Advanced Interaction Design

Prof. James A. Landay
Computer Science Department
Stanford University

Spring 2023
May 8, 2023
*based on slides by Julie Stanford

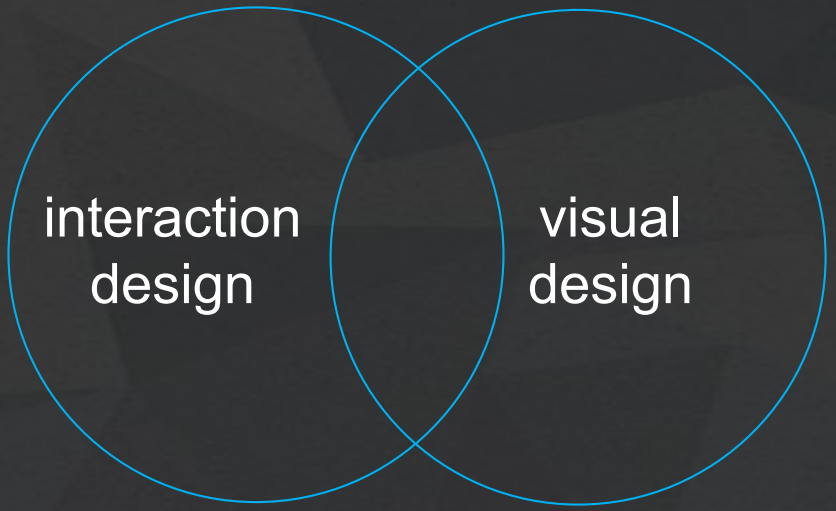
Outline

- Interaction design vs. visual design
- Timeline of use
- Implicit interactions
- The basics
  - 80/20 rule
  - Affordances
  - Consistency
  - Mapping
  - Progressive disclosure
  - Visual hierarchy
  - Organizing information

What is Interaction Design?

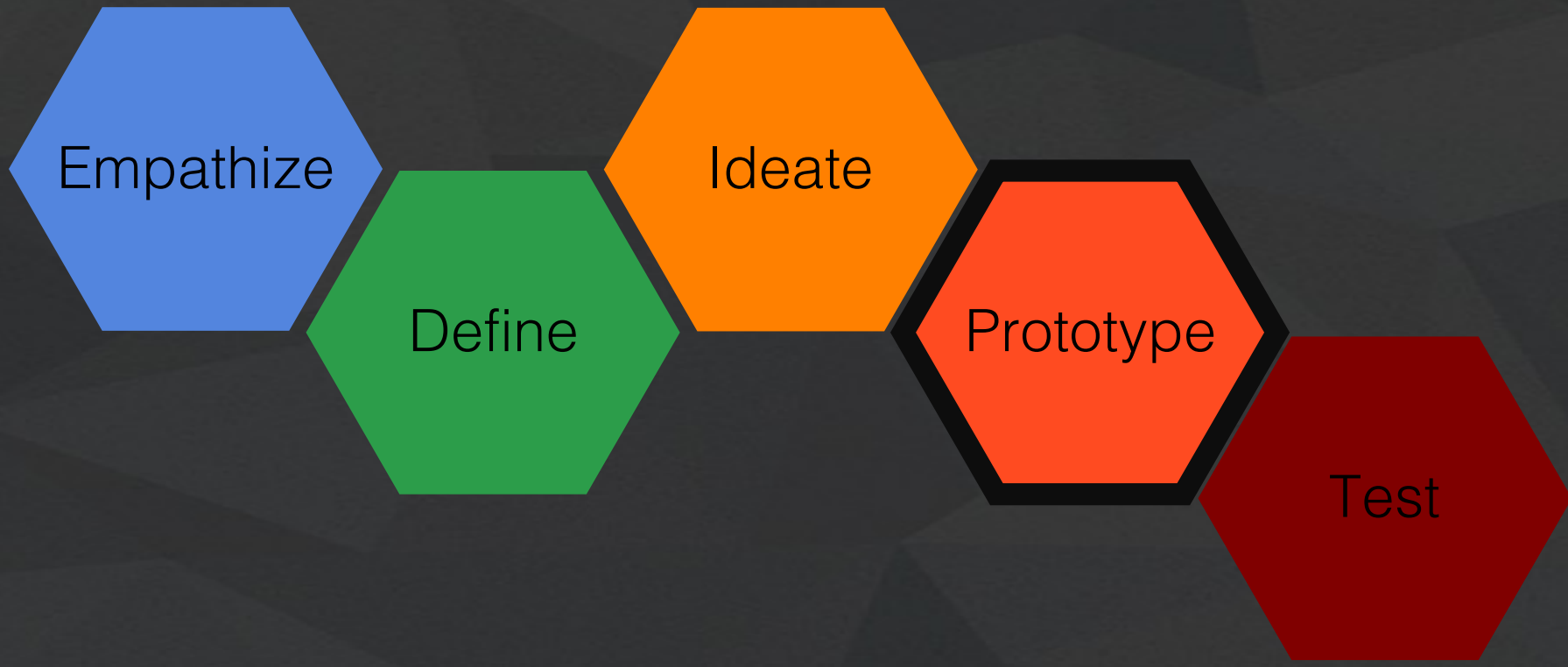
The practice of designing interactive digital products, environments, systems, and services

Interaction Design vs. Visual Design



How much overlap?

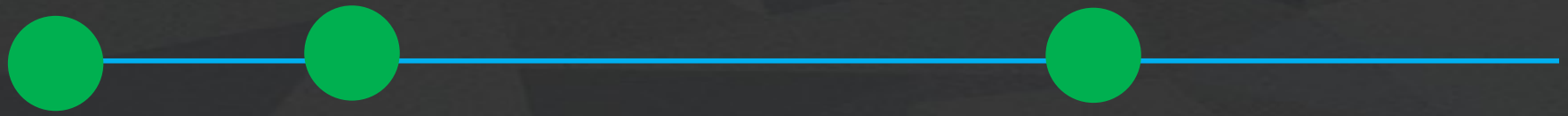
Where does it fit in the process?



What to think about when you are designing

Timeline of Use

People will use your UI over time



First use
- Sign up
- Explore
- Taste
- Excitement

2nd use
- Repeat something
- Try new area
- Accomplish specific goal
- Confirm assumptions
- Getting comfortable

5th use
- Habits/Ruts
- Ignore updates
- Effect of lack of novelty
- Time period between use
- Requirement for user engagement

