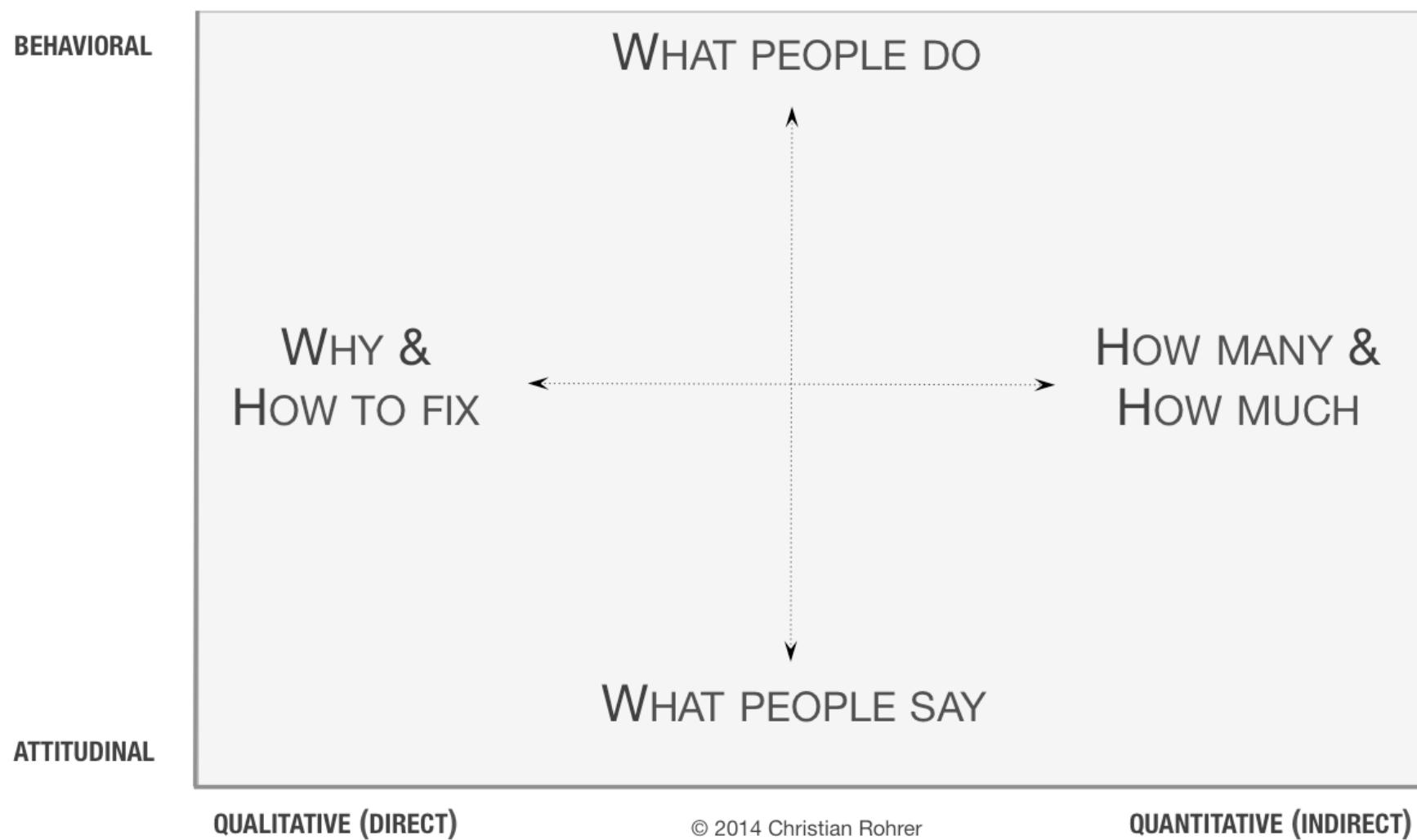
**(aka User Research)**

# How do we empathize with users?

Understanding user needs, preferences, and expectations by studying what users do, say, think, and feel.

There are many methods to build empathy.

