

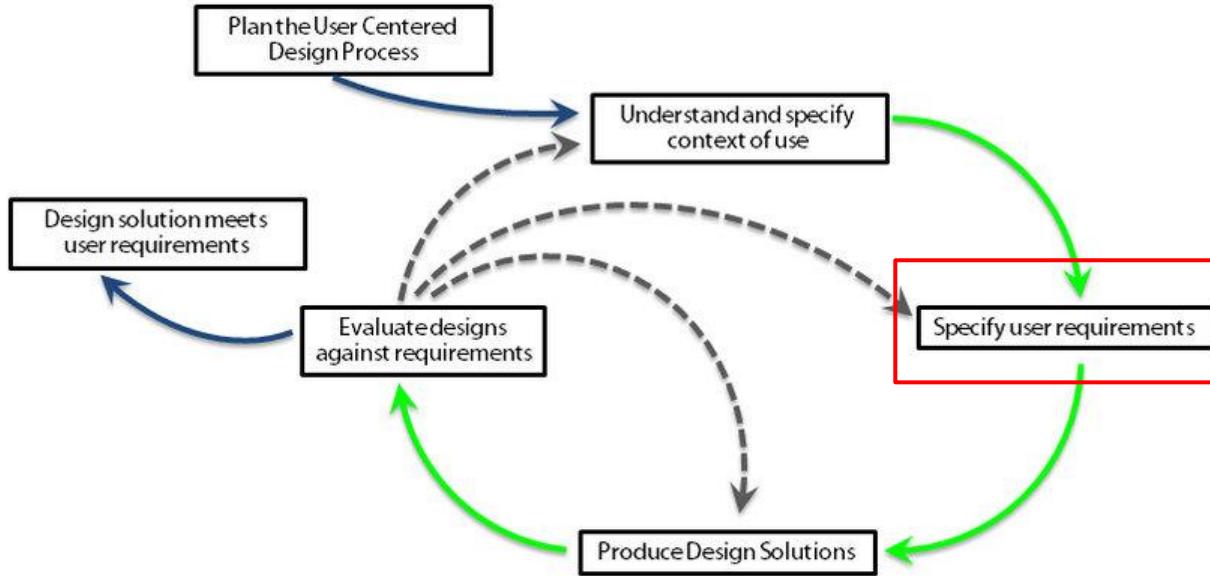
SENG 310

Lecture 7 - May 29th, 2023

RECAP

SPECIFYING USER REQUIREMENTS

HUMAN-CENTERED DESIGN PROCESS



WHAT IS A REQUIREMENT?

A statement about an intended product that specifies what it is expected to do or how it will perform it.

Examples:

For a map application, the requirement could be that the time to load the map *must be less than half a second*. [Very precise]

For a smartwatch, the requirement could be that the *interface should be made attractive for college students*. [Vague. What attractive means is subjective]

DISCOVERING AND COMMUNICATING REQUIREMENTS

Helps us tell the developers what to build

Allows users to verify and contribute towards the development

Overall advancing our goal to build usable systems and one that meets the needs of people.

REQUIREMENTS GATHERING AND COMMUNICATION

Happens iteratively and could be gathered from different stages of HCD process

Over a period of time, requirements could change completely. For example, our requirements from our smartphone today are very different from early phones such as landline phone and early cell phones

TYPES OF REQUIREMENTS

Functional

Describe what the product will do

E.g., new video game

- The game must have varying levels of difficulty to match player's expertise level (number of tasks, hidden options etc.)
- Has to capture player data continuously

Non-Functional

Describe the constraints (physical, logical, semantic, cultural, technical)

E.g., new video game

- Works only on Xbox
- Needs two players

THINK ABOUT:

- Where will the interface be deployed – physical, digital, hybrid, home, office, school, hospital, etc.
- How many people will use it – single, two, multiple
- Use how? – synchronously, asynchronously
- User characteristics – skill levels, abilities
- User needs – types of tasks they perform using the system
- Security – what type of data does the system capture, store and how is it handled?

HOW DO WE CAPTURE REQUIREMENTS?

Directly interacting with potential end-users using methods such as interviews, surveys, diary studies, ethnography, rapid testing etc.

Secondary research – reading patents and research articles that typically explain in detail how systems have been developed and also do a good job outlining the rationale.

TASK CENTERED SYSTEM DESIGN?

A method to identify meaningful tasks that people want to or have to accomplish using a system, and

Using those tasks to propose new ideas or improvements for UI design

[http://grouplab.cpsc.ucalgary.ca/grouplab/uploads/Publications/
Publications/2004-TaskAnalysis.LEAChapter.pdf](http://grouplab.cpsc.ucalgary.ca/grouplab/uploads/Publications/Publications/2004-TaskAnalysis.LEAChapter.pdf)

DEVELOPING TASKS

1. Says what the user wants to do but does not say how they would do it
 - No assumptions made about the interface
 - Can be used to compare design alternatives in a fair way

Requirement:

The interface must help people search for items

* How such a search may take place (e.g., by strolling through a store, looking at a catalog, based on crowd-sourced ratings or reviews, by recommendations) is something to ideate about

Fred wants to purchase a good quality umbrella stroller (red is preferred, but blue is acceptable).

Jamie wants to learn how to build bookends for her bookshelf at home

DEVELOPING TASKS

2. Are very specific

Requirement:

The interface must help people input data of different types to facilitate searching of information

* How such a search may take place (e.g., via search, image search, scanning of barcodes, speech input etc) is something to ideate about

Fred Johnson browses the catalog and chooses the JPG stroller and **makes note of the item code 323 066 697.**

Jamie Black wants the bookends to be **50 x 80 inches**

DEVELOPING TASKS

3. Describes a complete job/action being performed by the user from start to end

Fred wants a good quality umbrella stroller (red is preferred, but blue is acceptable). [where the user begins]

Requirement:

The interface must help people navigate 3 core steps: search, compare and contrast items and then purchase

He browses the paper catalog and chooses the JPG stroller and notes the item code 323 066 697). [intermediate steps]

He pays for it in cash, and uses it immediately. [where the user ends]

* How the workflow is supported (e.g., wizard style system, by placing arrows in the store) is open to discussion

DEVELOPING TASKS

4. Says who the user is

Requirement:

The interface must support first time users

The interface must support expert users

* How the expertise of the user is accounted for open to discussion e.g., novices may need a lot more help whereas experts may need advanced features such as shortcuts

Fred is a first-time customer to this store. He has little computer experience. He types very slowly with one finger.

Jamie is a 30-year DIY enthusiast. She is a long time member of the Victoria makerspace and builds things there often. She is an expert of fabrication machines. She is an expert technology user.

DEVELOPING TASKS

5. As a set the tasks cover a range of possibilities

- Typical 'expected' user; typical routine tasks
- Occasional but important user; infrequent but important tasks
- Unusual user; unexpected or odd tasks

From looking through your full task set, you can expand your requirements lists

| System/ UI | Task | User |
|------------------------|---|--|
| Restaurant menu system | Browse menu (routine task) | Adults (primary users) |
| | Select items (routine task) | An entire summer camp group (occasional users) |
| | Pay bill (routine task) | |
| | Look up ingredients on the web (important but infrequent) | 10 days old baby (least likely to use the system) |
| | Copy menu (odd or unexpected task) | Person who is unable to read (this person would be least likely to interact with the system) |

WHAT IS THE SCOPE OF A TASK?

- Can be seen as each main thing people can do with the interface e.g., for an ATM, withdrawing cash. For restaurant context, tasks can be ordering food, paying the bill
- A cluster of tasks can be viewed as an activity e.g., banking-related activities involve depositing and withdrawing cash. The activity of going to restaurant involves tasks such as booking table, ordering food, paying bills

TASKS TO REQUIREMENTS

Which user groups will be addressed by the interface?

- Designs can rarely handle everyone! We typically need feature-level customization to reach a broad audience

Which tasks will be addressed by the interface?