Timeline how to

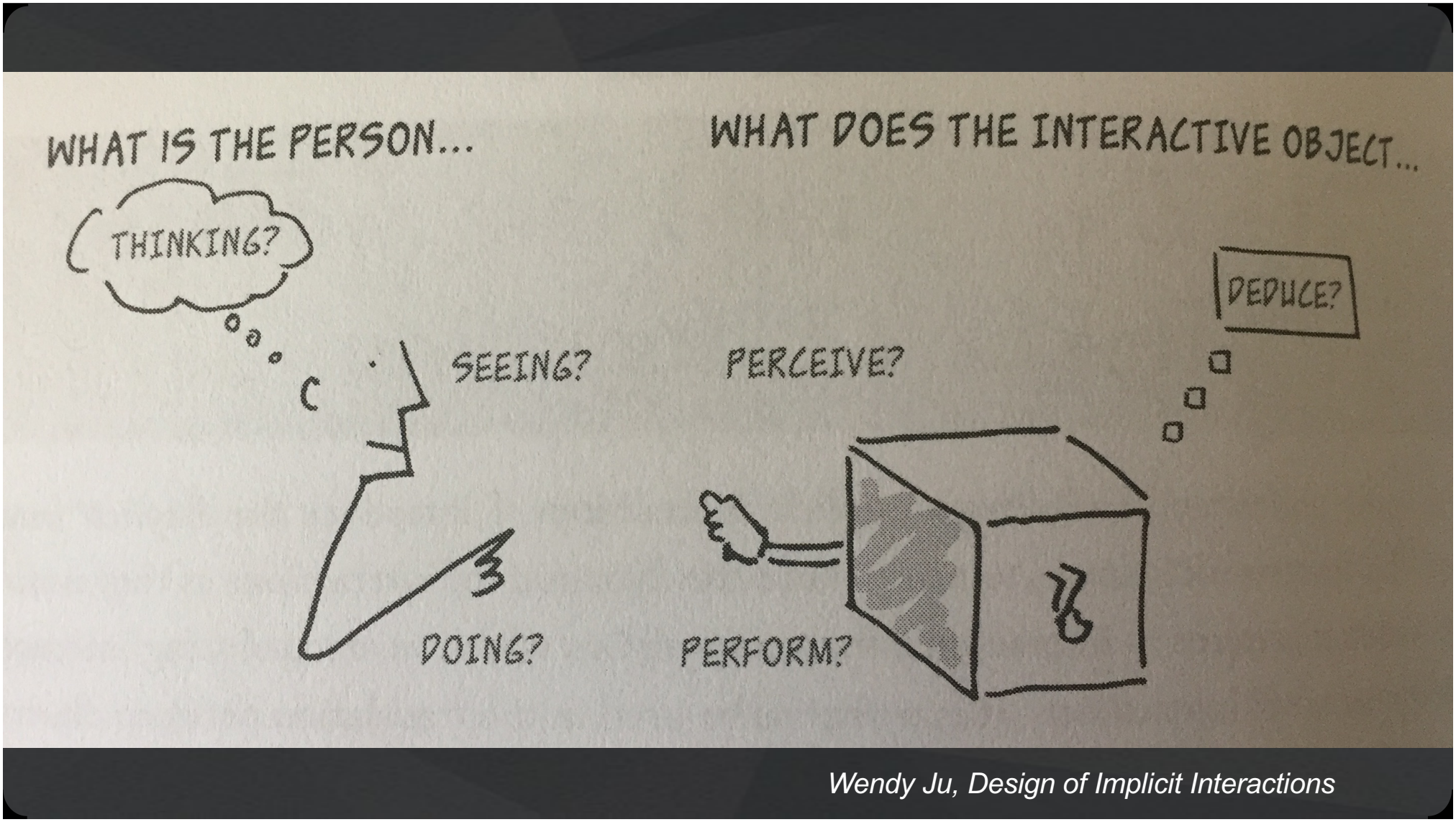
- Think about not just first use but 2nd use, and 10th use…how do things change?
- What stays fresh? What becomes tedious?

Implicit Interactions

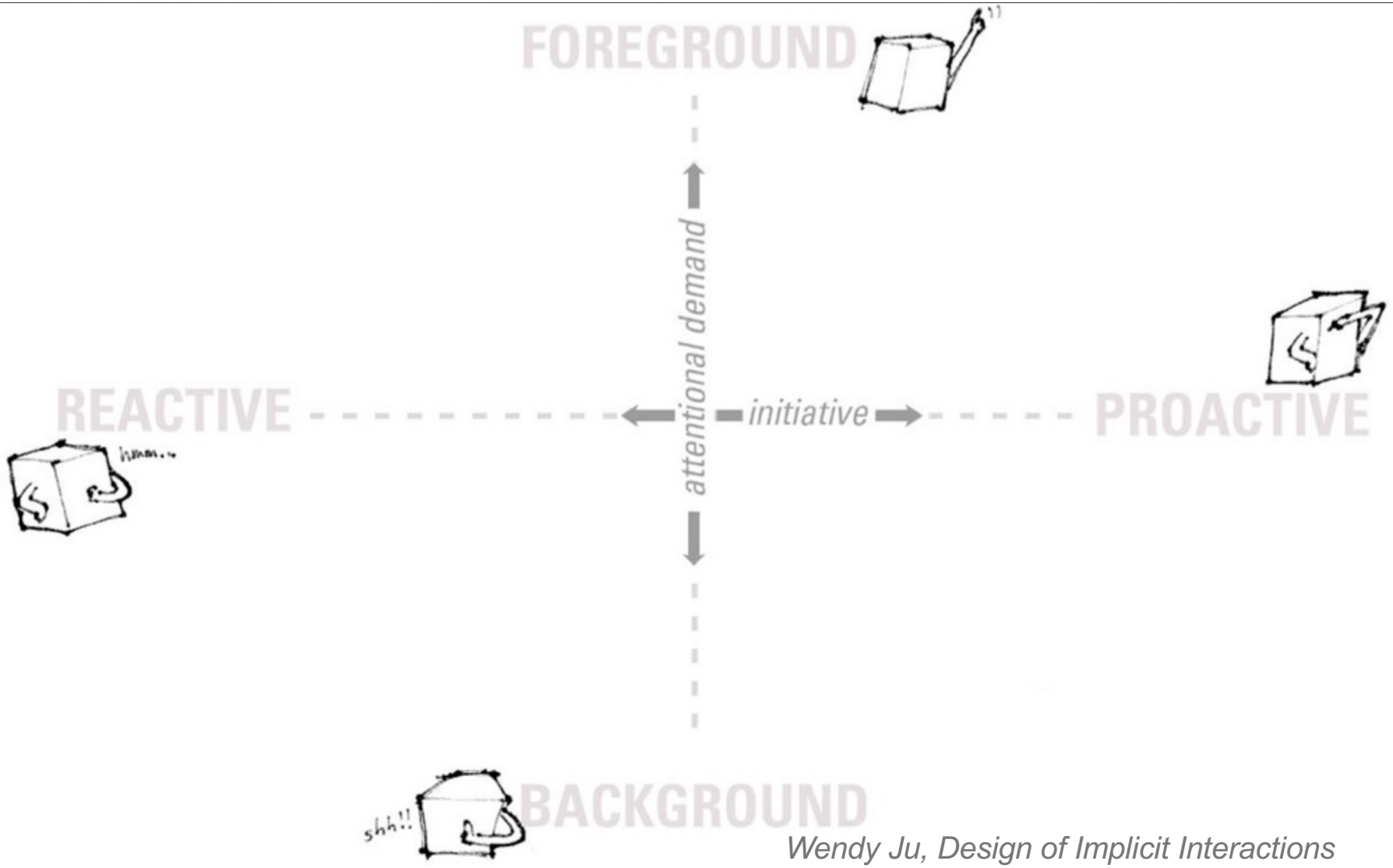
“Sensing and computation need to be augmented with an understanding of the unstated expectations people have from our interactive counterparts.”