## QUESTIONS ANSWERED BY RESEARCH METHODS ACROSS THE LANDSCAPE



## 4 NN/g UX Research Methods

**The simplest and most powerful method for empathy:**

# **think-alouds**

**"The #1 Usability Tool" – Jakob Nielsen**

# Source<sup>5</sup>



<sup>5</sup> Nomensa

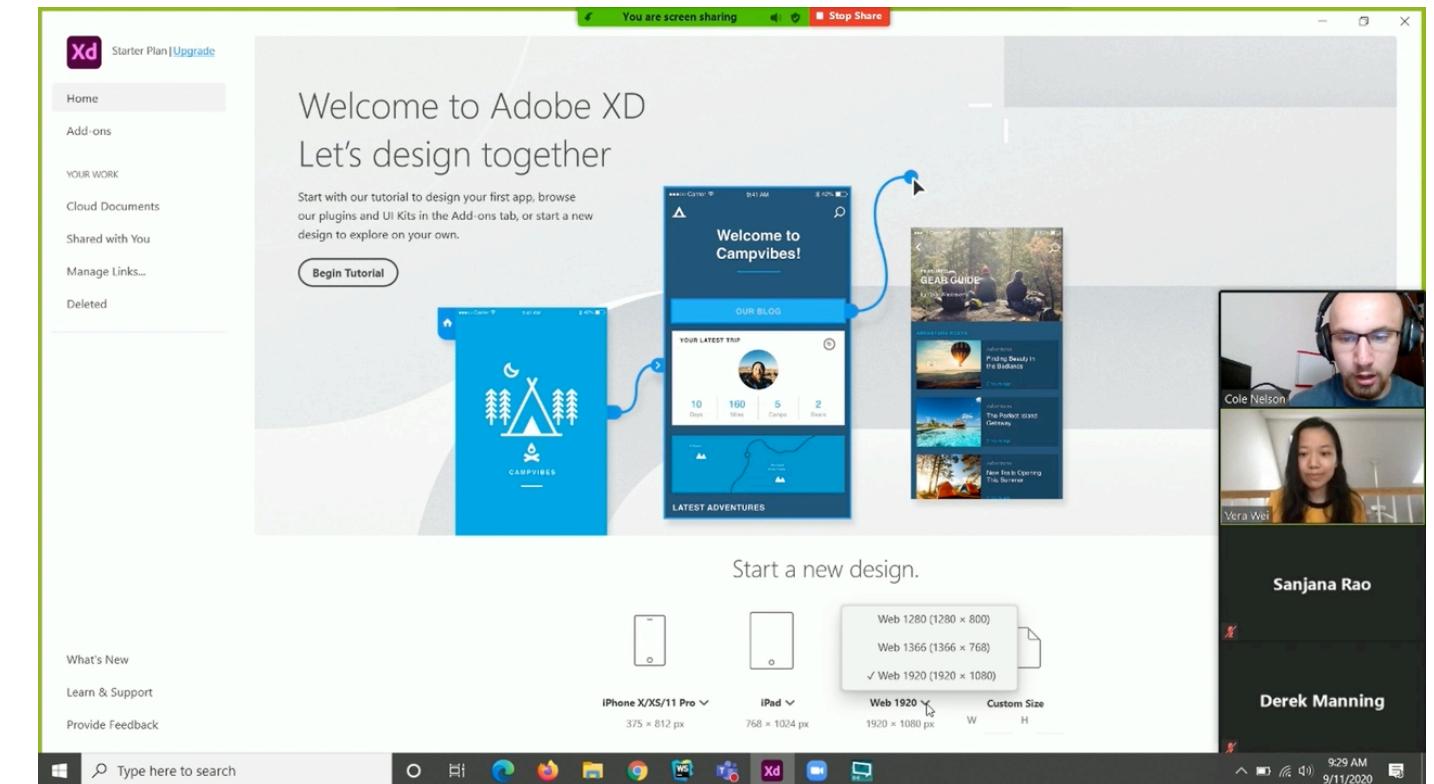
## How to conduct a think-aloud

1. Identify representative users
2. Ask users to perform representative tasks
3. Observe and record what they *say* and *do*
4. Analyze your data to develop design insight

# In-class Activity: Adobe XD

# In-class Activity: Part I – the *think-aloud*

We will watch a 10-minute video of a *think-aloud session* with a novice user performing a set of tasks in Adobe XD.



## What **you** should do<sup>6</sup>

**Do:** Grab a post-it note on [this Google Drawings canvas](#) (or create one if none left). Write down one key observation on the post-it note. Hold onto your post-it note until later. ➔ *Repeat for additional observations.*

**Pro tip:** Write concisely but in a way that others can understand; write the name of the source; color-code types of note; use a Sharpie! ➔ *Applies to physical post-it notes.*

Seamless

Bad post-it  
No explanation or provenance

SARAH  
Likes to shop with friends but feels much more time pressured

Good post-it  
Named and clearly written

<sup>6</sup>[Cooper-Wright](#)

# Think-aloud Tasks

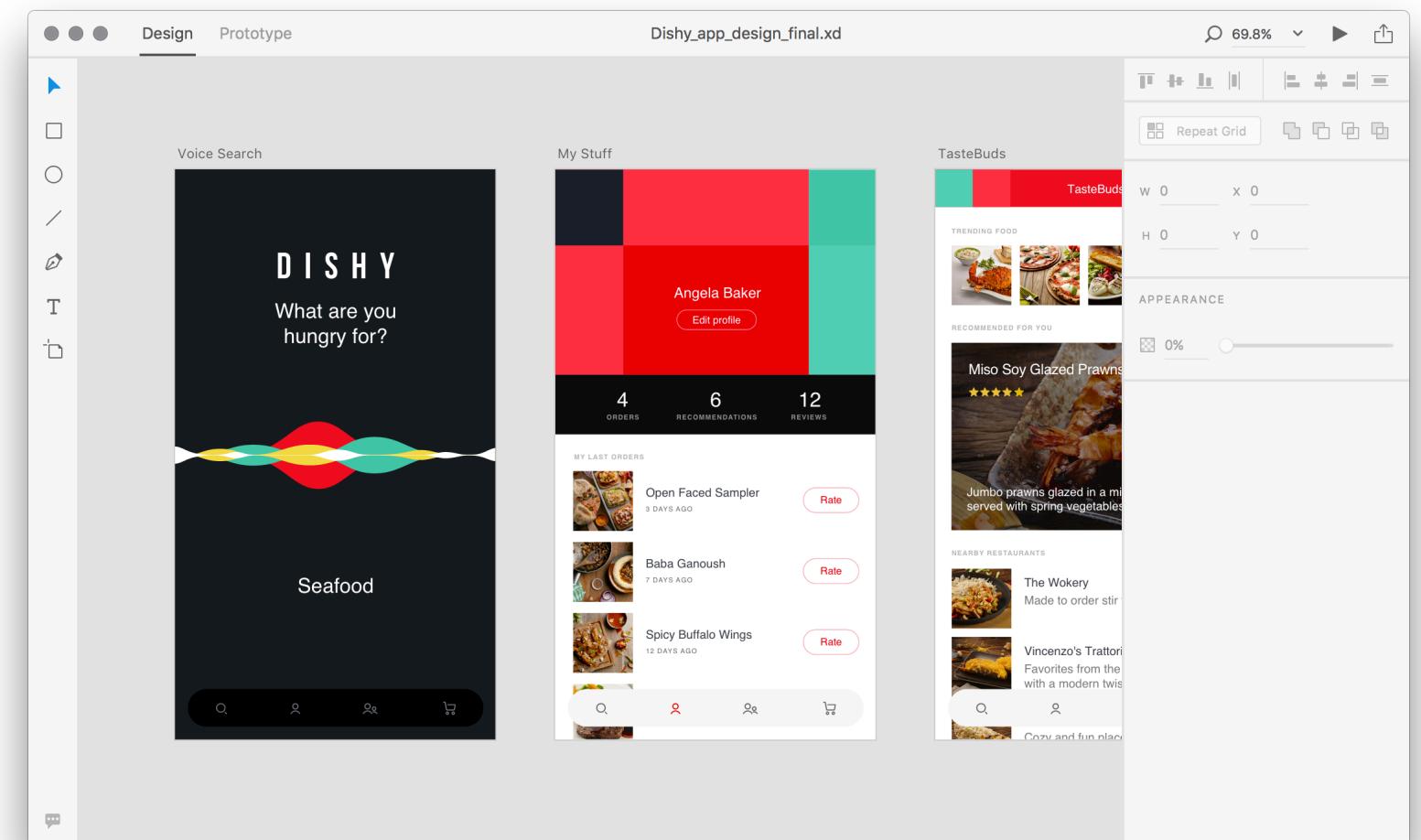
**Task 1:** Start a new design for the web at size 800 x 600.

