

Design
Analyze Data
Sketching Ideas

CSCI 5601



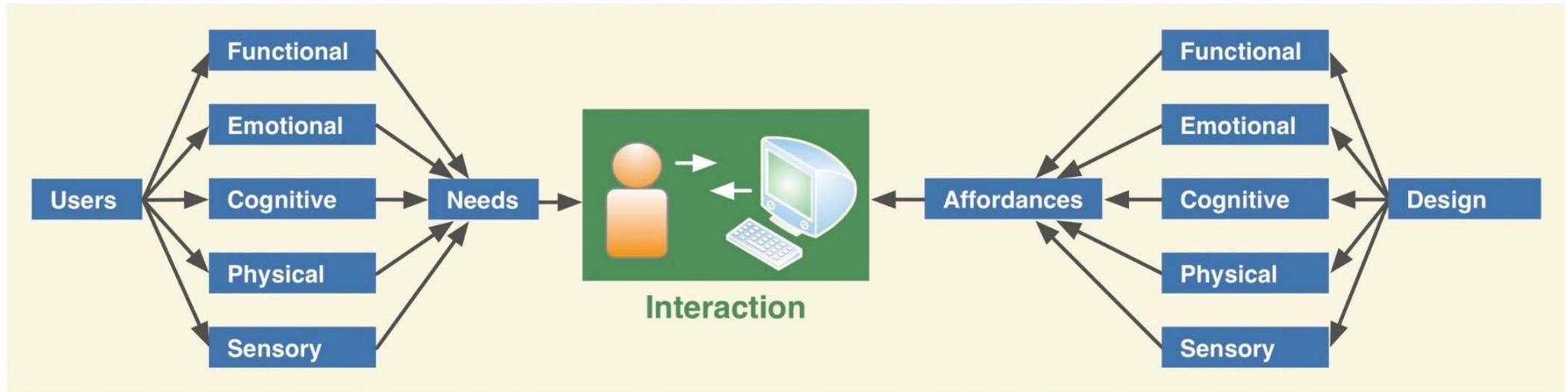
Topics/Agenda

Last Day

- User characteristics
- Design Introduction
- 5 Affordances

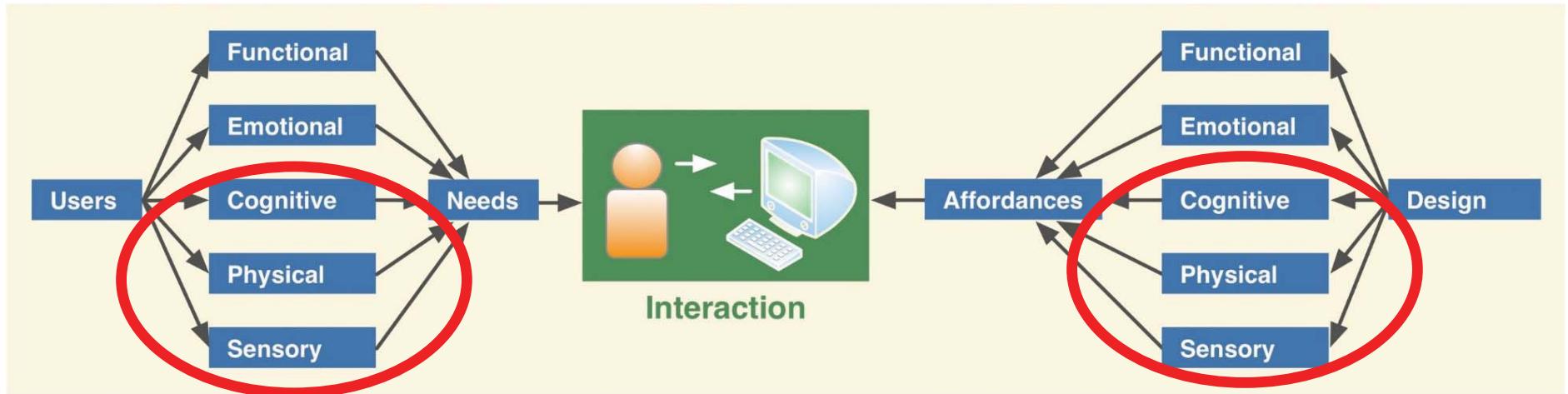
Today

- Finish Design
- Getting ready to prototype – sketching
- Analyzing Data
- Midterm Info
- Class Activity – if time



Affordances as an alliance in design

- The different types of affordances work together, connected in design
- Overall design considerations
 - How does it connect to functionality?
 - What is the positive emotional impact?



Affordances as an alliance in design

To accomplish usage goals, user must sense, understand, and operate user interface objects through:

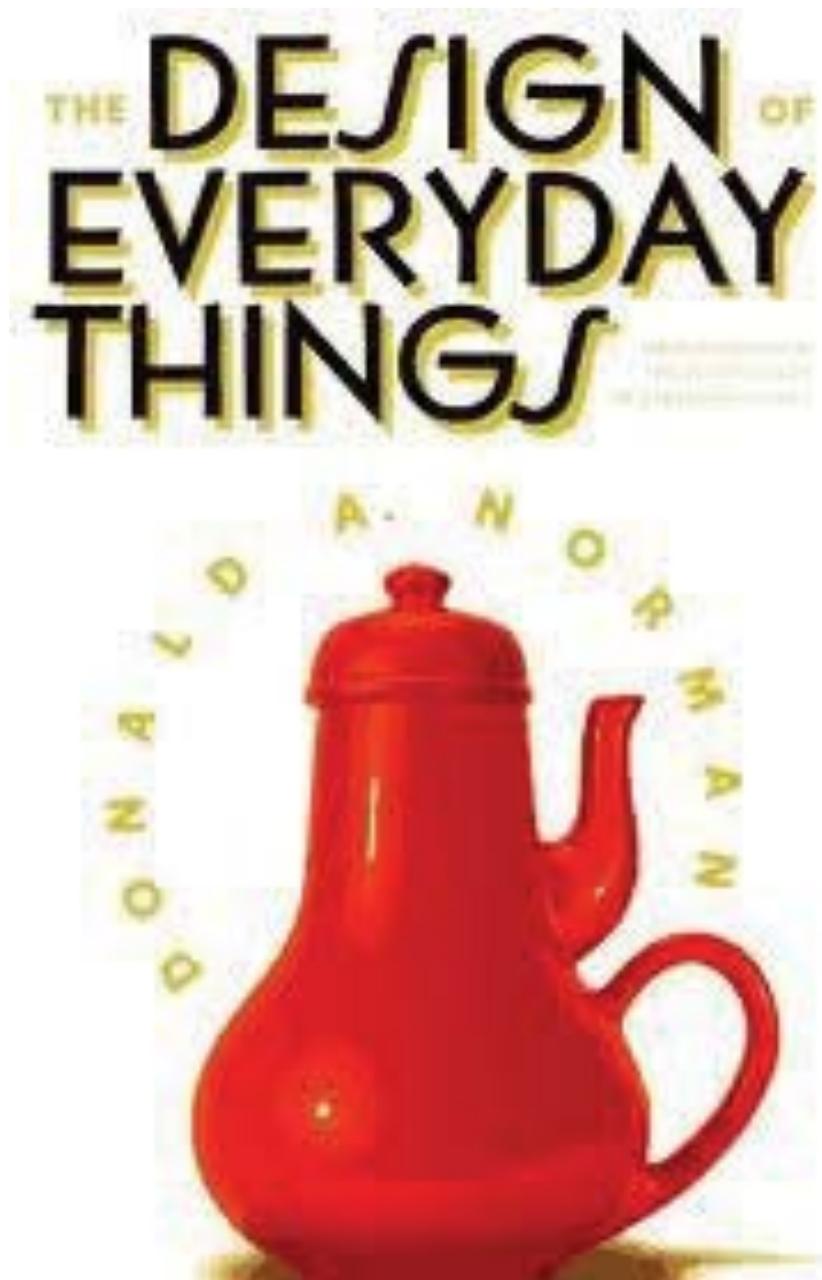
- Cognitive affordances
- Physical affordances
- Sensory affordances
- Functional and emotional are also necessary to accomplish a goal and can add an emotional connection

A complex, abstract background featuring a network of white lines forming a mesh against a dark purple gradient. Overlaid on this are several diagonal bands containing binary code (0s and 1s). One band is clearly visible in the center-left, while others are partially visible at the top and bottom edges.

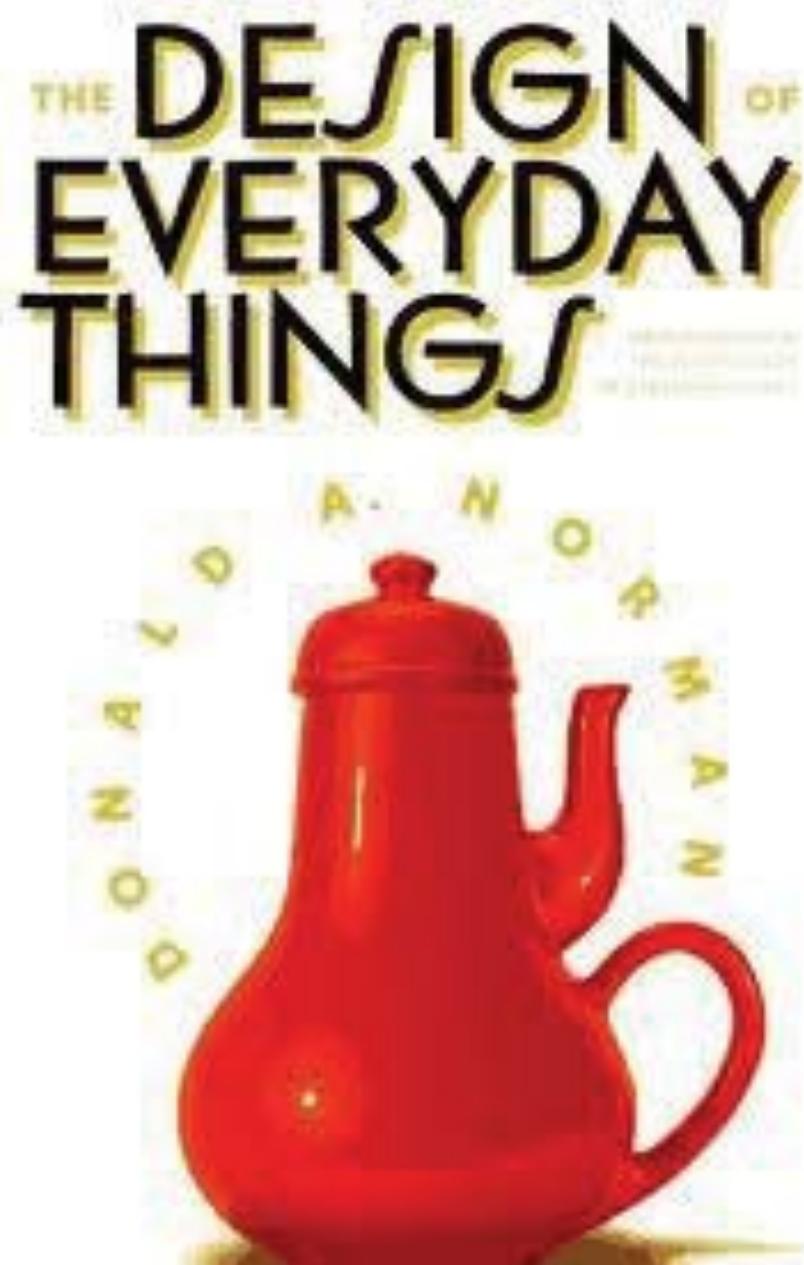
A UX design checklist of affordances

For design of each user interface artifact
consider each of these types of affordance:

- ✓ Sensory—Appearance
- ✓ Cognitive—Content and meaning
- ✓ Physical—Manipulation characteristics
- ✓ Functional—Connections to software functionality
- ✓ Emotional—Potential for emotional impact



- What if I asked you to design a tea pot – it needs a handle, and spout to pour, and a lid to add water?
- Seems obvious right???
- Teapot requirements:
 - ✓ Top to add water and tea
 - ✓ Spout to pour it out
 - ✓ Handle to hold the teapot
- But doesn't work - what is wrong?
- *Don Norman*



Design of Everyday Things – Don Norman

- many so-called human errors are actually errors in design
 - human factors and UX design became important as human performance limitations reached when handling complex machinery
- Important concepts for designing everyday things
 - He discusses affordances from the perspective of 'perceived affordances'
 - causality
 - visible constraints
 - mapping
 - transfer effects
 - idioms & population stereotypes
 - conceptual models
 - individual differences
 - why design is hard

Perceived Affordance (how the affordance is interpreted)

- The perceived properties of the object that suggest how one could use it (can violate one or more often more of the affordances we looked at)
 - **perceived affordances:**
 - design invites people to take possible actions
 - **actual affordances:**
 - the actual actionable properties of the product

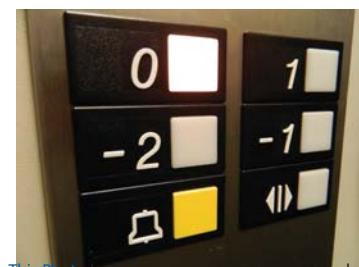


slots are for inserting
handles are for turning

Many concepts in this section are adapted from Don Norman's book: The Design of Everyday Things
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chairs are for sitting
table for placing things on