- Wendy Ju

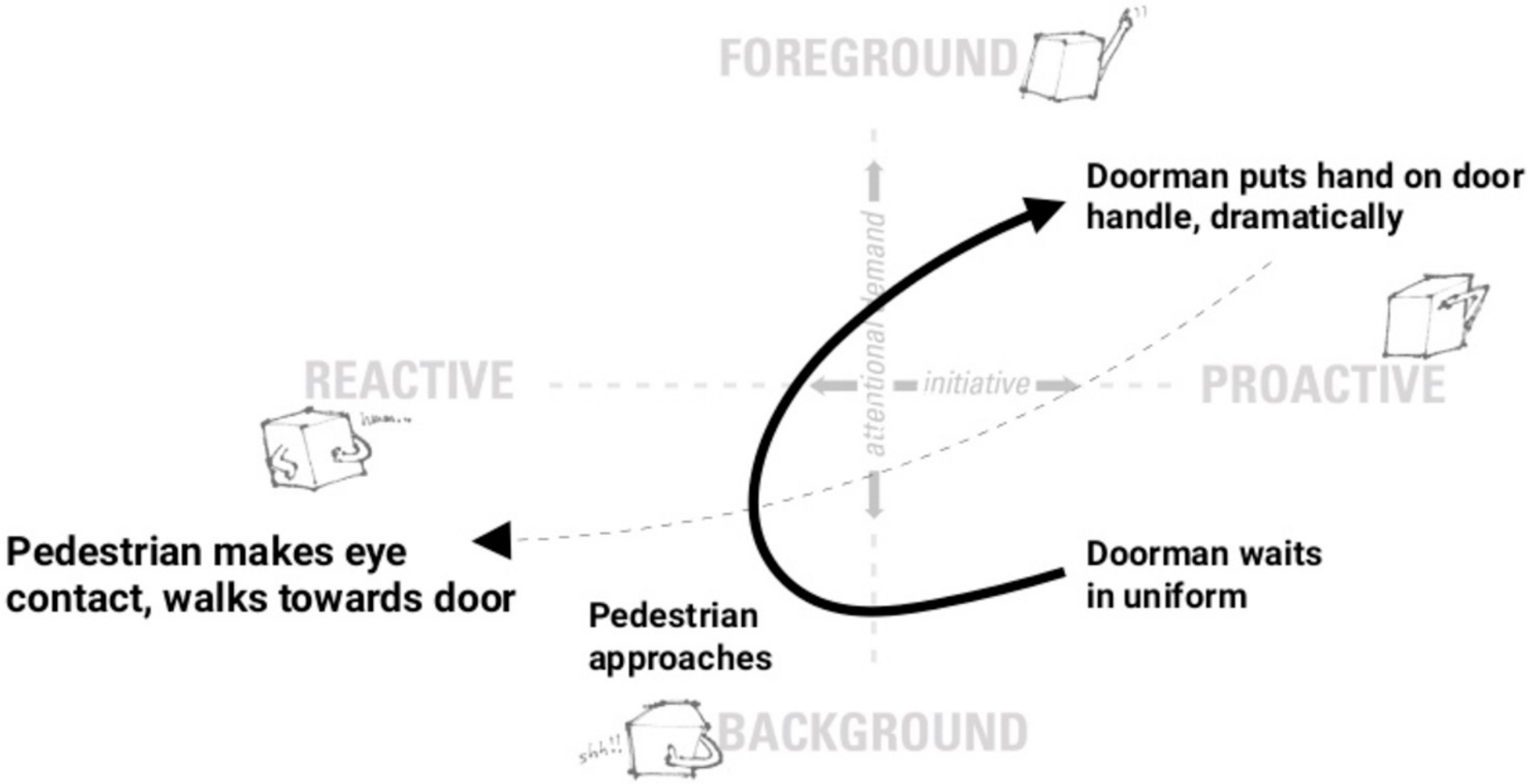
The Design of Implicit Interactions



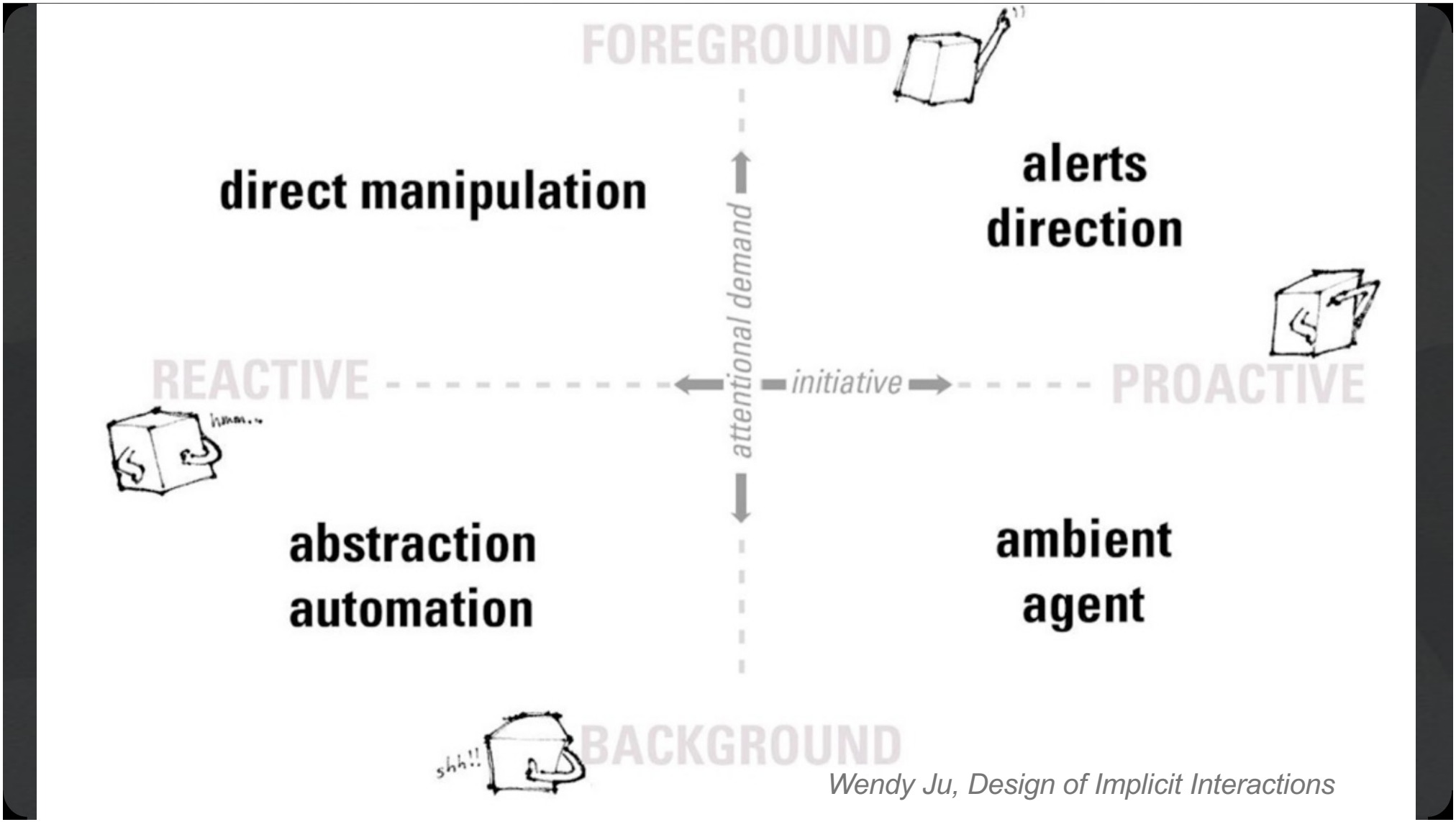
Wendy Ju, Design of Implicit Interactions