**Task 2:** Create a red button in the center of the canvas.

**Task 3:** Create a second canvas and place a blue button in the center.

**Task 4:** Link red button to second canvas and blue button to first.

**Task 5:** Simulate your design.



Starter Plan | [Upgrade](#)

Home

Add-ons

YOUR WORK

Cloud Documents

Shared with You

Manage Links...

Deleted

What's New

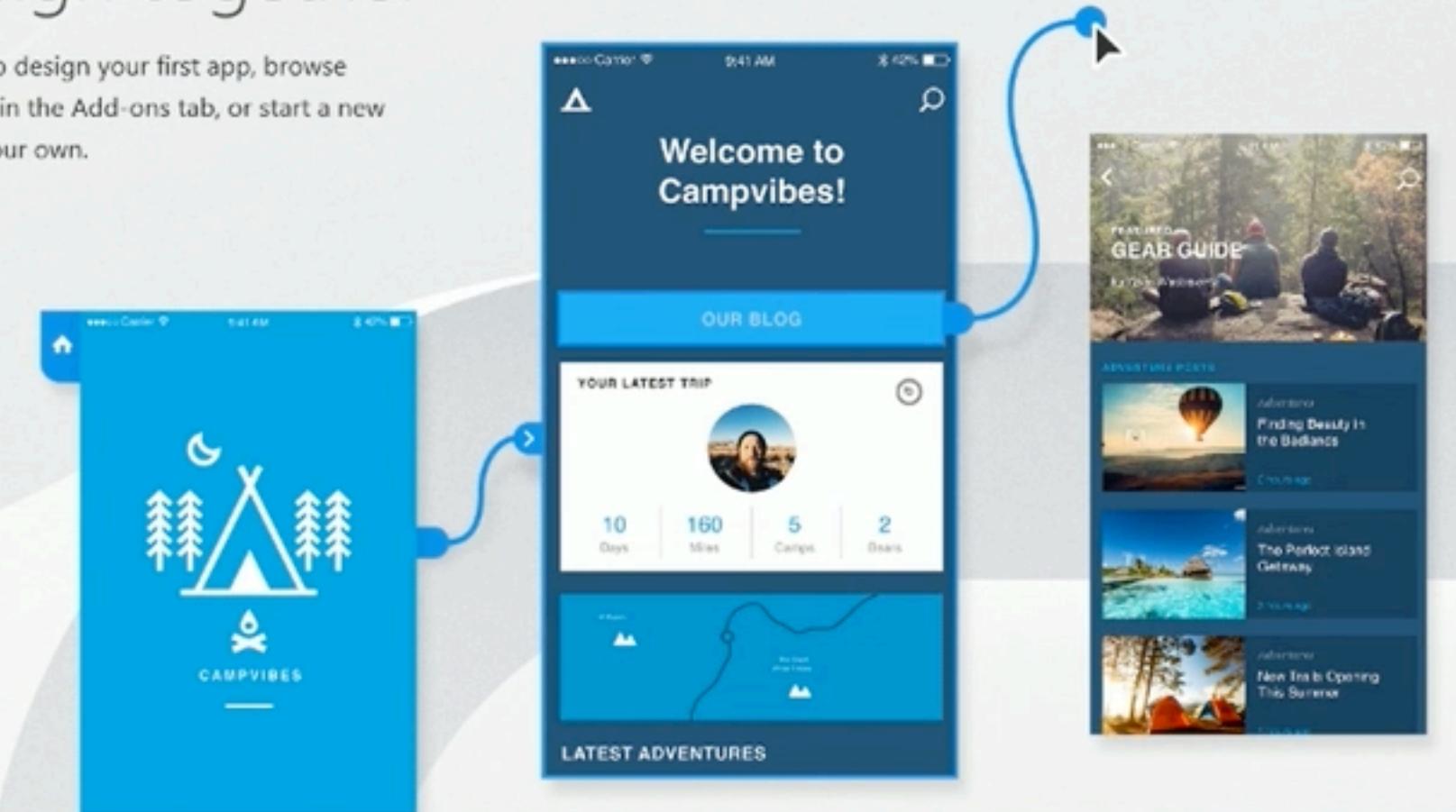
Learn &amp; Support

Provide Feedback

# Welcome to Adobe XD

## Let's design together

Start with our tutorial to design your first app, browse our plugins and UI Kits in the Add-ons tab, or start a new design to explore on your own.

[Begin Tutorial](#)

Start a new design.



iPhone X/XS/11 Pro



iPad

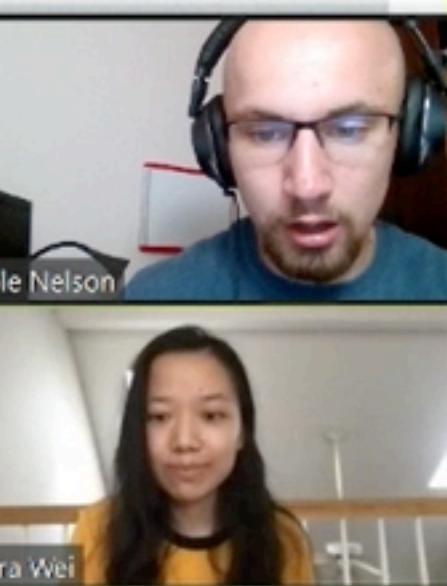
Web 1280 (1280 × 800)  
Web 1366 (1366 × 768)  
 Web 1920 (1920 × 1080)

