

Design Methods and Practices

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What is Design?

- Design as a Practice
 - Domain-specific
 - Knowledge, skills, tools, etc.
- Design as a Way of Thinking
 - Generic
 - Process, mindset, etc.





Design as a Domain-Specific Practice



Graphic Design



Industrial Design



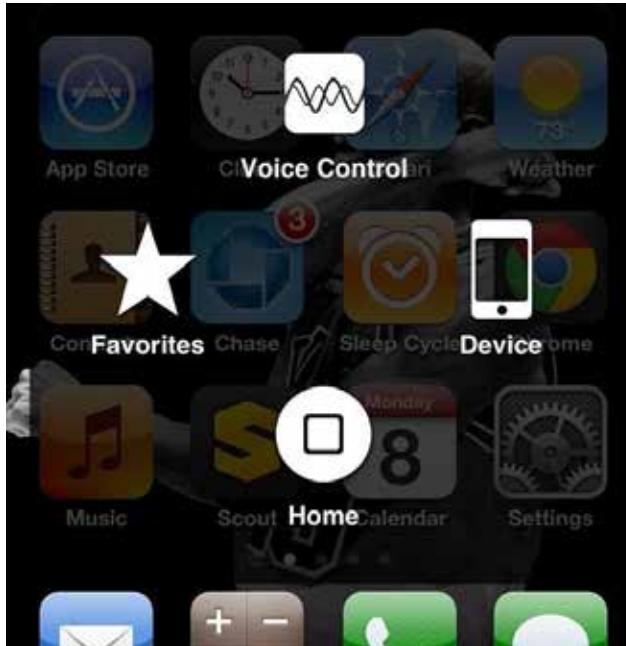
Interaction Design



Service Design



Three Levels of Design



Visceral Design

- Sensation

Behavioral Design

- Usability

Reflective Design

- Meaning

Norman, Donald A. *Emotional design: Why we love (or hate) everyday things*. Basic books, 2005.



Aspects of Design: Usability

The screenshot shows the classic Google homepage. At the top, there's a navigation bar with links for Web, Images, Videos, Maps, News, Shopping, Mail, and more. On the right side of the bar are 'Sign in' and a gear icon. Below the bar is the large, colorful Google logo. Underneath the logo is a search bar with a microphone icon and a blue 'I' placeholder. To the right of the search bar are links for 'Advanced search' and 'Language tools'. Below the search bar are two buttons: 'Google Search' and 'I'm Feeling Lucky'. At the bottom left, there are links for 'Advertising Programs', 'Business S...', 'Go to Google De...', and a copyright notice '© 2011 - Priva...'. A blue link 'Change background image' is also visible. On the right side of the page, there's a large yellow box containing a quote: "The simplest solution is usually the best." attributed to "--- Occam's Razor".

Advertising Programs Business S...
Go to Google De...
© 2011 - Priva...

Change background image

“The simplest
solution is usually
the best.”

--- Occam’s Razor



Aspects of Design: Aesthetics

The collage illustrates the concept of 'Attractive things work better' through the design of political campaign websites. It features two main versions of a campaign page for George Hutchins and one for Mitt Romney, with a sidebar navigation bar on the left and right.

Left Sidebar:

- WE'LL BE BACK IN 2014 !!!
- We wish to thank 5,770 GOP Voters: May 8, 2012.
- VOTE ROMNEY 2012.
- NOBAMA !!!
- ALL Republican Party.
- ALLOW TIME SLIDE-SHOW LOADING
- OBJECTIVES
- NOObama
- NCGOP -WAR-
- BIOGRAPHY
- Contact Us
- MESSAGES

Center Content:

George HUTCHINS For U.S. Congress
www.georgehutchins.com

GEORGE HUTCHINS FOR U.S. CONGRESS 2012 CAMPAIGN REPUBLICAN - NORTH CAROLINA
(Raleigh, Durham, Apex, Cary, Morrisville, Chapel Hill, Hillsboro, Carrboro, Fayetteville, }

HUTCHINS FOR U.S. CONGRESS 2010 2012

VOTE FOR HUTCHINS 2010 2012

U.S. SENATOR JESSIE HELMS
October 18, 1921 – July 4, 2008
Greatest North Carolina Leader
www.georgehutchins.com
VOTE FOR HUTCHINS

Masters Degree (MPA) Public Administration

GEORGE HUTCHINS Wishes To Thank '5,770' May 8

GEORGE HUTCHINS Wishes To Thank '1,099' May 4

NORTH CAROLINA 4TH DIST. INDEPENDENT CONSERVATIVE REPUBLICAN
www.georgehutchins.com

GEORGE FOR U.S.

GEORGE HUTCHINS U.S. CONGRESS

HUTCHINS MAIN PAGE HUTCHINS POLITICAL DIRECTOR

Right Sidebar:

- WE'LL BE BACK IN 2014 !!!
- We wish to thank 5,770 GOP Voters: May 8, 2012.
- VOTE ROMNEY 2012-
- NOBAMA !!!
- The so-called NCGOP, North Carolina Republican Party has FAILED to serve the Interests of REAL REPUBLICANS since
- ALLOW TIME SLIDE-SHOW LOADING
- FaceBook
- DISCUSSIONS
- GOP STAFF
- Organizations

Bottom Text:

"Attractive things work better."

— Donald Norman

http://jnd.org/dn.mss/emotion_design_attractive_things_work_better.html



Aspects of Design: Culture ...

The top screenshot shows the Rakuten Ichiba homepage. It features a header with the Rakuten Ichiba logo and a search bar labeled "買い物かご". Below the header is a navigation bar with links like "ランキング", "あす楽", "送料無料", "オークション", "共同購入", "カード", "ツールバー", "モバイル", "懸賞市場", "専門市場", "ブックス", "商品カタログ", "証券", "トラベル", and "ポータル". A search bar with the placeholder "ジャンルで絞り込む" is followed by a "検索" button and a link to "特集検索 ショップ/全商品一覧". The bottom screenshot shows the Japan Airlines (JAL) website. It has a header with the JAL logo and "Japan". Below the header is a navigation bar with links for "国内線", "国際線", "JALマイレージバンク", "JALカード", "国内ツアー", "海外ツアー", and "法人のお客さま". There are also links for "ENGLISH" and "WORLDWIDE". The main content area features a "エントリーして落札でポイント10倍" banner for rain boots, a "あす楽" section, and a flight booking form. Promotional banners for "早い予約でおいしい秋旅" and "JALダイナミックパッケージセール" are also visible.

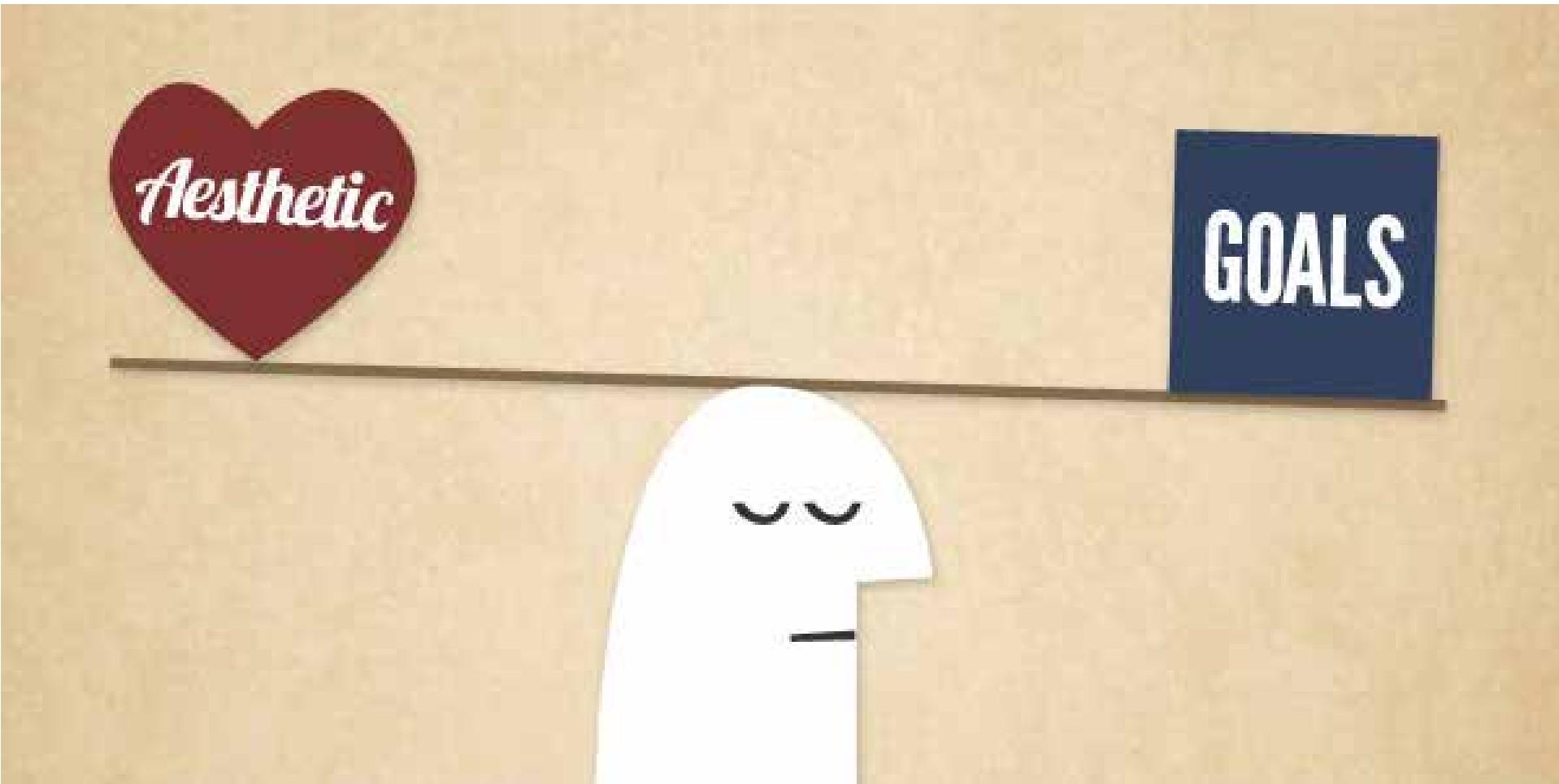
Usability and Aesthetics are User-Dependent

The screenshot shows a flight booking form on the left and a news feed on the right. The flight booking form includes fields for "乗継便を含める", "搭乗クラス", "お客様人数", and "出発地" and "到着地". The news feed on the right lists several items:

- 07.28 JALダイナミックパッケージ10日間限定の夏のタイムセール！発売開始！
- 07.28 空港の「ピット端末」と「自動改札機」が順次新しくなります！
- 07.27 10月からの先得割引もなく発売開始!秋のおすすめ情報を事前にチェック
- 07.27 みやざきの魅力を紹介！JALグループは宮崎県を応援しています。
- 07.22 COP10エコ・ハッピーターン号就航！エコでうれしいキャンペーン開始！
- 07.21 10月からのJALパック海外ツアー発売開始！最大1万円割引も！
- 国際線「燃油特別付加運賃」「航空保安特別料金」について



Then, How to ...

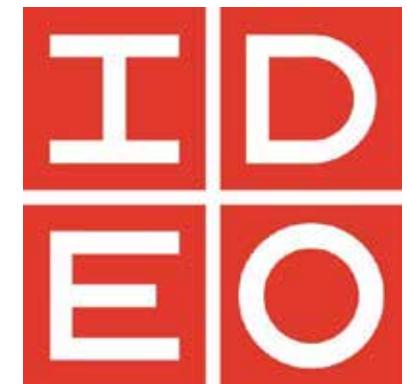




Design as a Way of Thinking

Design Thinking:

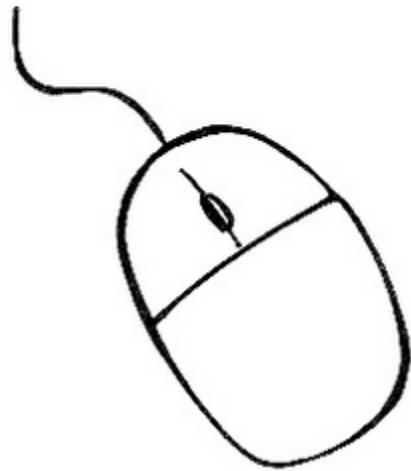
*Design thinking is a **human-centered** approach to innovation that ... integrates the **needs of people**, the **possibilities of technology**, and the **requirements for business success**.*





Design as a Way of Thinking

IT USED TO BE ABOUT
PRODUCTS



NOW, IT'S ABOUT PEOPLE





Where to Start? ~~A solution?~~

- “I just come up with this cool feature ...”
- “We have technically strong in ...”
- “Our competitor just launched ...”





Where to Start? ~~A Problem?~~

- “They ask me to solve ...”
- “I feel that there is a problem ...”
- “I don’t like it, so ...”