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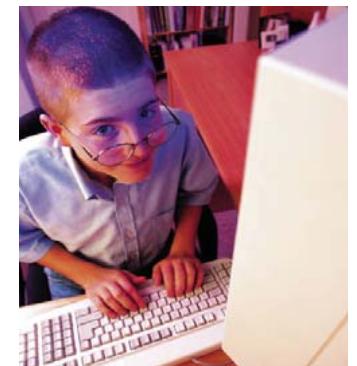
buttons are for pressing



switch for toggling



knobs are for turning

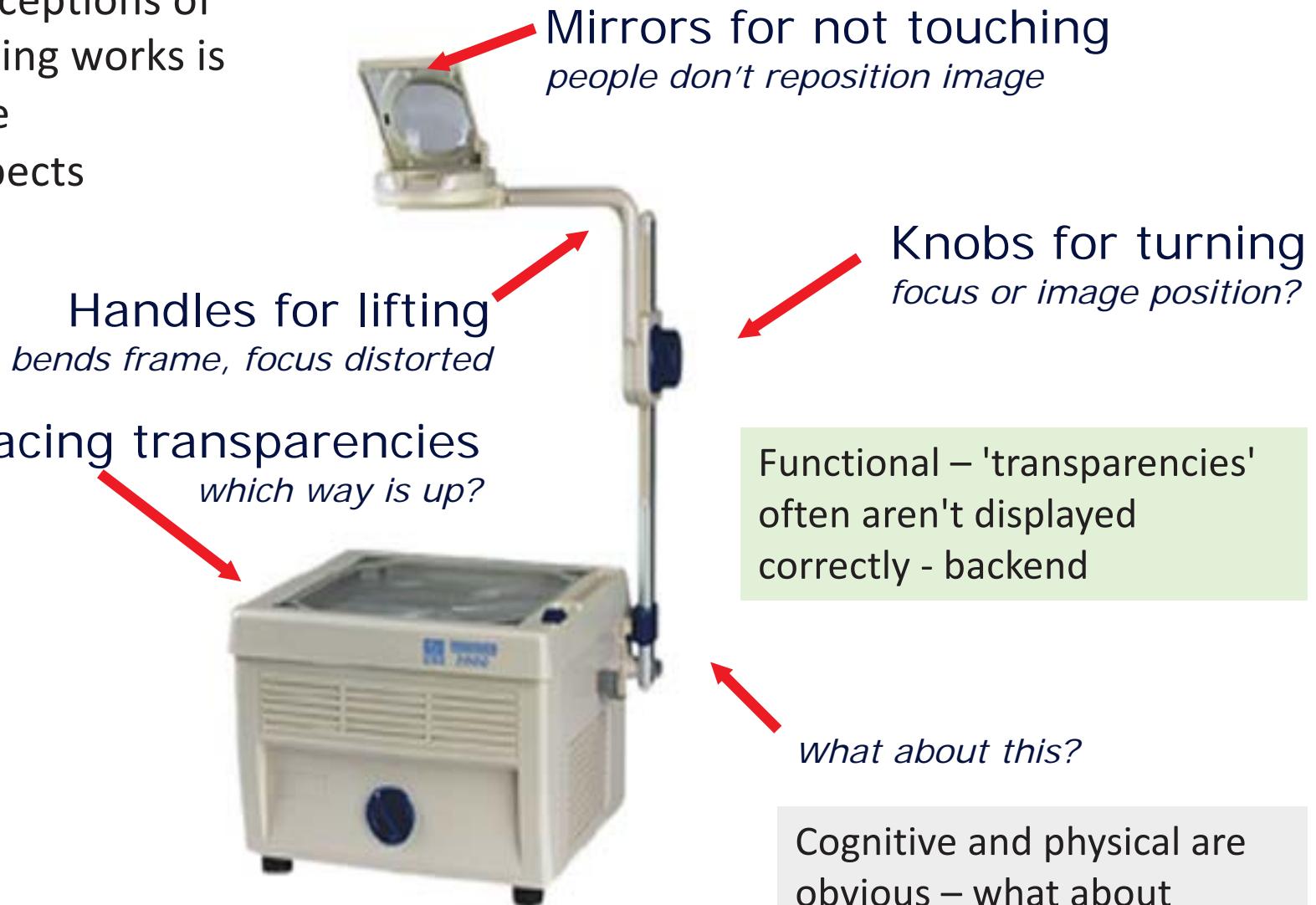


computer for...

Perceived Affordance Problems

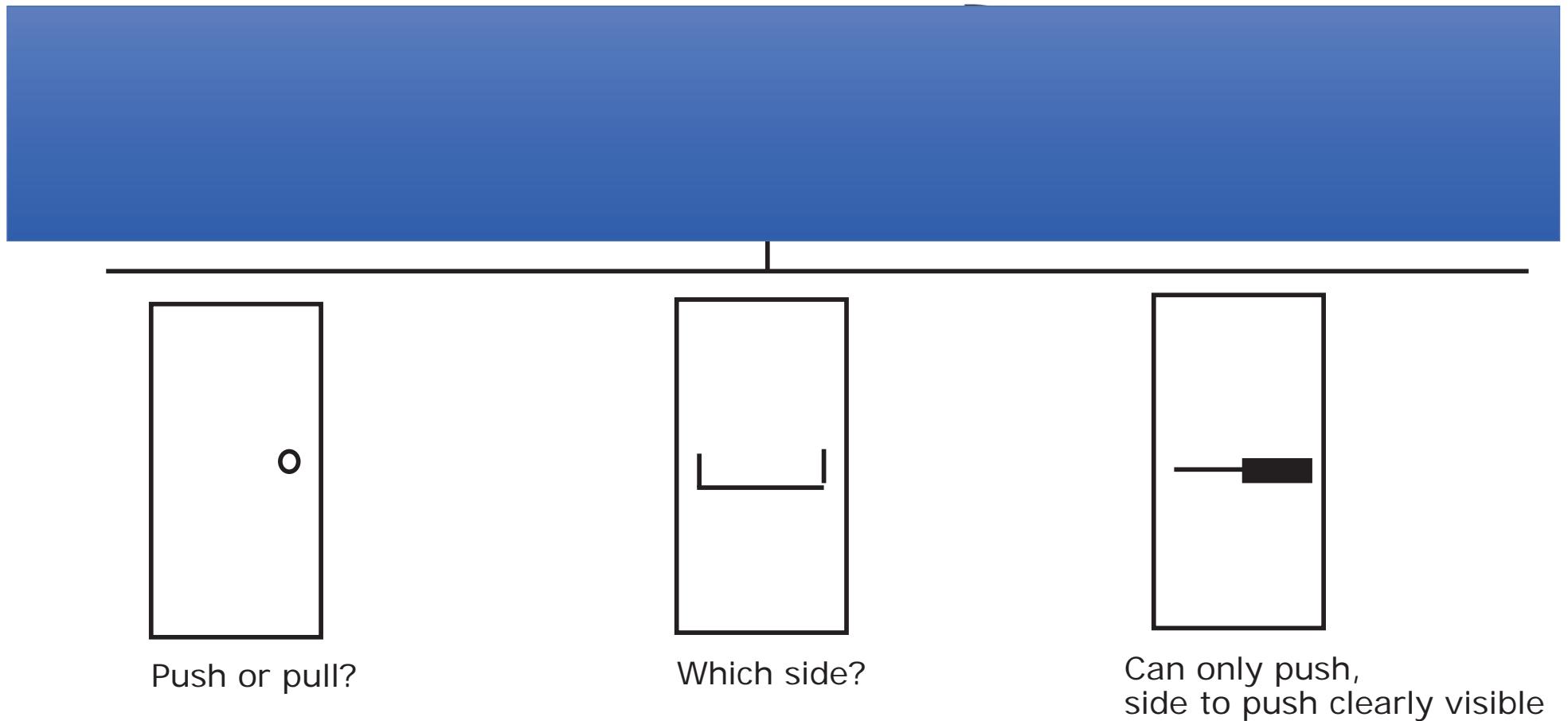
Problems occur when
people's perceptions of
how something works is
not what the
designer expects

Surface for placing transparencies
which way is up?



Visible Constraints (what do you think these are?)

- An affordance may be perceived incorrectly due to limitations of the actions possible perceived from object's appearance
 - provides people with a range of usage possibilities



Visible constraints: Entering a Date

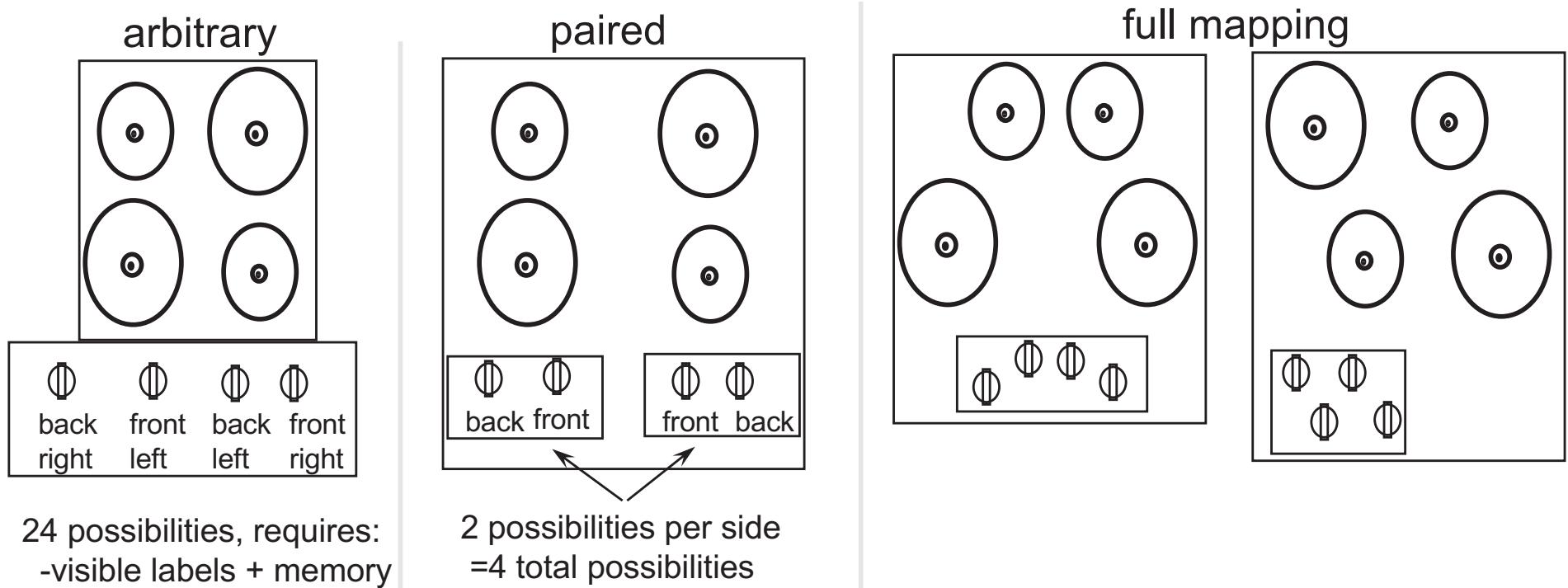
- The more constraints, the less opportunity for error
 - particularly important for managing user input

The image displays two examples of date range entry. On the left, a Microsoft Excel screenshot shows a formula in cell E5: =TEXT(B5,"mmm d")&" - "&TEXT(C5,"mmm d"). The result is 'Mar 1 - Mar 10'. On the right, a screenshot of the Air Canada mobile app shows a flight search interface with departure from Halifax YHZ to Toronto YYZ for May 17, 2018, with a red box highlighting the date '17 May'.