Web 1920

Custom Size

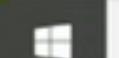
W H

1920 × 1080 px



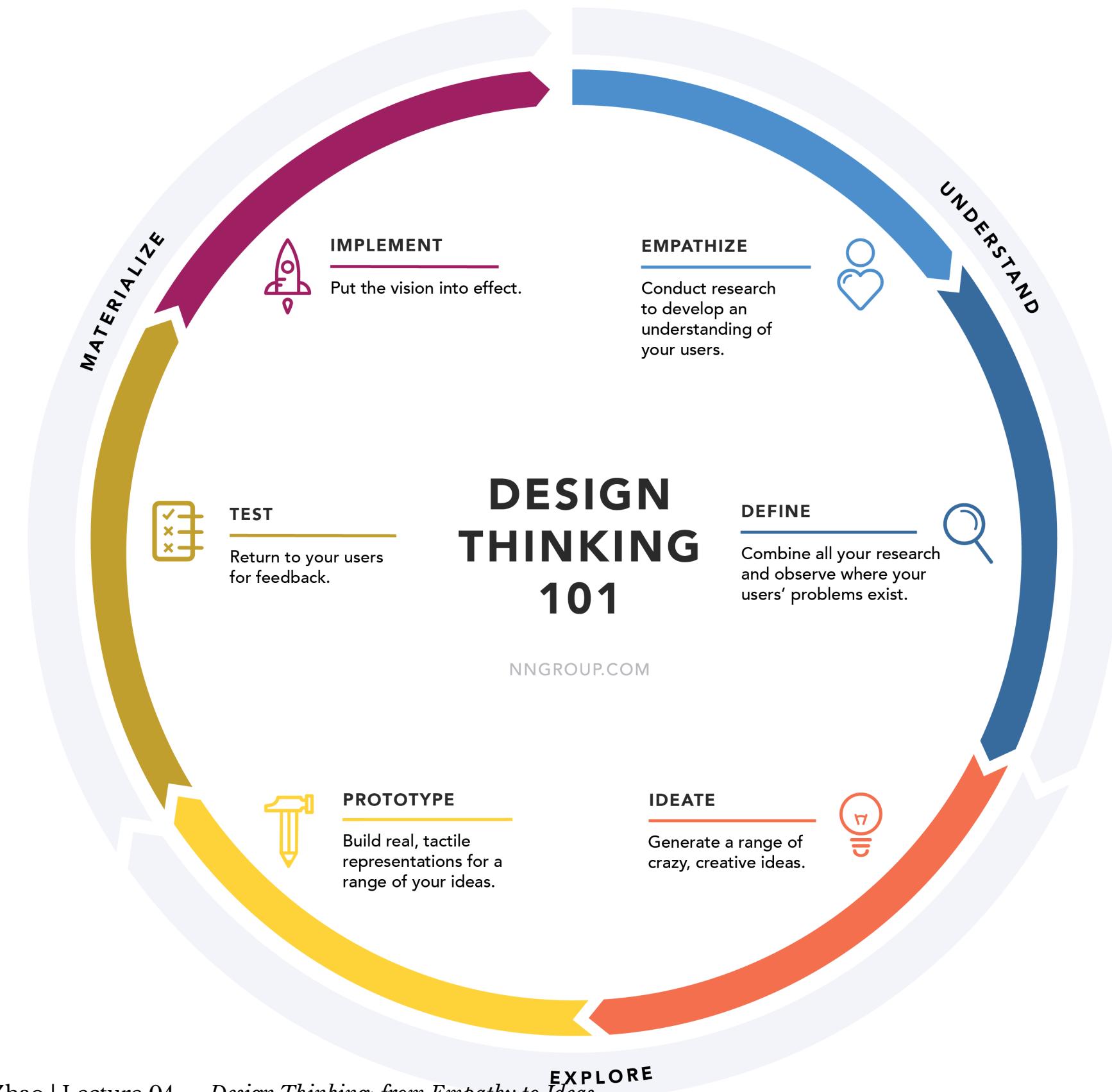
Sanjana Rao

Derek Manning



# More on the TA methods

- Can be done *concurrently* or *retrospectively*
- Can be applied to pretty much anything
- Can be done *before* or *after* design



# Define

# What does that mean?

- Gathering all findings — **gather**
- Consolidating, categorizing, distilling — **analyze**
- Translate into insight — **recommend**

# But how do we go about this?

- Again, there are many methods for analysis.
- The simplest and most powerful method is *affinity diagramming*.

# Affinity Diagramming

# What is it?

- **Definition:** Organizing data into clusters based on "affinity."
- It helps you make sense of qualitative, messy data.
- Also known as *affinity mapping*, *collaborative sorting*, *snowballing*.
- Used across the board in creative, generative industries.



<sup>7</sup> NN/g Affinity Diagramming

NNGROUP.COM NN/g

# How do we go about it?

- Step 1: Start an initial set of categories
- Step 2: Sort notes into these categories
- Step 3: Add subcategories or consolidate categories as needed
- Step 4: Present each category
- Step 5: Rank categories in *severity*, combining importance, prevalence, frequency

# How do we go about it? Continued.<sup>8</sup>

*Pro Tip:* Steps 2–3 will likely be iterative.

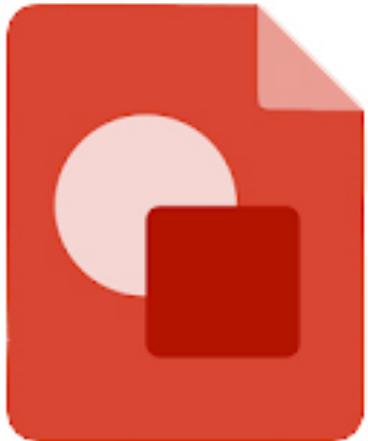
*Pro Tip:* Assign team members to categories who will be responsible for all the sorting and presentation of the categories

<sup>8</sup> Image source: UX Collective



## In-class Activity: Part II – affinity diagramming

Now, let's get back to the Google Drawings canvas and follow this process.