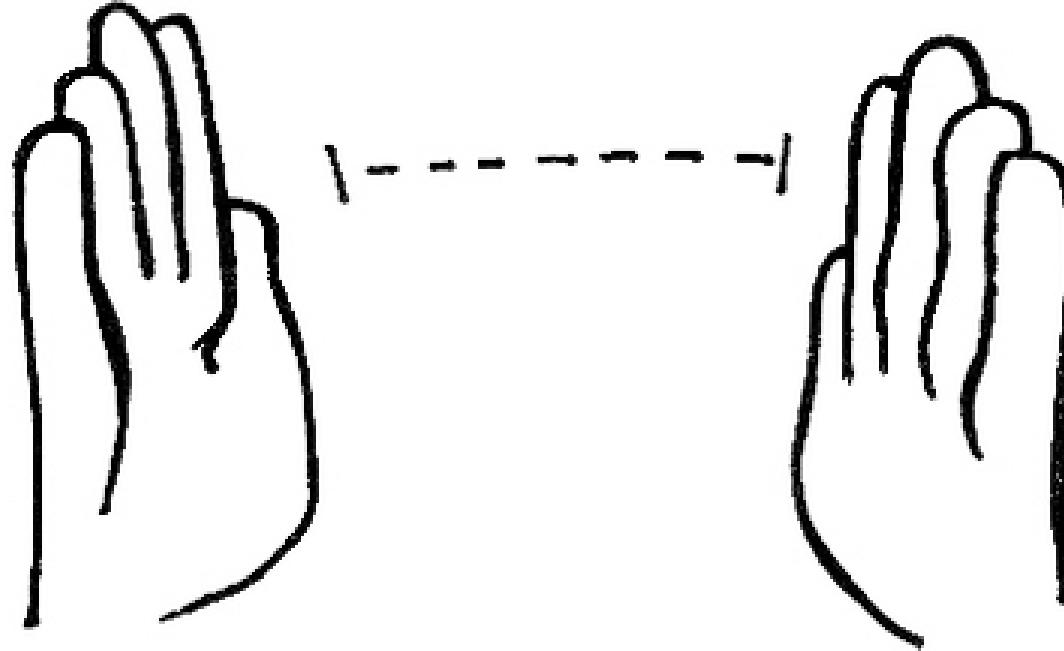
Where to Start? A Users' Need!

- “Many users encounter this problem ...”
- “A lot of us want to have ...”
- “People may benefit from ...”

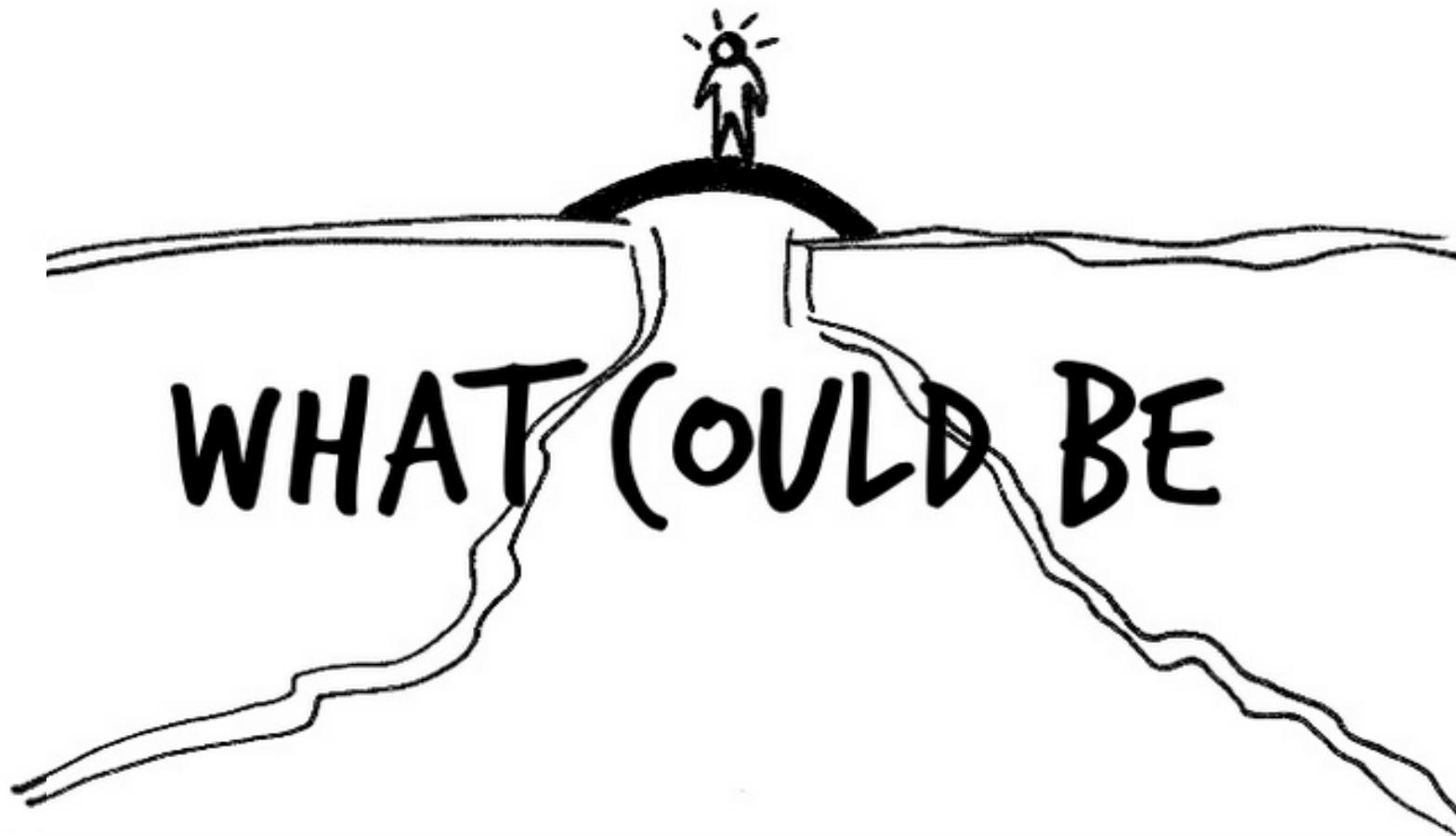
WE ARE OVERWHELMED

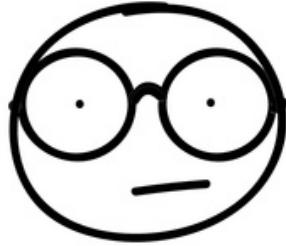


"I KNOW IT WHEN I SEE IT"

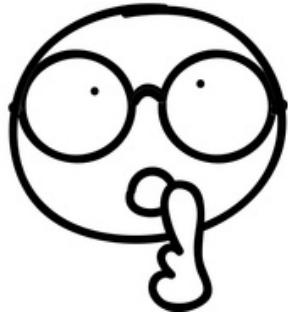


"WE HAVE AN ENGAGEMENT GAP"

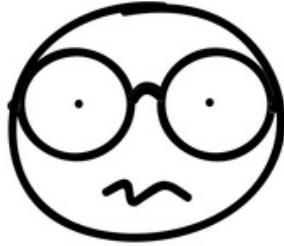
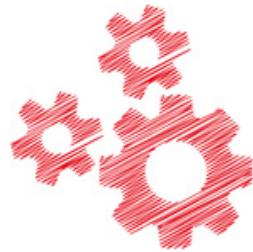
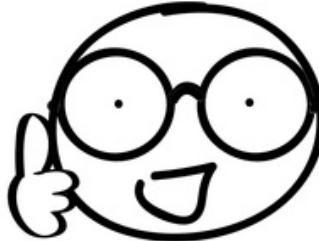
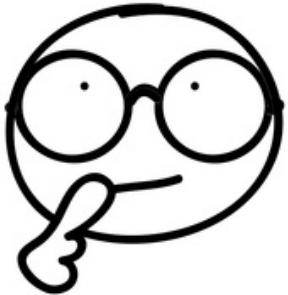




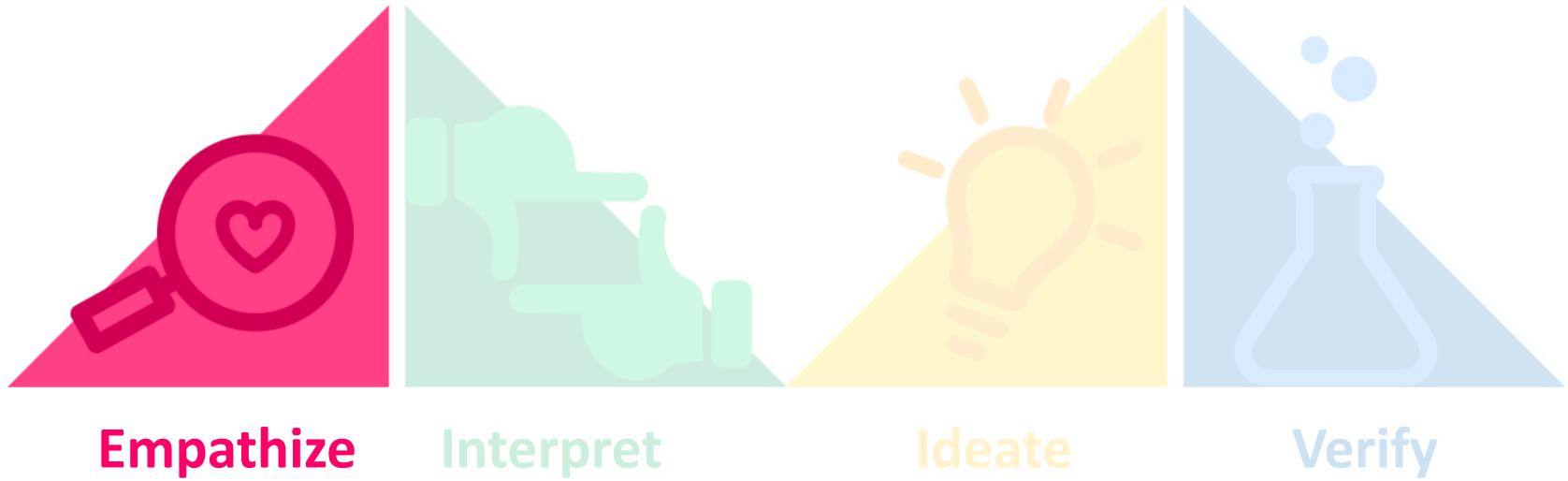
!



?



From Mindset to Process



Preparation (1): Problem Scope



User Type

- Age group
- Profession
- ...

Context

- Location
- Domain
- ...

Goal

- Productivity
- Wellbeing
- ...

Technology

- Touch screen
- Wearable
- ...

Preparation (2): Ability and Constraints



Preparation (3): Basic Knowledge

- Familiarize with common practices
- Respect the concerns and rights
- Find potential problems
- Speak the language



Empathize



Immerse

- Be one of them



Observe

- Record



Contact

- Interview



Empathize



Immerse

- Be one of them



Observe

- Record



Contact

- Interview

Observe

- Methods
 - Watching people in a particular context
 - Shadowing potential user(s) in the real environment
 - (Supplementary) Collecting self-reported diaries



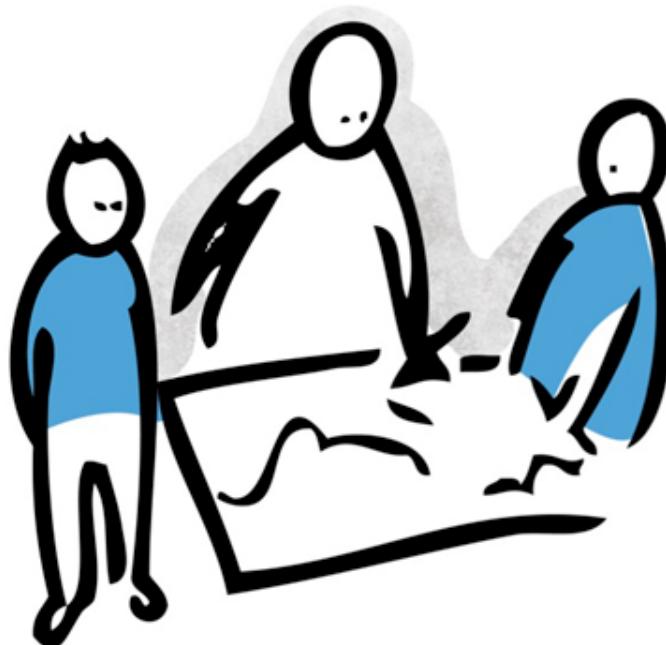
Observe

- Methods
 - Watching people in a particular context
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 - (Supplementary) Collecting self-reported diaries



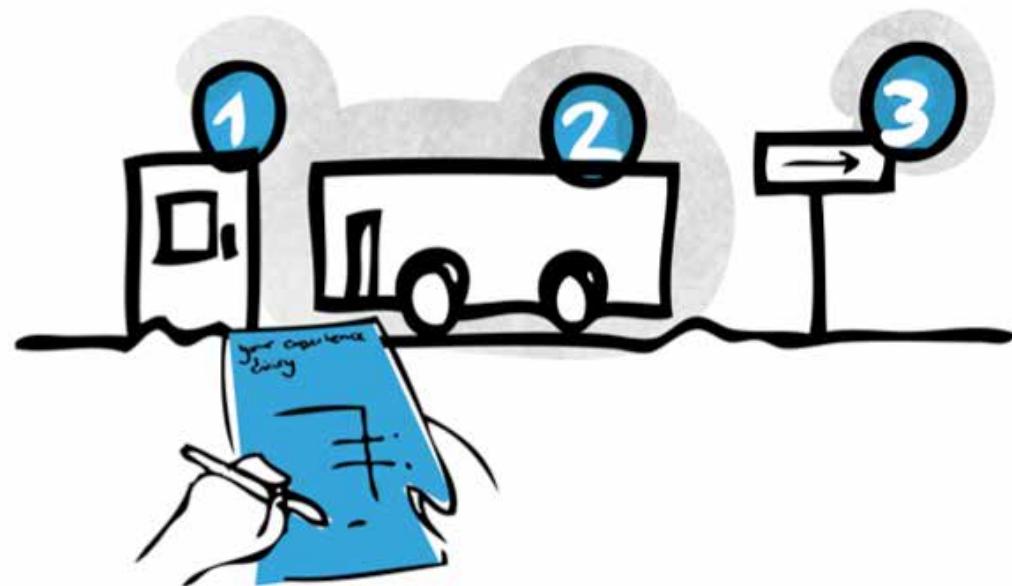
Observe

- Methods
 - Watching people in a particular context
 - Shadowing potential user(s) in the real environment
 - (Supplementary) Collecting self-reported diaries



Observe

- Questions to Answer
 - When, where, how a behavior is formed
 - Who, what is involved
 - How people feel
 - Why it happens
 - ...