- Designs can rarely handle all tasks. It costs money and time to implement features
- Requirements listed in terms of how they address tasks
 - Absolutely must include
 - Should include
 - Could include
 - Exclude

VISUAL METHODS

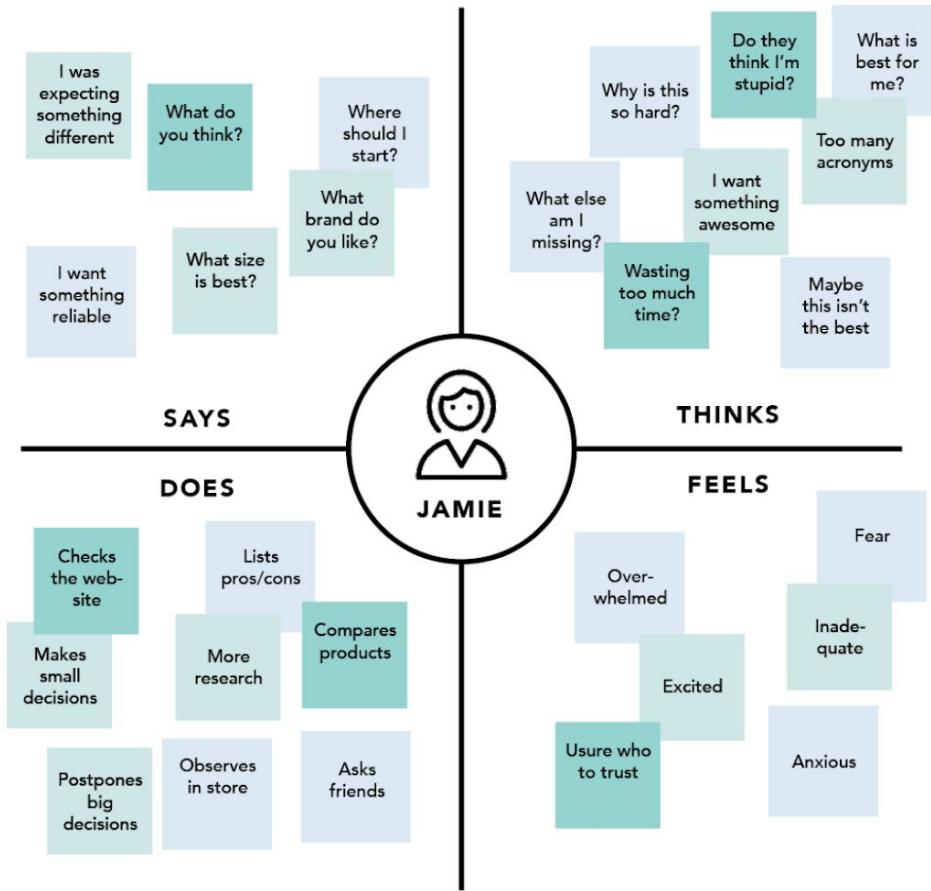
Projects are typically executed as a team and it's important for everyone involved to be on the same page

UX methods such as **empathy mapping, journey mapping, experience mapping** and **service blueprints** can help to visualize the information being synthesized and analysed. These visualizations can be shared with everyone for discussion and feedback

EMPATHY MAP

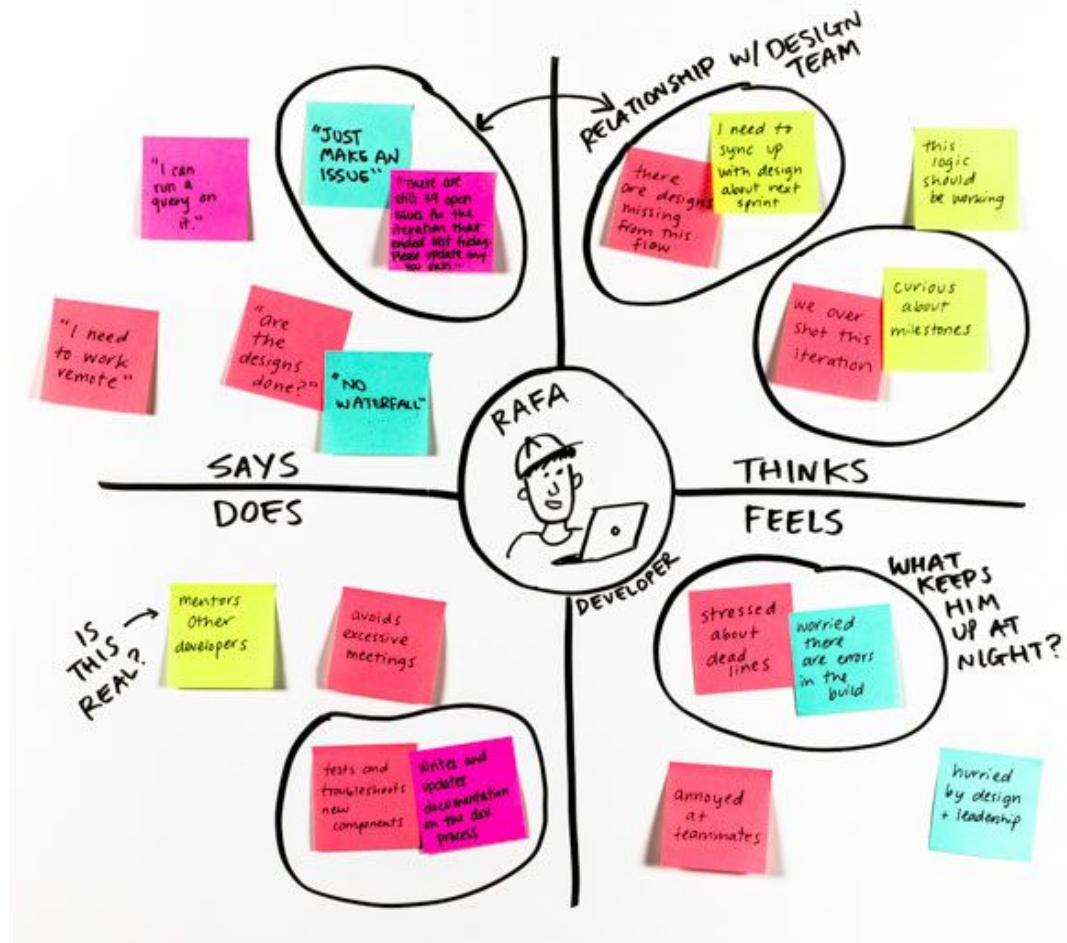
EMPATHY MAP Example (*Buying a TV*)

- Empathy Map is used to distill and categorize your knowledge of the user



EMPATHY MAP

- Empathy maps can also be constructed for multiple users. Wherein the aggregated map represents a user segment instead of an individual.
- Once the map is filled out, as a team you can begin clustering data into categories and identify themes and relationships between quadrants.



EMPATHY MAP

When to use:

- At the beginning of the design process
- Categorizing research notes after understanding the user