Wendy Ju, Design of Implicit Interactions

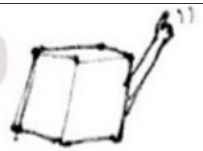


Wendy Ju, Design of Implicit Interactions



Wendy Ju, Design of Implicit Interactions

FOREGROUND



You use a DVR to record a show

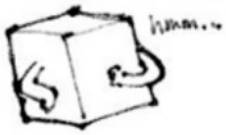
DVR suggests a show you might like

attentional demand

initiative

REACTIVE

PROACTIVE



DVR records a pre-set weekly show

DVR pre-records shows you might like on its own

BACKGROUND

Wendy Ju, Design of Implicit Interactions

What does this mean for your UIs?

Think about all the potential ways the user is implicitly interacting with your experience.

Example: Light switch state: On/Off

User's State:

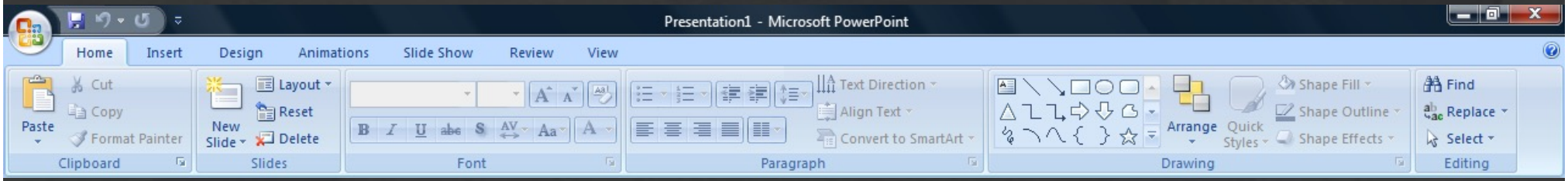
- Can see the light is on
- Sees the light is on but thinks it should be off
- Doesn't notice the light is on but would want it off
- Might want to turn it off if it were clear how to
- Doesn't know if he is responsible for the light or not

Implicit interactions how to

- Consider *all* the mental states that the user might have when they are engaging with your interface (make a list!)
- How will the interface react? What social cues will it use?

and don’t forget the basics…

80/20 rule



Ribbon in Microsoft Office

A high percentage of effects in any large system are caused by a low percentage of variables. Also known as Pareto's Principle. – *Universal Principles of Design*

"Users use 20% of the features 80% of the time."

12:29
>>DIRECT ACCESS<<
POPCORN
BEVERAGE
START
BAKED POTATO
FROZEN ENTREE
PIZZA
REHEAT
POWER LEVEL
KITCHEN TIMER
MULTI STAGE COOKING
COOK MEAT BY WEIGHT
DEFROST BY WEIGHT
TIMED DEFROST
1
2
3
4
5
6
7
8
9
CLOCK
0
STOP/ RESET
SANYO

80/20 rule: CS247 microwave redesign

Removed unnecessary buttons

Only functionality to increase time

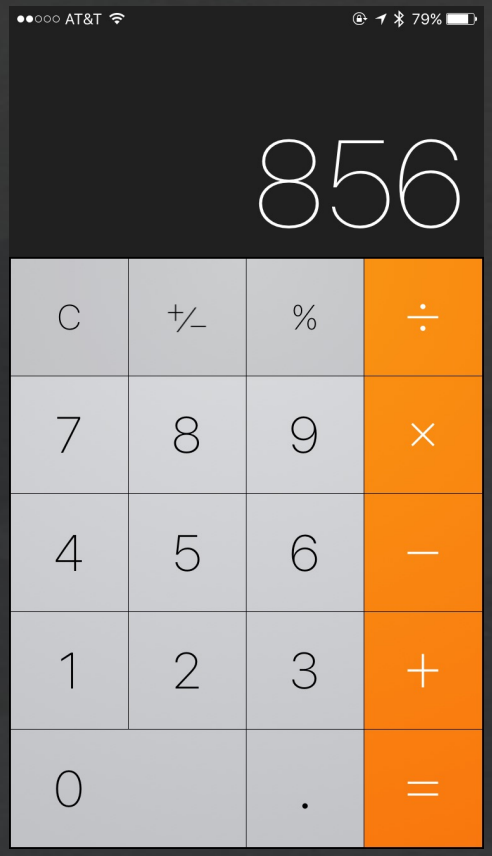
Most important buttons larger

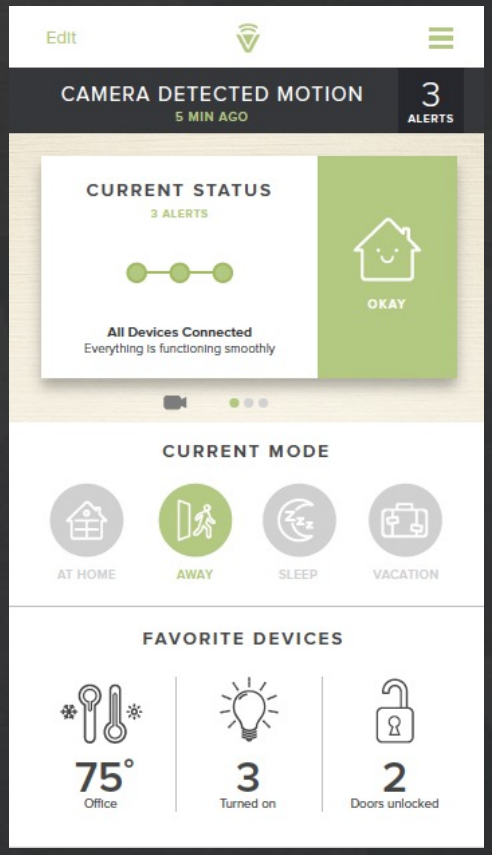
80/20 rule: Cross-platform design

80/20 rule how to

- List all the things your user may want to do
- Select 20% of them as the key things
- Ensure those 20% of things are easy & fast
- Question your need for the other 80%