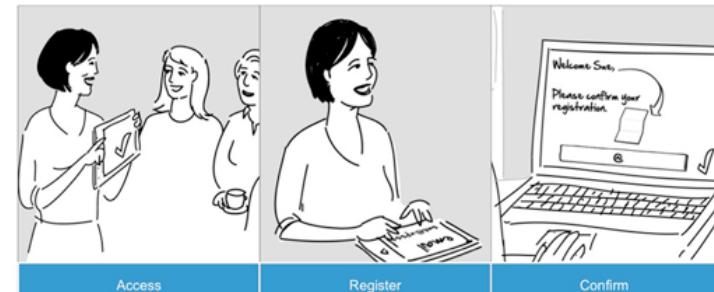
Observe

- Tools
 - Notes
 - Sketches
 - Photos
 - Videos
 - Audios
 - ...



Observe

- Things to Pay Particular Attention to
 - Environment / Context
 - Location: streets, landmarks, signs, ...
 - Context: time, activities, weather, crowdedness, ...
 - People
 - Type: frequent, outlier, relationship, ...
 - Style: appearance, facial expressions, gestures, body languages, ...
 - Behaviors
 - Reoccurring behaviors: touching something, phone ringing, ...
 - Change of behaviors: people stop and go, light on and off, ...
 - Dynamics and Interactions
 - Verbal: conversations, fights, ...
 - Physical: hugs, hand off, ...



Observe

- Use Yourself as one of the Observation Tools
 - How you feel as an observer
 - How you feel in the shoes of the subject



Observe

- Be Conscious of ...
 - Legal issues, e.g., the use of camera in certain places
 - Privacy, e.g., people are agreed to be watched
 - Ethics, e.g., children
- Get Consents!



Monitoring



- Find a spot with good view
- Watch over an extended period

Shadowing

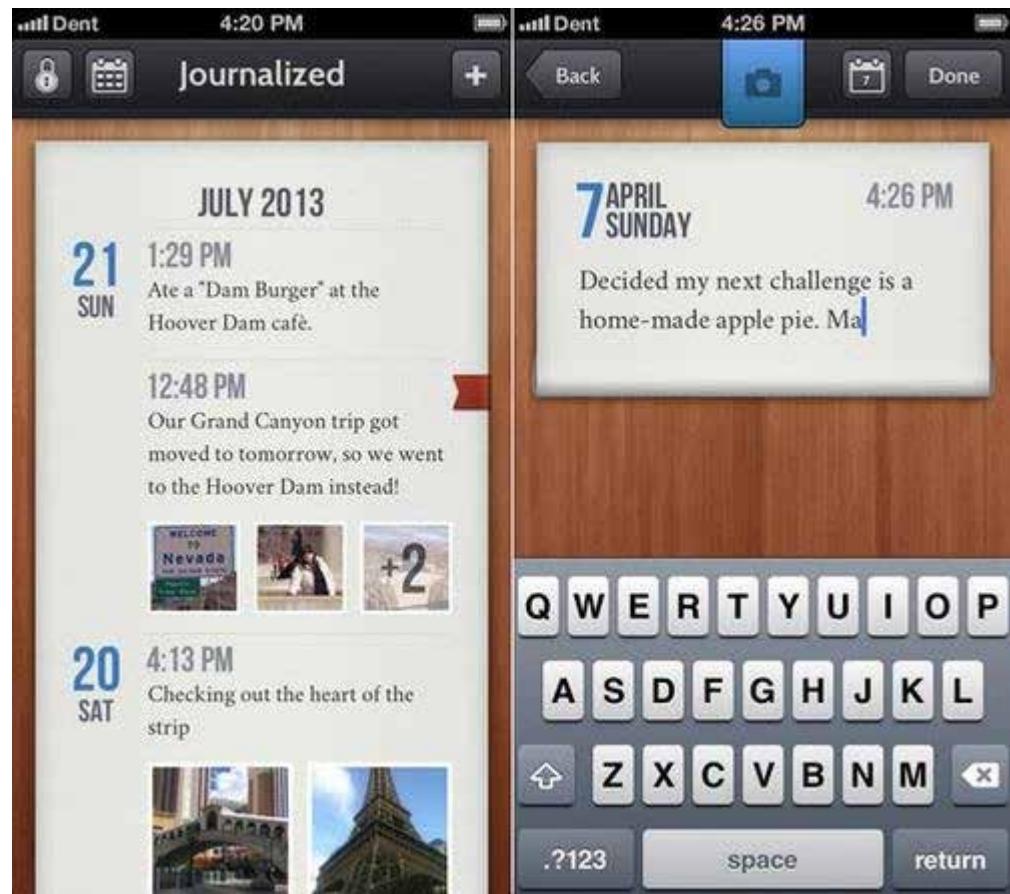


- Follow around
- Record and annotate, but do not interpret
- No interference

Self-Report Diaries

- Paper-based
- Digital (app, Google Form)

14 February, 2009 Saturday		January 2009 Su M Tu W Th F Sa	February 2009 Su M Tu W Th F Sa	March 2009 Su M Tu W Th F Sa
Valentines Day		1 2 3 4 5 6 7	8 9 10 11 12 13 14	15 16 17 18 19 20 21
		18 19 20 21 22 23 24	25 26 27 28 29 30 31	1 2 3 4 5 6 7
		8 9 10 11 12 13 14	15 16 17 18 19 20 21	22 23 24 25 26 27 28
		29 30 31		
Remember Mom&Dad's Anniversary Birthdays: Ted & Mary		Appointments 7:00 8:00 :15 :30 :45 9:00 :15 :30 :45 10:00 :15 :30 :45 11:00 :15 :30 :45 12:00 :15 :30 :45 1:00 :15 :30 :45 2:00 :15 :30 :45 3:00 :15 :30 :45 4:00 :15 :30 :45 5:00 :15 :30 :45 6:00 :15 :30 :45 7:00 :15 :30 :45 8:00 :15 :30 :45 9:00 :15	Notes	
<input checked="" type="checkbox"/> ABC Prioritized Task List				
Time	People to Call			
\$Amt	Expenses			



Self-Report Diary

- What to Report?
 - Contexts
 - Time, location, weather, ...
 - Activities
 - Goals, outcomes, ...
- Participants
 - People
 - Objects, technologies, ...
- Feelings



Self-Report Diary

- Design Considerations
 - Light and mobile
 - Simple but clear
 - Structured and open-ended
 - Proper reminder



Contact

- The Art of Interview
 - Formal vs. informal
 - Structured vs. semi-structured
- Who to Interview?
 - “Everyone has stories to tell”
 - Representatives



Interview Preparation

- Script and pilot your questions
 - Send to the interviewee beforehand if asked
- Schedule in advance
 - Reminder
 - Instructions
- Bring recording tools
 - Notes
 - Voice / video recorders
- Be a good Listener
- Express your appreciation
 - Do follow up when asked



Interview Techniques

- Make your Interviewee Comfortable
 - Convenient time
 - Comfortable ambience
 - Welcoming gesture



Interview Techniques

- Ask about how to call the interviewee
- Ask open rather than yes/no questions
- Ask for demonstration, comparison, envision
- Ask for definition, examples, anecdotes
- Ask one question at a time
- Ask follow-up questions
- Ask an exit question
- Ask for follow up
- Ask for recommendation
- Ask if having anything to add at the end



Interview Techniques

- Do not bias
- Do not judge
- Do not argue
- Do not add your own comments
- Keep questions brief but to the point
- Keep digging if necessary
- Stay focused
- Stay open
- Stay polite



Which Method to Use?

- Observation
 - Objective, natural information
 - Less controllable



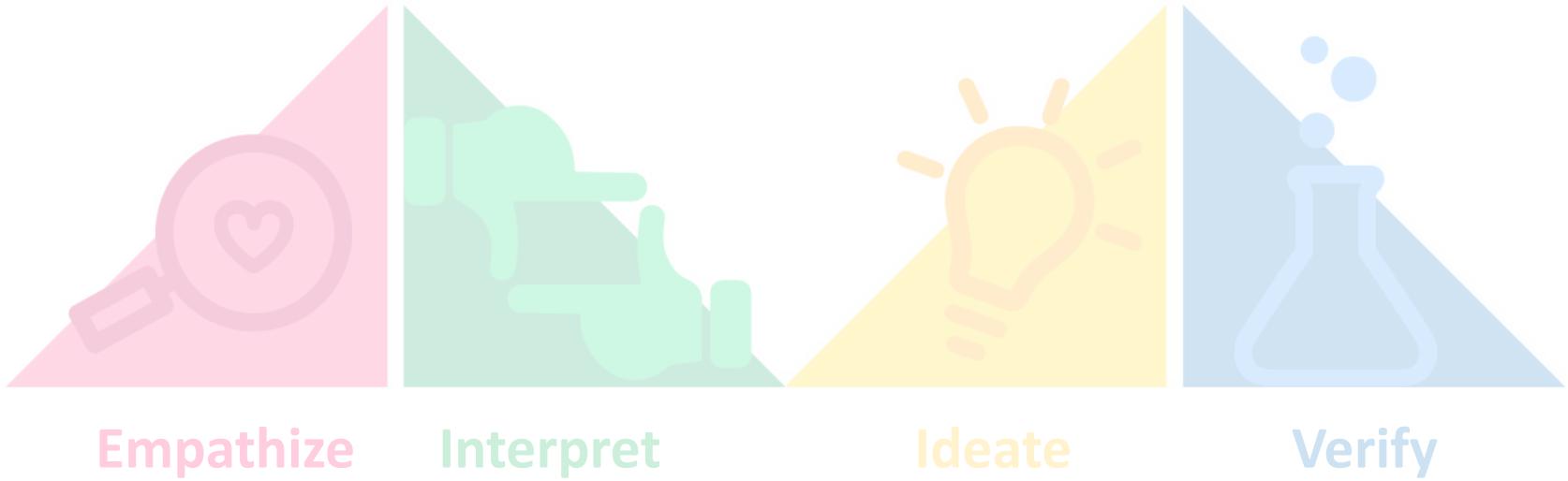
- Interview
 - Subjective, insightful information
 - Omission



What to Do Next?

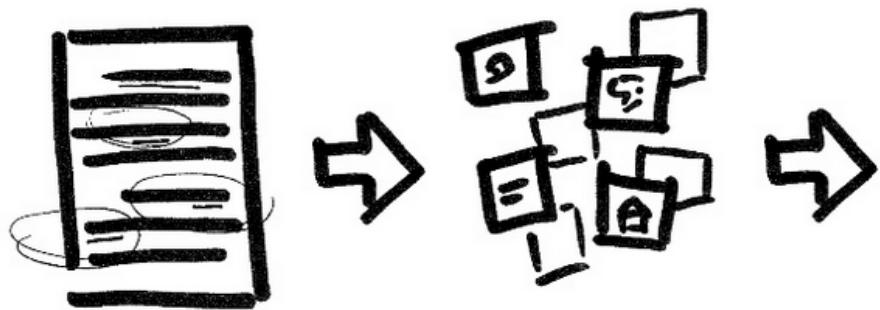


From Mindset to Process

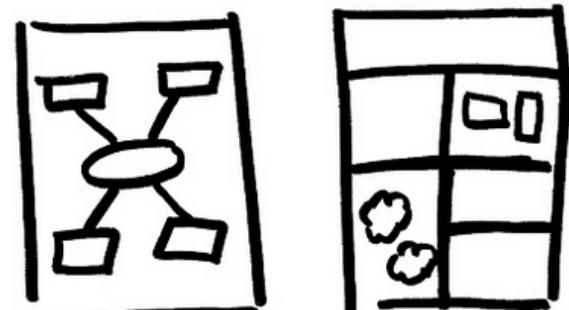


Interpret the Results

MAKE CONCRETE.



WHAT'S YOUR STORY?