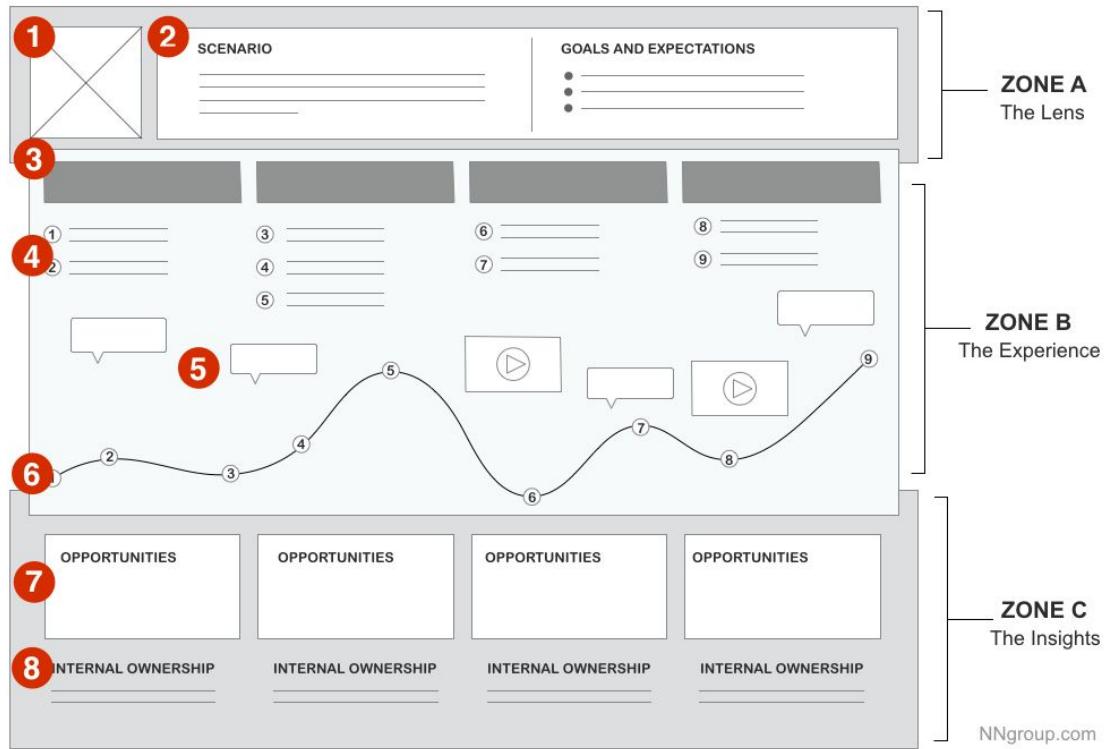
JOURNEY MAPS

- **Journey maps**

visualize a end-user's
journey over a period
of time

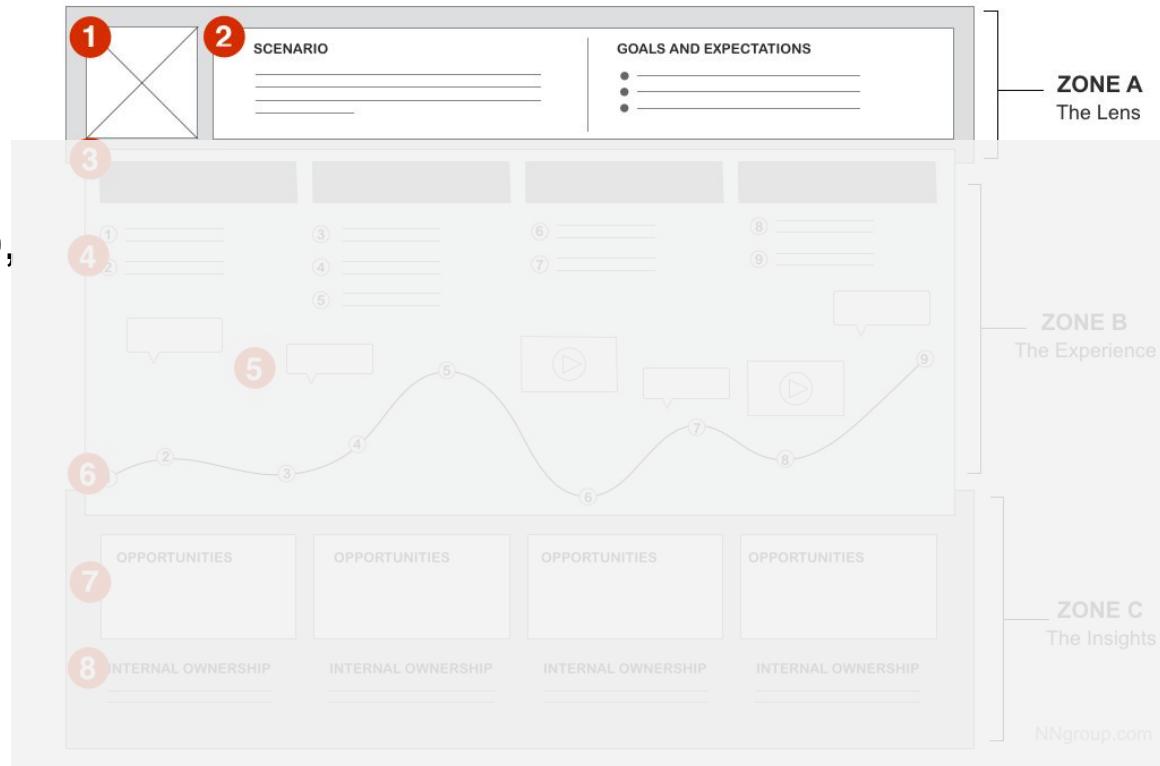
JOURNEY MAPS

- **Journey maps** visualize a end-user's journey over a period of time



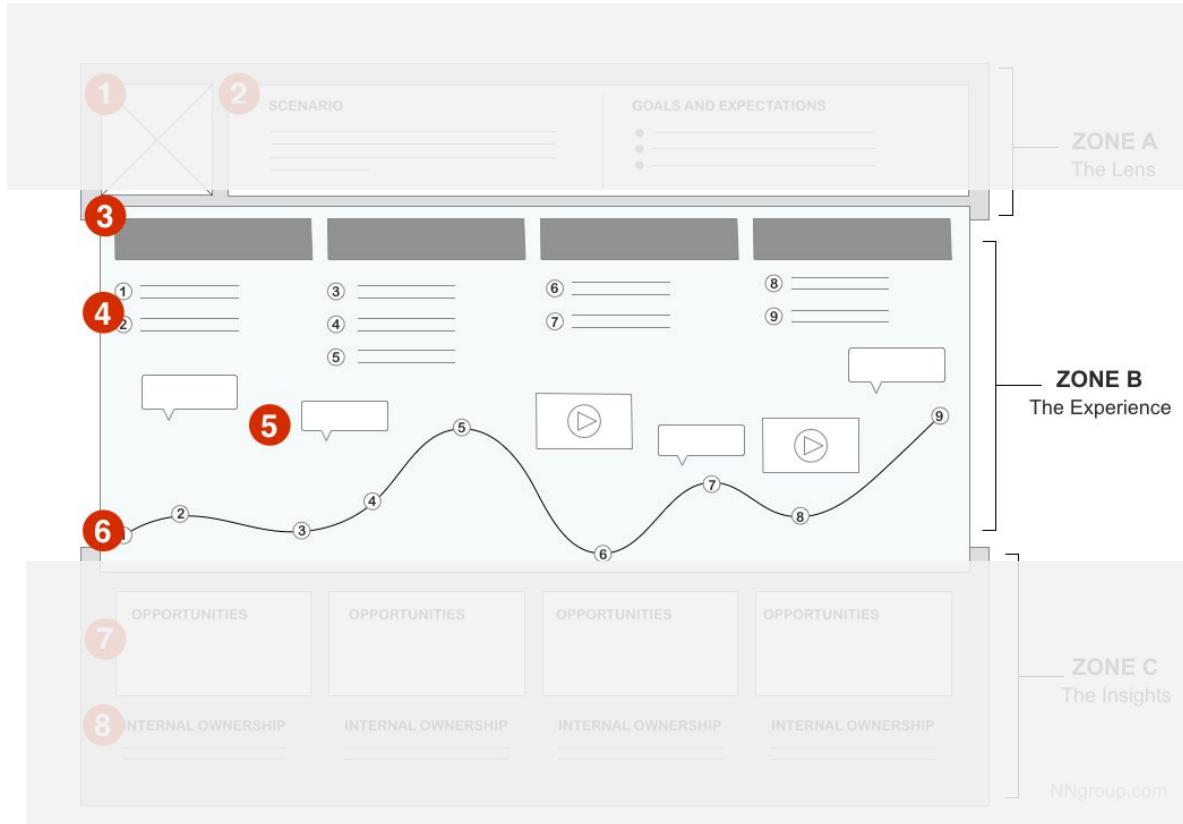
JOURNEY MAPS

- **Zone A:** The lens provides constraints for the map by assigning
 - **(1)** a persona (“who”),
 - **(2)** the task to be examined (“what”).



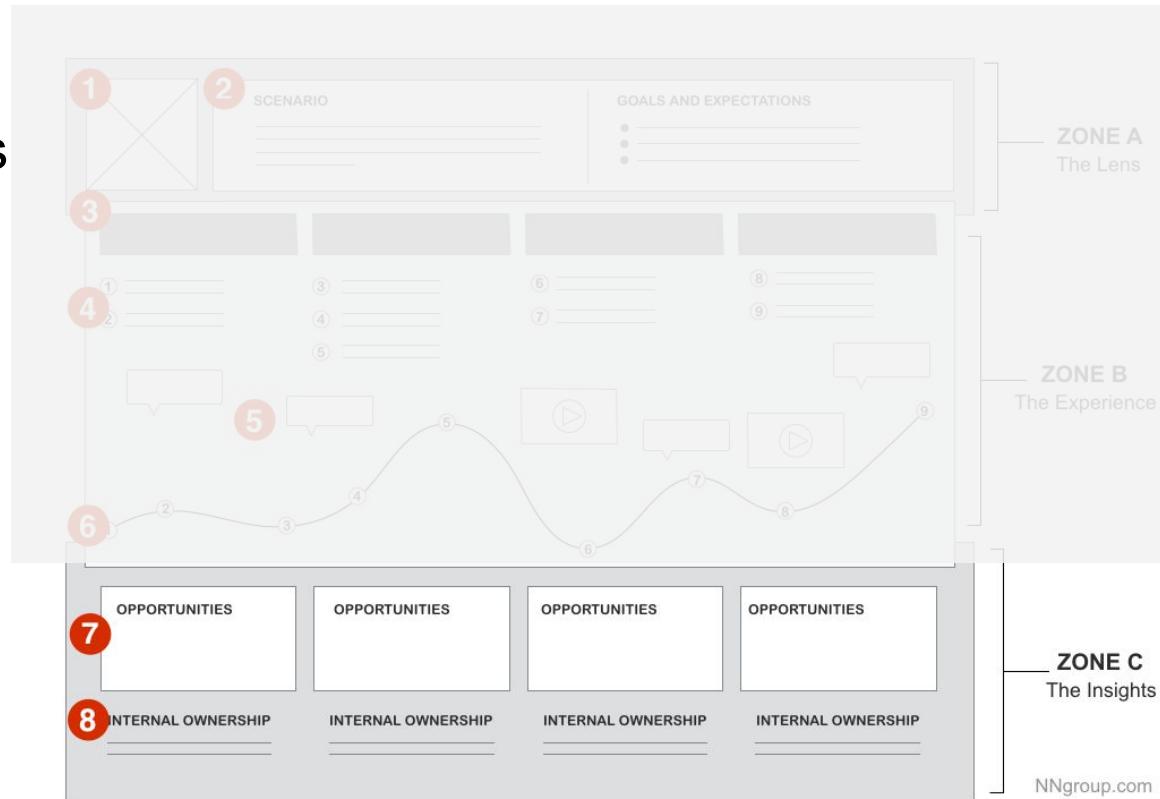
JOURNEY MAPS

- **Zone B:** The heart of the map is the visualized experience, usually aligned across
 - (3) steps or the end-to-end actions included in the task description,
 - (4) elaboration for the actions,
 - (5) thoughts
 - (6) emotional experience of the user has throughout the journey can be supplemented with quotes or videos from research