Affordances





Consistency

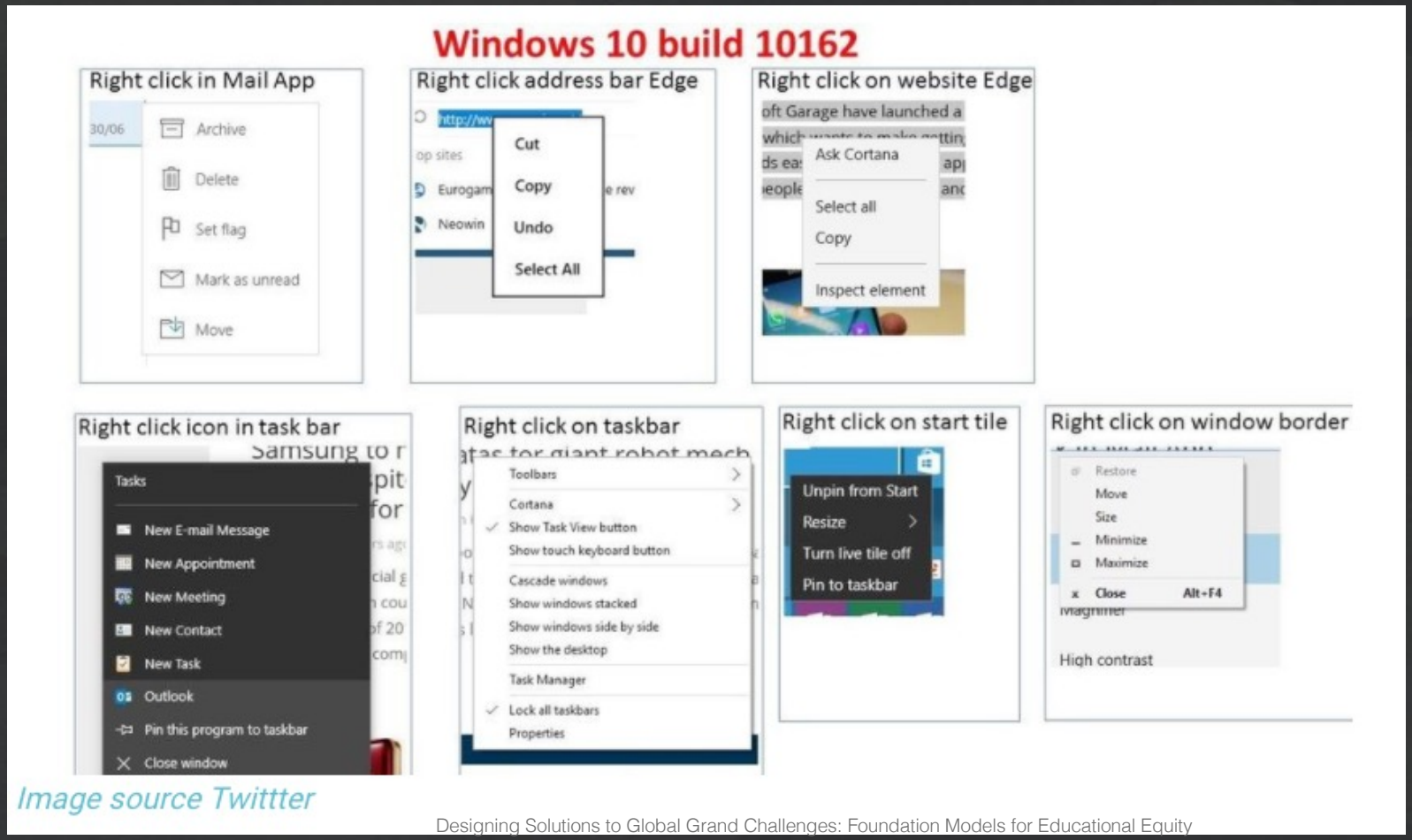
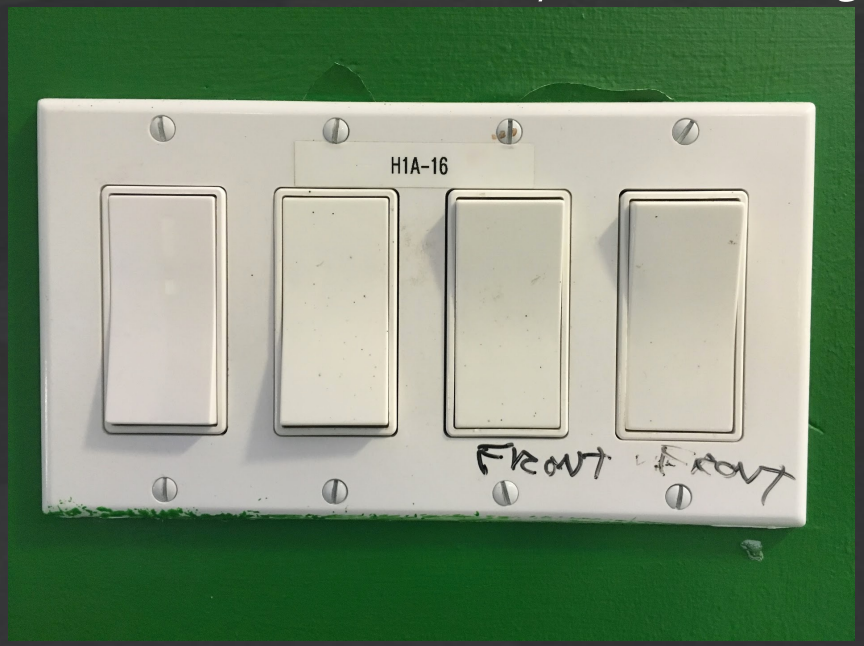


Image source Twittter

Mapping

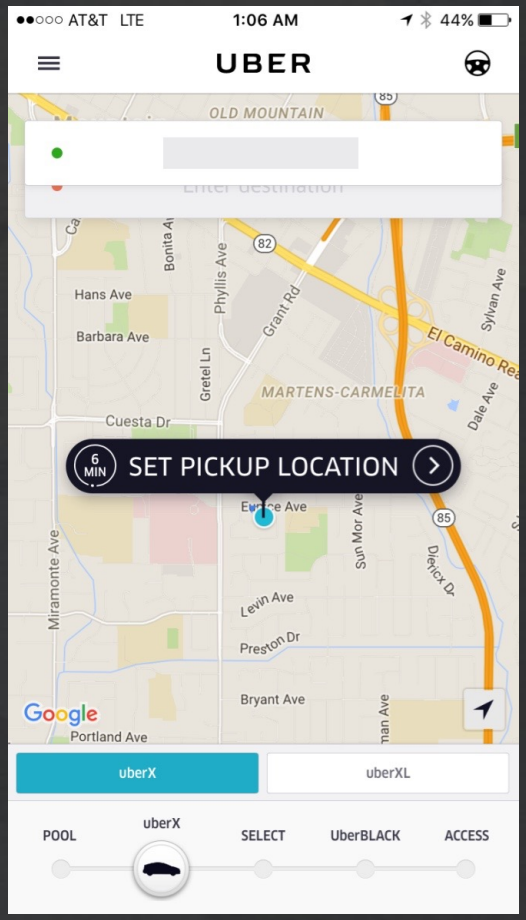
A relationship between controls and their movements or effects. Good mapping between controls and their effects results in greater ease of use. – *Universal Principles of Design*