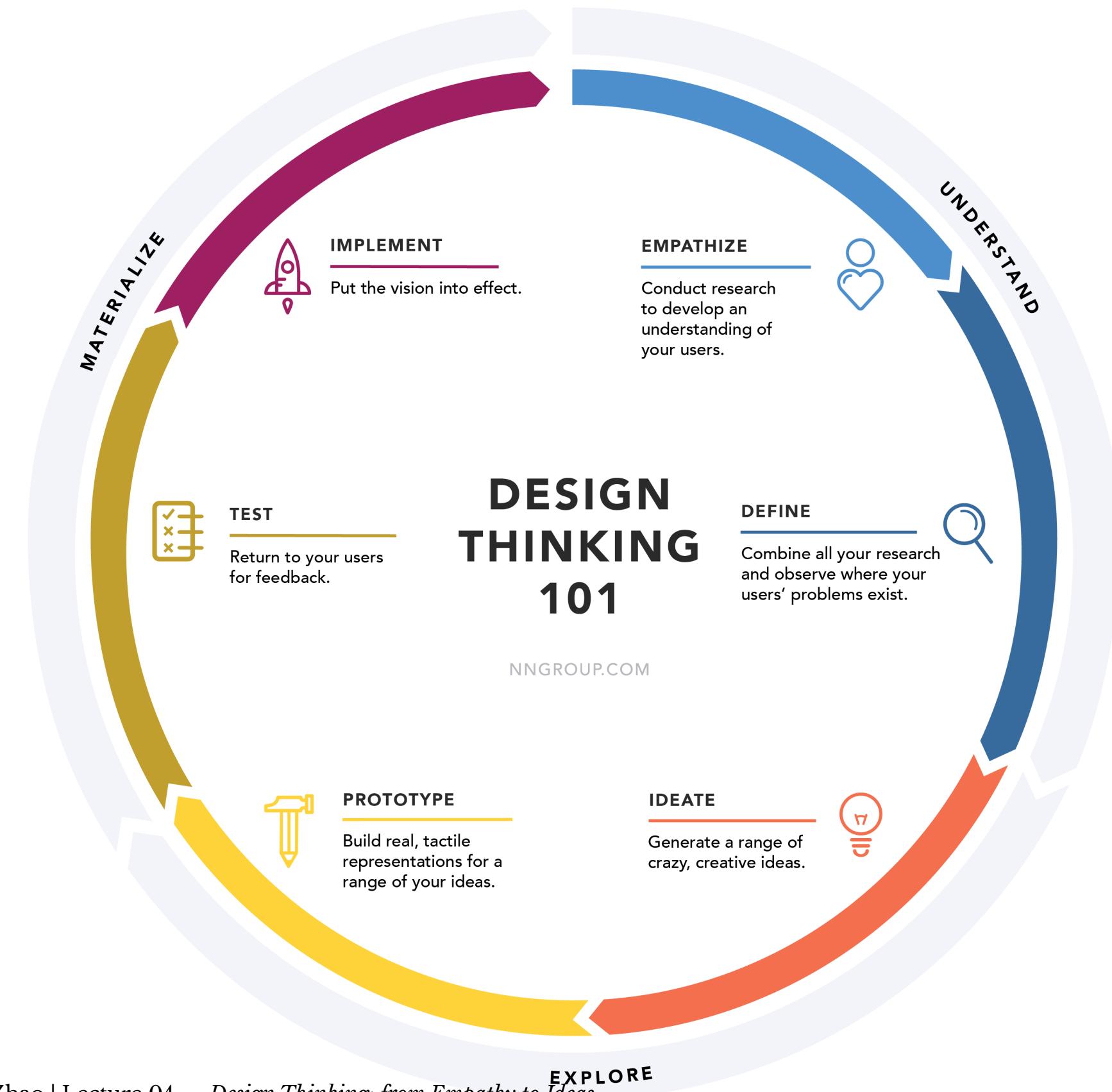


Google Drawings

- Step 1: Start an initial set of categories
- Step 2: Sort notes into these categories
- Step 3: Add subcategories or consolidate categories as needed
- Step 4: Present each category
- Step 5: Rank categories in *severity*, combining

voilà!

Your findings will serve as *design insight*.



**ideate**

**Definition:** An active, creative, exploratory, highly iterative, fast-moving collaborative process for forming ideas for design.

Ideation can be done *individually* or *collaboratively*.

**Ideation has two stages:  
Idea creation → Critiquing**

# Key considerations

- Workspace
- Team
- Process
- Rules of engagement
- Method of capturing ideas

Image source<sup>9</sup>



<sup>9</sup> [GlassDoor](#)

# IDEO's Rules of Engagement

1. Defer judgement.
2. Encourage wild ideas.
3. Build on the ideas of others.
4. Stay focused on the topic.
5. One conversation at a time.
6. Be visual.
7. Go for quantity.

## Quiz 2

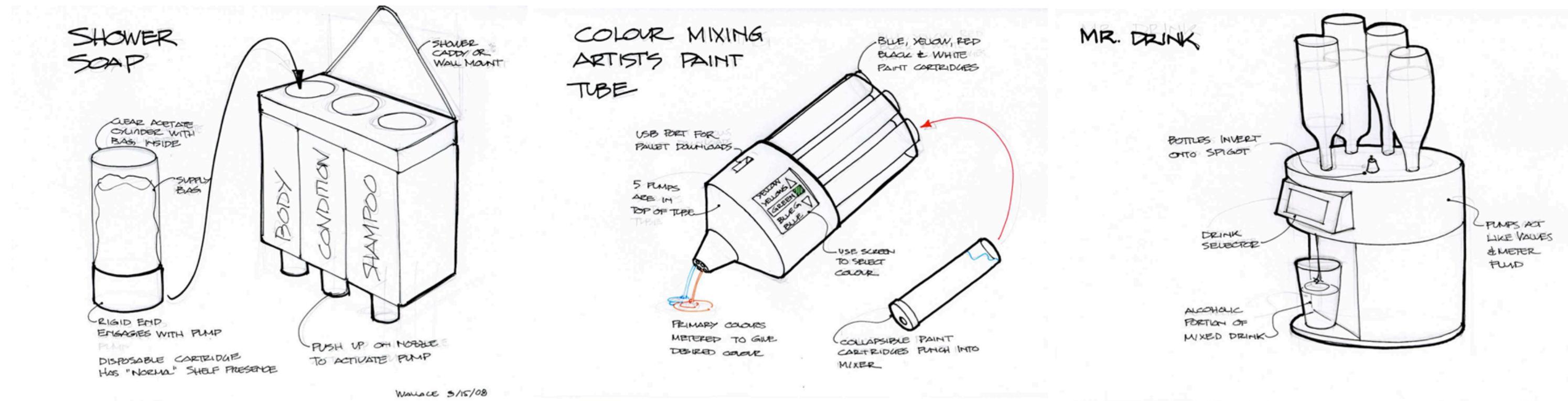
Complete the Canvas quiz.



canvas

# Ideation $\rightleftharpoons$ Sketching

**Definition:** A sketch is a quick and rough drawing that gives a general outline of an idea.<sup>10</sup>



<sup>10</sup> Idea sketch examples: [MIT 2.009](#)

# Sketching Principles<sup>11</sup>

- Everyone can sketch
- Sketching is more effective than words for most ideas
- Quick and inexpensive sketches do not inhibit exploration
- Sketches are disposable