JOURNEY MAPS

- **Zone C:** describe the positive and pain points discovered, and the
 - **(7)** opportunities to focus on going forward
 - **(8)** internal ownership



JOURNEY MAPS

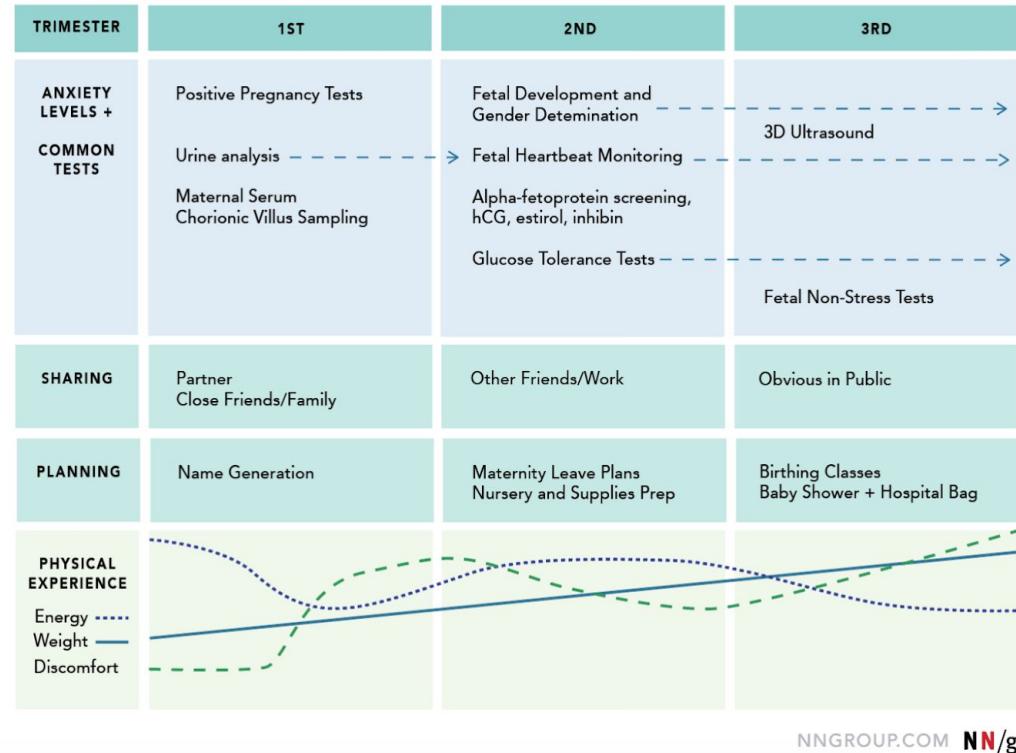
When to use:

- Typically, at any point as a reference point amongst a team

EXPERIENCE MAP

- **Experience maps** are typically used to generalize the experience of multiple users
- You can think of it as an aggregated journey map

EXPERIENCE MAP Example (Pregnancy)



EXPERIENCE MAPS

When to use:

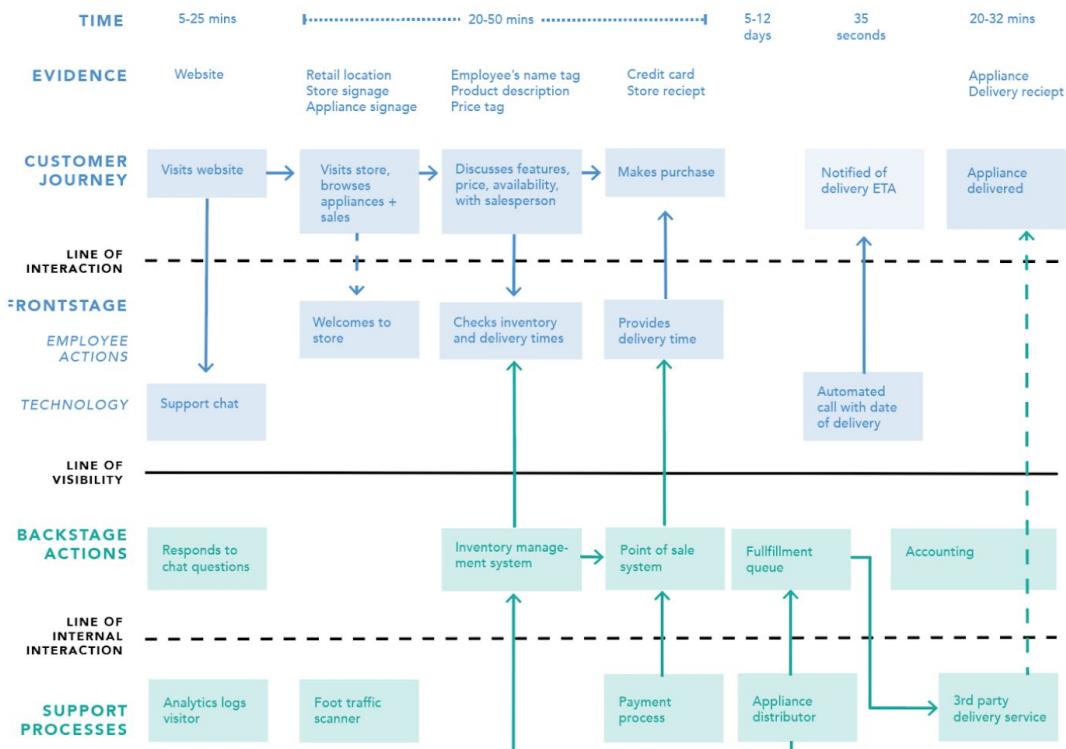
- Typically, before a journey map to gain a **general** understanding of human behavior in the targeted domain
- When converging multiple experiences

SERVICE BLUEPRINT

- Service blueprints visualize the relationship between people (customer & organization), props (physical and digital) and processes

*Essentially lays out a picture of how an entire system will work (front and back-end)

SERVICE BLUEPRINT Example (Appliance Retailer)



SERVICE BLUEPRINT

When to use:

- After journey mapping
- Before making organizational or process changes
- When pinpointing a breakpoint

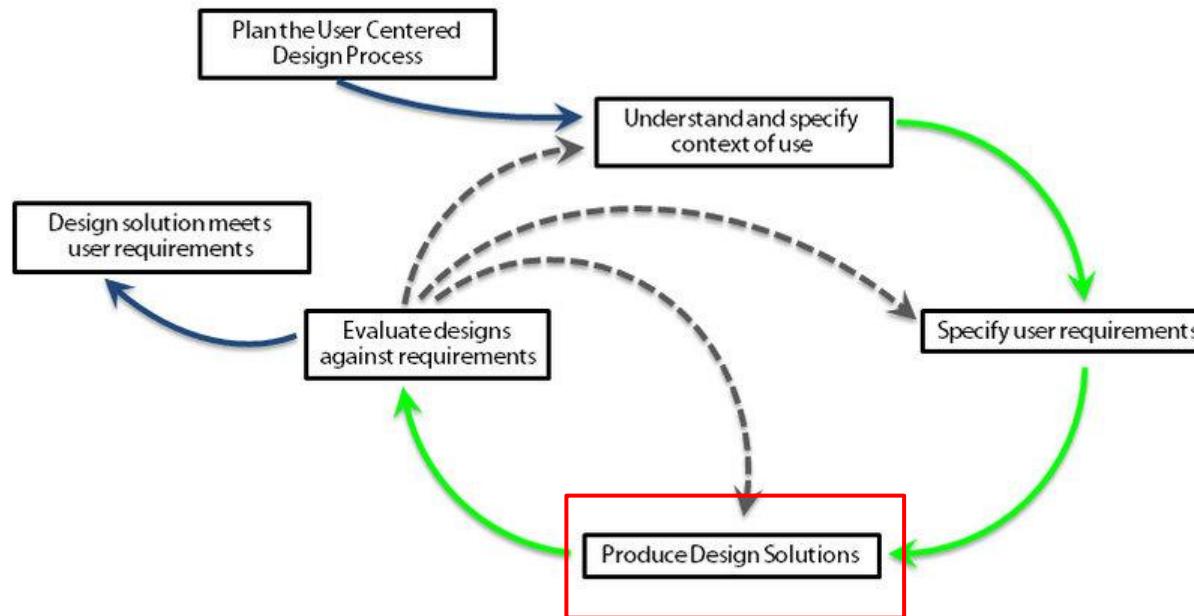
SOME THINGS TO CONSIDER

Current (as-is) vs future (to-be): You can map the experiences of people using certain products/services/spaces as of today or you can imagine an “ideal” future and describe that. Maps that plot the current are useful to find pain points and opportunities whereas the future maps are helpful to evaluate your ideas.

Lo-Fi vs High-Fi maps: At the start of the process typically you want to start with creating low-fidelity maps using sticky notes or drawing on a white board. When the research is complete and the details have all been discussed then create well designed finished maps.