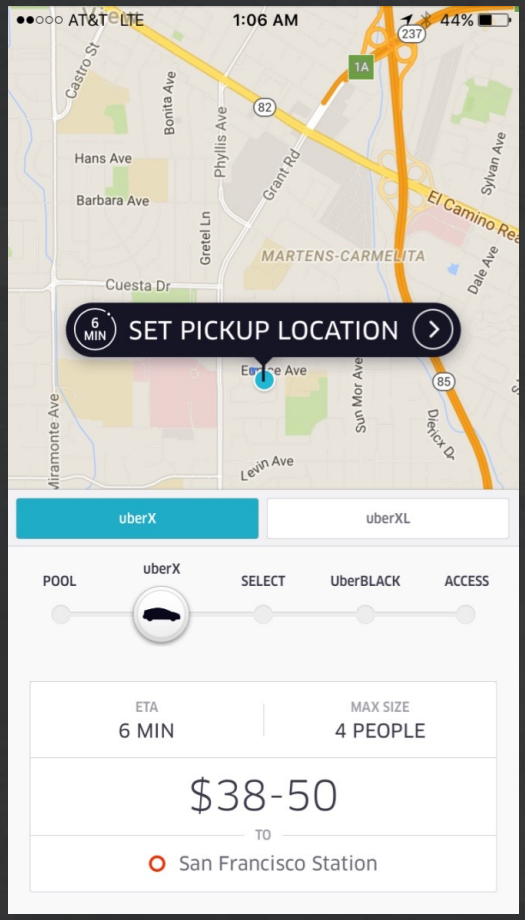


Mapping – which knob goes to each burner?

Mapping – better knob & burner mapping

Progressive disclosure





Visual Hierarchy and Reading Order

Strong visual hierarchies guide visual & logical progression by showing what is important.

Weak visual hierarchies provide little or no guidance about what is important.

source: http://52weeksofux.com/post/443828775/visual-hierarchy

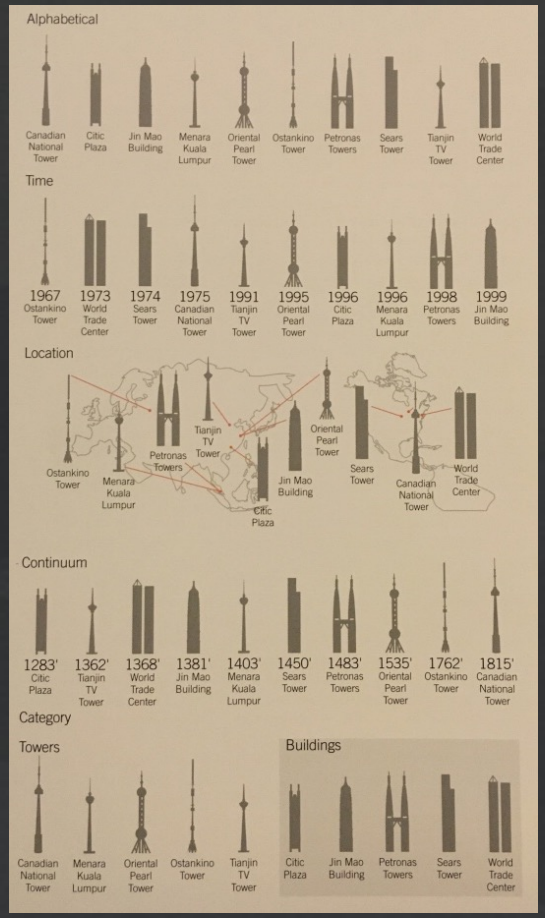
NETFLIX
Browse
Kids
DVD
Search
2
Jenny
NETFLIX ORIGINAL
KONG
KING OF THE APES
Watch Season 1 Now
He's the biggest hero the world has ever seen. But even Kong will need help to stop this army of high-tech beasts!
PLAY
+ MY LIST
Continue Watching for Jenny
EXPEDITION UNKNOWN
ANTHONY BOURDAIN PARTS UNKNOWN
NEW EPISODES
Parks and Recreation
MIDSOMER MURDERS
SLUGTERRA
THE MIND of a CHEF
NARRATED BY ANTHONY BOURDAIN

The First Read: Reading order pillars

1. size
2. color
3. layout
4. spacing
5. style

source: http://thenextweb.com/dd/2015/04/30/the-5-pillars-of-visual-hierarchy-in-web-design/#gref

5 ways to organize information (five hat racks)



- category
- time
- location
- continuum
- alphabet

The fallback order is alphabetical order

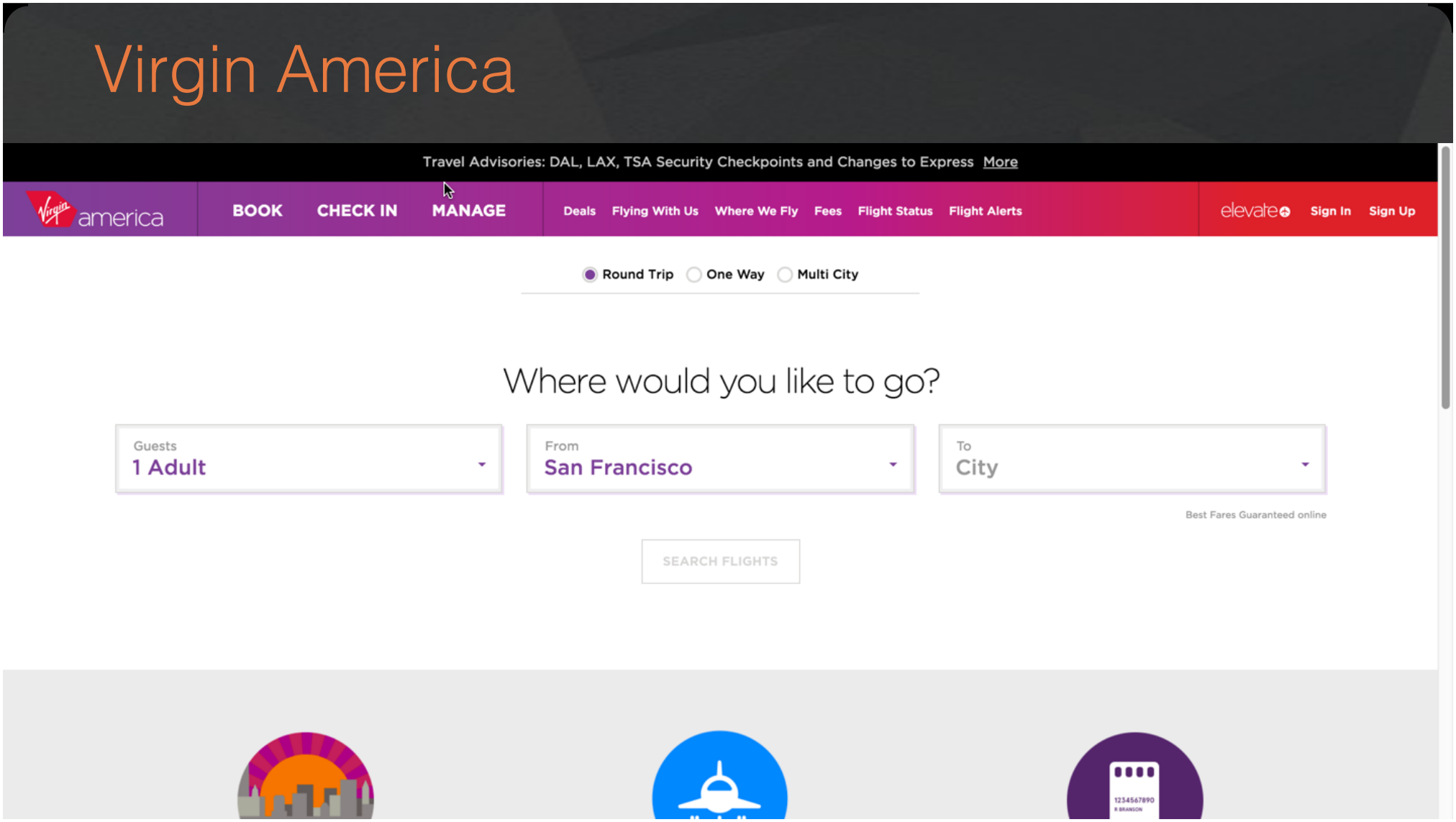
Source: *Universal Principles of Design*