Organize

- Transcribe and annotate

Construct

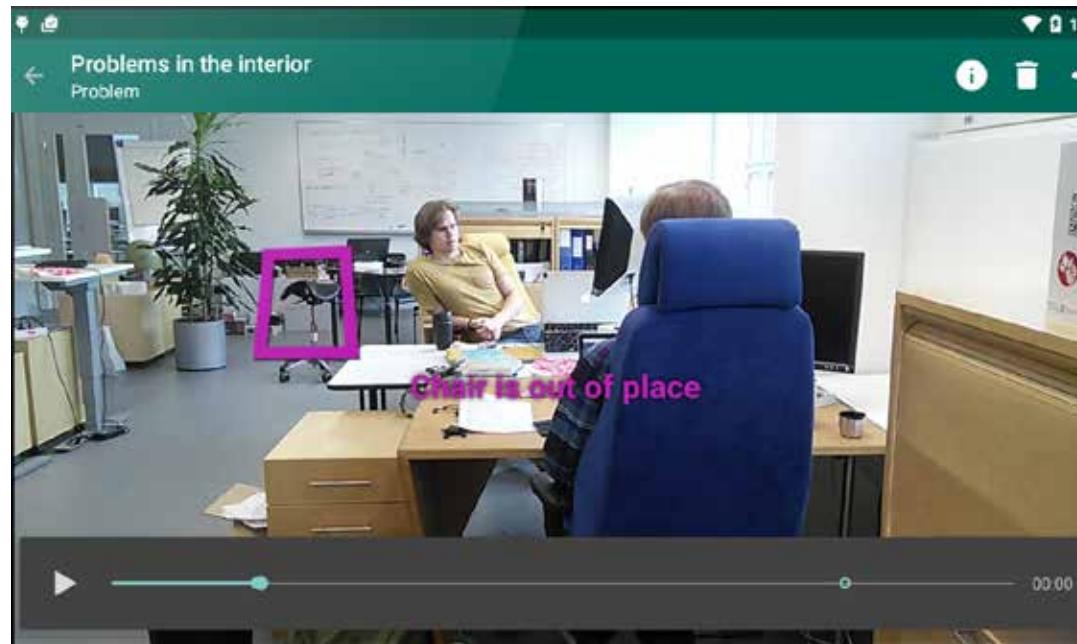
- Build a framework

Generate POV

- User-need-insight

Organize

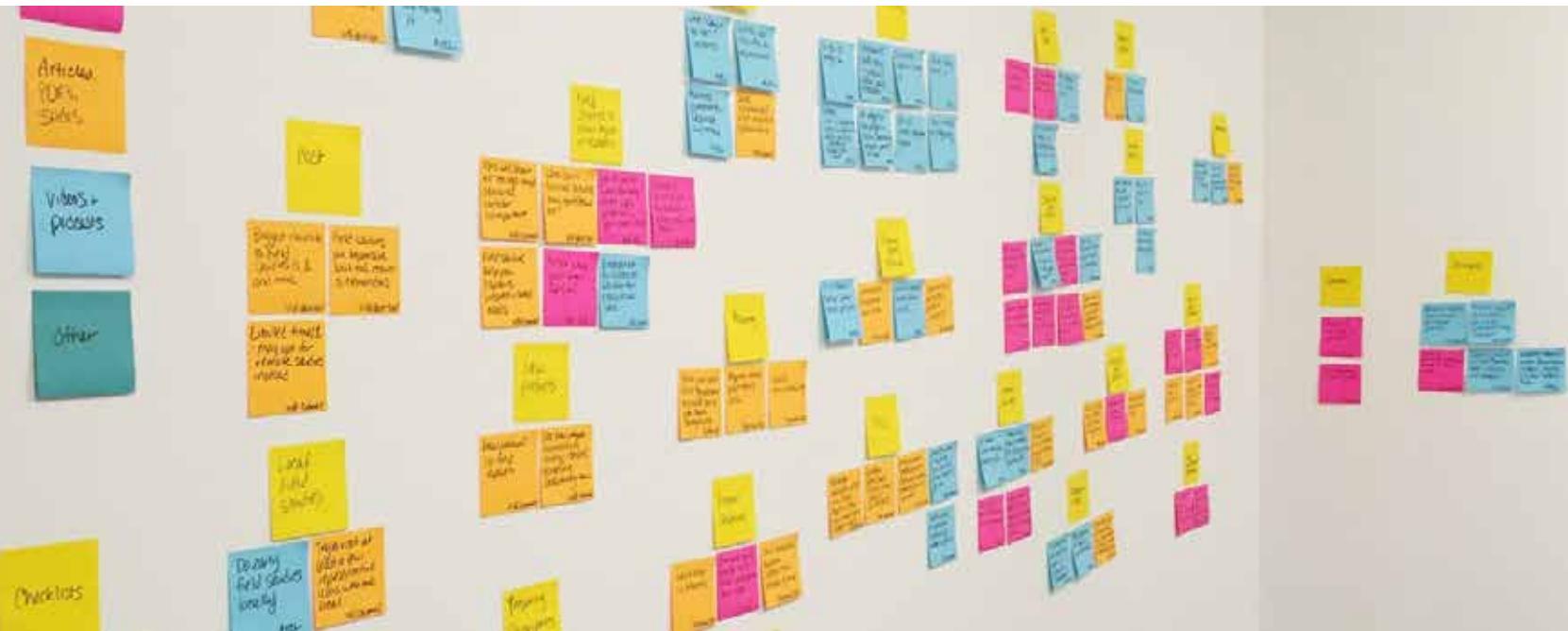
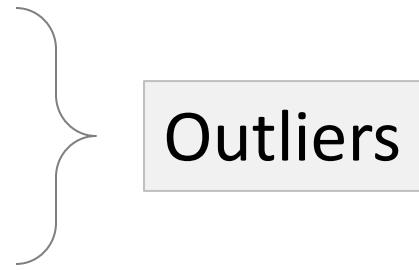
- Transcribe all materials to text
 - Verbal and non-verbal
- Add annotations
 - Context, motivation, barrier, action, surprise, ...



Organize

- Group into necessary clusters

- Themes
- Patterns
- Trends



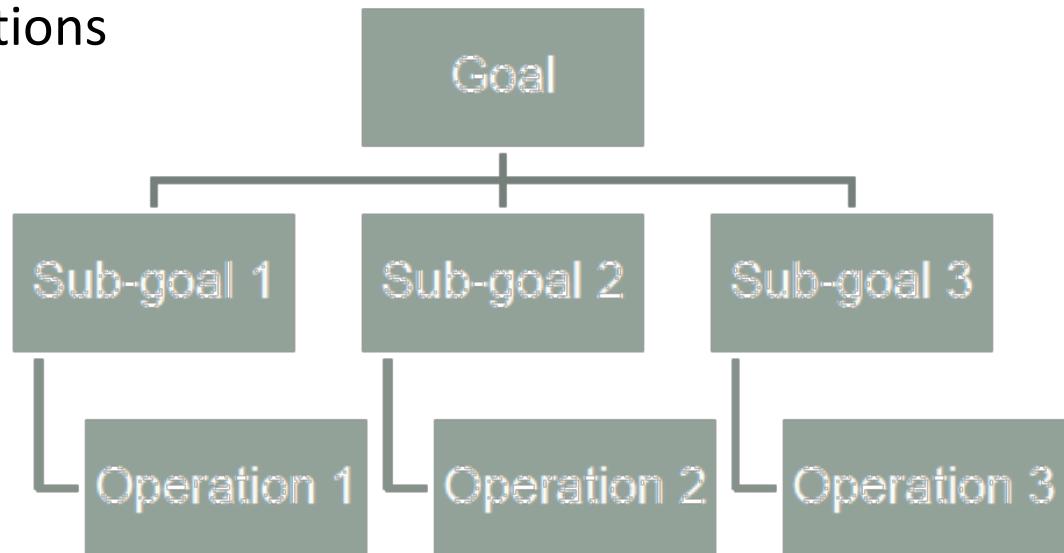
Construct a Framework (Selected)

- HTA (Hierarchical Task Analysis)
 - Goals, sub-goals, operations, plans
 - Task and event-oriented
 - Emphasis
 - Weight of sub-goals
 - Frequency of operations
 - Similarity of plans
 - ...

Plan A: Op 1 + Op 2

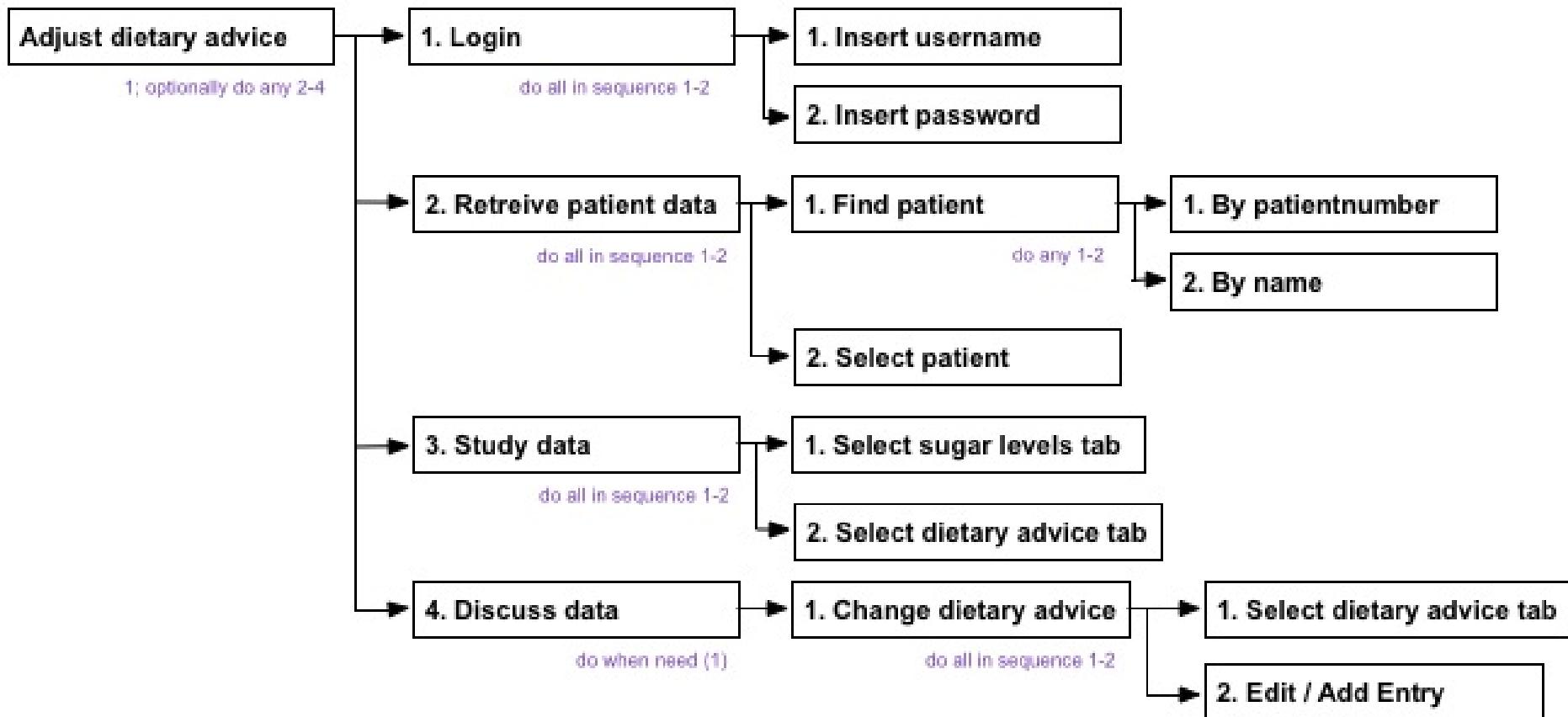
Plan B: Op 3

Plan C: ...



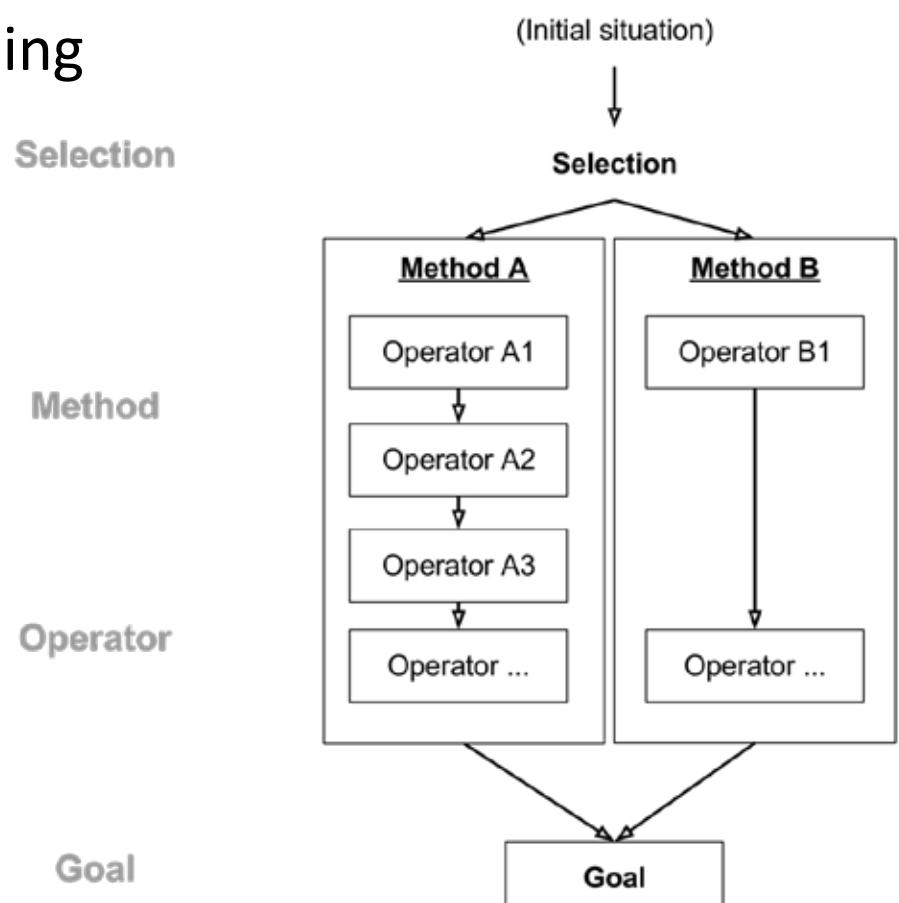
HTA (Example)

HTA - Dietary Advice



Construct a Framework (Selected)

- GOMS (Goals, Operators, Methods, and Selection rules)
 - Solution-oriented
 - Human information processing
 - Emphasis:
 - Context-dependent rules
 - Critical operators
 - Efficacy to a goal
 - ...