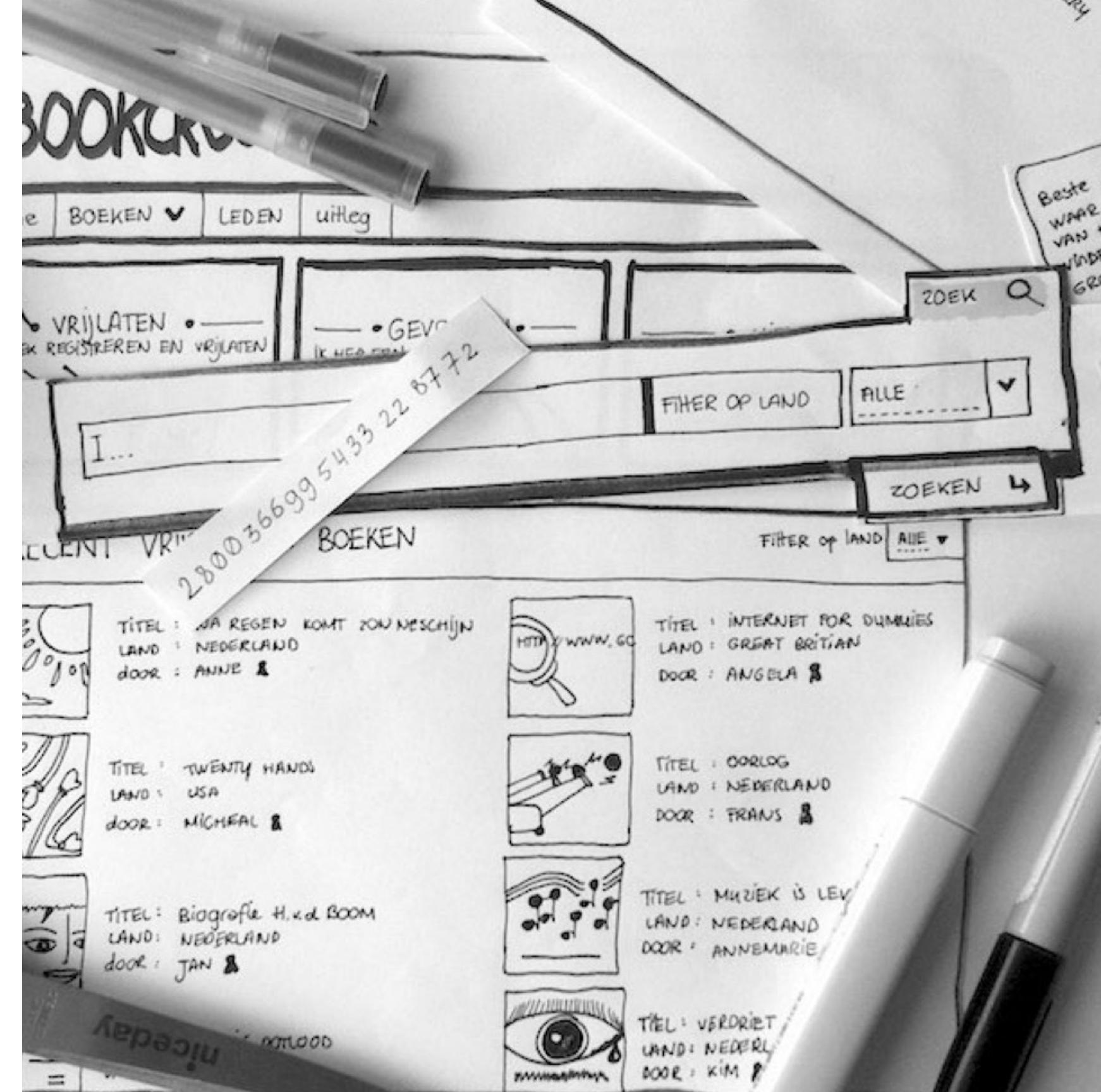


<sup>11</sup> Buxton, 2007

# Sketching Principles<sup>12</sup> Continued

- Sketches are made just-in-time, in-the-moment, when needed
- Sketches should be plentiful, entertain a large number of ideas, and include multiple sketches of each idea
- Textual annotations can explain what is going on in the sketch

<sup>12</sup> Buxton, 2007



# Sketching can do more!<sup>13</sup>

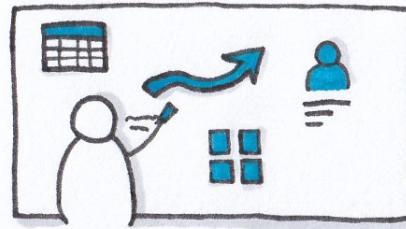
<sup>13</sup> Medium



YOU CAN DRAW,  
IT IS NOT ABOUT  
BEING ARTISTIC!



JUST START IT, YOU'LL  
BECOME MORE CONFIDENT  
OVER TIME!



① FACILITATING MEETINGS &  
DESIGN WORKSHOPS,  
PROJECT PLANNING

UX Knowledge Base Sketch #52

# SKETCHING

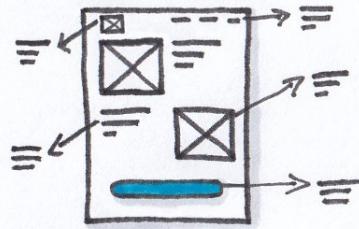
FOR UX DESIGNERS

TOOLS:  
JUST GRAB THE NEAREST  
PEN & PAPER!

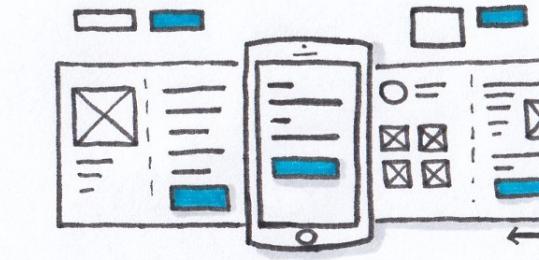


IN CASE OF USER INTERFACES:  
VARY THE FIDELITY /  
DETAIL LEVEL BASED ON  
YOUR GOAL  
(DELIVERABLE?  
QUICK CONCEPT?)