Combining it all

What to consider

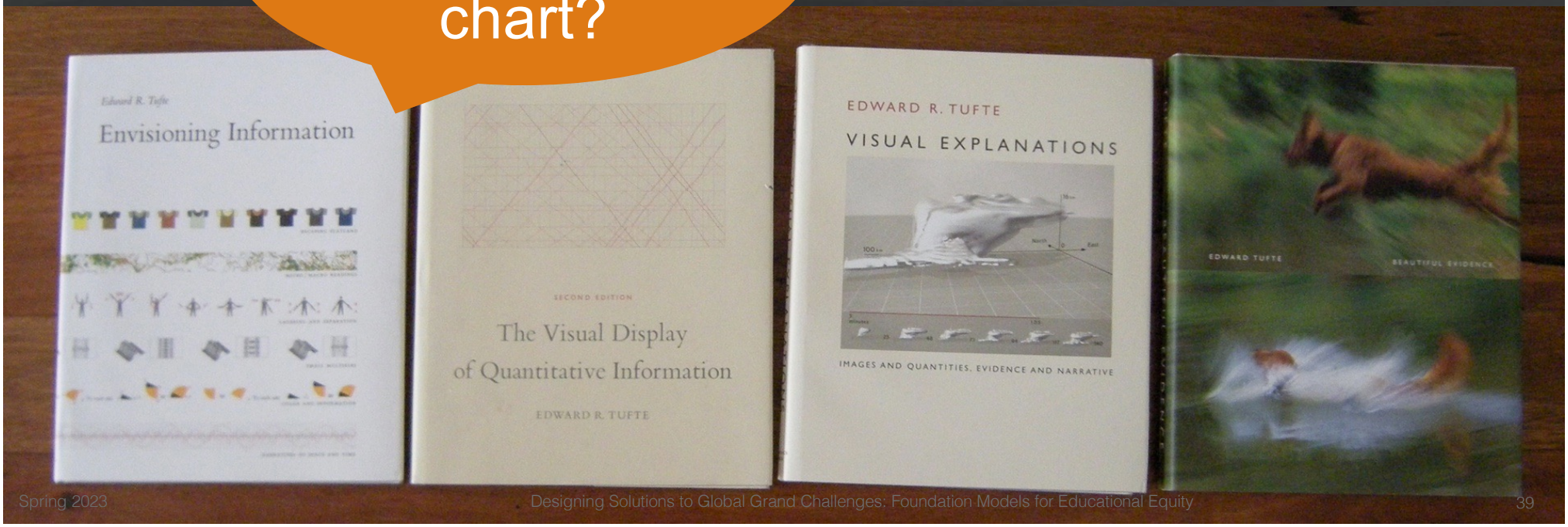
- Timeline of use
- Implicit interactions
- Basics
  - 80/20
  - consistency
  - mapping
  - progressive disclosure
  - order
  - hierarchy

Virgin America

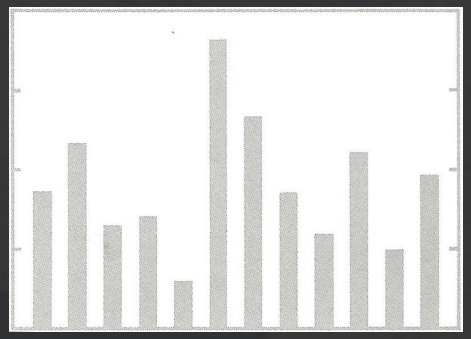


Edward Tufte on visualizing information

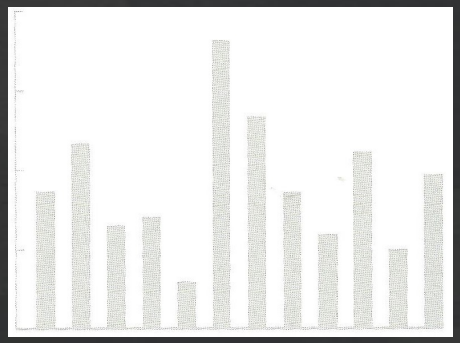
How should I design a bar chart?



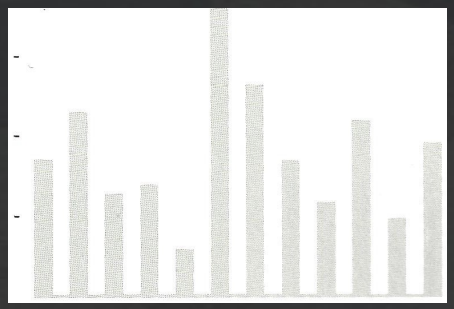
Edward Tufte on visualizing information



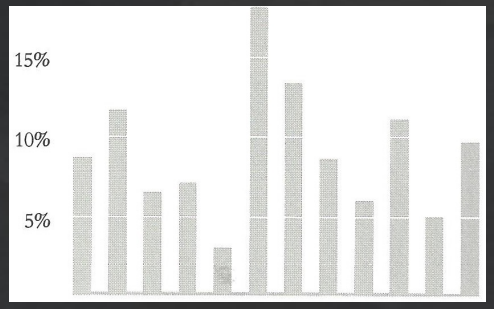
typical bar chart



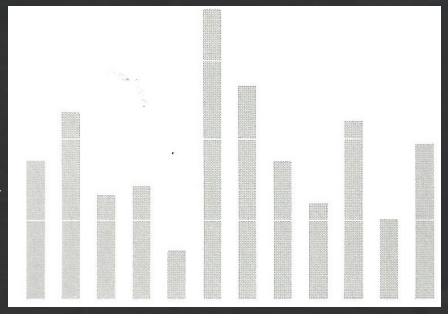
erase box



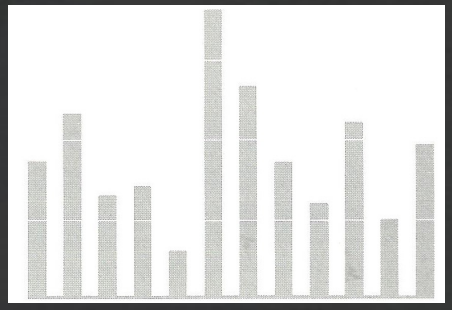
erase vertical axis, except ticks



add white grid to replace tick marks



erase baseline, bottom of bars define endpoint



still, a thin baseline looks good

Source: *The Visual Display of Quantitative Information* by Edward R. Tufte

“This machine is for the aides”: Tailoring Voice Assistant Design to Home Health Care Work

CHI ‘23, Bartle et al.