IDEATION

HUMAN-CENTERED DESIGN PROCESS



POINT OF VIEW STATEMENTS

Point Of View statements help you frame the design challenge and help you transition from research, analysis, and synthesis to prototyping.

Point of View Template – Example

| User | Need | Insight |
|-------------------------------------|--|---|
| An adult person who lives in a city | To use a car for 10-60 minute trips 1-4 times per week | The user would not want to own his own car as it would be too expensive compared to his needs. He would like to share a car with others who have similar needs, however, there are no easy and affordable solutions for him. It's important for the user to think and live green and to not own more than he truly needs. |

[User . . . (descriptive)]
needs [Need . . . (verb)]
because [Insight . . .
(compelling)]



“HOW MIGHT WE?” QUESTIONS

- Help frame the research done so far and set context for brainstorming solutions
- Iteratively developed

Point of View Template – Example

| User | Need | Insight |
|-------------------------------------|--|---|
| An adult person who lives in a city | To use a car for 10-60 minute trips 1-4 times per week | The user would not want to own his own car as it would be too expensive compared to his needs. He would like to share a car with others who have similar needs, however, there are no easy and affordable solutions for him. It's important for the user to think and live green and to not own more than he truly needs. |

How might we design an interface that helps people to book a ride share so that they can travel within the city without needing to own a personal vehicle?

How might we design an interface that helps a group of car share riders to split the bill so that they can share the cost?



CHARACTERISTICS OF HMW QUESTIONS

Frame for opportunities – the question should be optimistic and highlight the opportunity that you have identified using preliminary primary research and secondary research.

HMW question should inspire several solutions – there is a delicate balance to maintain. It should not be so specific that there is only one solution. Yet it should not be so broad that you don't even know where to start. You want to draft a sentence where you have a starting point and can generate a variety of ideas related to a specific opportunity.

CHARACTERISTICS OF HMW QUESTIONS

Don't embed solutions – the question shouldn't already provide the solution. That would be counter to the fact that we are asking “How might we...?”

Make it human-centered – Typically the question should be framed from a person and/or community perspective, unless you are working on a post-anthropocentric project

Multiple HMWs – it is possible to have multiple HMWs. In which case, it is typically organized as a hierarchy i.e. overarching question/goal and sub-questions/goal within that.

EXAMPLES

How might we implement a self-tracked roll-call system so the school can track attendance for students?

- A bit narrow
- Solution is explained and therefore not a lot of room for exploring alternatives

EXAMPLES

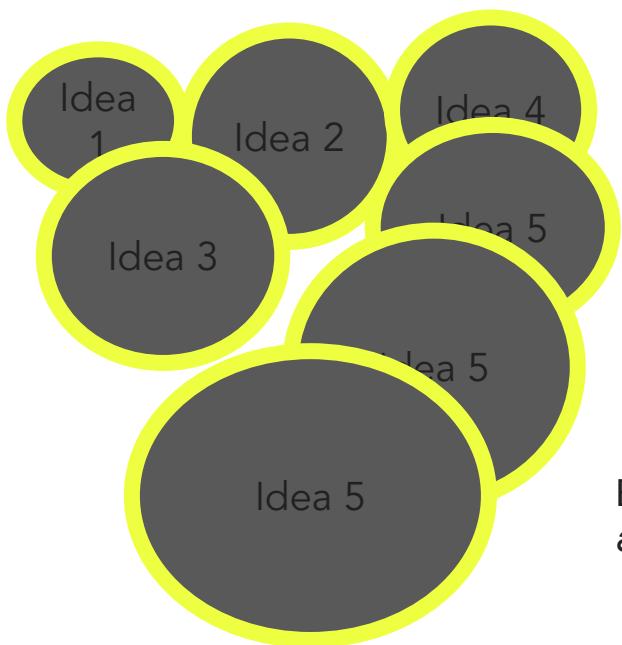
How might schools help undergraduate teaching faculty learn about pedagogies so as to help them improve their teaching strategies?

- Helpful framing
- We know the end users – teachers
- Purpose – help teachers improve their teaching strategies
- There is context - undergraduate faculty, pedagogies.
- There is room to brainstorm several solutions – community groups, seminars, web resources, mini workshop sessions etc.

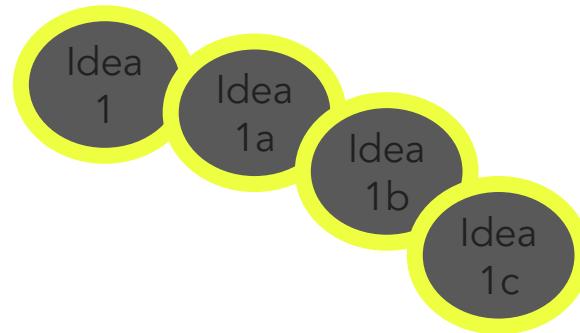
We have questions! What
next?

IDEATION

Getting the right design
(reflection and selection)



Getting the design right (iteration
and development)



Buxton, Bill. *Sketching user experiences: getting the design right and the right design*. Morgan kaufmann, 2010.

DESIGN IS ABOUT MAKING CHOICES AND COMPROMISES

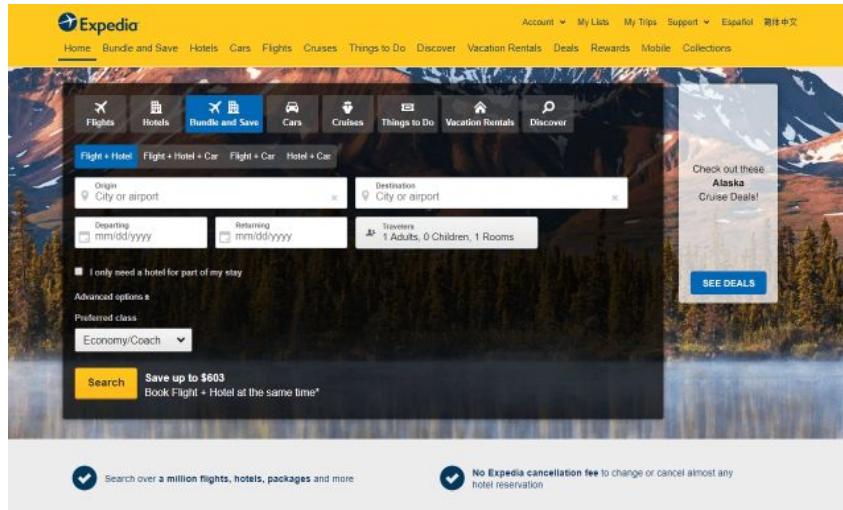
There are three places where there is room for creativity in design:

- Determining the methods for investigating the problem and evaluating the solution
- Enumerating distinct options from which to choose
- Defining the criteria or heuristics according to which you make your choices

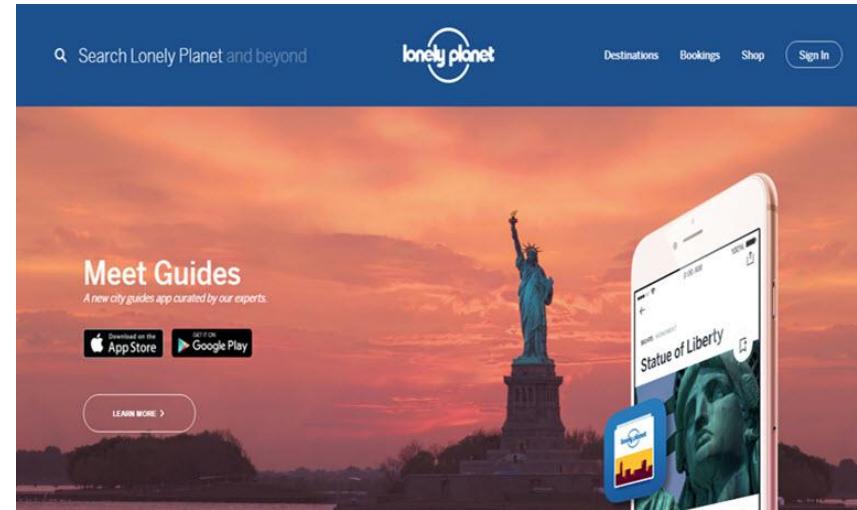
HOW DO WE GENERATE IDEAS?



1. COLLECT EXISTING IDEAS



The Expedia website interface shows a search form for flights and hotels. The search bar includes fields for 'Origin' (City or airport), 'Returning' (mm/dd/yyyy), and 'Travelers' (1 Adults, 0 Children, 1 Rooms). Below the search bar are buttons for 'Flight + Hotel', 'Flight + Hotel + Car', 'Flight + Car', and 'Hotel + Car'. A checkbox for 'I only need a hotel for part of my stay' is present. Under 'Preferred class', there is a dropdown menu set to 'Economy/Coach'. A yellow 'Search' button is at the bottom left, with a note above it: 'Save up to \$603 Book Flight + Hotel at the same time!'. At the bottom, two promotional icons are shown: one for searching over a million flights, hotels, packages and more, and another for 'No Expedia cancellation fee'.