<https://exceljet.net/formula/create-date-range-from-two-dates>

Mapping

- The set of possible relations between objects
- Helps to distinguish affordances
- Control-display compatibility
 - the natural relationship between controls and displays
 - e.g., visual mapping of stove controls to elements



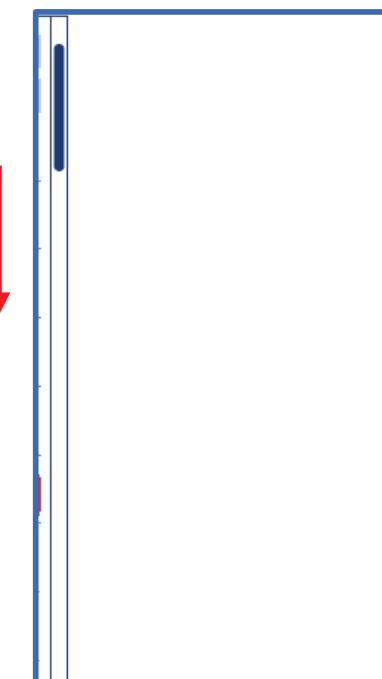
Mapping

- E.g., Control-display compatibility - cause and effect



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steering wheel-
turn left, car turns left



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scroll bar – scroll down
viewport goes down

Mapping

Menu controls and active objects – notice that this applies visible constraints

Only controls that can operate on document are fully visible

Selected Action is highlighted

lecture6_devices.... x

2 / 14

66.2%

2/7/18

2. Structure

- Structure should align, group and position the user controls in a way to help the user use them efficiently and effectively
- Metaphors can help structure the interface in a way that is familiar
- E.g., tourism kiosk → uses maps

3. Consistency

- Emphasizes importance of uniformity in appearance, placement, and behaviour in a UI to make a system easy to learn and remember
- If you do something on one level of the UI, users expect it to be the same throughout the UI because they develop a mental model of the UI (this UI helps them predict how the subsequent screens, levels, layers, etc will behave)

3. Consistency

- Greatly affects usability – if users think the system will act one way and it acts another – frustration
- Consider consistency for single systems, across systems within an organization or familiar domain (e.g., websites, MS office Suite)
- To ensure consistency: REUSE
 - GUI controls and design strategies within and between systems (e.g., logos, menus, etc.)
 - It is advantageous to users because they will need to learn fewer things and transfer knowledge

4. Tolerance

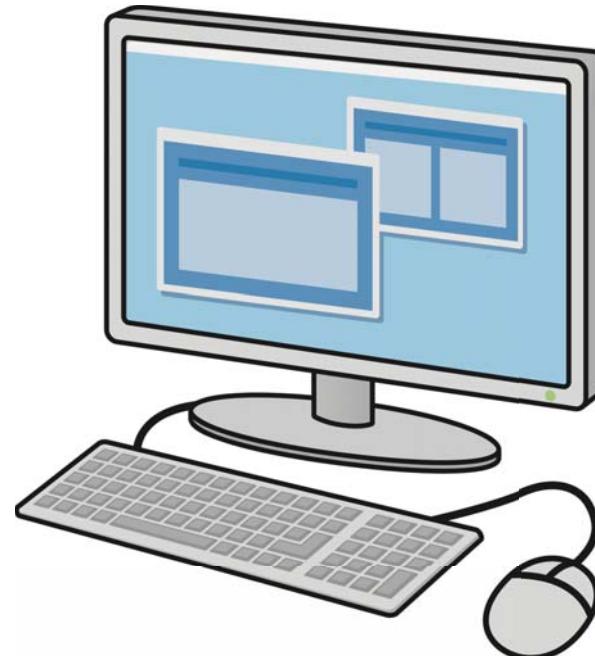
- Emphasizes importance of designing the user interface to prevent user from making errors
 - Errors can be due to bad UI designs but also from poor task knowledge or domain knowledge, stress, etc.
 - Reduce errors by:
 - Help users avoid mistakenly by making wrong choice unavailable (e.g., grey out choices)
 - Show how info should be entered or accept all formats (e.g., dates on a form)
 - Help users recover if they make errors

Causality

- The thing that happens right after an action is assumed by people to be caused by that action
 - *interpretation of “feedback”*
 - false causality
 - incorrect effect
 - invoking unfamiliar function just as computer hangs
 - causes “superstitious” behaviors
 - invisible effect
 - command with no apparent result often re-entered repeatedly
 - e.g., mouse click to raise menu on unresponsive system

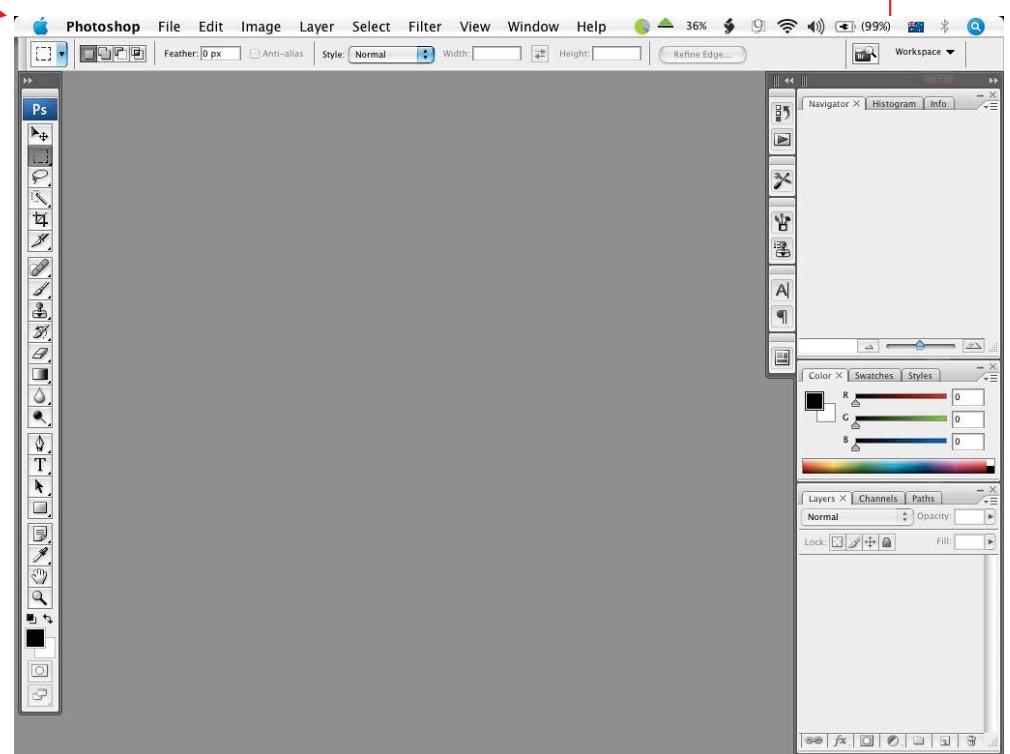
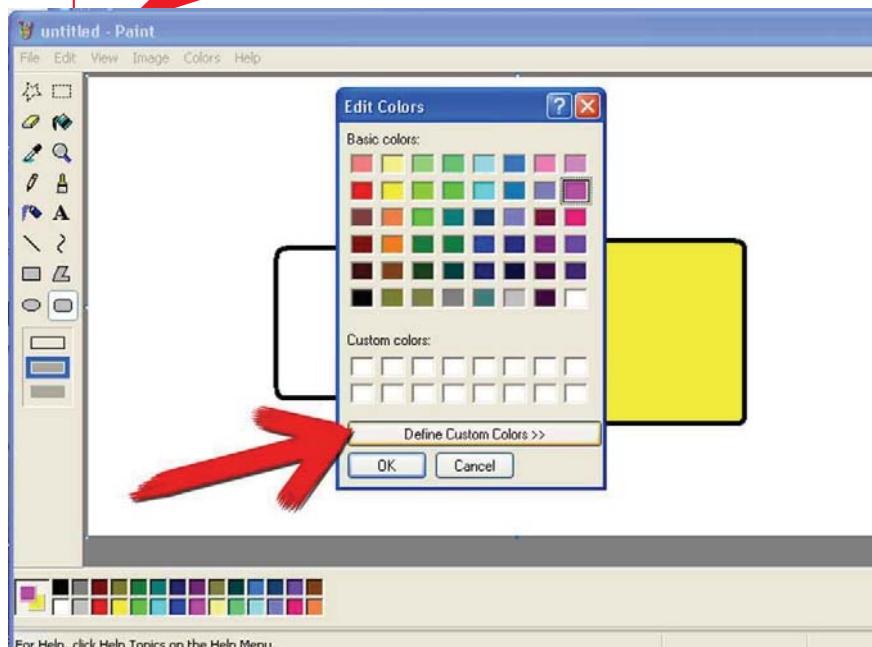
Transfer Effects – what is this?

- People transfer their learning/expectations of similar objects to the current objects
 - positive transfer: previous learning's also apply to new situation
 - negative transfer: previous learning's conflict with the new situation

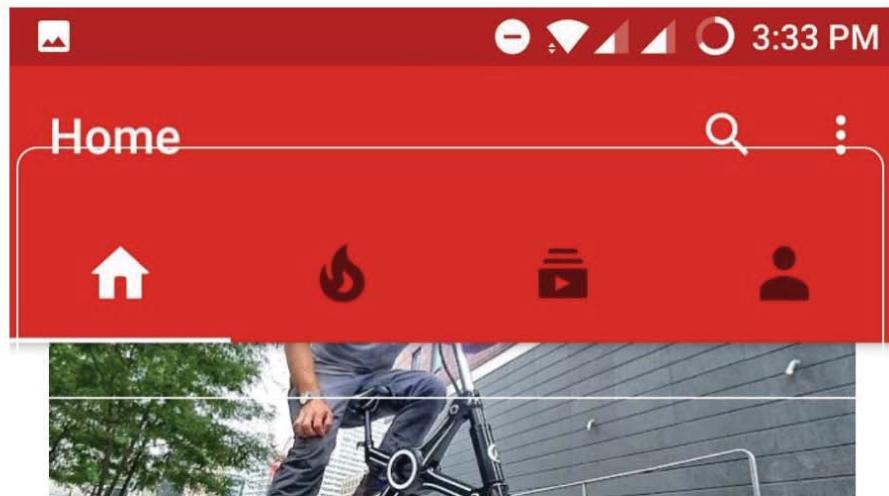


Transfer Effect Problems

- How does knowing MSPaint
- help you in Photoshop?
 - e.g. rectangular control...

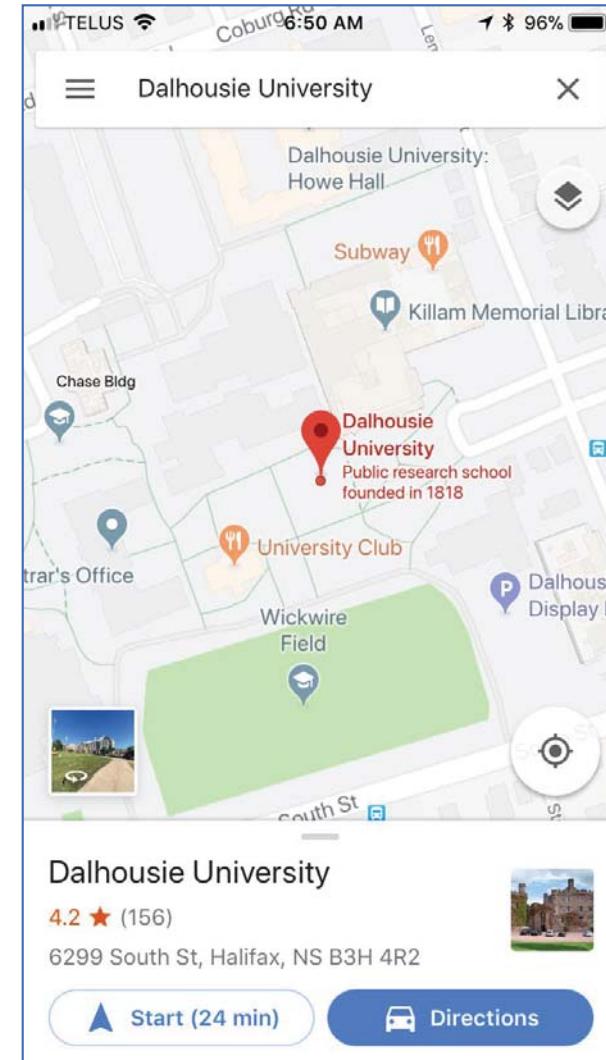
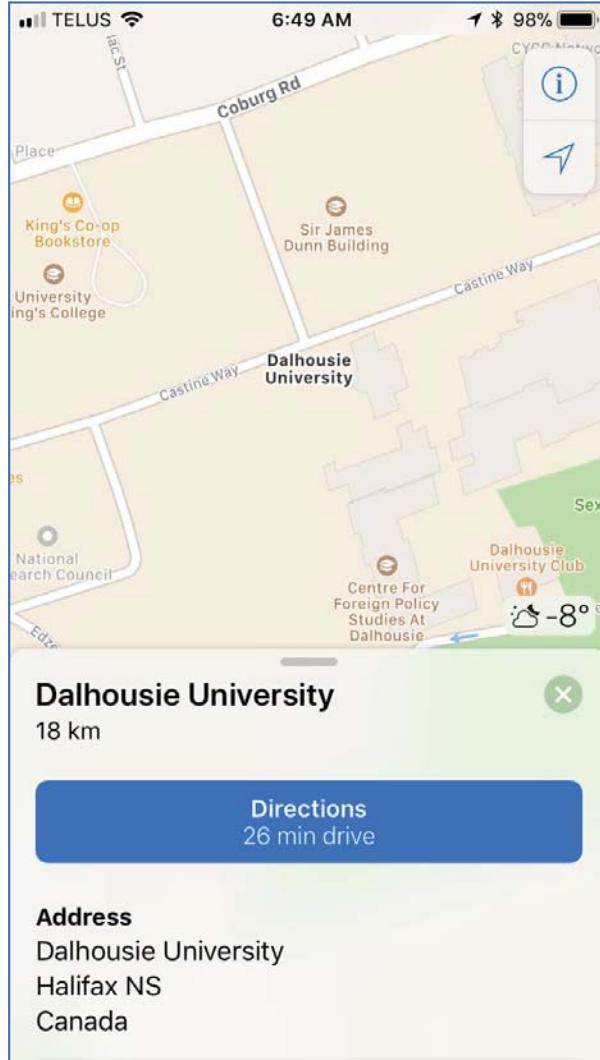


In app Navigation



Left: Different sections of YouTube on Android are organized as tabs on top of the app. Right: Sections are organized as tabs on the bottom of the app on iOS.