GOMS (Example)

Date of birth results

Single masked input field ~2.5 times faster!

Birthday: Month: Day: Year:

21 sec

Birthday

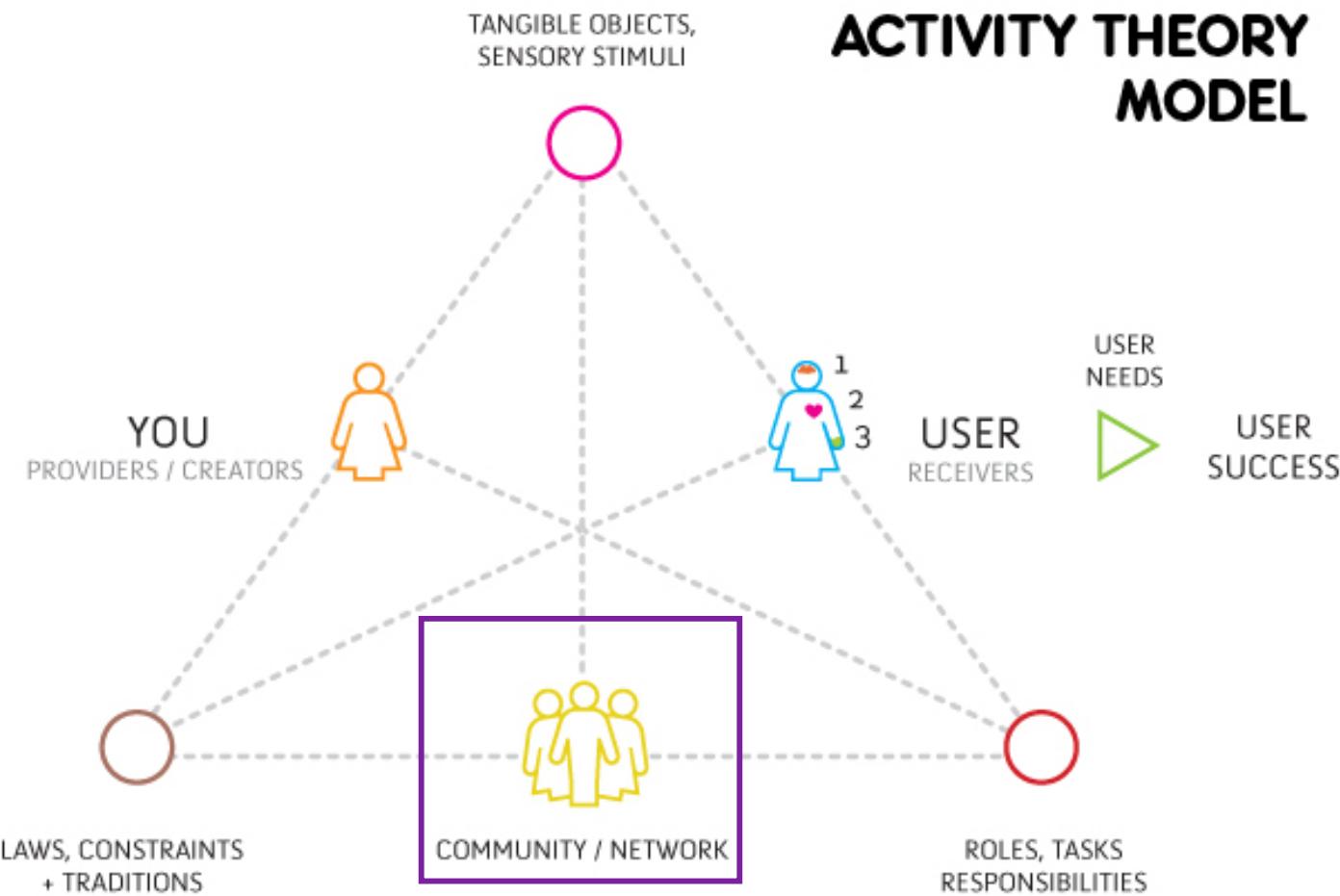
15.7 sec

* Date of birth
(dd/mm/yyyy)

8.7 sec

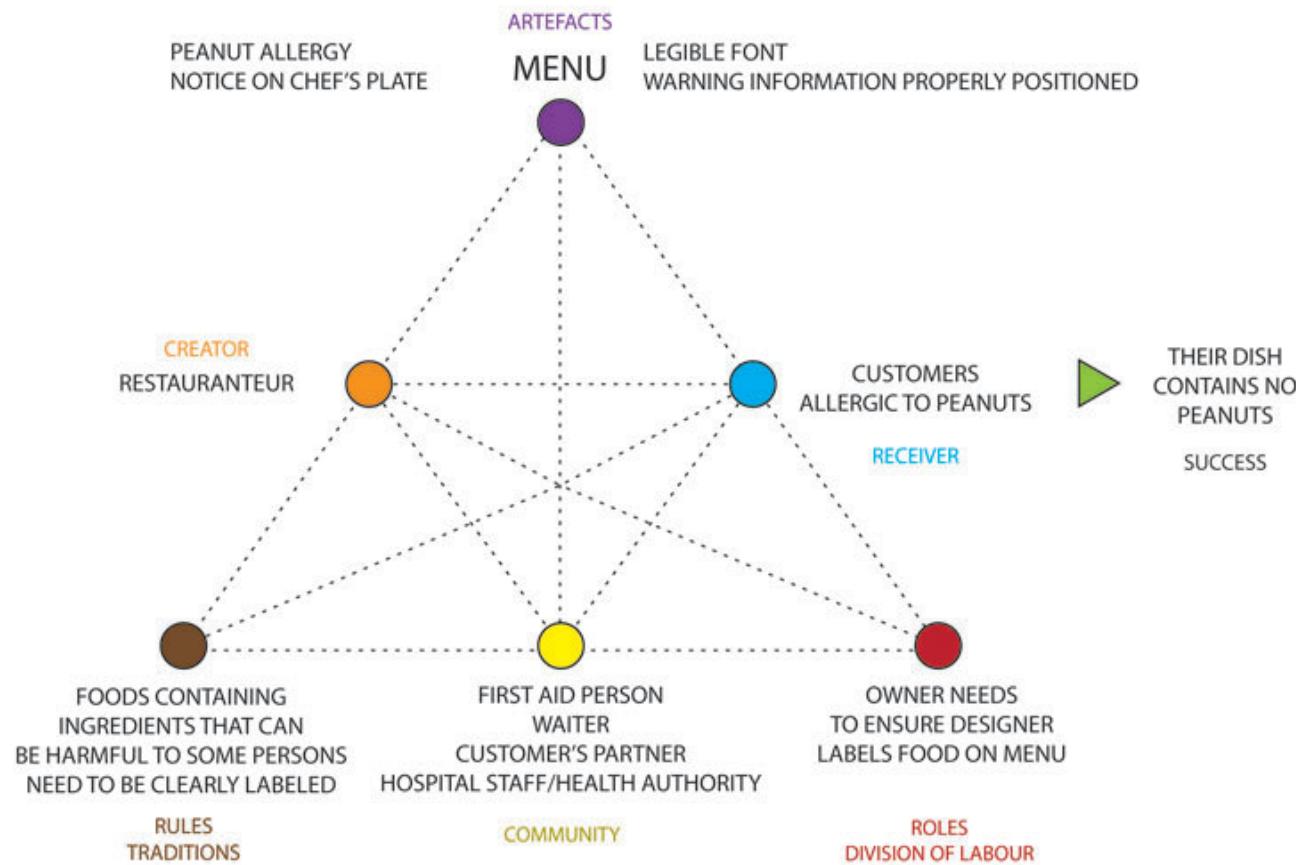
Construct a Frame Work (Other)

- Activity Theory



Construct a Frame Work (Other)

- Activity Theory (Example)



Generate Point-of-View (POV)

- POV = User + Need + Insight
- Analyze facilitators and barriers in the Frameworks
 - To goal and sub-goals
 - Between operations / operators in HTC / GOMS
 - Regarding rules in GOMS
 - Related to constraints in Activity Theory

POV (User): Create Persona

- What is Persona?
 - A description of a “fake” representative user



Demographics

- Background
- Bio

Attributes

- Abilities
- Likes / dislikes

Goals

- Details
- Reasons

Clark Andrews

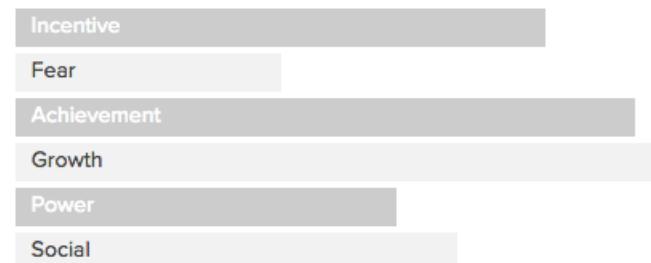
AGE 26
OCCUPATION Software Developer
STATUS Single
LOCATION San Jose, CA
TIER Experiment Hacker
ARCHETYPE The Computer Nerd

Friendly Clever Go-Getter

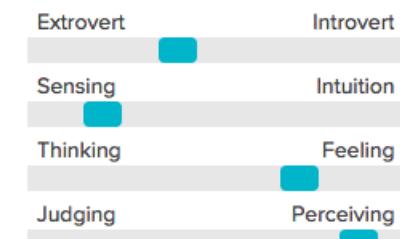


"I feel like there's a smarter way for me to transition into a healthier lifestyle."

Motivations



Personality



Goals

- To cut down on unhealthy eating and drinking habits
- To measure multiple aspects of life more scientifically
- To set goals and see and make positive impacts on his life

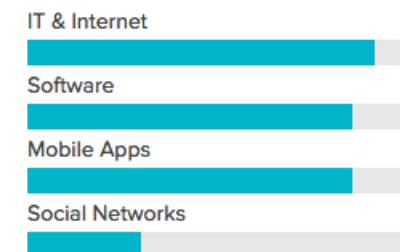
Frustrations

- Unfamiliar with wearable technology
- Saturated tracking market
- Manual tracking is too time consuming

Bio

Aaron is a systems software developer, a "data junkie" and for the past couple years, has been very interested in tracking aspects of his health and performance. Aaron wants to track his mood, happiness, sleep quality and how his eating and exercise habits affects his well being. Although he only drinks occasionally with friends on the weekend, he would like to cut down on alcohol intake.

Technology



Brands



Jill Anderson



"I'm looking for a site that will simplify the planning of my business trips."

AGE 29

OCCUPATION Regional Director

STATUS Single

LOCATION Portsmouth, NH

TIER Frequent Traveler

ARCHETYPE The Planner

Organized

Practical

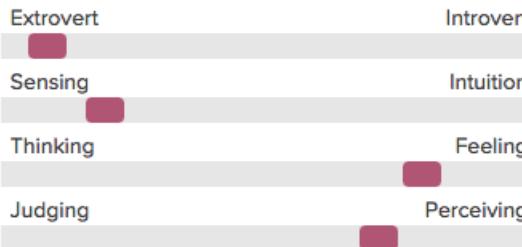
Protective

Hardworking

Bio

Jill is a Regional Director who travels 4-8 times each month for work. She has a specific region in which she travels, and she often visits the same cities and stays in the same hotel. She is frustrated by the fact that no matter how frequently she takes similar trips, she spends hours of her day booking travel. She expects her travel solutions to be as organized as she is.

Personality



Brands



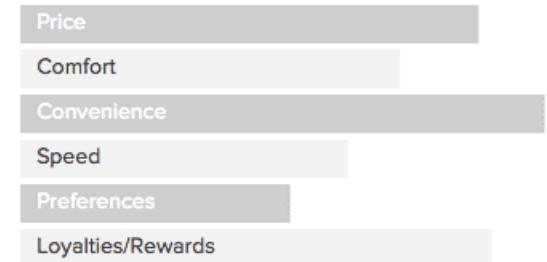
Goals

- To spend less time booking travel
- To maximize her loyalty points and rewards
- To narrow her options when it comes to shop

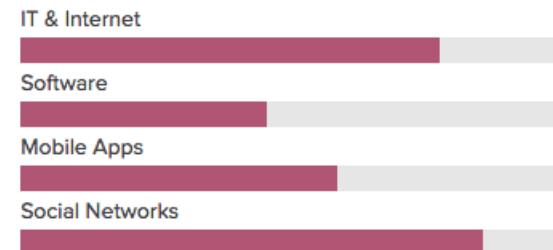
Frustrations

- Too much time spent booking - she's busy!
- Too many websites visited per trip
- Not terribly tech saavy - doesn't like the process

Motivations



Technology



POV (Need): Ideals and Constraints

- User needs to ...
- User wants to ...
- User do not ...
- User cannot ...