The Lonely Planet website features a search bar at the top with the placeholder 'Search Lonely Planet and beyond'. The header includes the Lonely Planet logo, a 'Sign In' button, and navigation links for 'Destinations', 'Bookings', and 'Shop'. The main visual is a sunset over the Statue of Liberty. A central call-to-action reads 'Meet Guides' with the subtext 'A new city guides app curated by our experts.' Buttons for 'Download on the App Store' and 'GET IT ON Google Play' are shown. A 'LEARN MORE >' button is located below the main image. An iPhone screen on the right displays the 'Statue of Liberty' page from the Lonely Planet app.

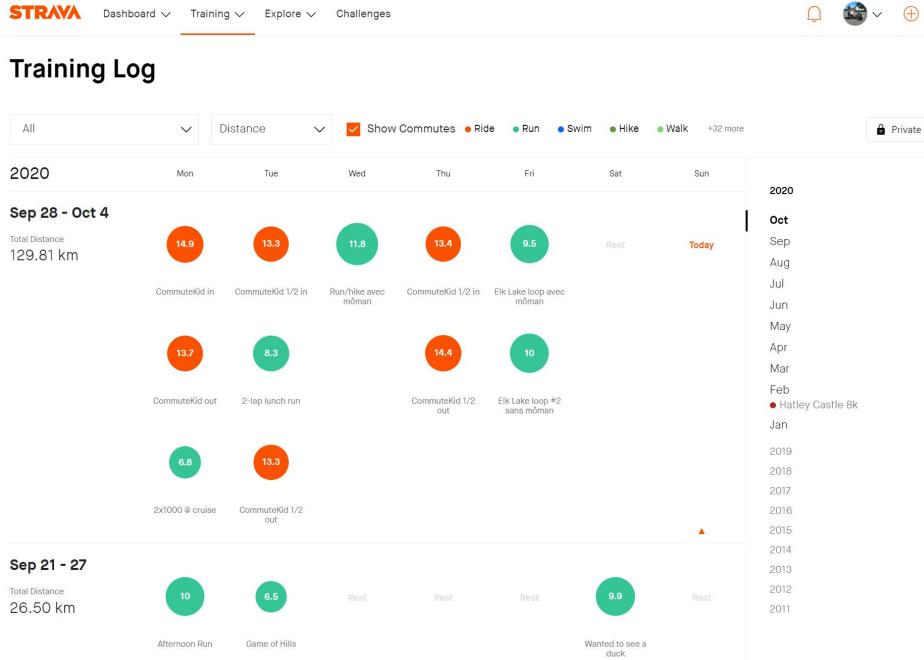
1. COLLECT EXISTING IDEAS

Collect things that you don't like or dislike using or are clearly bad design



1. COLLECT EXISTING IDEAS

Collect things that seem really good



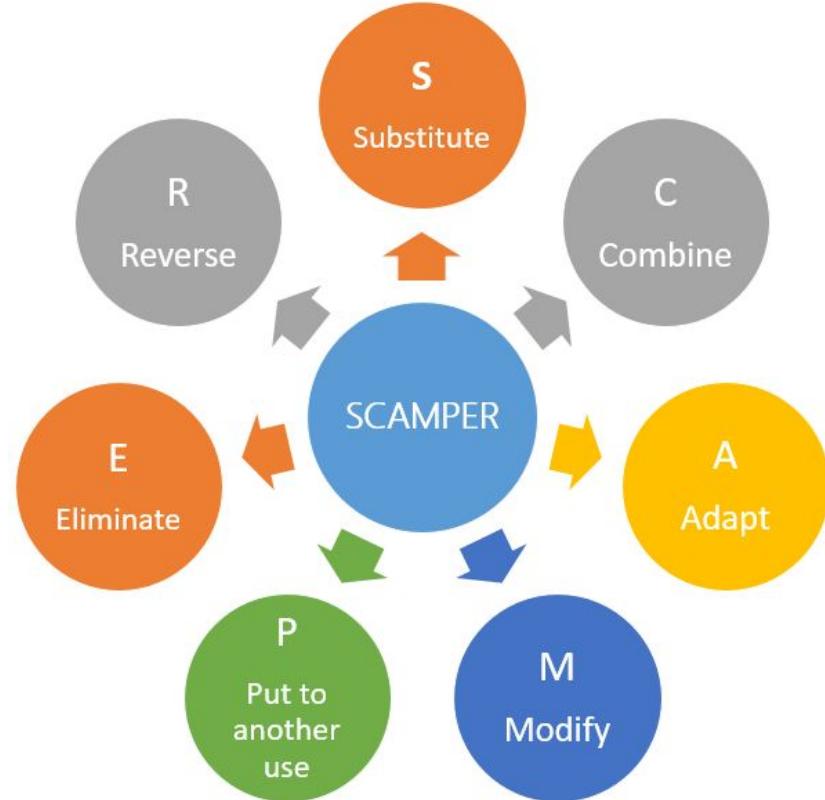
1. COLLECT EXISTING IDEAS

Look for analogous examples

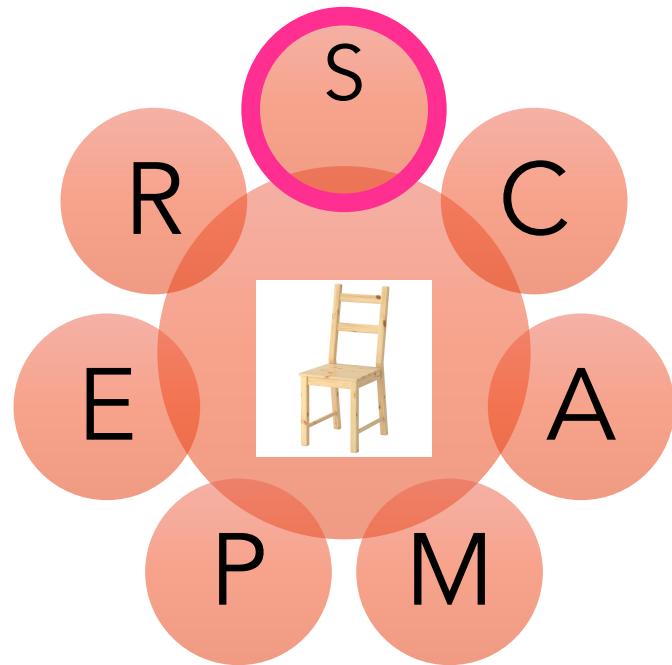


2. SCAMPER METHOD

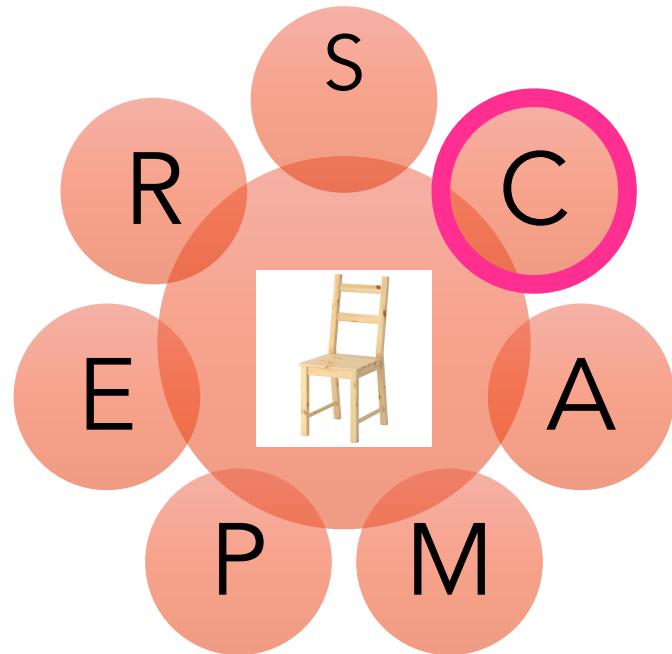
SCAMPER method helps you generate ideas for new products and services by encouraging you to ask seven different types of questions