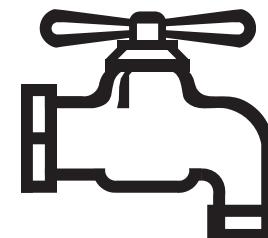
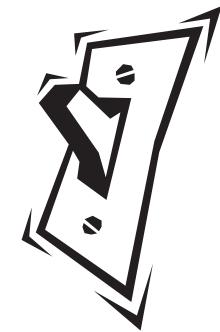
Map Applications



Subtle Differences... do they transfer?

Idioms and Population Stereotypes also impact perceived affordances

- Interface idioms:
 - 'standard' interface features we learnt, use and remember
- Idioms may define arbitrary behaviours
 - red means danger
 - green means safe
- Population stereotypes: Idioms vary in different cultures
 - Light switches
 - America: down is off
 - Britain: down is on
 - Faucets
 - America: anti-clockwise on
 - Britain: anti-clockwise off



Data Analysis – Making Sense of Data

Qualitative and Quantitative Data

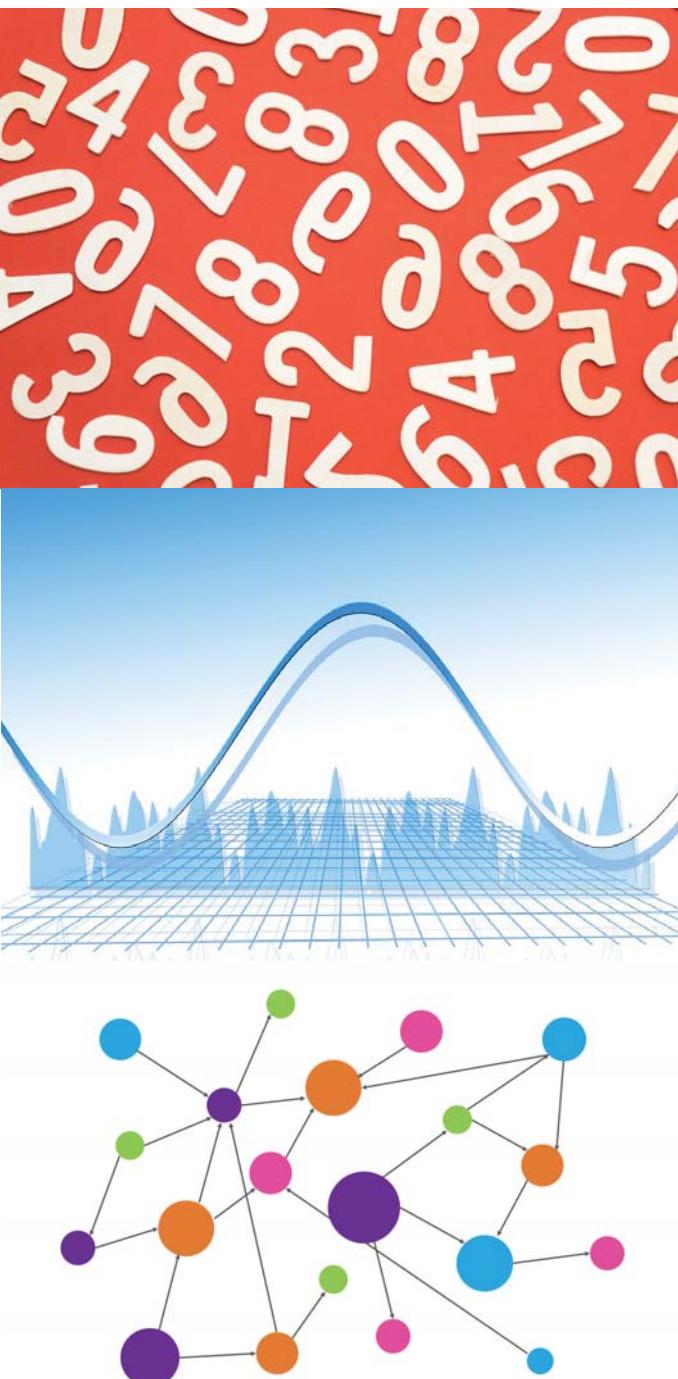
Data Types

There are two types of data collected in studies:

1. Quantitative Data – numerical data and closed ended questions (e.g., time, counts, etc.)
 2. Qualitative Data – observations, opinions, reasoning behind results, interview notes, open ended questions, etc.
-
- *Most data you will collect with your group will be qualitative data (there may be some quantitative data)*



Quantitative Data



Quantitative Data

Three main ways to summarize quantitative data:

1. Visualization of data
 - Charts, graphs and tables
 - Choose your visualization carefully – it should be appropriate for the type of data you have (e.g., a pie chart is only good for very specific types of data)
 - Make sure you give visualizations titles and label x and y axis!
2. Descriptive Statistics (e.g., mean, median)
3. Inferential Statistics (e.g., tests of statistical significance such as t-test, regression)

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Tables

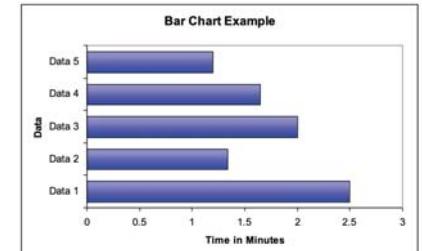
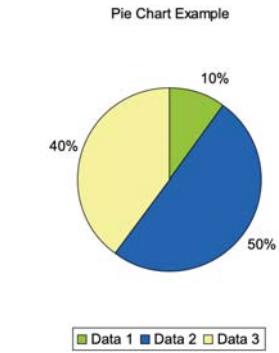
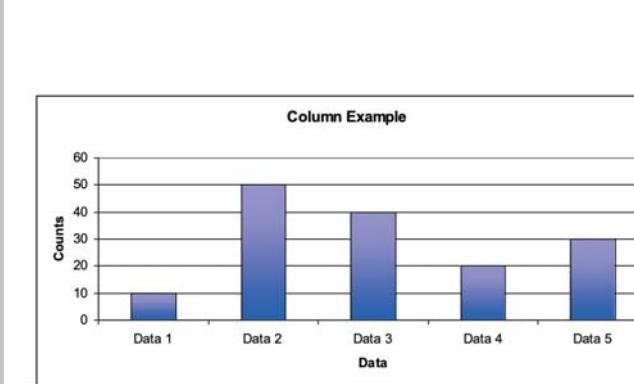
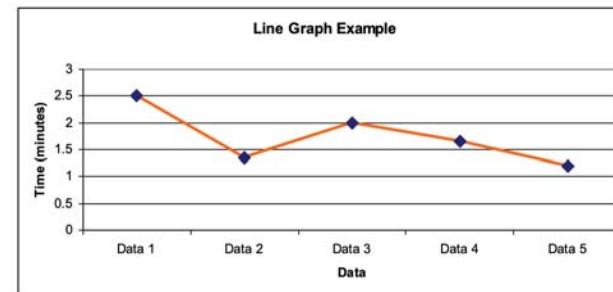
Data	Counts
Data 1	10
Data 2	50
Data 3	40
Data 4	20
Data 5	30

Data	Time
Data 1	2.5
Data 2	1.34
Data 3	2
Data 4	1.65
Data 5	1.2

Data	Counts
Data 1	10
Data 2	50
Data 3	40

Graphs

- Pie charts
- Line graphs,
- Bar/column graphs



Guide to Graph Types

Line graphs

- Good to show specific values (e.g., income levels over time)
- Can show trends in data (e.g., use of Facebook over time)

Bar and Column

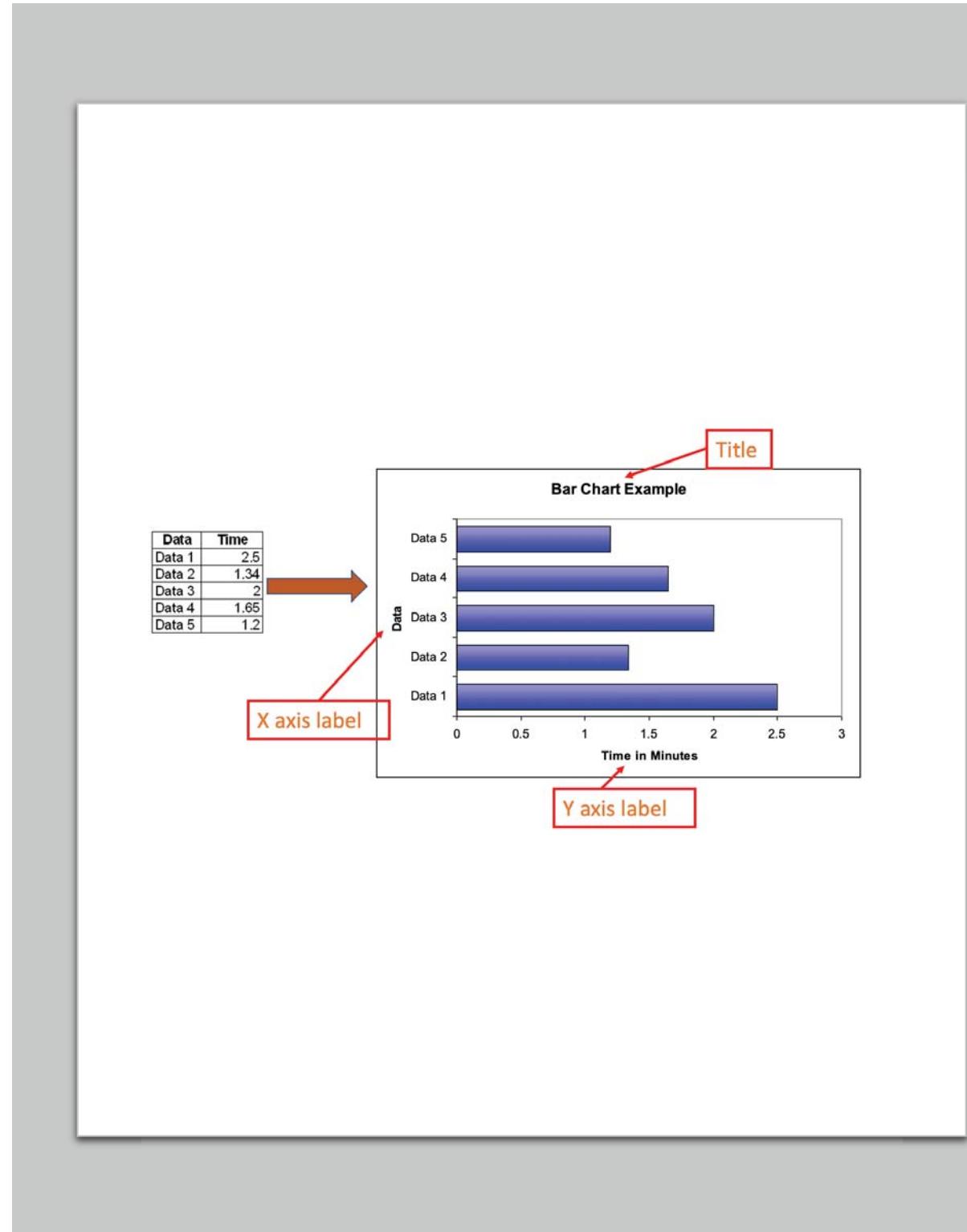
- Can make comparisons between different variables
- Clearly shows trends in data