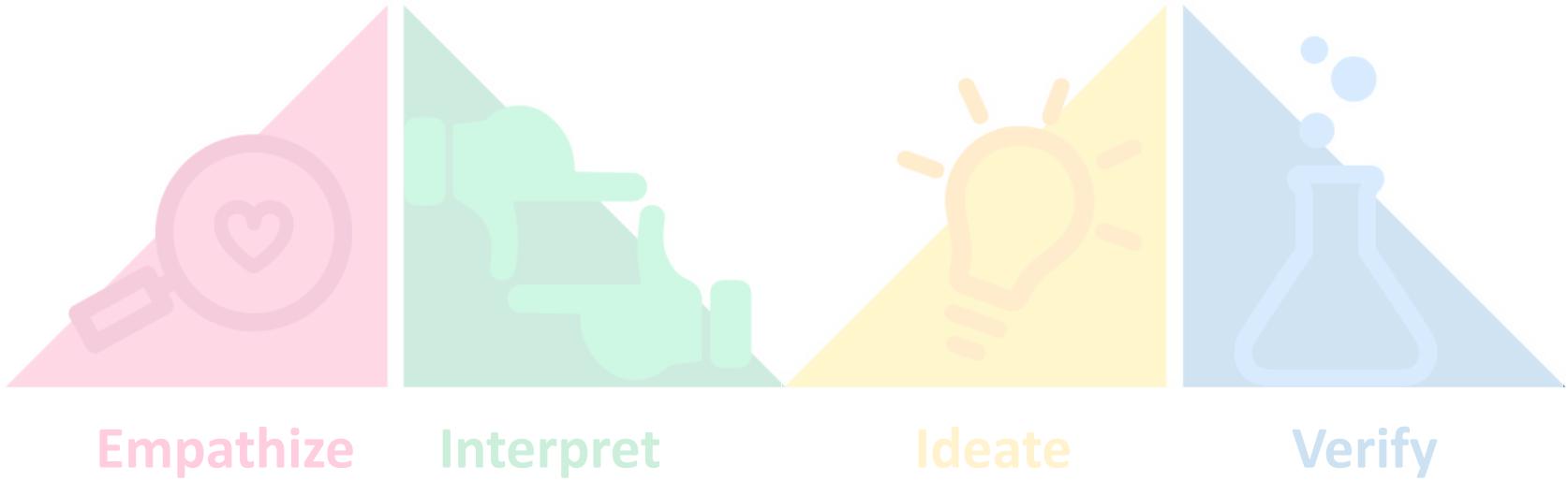


POV (Insights)

- Something Interesting
 - As a result of the need and constraints
 - Existing attempts
- Something Potentially Beneficial

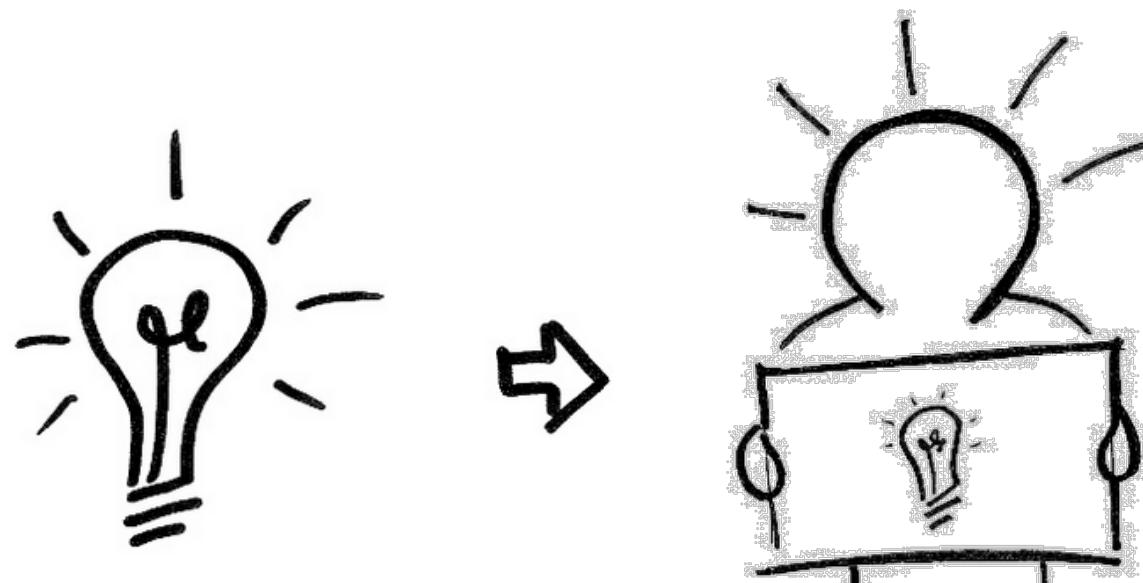


From Mindset to Process



Ideation

- Interpret the POV
- Broaden the Scopes
- Conceptualize the Designs



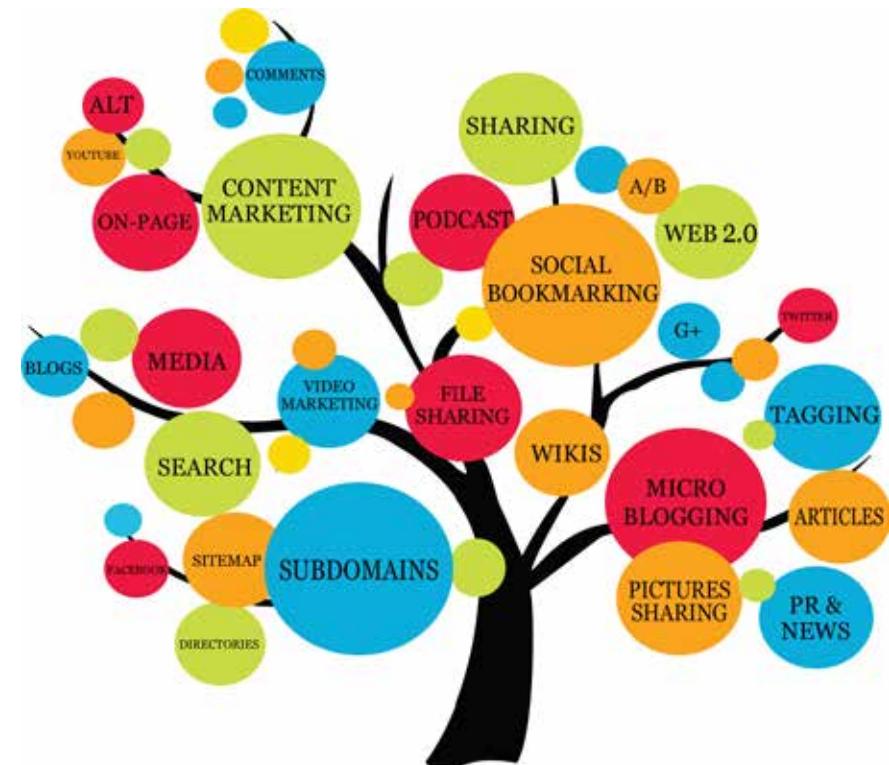
Ideation: Brainstorming

- Eight Steps
 - Define a clear and realistic challenge/problem (POV)
 - Find a neutral person to facilitate the process
 - Find an inspiring meeting place
 - Gather people
 - Understand brainstorming rules
 - Idea development
 - Refine the ideas
 - Start ~~prototyping~~ verification



Rules of Brainstorming

- “Yes, and” instead of “No / But”
- Communicate, and inspired by others
- Go visual
- Quantity makes Quality

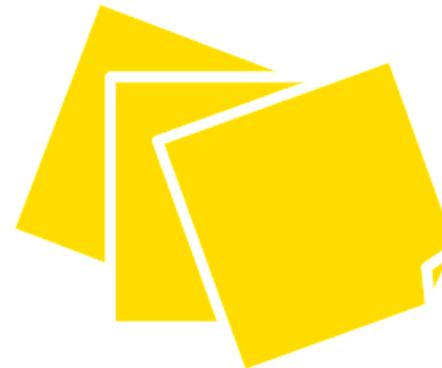


Tools for Brainstorming (Selected)