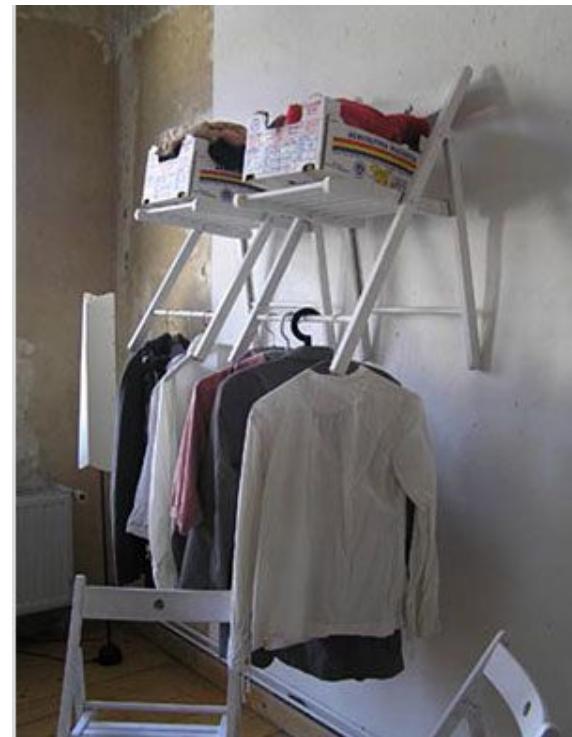
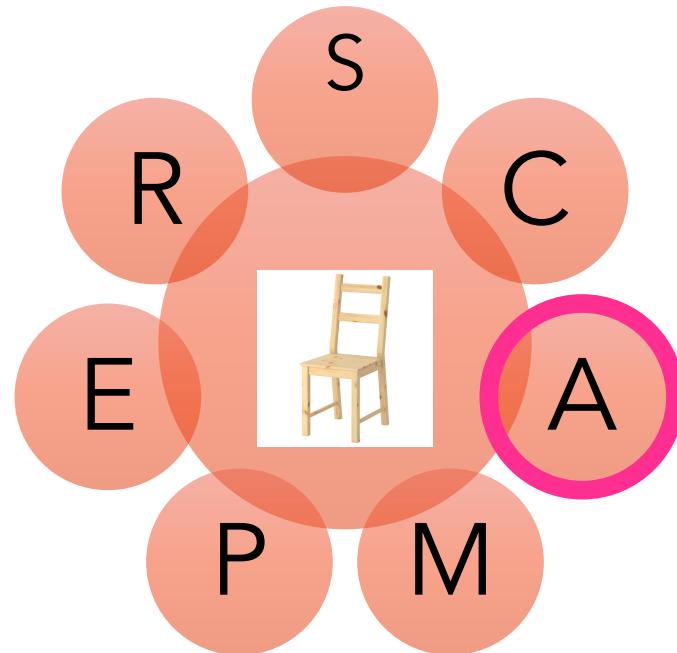
2. SCAMPER METHOD | SUBSTITUTE



2. SCAMPER METHOD | COMBINE

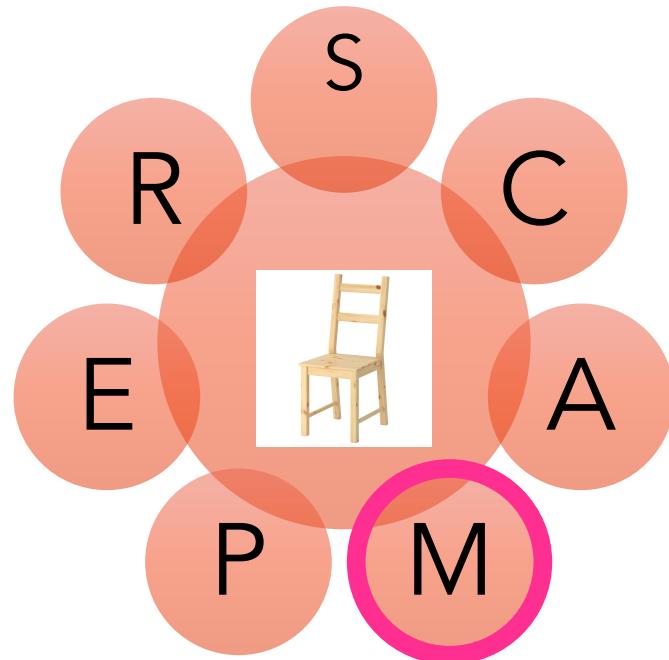


2. SCAMPER METHOD | ADAPT

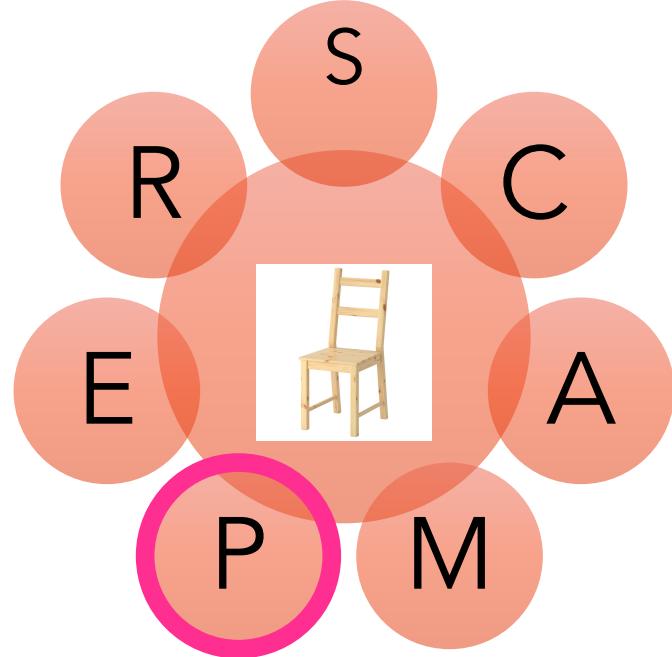


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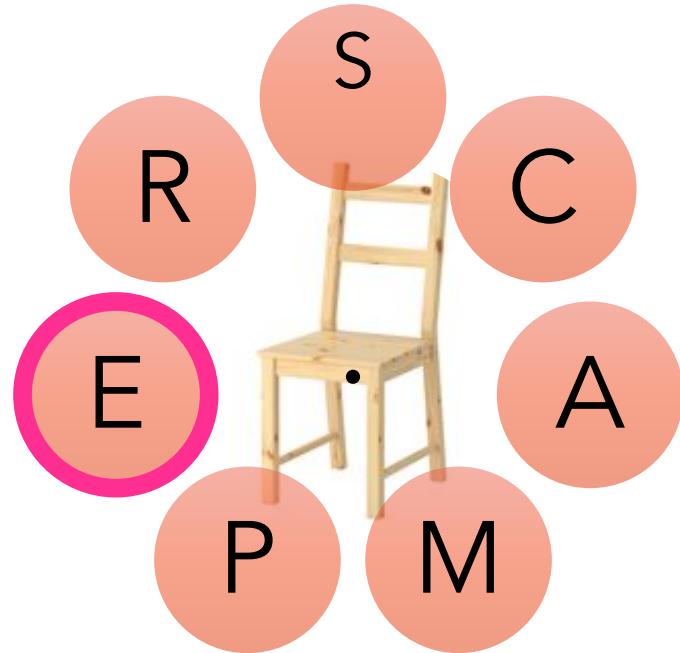
2. SCAMPER METHOD | MODIFY