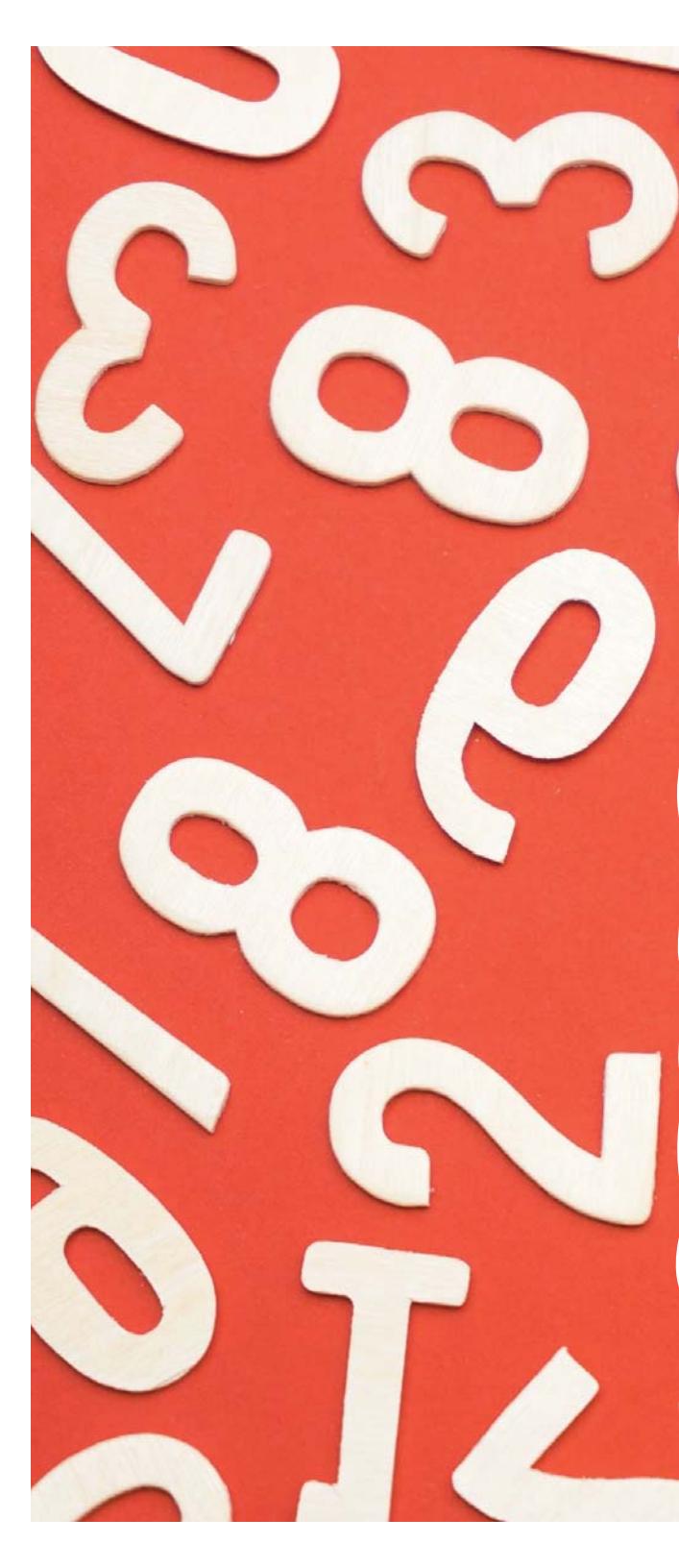
Pie Charts

- Really only good when can use percentages
- But – can be difficult to see differences sometimes between pie slices (due to how the image is shown)
- If the categories or how you came up with the percentages are unclear, the data is ambiguous

Using graphs

- Make sure to give graphs a title and labels
- Also, make sure it's clear where the data came from





Descriptive Statistics

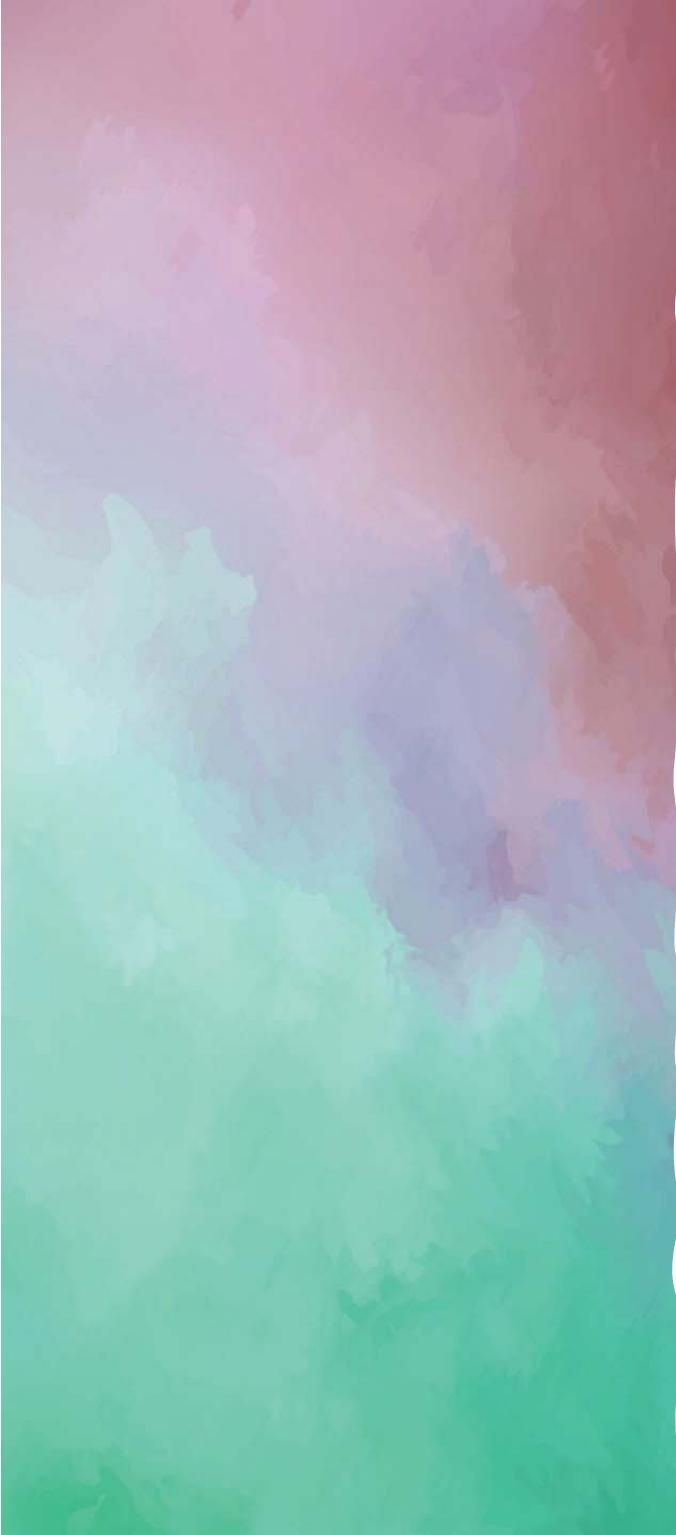
- Descriptive Statistics: Mean, median, mode
 - Mean: the average of a set of numbers
 - E.g. the average of 3, 5, 3, 2, 4:

$$3 + 5 + 3 + 2 + 4 = 17/5 = 3.4$$



Inferential Statistics

- This includes tests of statistical **significance** that provides the probability that a claim arising from your data can be applied to user population as whole
 - E.g., t-tests, regression, etc.



Qualitative Data

Qualitative Data

- Qualitative data is analyzed differently than quantitative data
 - Involves human coding
- Absence of numeric data and direct measures can make qualitative data potentially susceptible to bias interpretation
- Sometimes you can apply statistical methods to evaluate the validity and reliability of coding methods
- The one approach we will look at today (and you will do in the lab this week) - **Affinity Diagrams**



Qualitative Data

- Tells a different story than quantitative data but can still show that differences exist
- Can give insights into causes of problems and provide solutions or suggestion on how to fix it (e.g., a task took too long because the system response time was excessive or because the user interface was confusing the user chose the wrong options)



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Qualitative Data

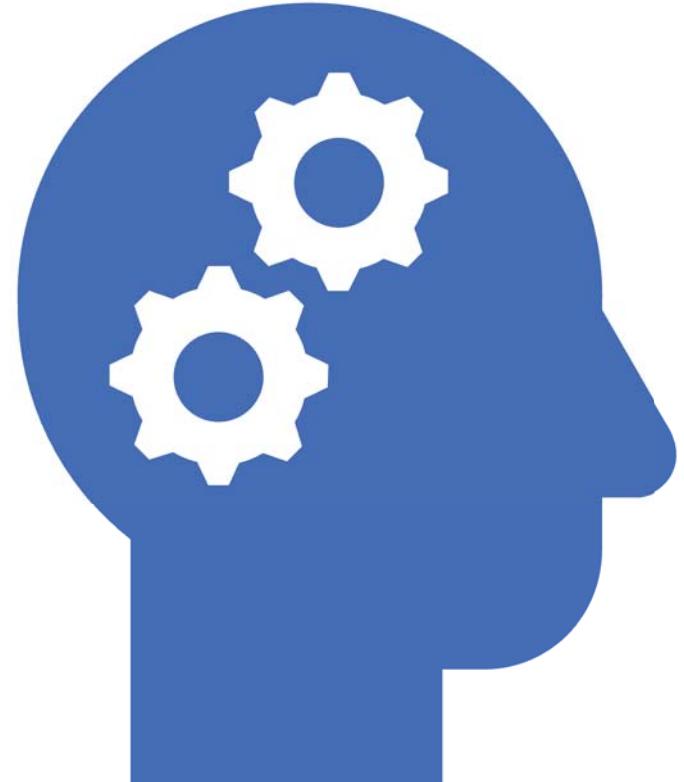
- Analyzing Text Content
 - The technical process and technique to analyze text content is called “**coding**”
 - Coding is **not** just paraphrasing and counting keywords but involves *interacting with the data* (e.g, making comparisons between data)
 - Need to *avoid biasing* your analysis by following a procedure
 - There are two main ways to approach analyzing data: **a priori** coding and **emergent coding** and both involve coding data



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A Priori approach:

- First stage – to identify potential coding categories or themes based on established theories or frameworks in the related literature
- Then you proceed to code the text data
- To control for subjective interpretation – use more than one coder to code the same data
- This works well for topics that have been studied before and there is sufficient literature to help identify the categories

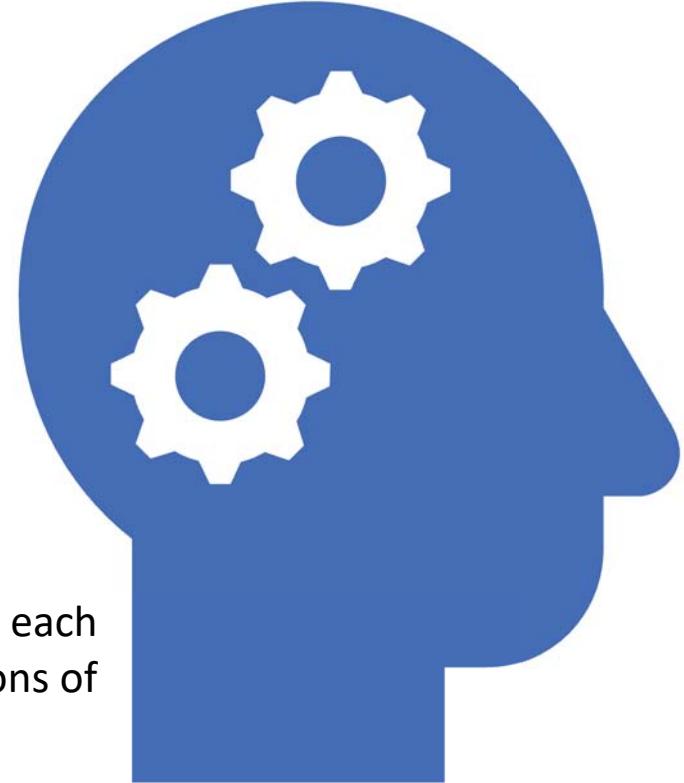


Emergent Approach:

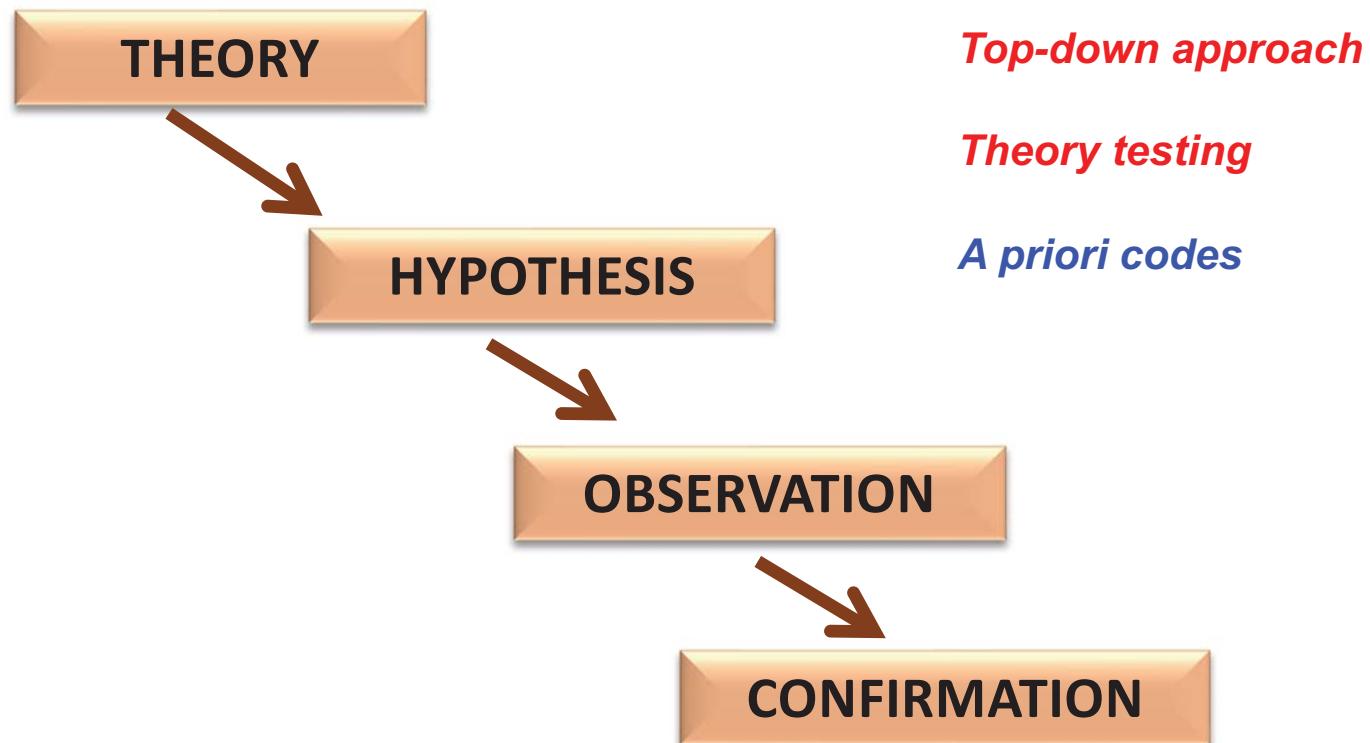
- Usually used for **new topic with limited literature to build on**
- First: researchers examine a sub-set of the data independently and each develops a list of key coding categories based on their interpretations of the data (open coding)
 - For example: the Category/term might be “frustration” to describe the underlying theme of the two responses