- Whiteboard



- Post-it Note

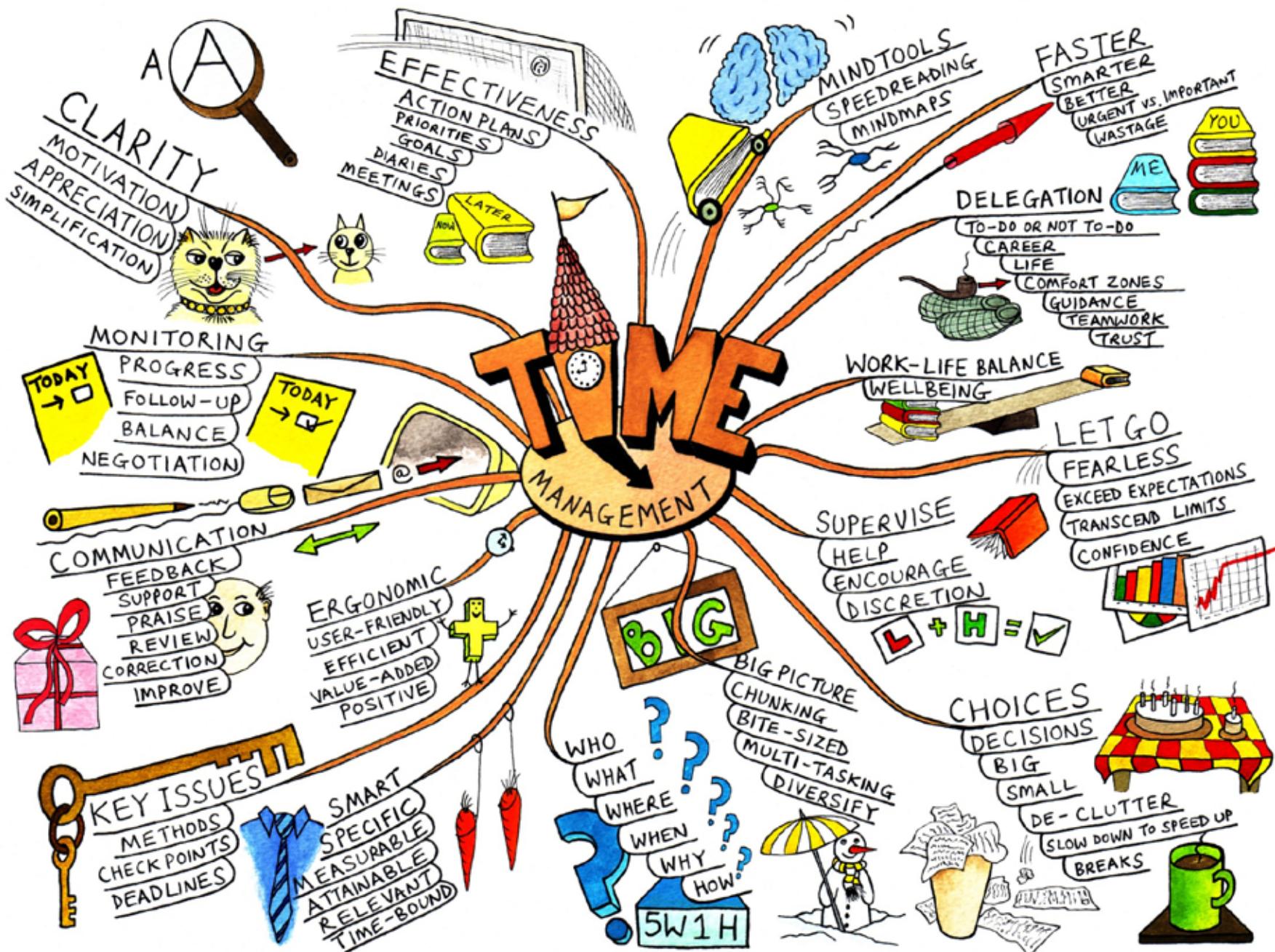


- Mind Map



- LEGO Blocks





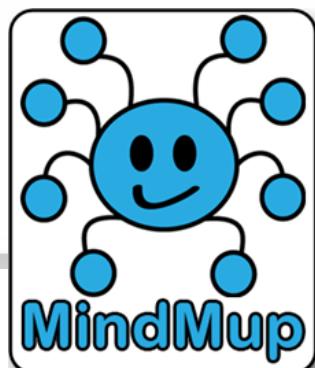
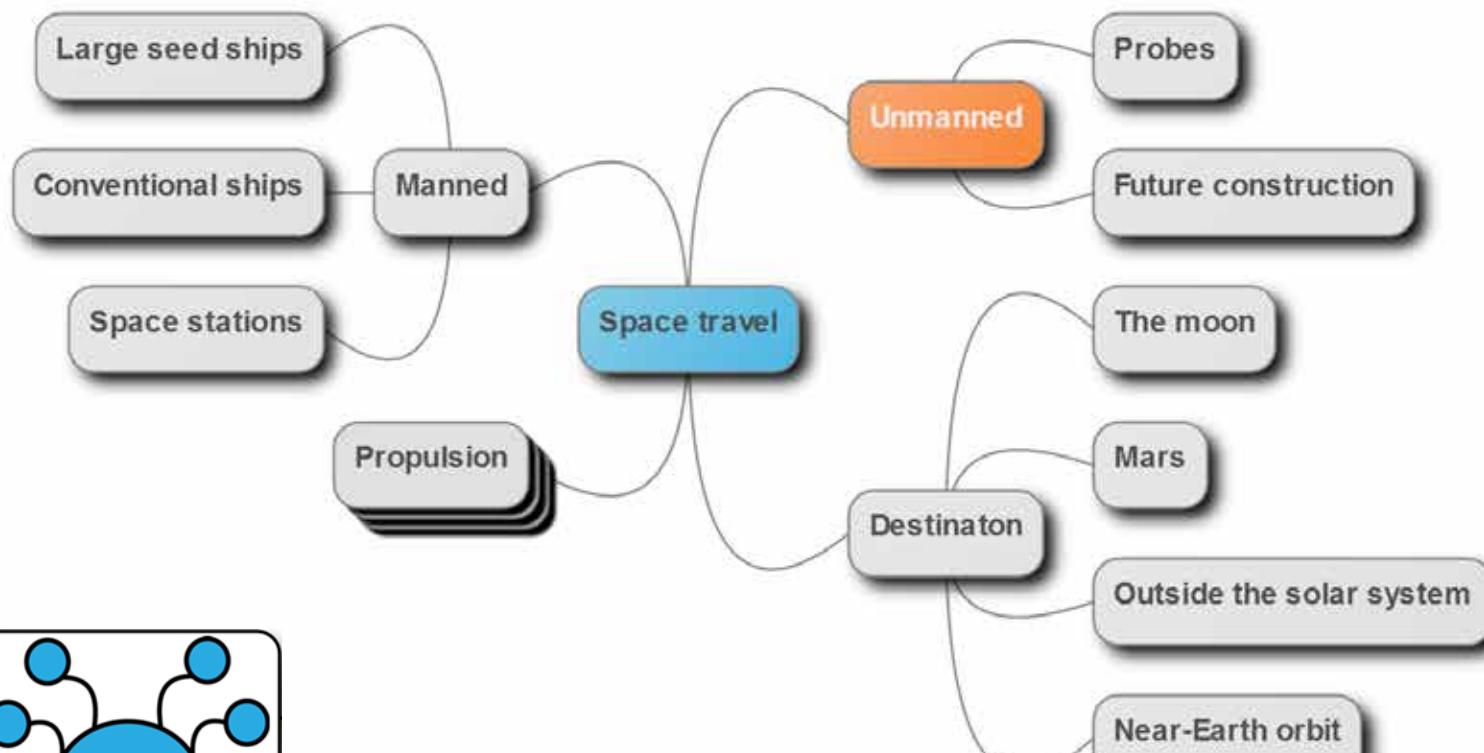
[Create a Map](#)[My Maps](#)[Save](#)

Like

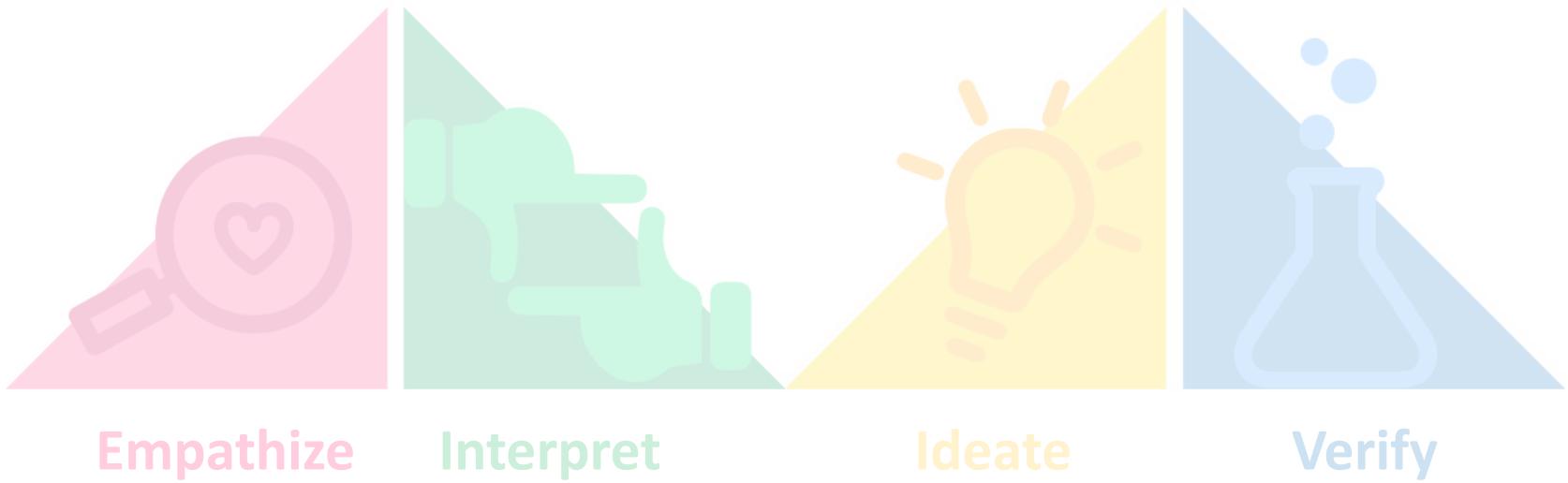
245



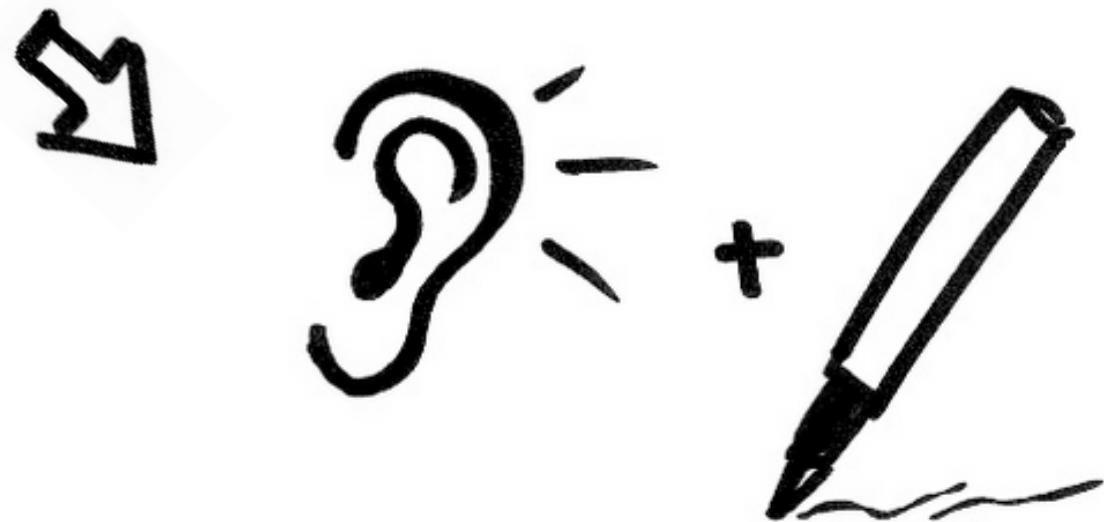
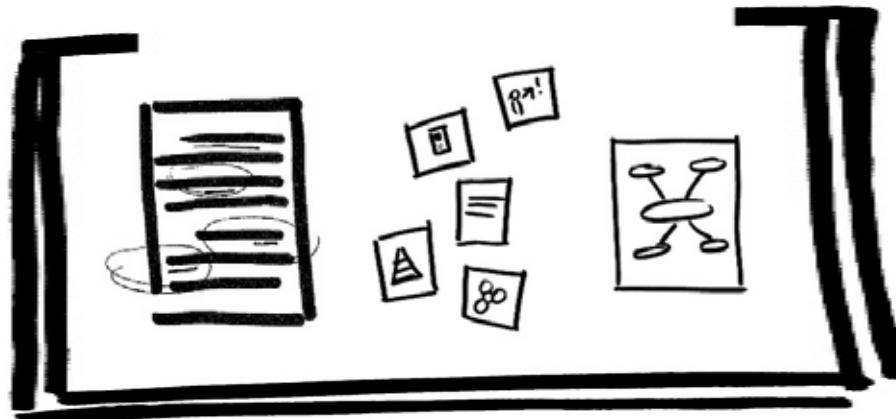
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From Mindset to Process

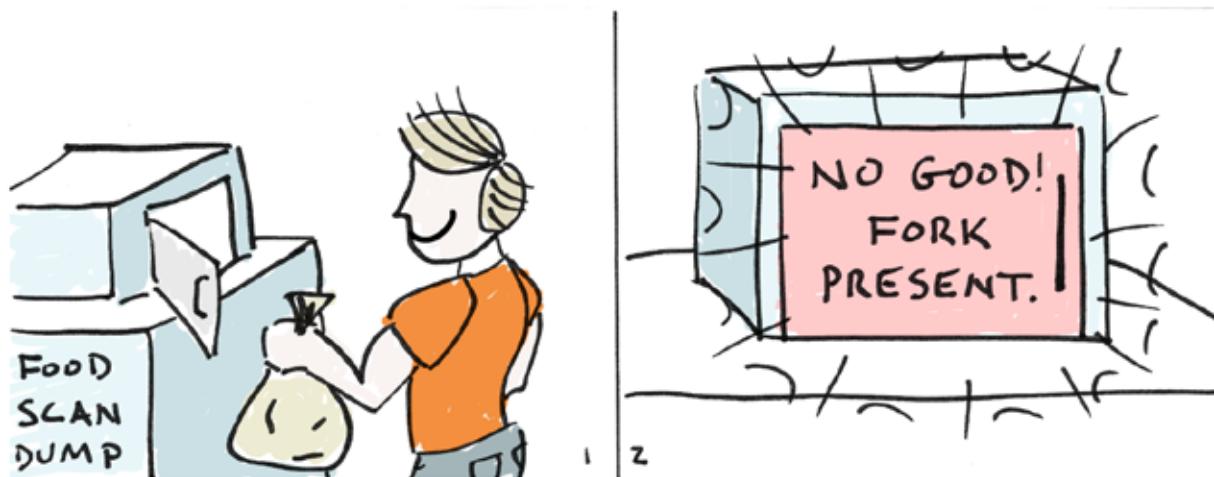


Verification: Storyboarding



Design Idea

We wish to facilitate easier food recycling by creating a machine capable of scanning food waste and identifying non-compostable materials.

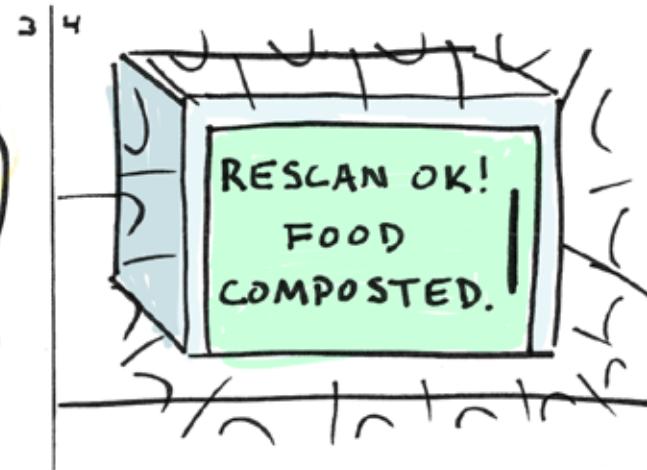


John bought a new "Food Waste Scanner" which can detect if there is anything cannot be composted in the food waste.

He put in the food waste, and the scanner warned him that there was a fork inside.



He got the fork out and scanned the food waste again.



How he passed the test, and the food waste is dumped into the recycle bin that sits beneath the scanner.

Design Idea

We wish to facilitate easier food recycling by creating a machine capable of scanning food waste and identifying non-compostable materials.

Context

- Daily activity

John bought a new "Food Waste Scanner" which can detect if there is anything cannot be composted in the food waste.

Intervention

- Conceptual design

He got the fork out and scanned the food waste again.

Problem

- The need

1 He put in the food waste, and the scanner warned him that there was a fork inside.

2

Outcome

- Improve QoL

3
4 How he passed the test, and the food waste is dumped into the recycle bin that sits beneath the scanner.



"No signal, I feel so helpless."



The smart home senses that Dad's going to miss Annie, and pings the people the Millers count on in a pinch.



The neighbor's not far from Annie. She agrees to get her.

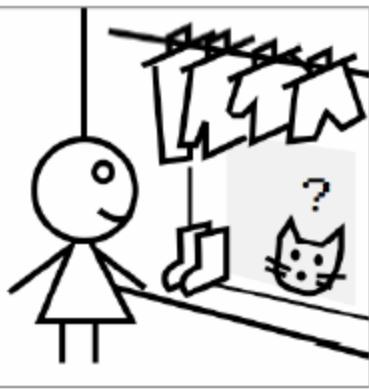


The tow truck that comes for Dad tells him that Annie is safe and sound.



"MOM SAID 10 MINUTES MAX."

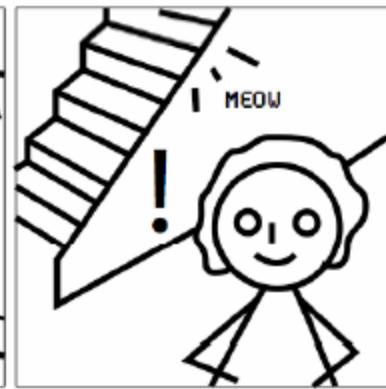
The smart home shuts off the TV. Annie goes to get dressed.



"IT'S SNOWING. WHAT SHOULD YOU WEAR?"



Annie picks a sweater and boots. Her "cyber pet" meows with joy.