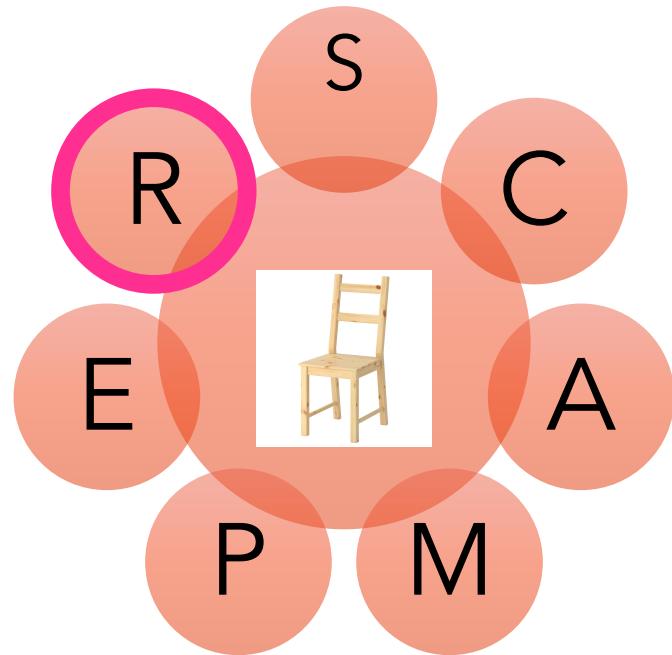
2. SCAMPER METHOD | PUT TO ANOTHER USE



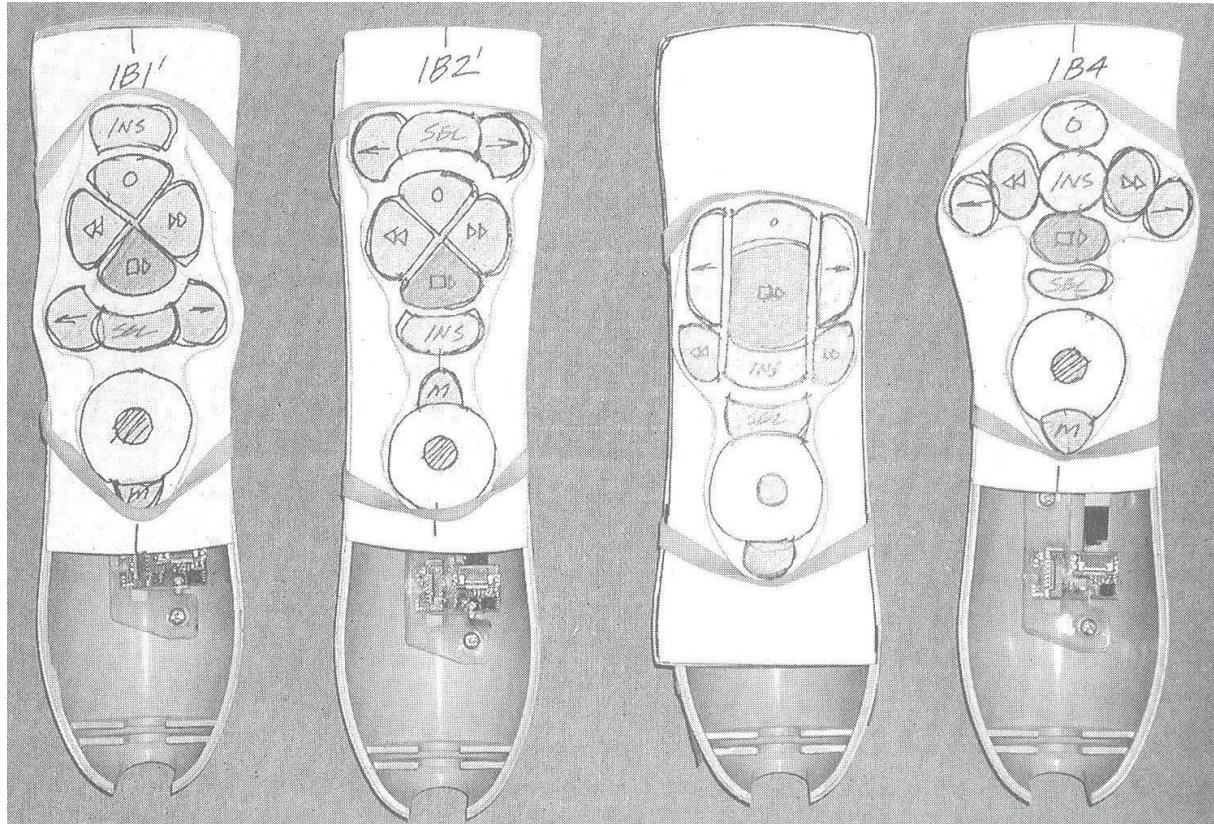
2. SCAMPER METHOD | ELIMINATE



2. SCAMPER METHOD | REVERSE



3. SKETCH CONSTANTLY



From Carloyn Snyder's Book:
Paper Prototyping (2003)
Morgan Kaufmann, p350

4. ASK PEOPLE

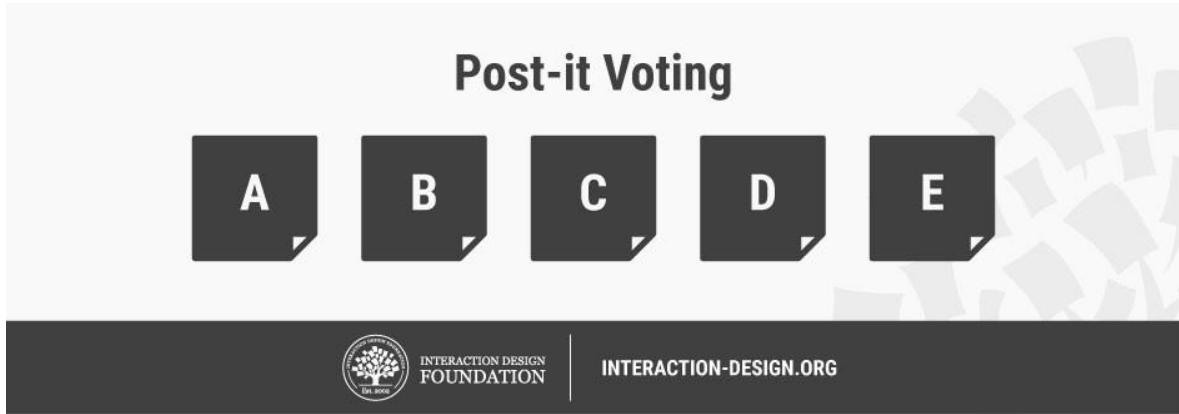
Example:
Design
Charrette



HOW DO I GO FROM ELABORATION TO
REDUCTION?

HOW TO CONVERGE?

Everyone gets
an equal
number of votes
so everyone's
voice is heard.



Each post-it is
one individual
idea

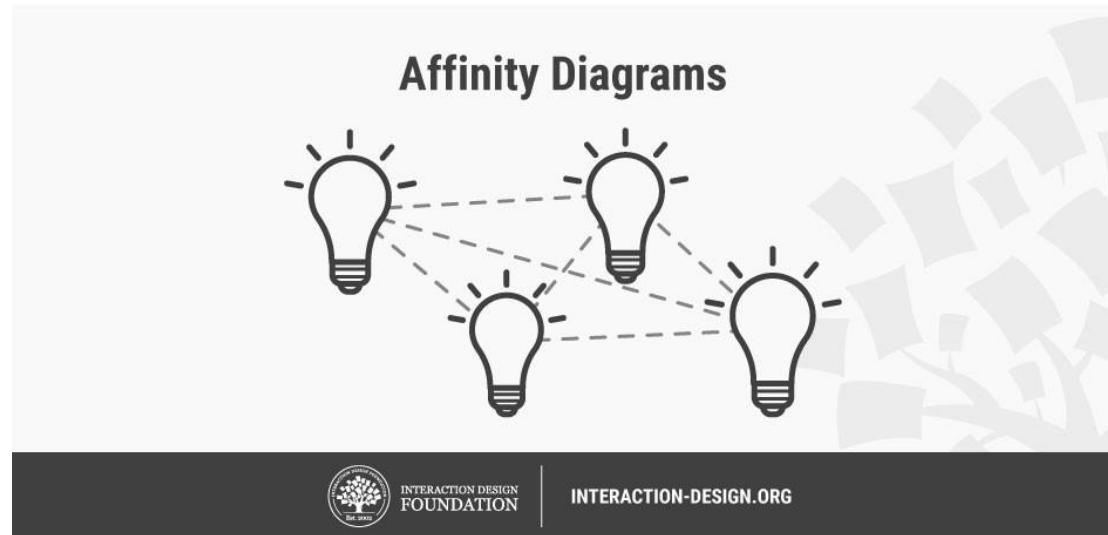
HOW TO CONVERGE?

Discuss every idea and place them on a spectrum of most rational/feasible/understandable to something that is most likely not to get implemented for technology, social, or legal reasons



HOW TO CONVERGE?

Cluster the ideas and discuss the connections between them to uncover which idea might be worth pursuing.



INTERACTION DESIGN
FOUNDATION

INTERACTION-DESIGN.ORG

IDEATION TIPS

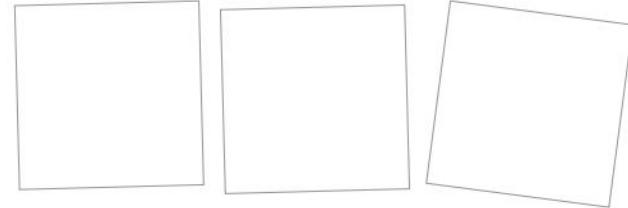
- Set a time
- Develop your POV statements and HMW questions
- Defer judgement and criticism. Encourage all kinds of ideas!
- **Aim for quantity**
- Build on each other's ideas
- **Visualize the solution – write or draw it out**
- One conversation at a time
- **Use your user research and requirements to guide your idea selection process**

CAPTURE TOP QUESTIONS AND IDEAS

SELECT IDEAS INTENTIONALLY AND RECORD THEM

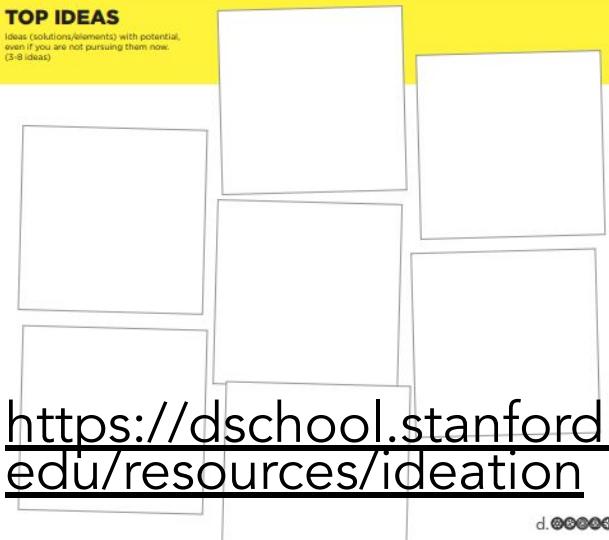
OPPORTUNITIES EXPLORED

Opportunities/HMW questions you ideated from:
Select three that were generative and represent fruitful directions?



TOP IDEAS

Ideas (solutions/elements) with potential, even if you are not pursuing them now.
(3-8 ideas)



<https://dschool.stanford.edu/resources/ideation>