“My son just sits there and sobs when the computer does not do what he wants”

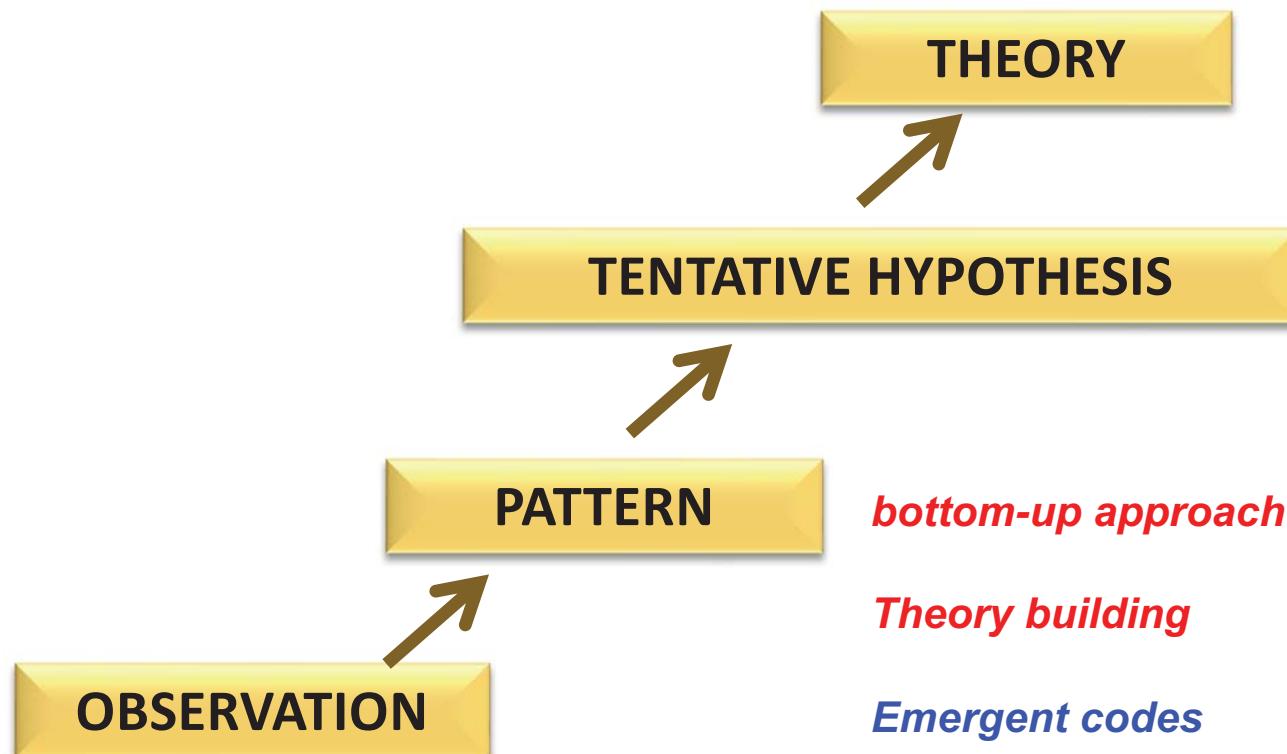
“he becomes irritated and keeps pushing the Enter button when the web page loads slowly”
- Then, researchers meet, compare lists, discuss limitations and reach a consolidated list that all agree to
- Then each applies the coding independently using the consolidated list (then compare the results between the researchers to determine reliability of results)



Deductive Research Approach



Inductive Research Approach



Often use a hybrid approach

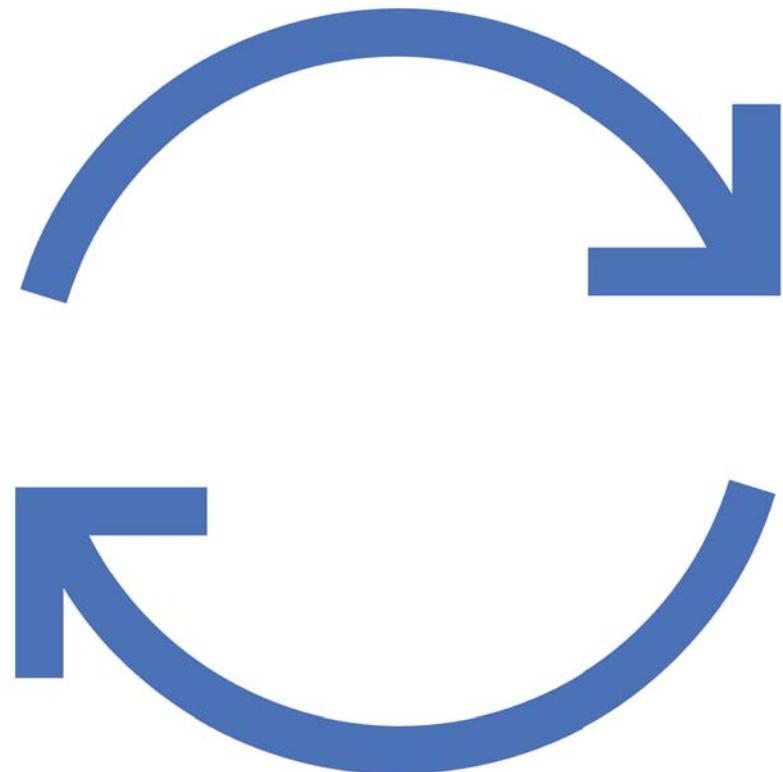
- A set of **a priori codes** reflecting your understanding of the topic and your research questions
- **Emergent codes** added as you code the data and find other factors/topics/codes that you had not considered





Make comparisons of the data

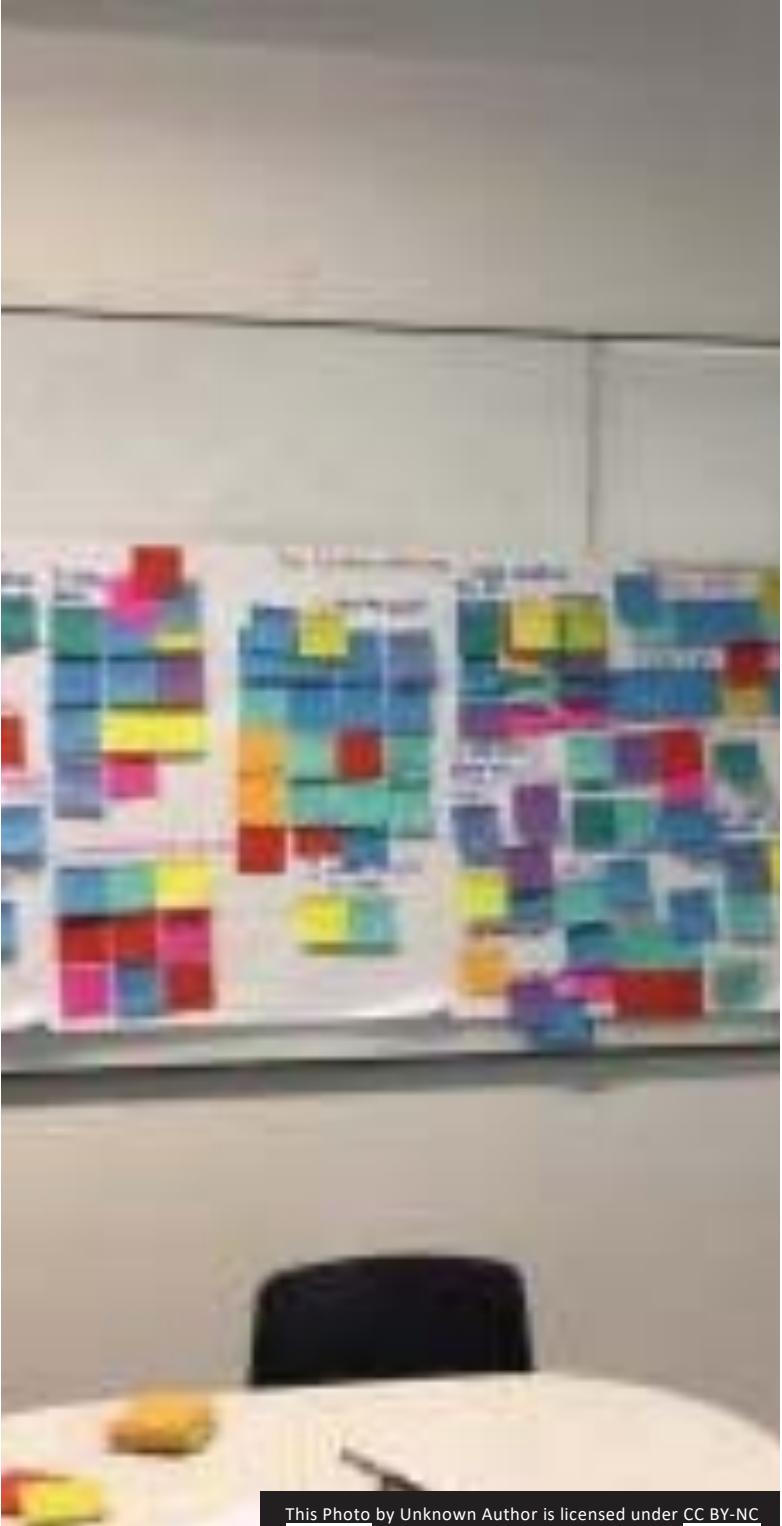
- During the coding process and afterwards, you can compare the data:
 1. between the different categories
 2. between different user groups
 3. to previously reported results in the literature





Trying to understand and make sense of all the comments, observations, etc.... work consolidation: *abstracting specific insights*

- one tool: the **affinity diagram**
- can use to “consolidate” insights from collected or generated data, for example you may start to look at:
 - brainstorming about design *problems*
→ **categories of problems**
 - brainstorming about design *ideas*
→ **categories of ideas**
 - comments from users
→ **categories of desirable / successful features**



Affinity Diagramming

- “Affinity” means being related as by being in common categories
- Trying to understand and make sense of all the comments, observations, etc.... work consolidation: *abstracting specific insights*
- Chapter 8 in the textbook – they adapt affinity diagramming into WAAD (work activity affinity diagram)
- you can use affinity diagrams to "consolidate" insights from collected or generated data, for example you may start to look at:
 - brainstorming about design *problems*
→ **categories of problems**
 - brainstorming about design *ideas*
→ **categories of ideas**
 - comments from users
→ **categories of desirable / successful features**



Summarizing User Needs

- Affinity Diagrams reveal major issues that need to be addressed or areas that can be explored
- Use affinity diagrams to create a list of *unmet needs* for your users
- List every possible aspect of work that could be improved, without indicating how it could be improved
- Organizes notes captured during interviews and observations
- Goal is to combine all data in one place
 - **Issues noted**
 - **Worries and comments and suggestions of users**
 - **Key elements of work practice relevant to project focus**
- All data relevant to a theme is shown together (takes a few rounds for a convergence)



Affinity Diagrams

Step 1: creating notes from your results (interviews and observations)

- Affinity diagram is a diagram **built from post-it notes**
 - You will do this
- Affinity is built bottom-up
- No starting categories, instead start with individual notes
 - A quote, an idea, a work process, a requirement, a need
 - Put up one note
 - Look for notes that go with it
 - Anyone can add a note
 - No justifying why a note goes with another
- The affinities you look for are notes that focus on similar intents, problems, or issues
- The data for notes can be sourced from any location
 - interview notes, post-its from an interpretation session, quote from transcripts (if available) or from memory (check with audio record).



Affinity Diagramming (WAAD) Process

- For each raw data point (interview answers, observations from the doing the tasks):
 - Synthesize each work activity note into a note (no judgement)
 - Hand-written on a Post It note
 - These work activity notes will all be inputs to a WAAD (work activity affinity diagram)

Ensure each activity note is

- Read guidelines in book for what makes a good work activity note

- Elemental
- Brief
- Concise
- Easy to understand
- Retain context

Raw user (ticket buyer) comment:

It is too difficult to get enough information about events from a ticket seller at the ticket window. For example, sometimes I want to see information about popular events that are showing downtown this week.

Synthesized work activity note:

Too difficult to get enough event information at window.

Provide information about current popular downtown events.

Break into 2
sticky notes

Raw user (ticket buyer) comment:

I always get the feeling that there are other good events that I can choose from but I just do not know which ones are available and the ticket seller usually is not willing to help much or doesn't understand what I need, especially when the ticket window is busy. I'd rather be able to do my own searching.