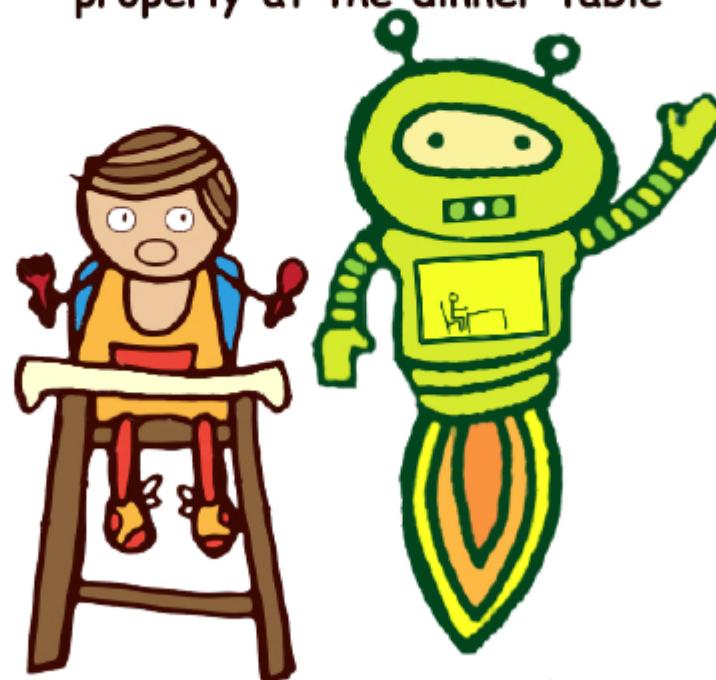
Mom's downstairs making breakfast. She hears the cat's meow, and knows that Annie's dressed.

Evan the Robot

Siri is refusing to behave properly at the dinner table...

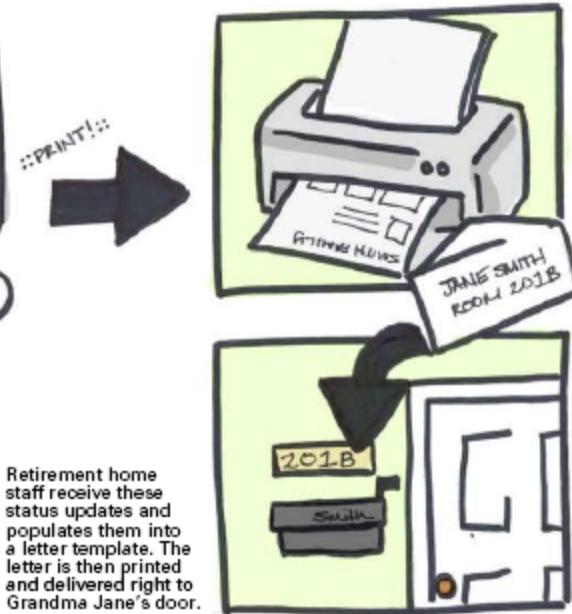
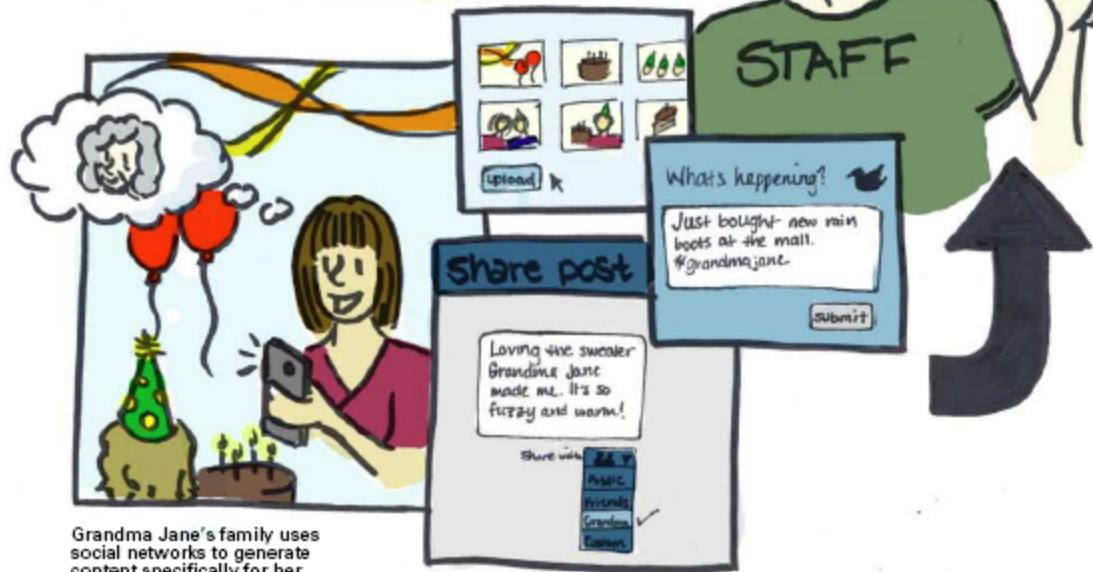
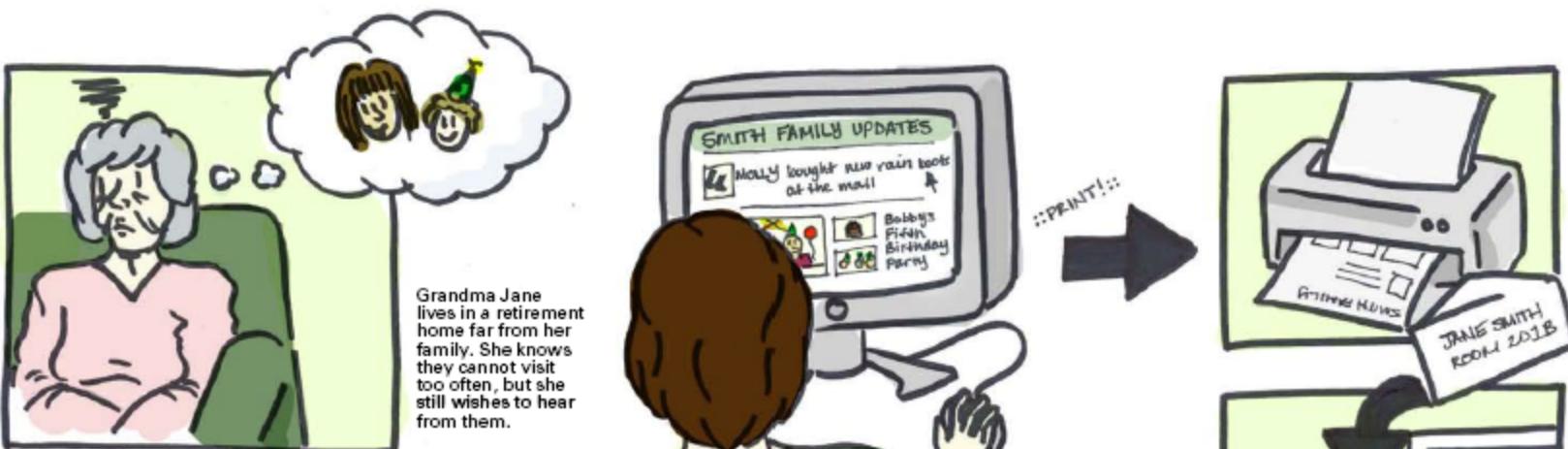


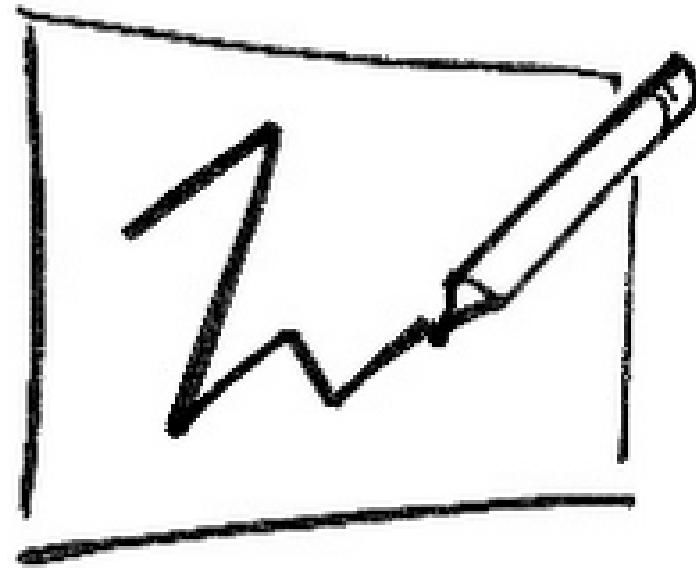
Evan comes flying in to help, he shows her a clip from her favorite cartoon where people are behaving properly at the dinner table



Siri tries to emulate what she saw in the video and calms down

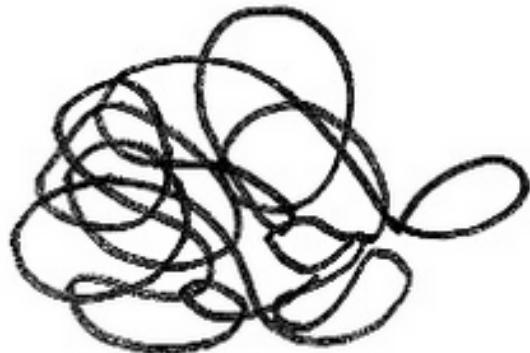






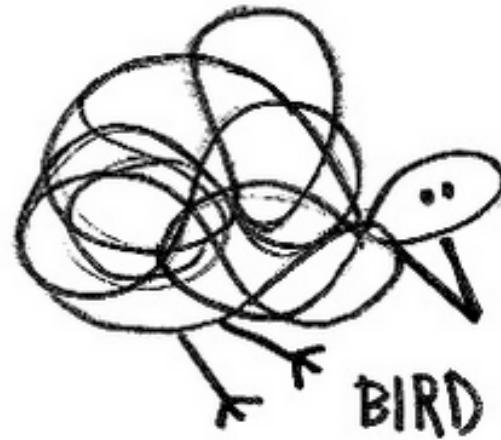
"BUT I CAN'T DRAW"

DRAW SQUIGGLES



YES, SQUIGGLES.

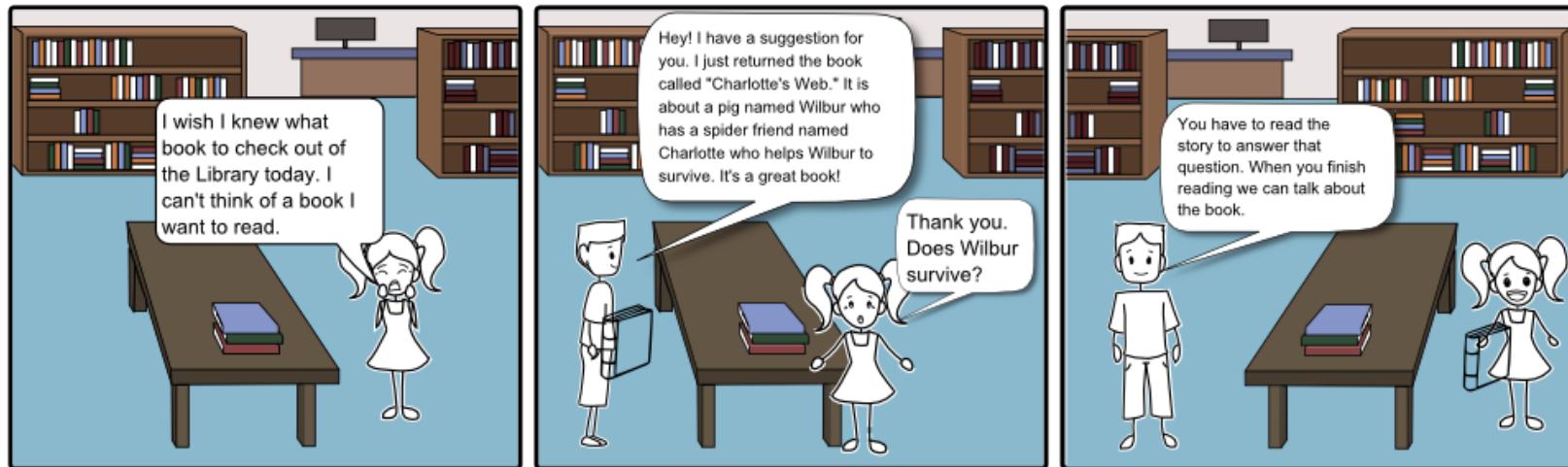
IT'S A PROCESS



...NOT AN OUTCOME.



Create your own at StoryboardThat.com



Create your own at StoryboardThat.com

Verification: Speed Dating

- Rapid Interviews with Potential Users
 - Purpose:
 - Verify your interpretation
 - Needfinding
 - Instrument: storyboard
 - Process:
 - Warm-up (know the user)
 - Interpret the storyboard
 - Similar problem in life?
 - If yes, why and how?
 - If no, what is the problem?
 - Things to add



Advanced Speed Dating: Role Playing



<http://elearningindustry.com/wp-content/uploads/2015/10/is-storyboarding-a-total-waste-of-time1.jpg>

Recap: From Mindset to Process



Empathize

- Immerse
- Observe
- Contact
(Interview)

Interpret

- Organize
- Construct
(Framework)
- Generate POV

Ideate

- Brainstorm
(Steps & Rules)
- Mindmap

Verify

- Storyboarding
- Speed Dating
(Role playing)

Questions?

Xiaojuan Ma

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Preparation for the Practice Class

- Draw a storyboard on **Procrastination / Stress**
 - Half of the class on each topic
 - Scenario for technological intervention
 - Hand-drawn or a print-out on A4 paper
 - Write down your name
- Prepare a set of speed-dating questions
 - Related to your storyboard
- Bring them to the Needfinding Practice Class
 - Bring paper and pen as well