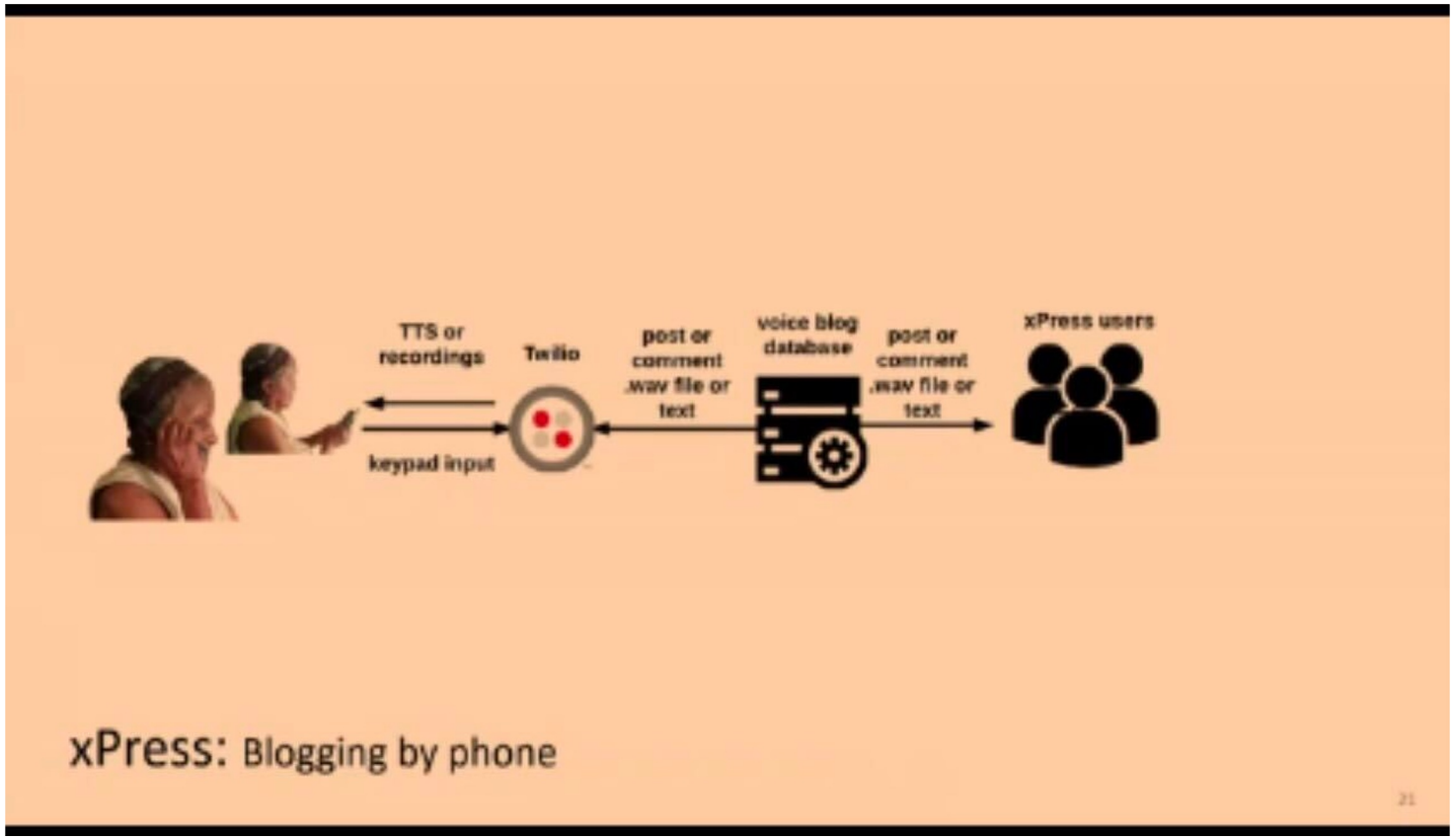
Participants also strongly associated control of the IVA software with control of the physical device. In particular, physically opening or closing the device equated to turning it on and off (discussed in detail in Section 5.2.2). Correspondingly, aides felt that *“the aide should choose if it’s open or closed”* (A12). While some participants envisioned the IVA only being accessible when an aide opened its case, others imagined it needing to provide reminders to clients in the absence of an aide. This further led to concerns about clients being able to use the device to access or change their care information (e.g., adding extra tasks not on the approved care plan).

Figure 1: The Health Kit (left) and Home Kit (right).

Figure 3: Closed Health Kit (left) and Home Kit (right)

Figure 4: Underlying device hardware

Robin Brewer



Shiri Azenkot

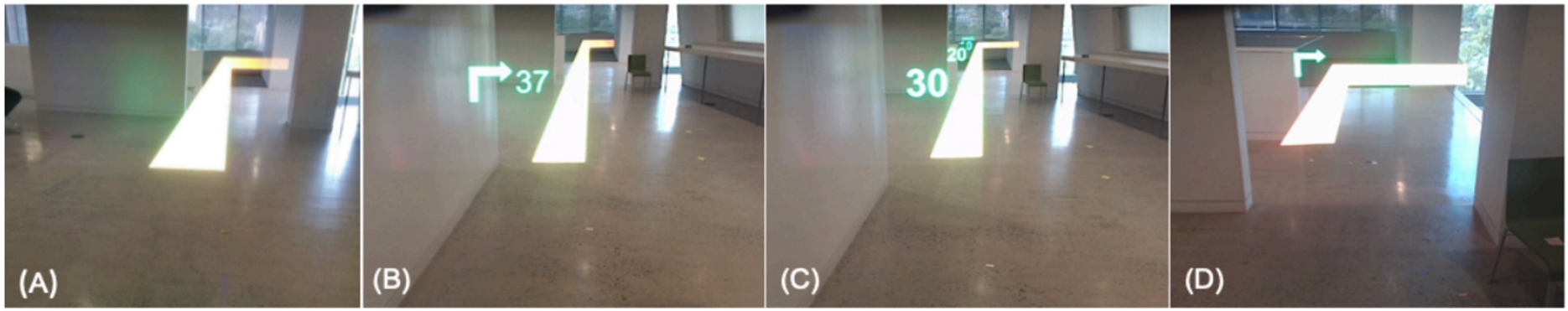


Figure 1. The visual wayfinding guidance: (A) Path (B) Path with the Floating Window (C) Path with Anchored Signs, including some Distance Signs and an Action Sign (D) an Action Sign.

https://dl.acm.org/doi/pdf/10.1145/3313831.3376516

Other reference books

- *Universal Principles of Design* by Lidwell, Holden, and Butler
- *Designing for Interaction* by Dan Saffer
- *The Non-Designer's Design Book* by Robin Williams
- *Don't Make Me Think* by Steve Krug

Inspiration and resources

Inspiration

- https://www.pinterest.com/timoa
- http://pttrns.com/

Icon resources

- Noun Project
- FontAwesome