Synthesized work activity notes:

Ticket seller not showing every option.

Ticket seller too busy, doesn't understand needs.

Users want to find their own events.

Break into 3
sticky notes

Raw user (ticket buyer) comment:

It is hard to judge just from information available at ticket window whether an event has been well received by others.

Synthesized work activity notes (with some designer license):

Users want reviews and feedback on events.

[Design idea] Include capability for people to add reviews? Question: Locate at event venues rather than kiosk?

Break into 2
sticky notes



Make each activity note
*elemental, brief and
concise*

- Break apart raw data into notes
 - Each about exactly one point or idea
 - Just one simple declarative point (concept, idea, or fact)
 - Possibly with one rationale statement
 - Paraphrase and synthesize, instead of quoting raw data verbatim
 - One to three succinct sentences for each point
 - Make a specific point
 - Filter out noise, fluff, verbiage
 - Each work activity note should be
 - **Easily read**
 - Understood at a glance
 - **Don't lose context when splitting up a raw data note**
 - Make each note complete and self-standing
 - And take note which participant said it and which task (on the back, e.g., P1, T2)

Frustrated that
bus is never
ontime (either
early or late)

P2 - Q3(a)

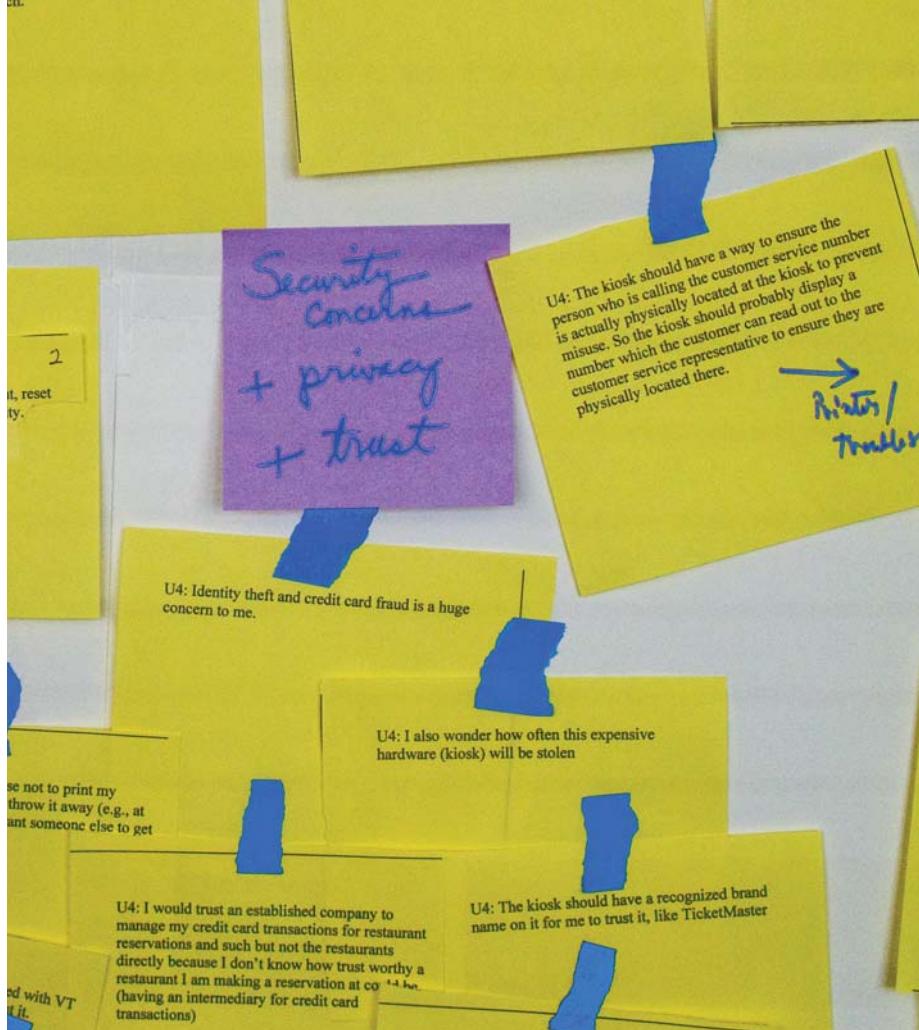
Write your notes on Sticky notes and a good idea is to link the post-it detail back to its source (e.g., P1, Q3a – which stands for participant 1, interview question 3a).

If you put a suggestion/issue and solution you can add [design idea?] at the bottom

Example: Team studying clusters to form groups

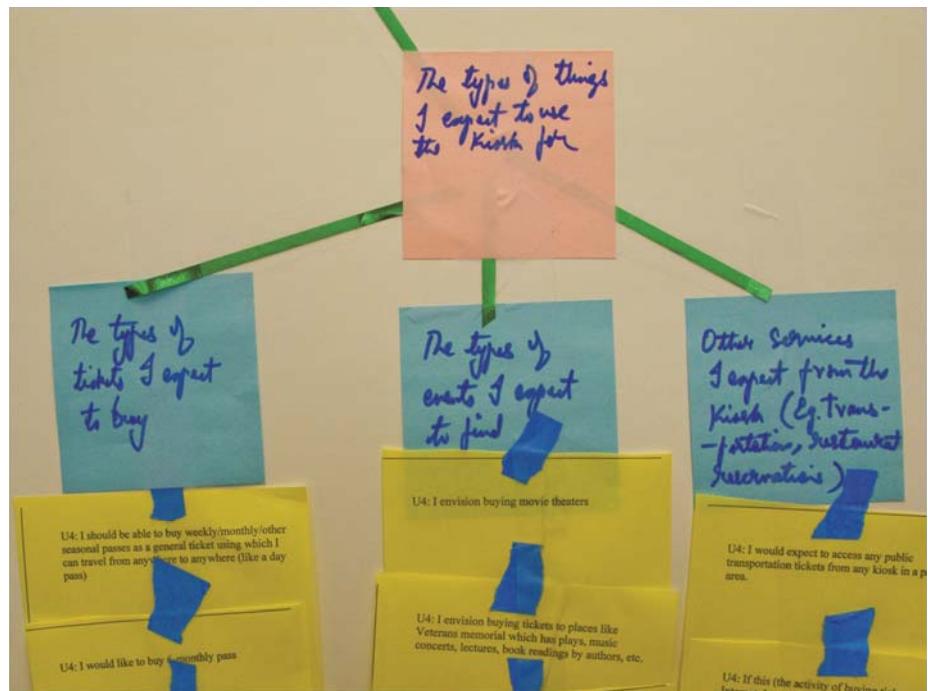


If work activity note fits into a group topic already posted



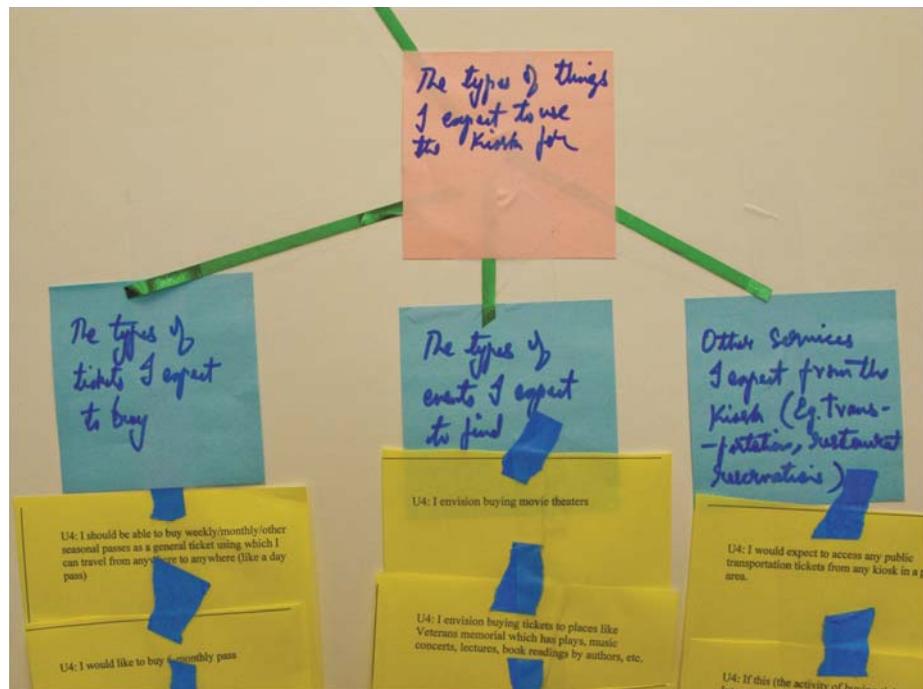
- Add it to that group
- Adjust group topic label, if necessary, to accommodate any added breadth

Combining groups



- After you place all the note, you start by naming groups by Find groups that are related
 - Group together with higher-level label

Splitting groups



- If a group gets to have more than about 10 work activity notes and topic is getting too broad
 - Split into sub-groups, each with a narrower label
 - Add “super-topic” label to a common parent node

How do you make an affinity diagram?

- Each team member writes down all data & insights on post-it notes (work notes);
be sure you can link the post-it detail back to its source (eg., P1, Q2)!

This stage done in silence

1. Stick one post-it on the wall and then another and if you have a note that similar to where a note is already place, place it near to it (the categories will emerge) (a whiteboard or big sheet of butcher paper is best)
2. Arrange the other post-its around it, **grouping** by affinity to each other. So as you add a note, see if it 'fits' nears someone else's note. In the first round, no talking... you can move other's people's notes too
 - **iteration** will be required.
3. Once everyone has placed their notes, you may rearrange some of the notes (iteration of groupings)

This stage done as a group talking and discussing (some movement may occur here as well)

1. Look at each group and see what it has in common into **categories**; name and describe each group.
2. **Go through as a group and create priorities for actions – e.g., high, medium, low**
3. Make to take a “**snapshot**” the result for documentation. For example:
 - digital photo → your design website or notebook
 - transfer post-its onto paper, 1 sheet / notes-cluster

<https://www.youtube.com/watch?v=C4nYxZxteJY>

Why does an affinity diagram work?



use physical
arrangement/proximity to
understand connections



openness to serendipity



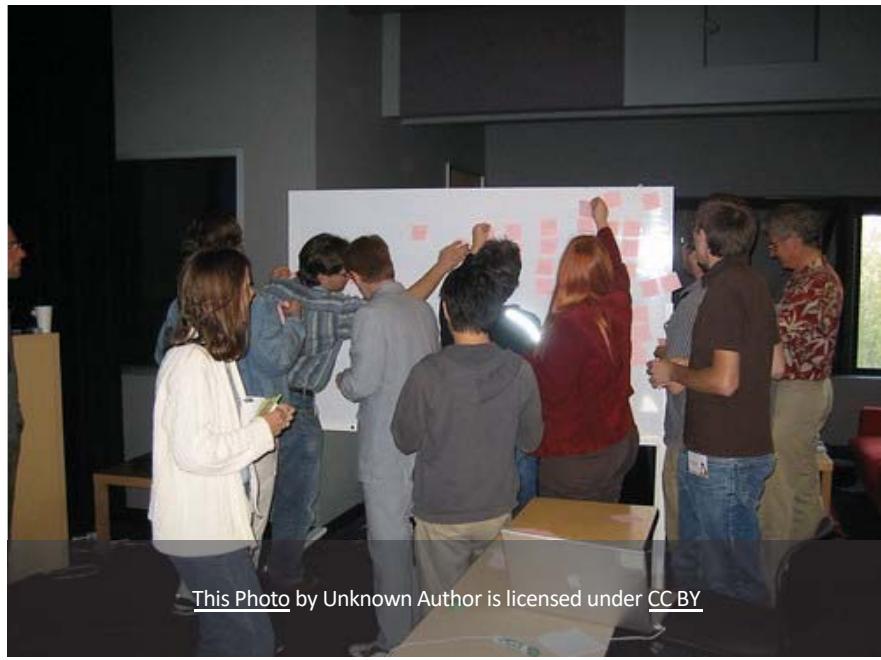
low cost to rearrange ideas



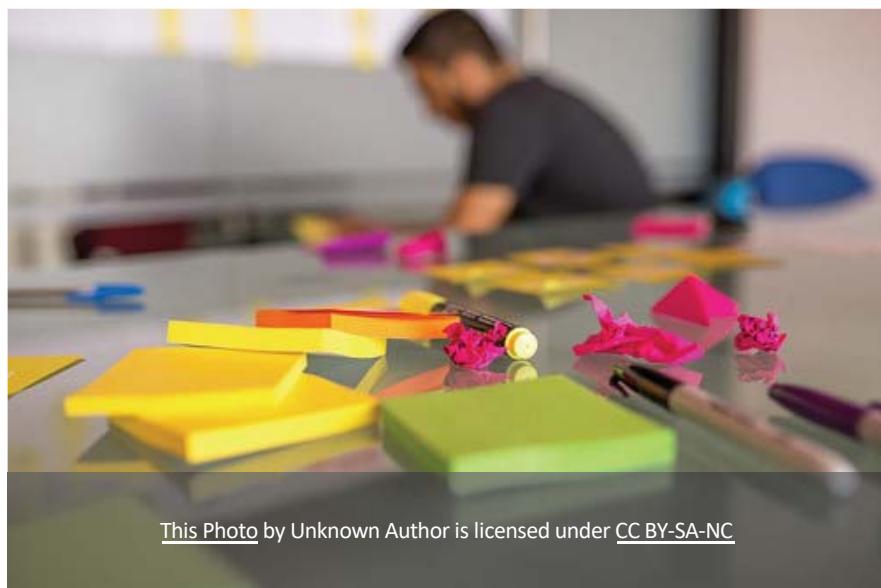
many variants:

arrange along axes rather
than by affinity
tie causes to effects
group evidence under
assertions





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2

Seller identity/personalization



3

attractiveness/beauty/focus/high c

After analyzing your data, you need to brainstorming new ideas (to help with design ideas)

- the point is:
 - to generate MANY, WIDE-RANGING ideas
 - nutty and absurd are GOOD. go for the extremes (to get out of the rut)
 - rip off other's ideas.
- the point is NOT:
 - to generate excellent, complete, feasible ideas
 - ... pressure stifles
 - to develop or critique ideas
 - ... go wide. deep is for later.