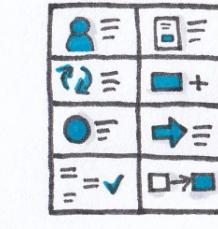
YOUR AUDIENCE  
(CLIENT? TEAM?  
YOURSELF?)



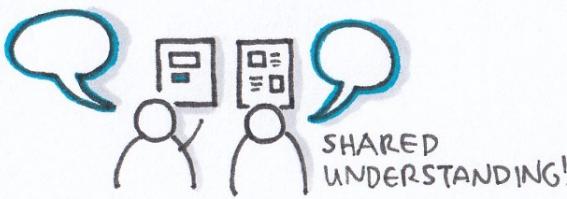
② WIREFRAMING  
DON'T FORGET:  
ANNOTATIONS ARE GREAT!



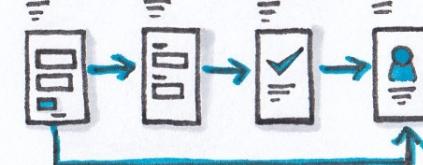
③ PAPER PROTOTYPING -  
VALIDATING IDEAS,  
TESTING OUT CONCEPTS



④ IDEATION  
QUICK IDEA GENERATION  
(E.G. DURING A DESIGN SPRINT,  
OR JUST ON YOUR OWN)



SHARED  
UNDERSTANDING!

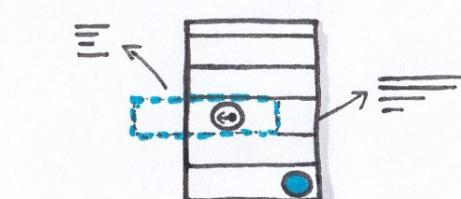


⑤ TEAMWORK, ANY KIND OF  
COLLABORATION  
(E.G.: "TALKING SKETCHES")

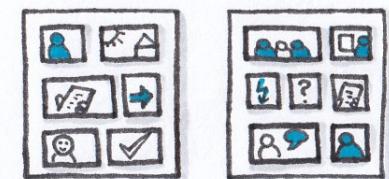
⑥ USER FLOWS  
SITEMAPS  
INFORMATION ARCHITECTURE



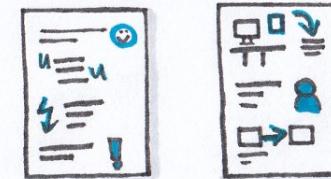
⑦ MAPPING: EMPATHY MAP,  
JOURNEY MAP,  
PRODUCT ROADMAP ETC.



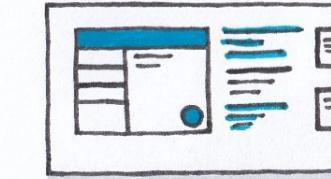
⑧ UI ANIMATIONS  
WHAT CHANGES, HOW,  
WHAT THE TRIGGER IS



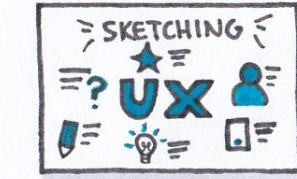
⑨ STORYBOARDING  
VALIDATING  
ASSUMPTIONS



⑩ APPLYING ICONS, VISUALS  
IN UX RESEARCH NOTES  
(E.G. USER INTERVIEW,  
CONTEXTUAL INQUIRY)



⑪ DOCUMENTATION,  
PRESENTATION  
TO CLARIFY &  
TO MAKE IT MORE ENGAGING



⑫ SKETCHNOTING  
- CONFERENCE TALKS  
- BOOKS  
- MEETINGS

CREATED BY KRISTINA SEROVAY  
[www.sketchingformx.com](http://www.sketchingformx.com)

## Quiz 3

Complete the Canvas quiz.



canvas

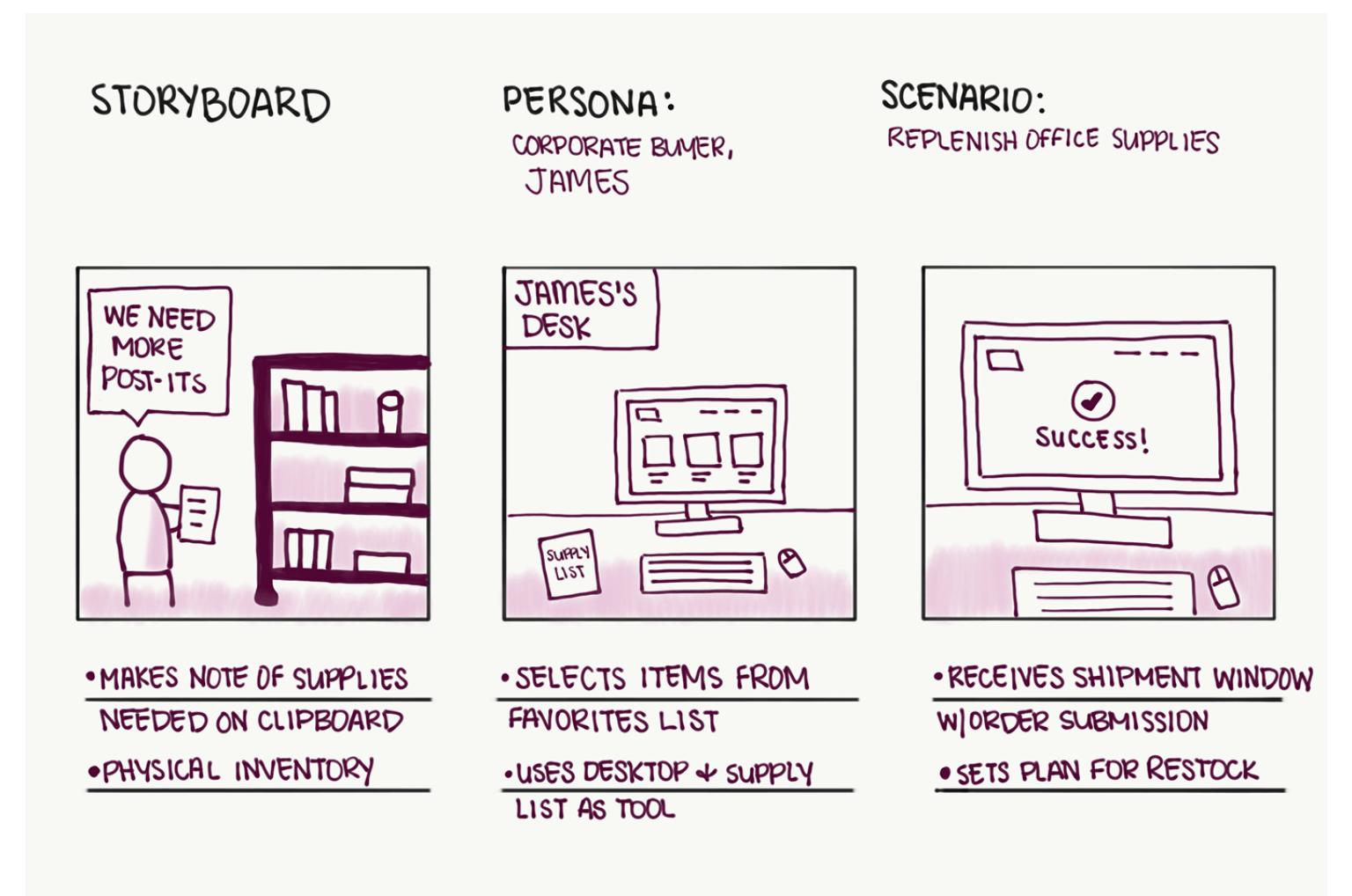
In ideation, sketches illustrate *conceptual designs*.

## What is Conceptual Design?

**Definition:** An abstract characterization of the context, use, or experience with an envisioned design solution that highlights the main premise of the solution.

# Storyboarding<sup>14</sup>

**Definition:** A sequence of visual frames that illustrate user interaction with the envisioned system, capturing social, environmental, and technical factors that shape user experience.



<sup>14</sup> NN/g: Storyboards Help Visualize UX Ideas

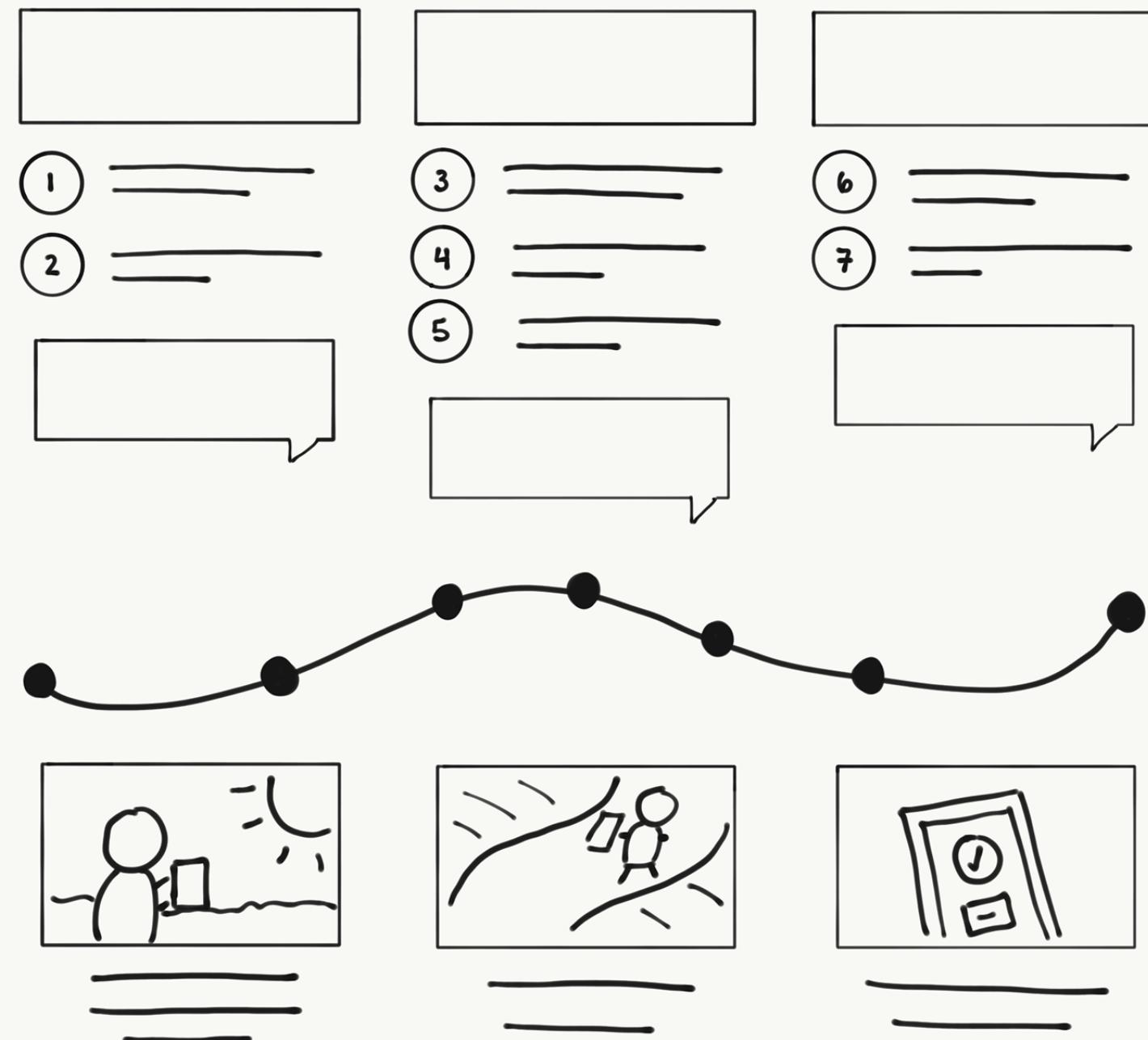
# Journey Maps<sup>15</sup>

**Definition:** A visualization of the process that a person goes through in order to accomplish a goal.

User actions, thoughts, and emotions mapped onto a timeline to create a narrative.

PERSONA: KELLY

USER STORY: RECORD MILEAGE WHILE ON AN OUTDOOR RUN



<sup>15</sup> NN/g: Journey Mapping 101

# Quiz 4

Complete the Canvas quiz.



canvas

# What did we learn today?

- Design thinking and process
- Step 1: How to empathize with users
- Step 2: How to turn data into insight
- Step 3: How to generate design ideas
- Sketching, conceptual design, storyboarding

# What's next?

- Next lecture on *Visual Design* on Wednesday
- *Javascript β* will be released Wednesday at 4 pm