Brainstorming Logistics

- Use big pads of paper or Post-Its to put up ideas
- One person writes down ideas
- Number your ideas
- Sketch, diagram, model the idea
 - **A sketch can communicate the idea better**
 - Also suggests new ideas



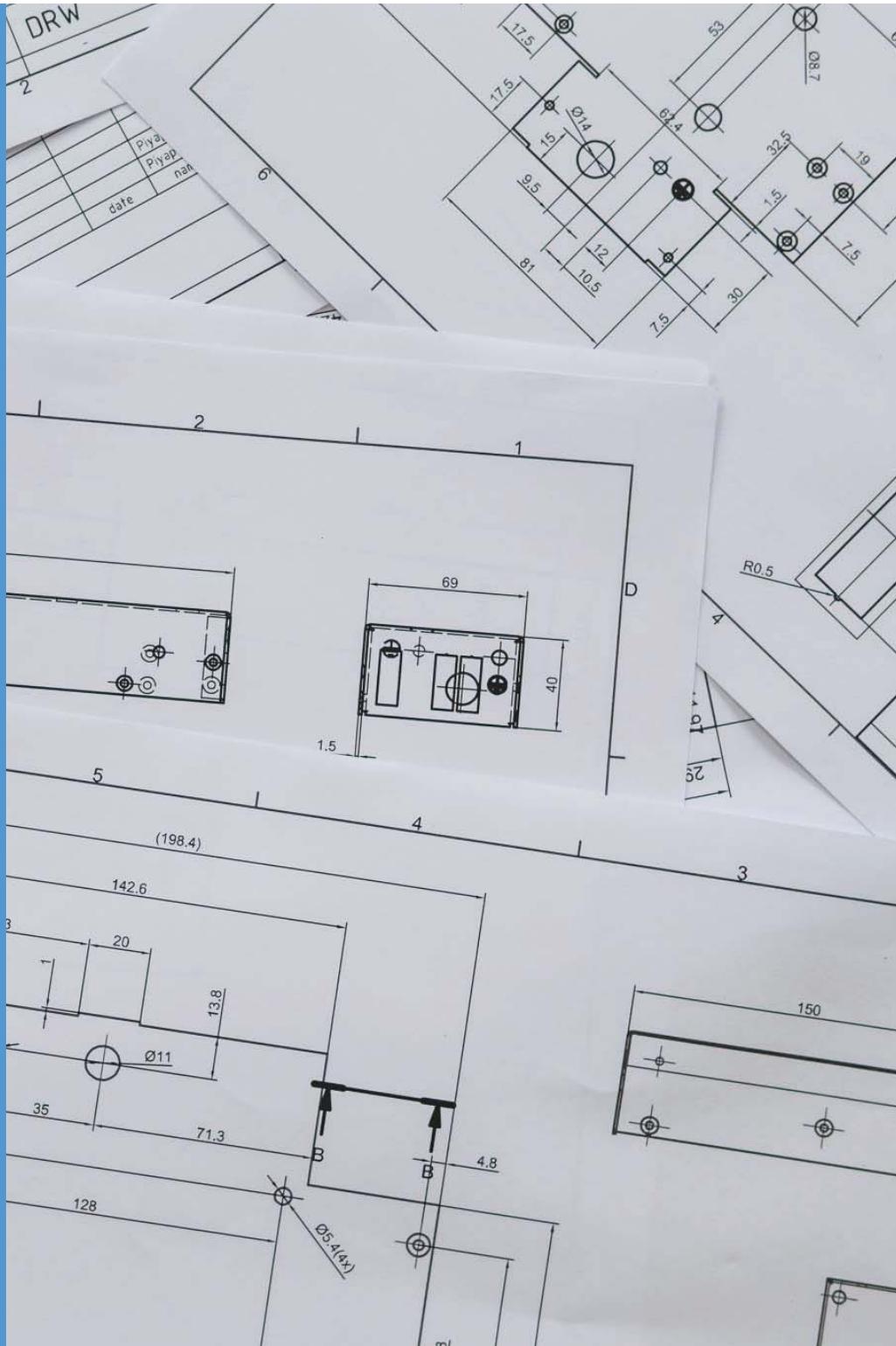
Sketching Idea Generation

Learning Objectives

- Understand what/why/how to sketch interaction
- Explore the benefits of sketching interaction
- Express, develop, and communicate your designs
- Develop tricks for sketching (for non-artists)
- Practice sketching skills

We interrupt
this lecture...
for the non-
artists

To give notice that you
don't need to be a
good at drawing



Sketching is about design

Sketching is not about drawing

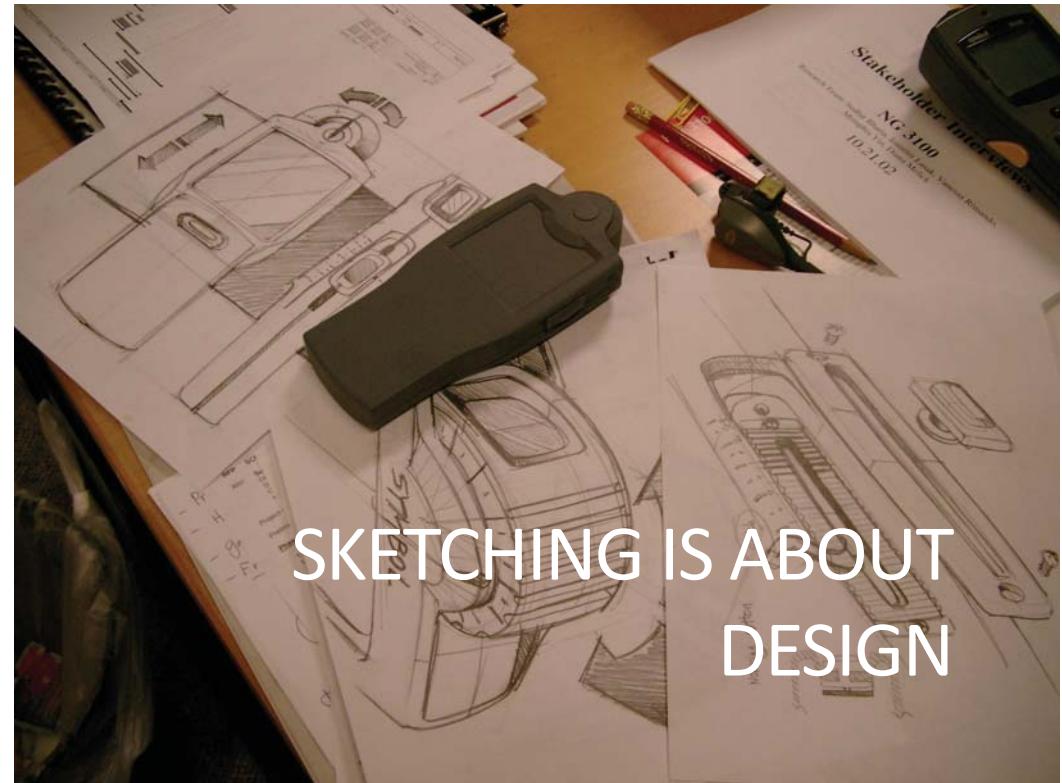
It is about design.

Sketching is a tool to help you:

- express
- develop, and
- communicate design ideas

Sketching is part of a process:

- idea generation,
- design elaboration
- design choices,
- engineering



SKETCHING IS ABOUT
DESIGN

Why Sketch?

Create

- early ideation
- think openly about ideas
- think through ideas
- force you to visualize how things come together
- brainstorming: generate abundant ideas without worrying about quality
- invent and explore concepts

Record

- ideas you develop
- ideas that you come across
- archive ideas for later reflection

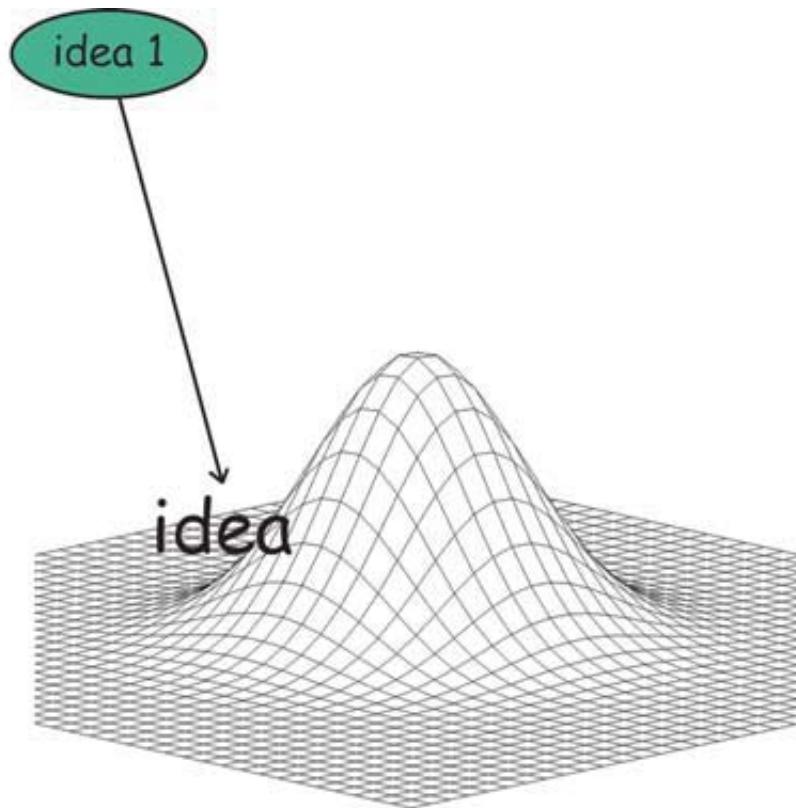
Reflect, share, critique, decide

- communicate ideas to others
- invite responses, criticisms, and alternatives;
- choose ideas worth pursuing

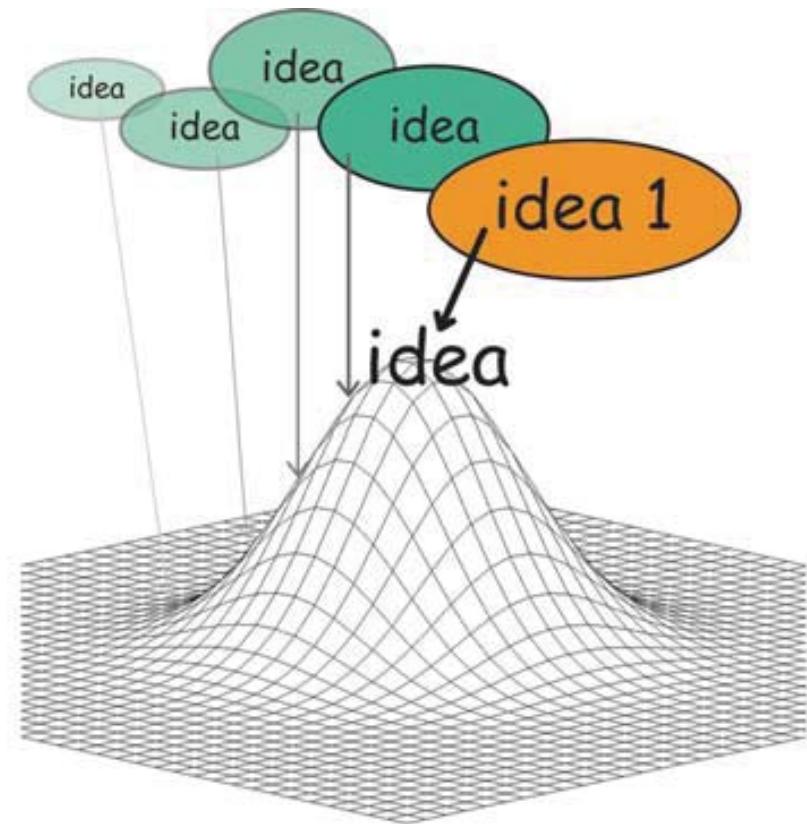
Exploring an idea

Getting the Design Right

Generate an idea



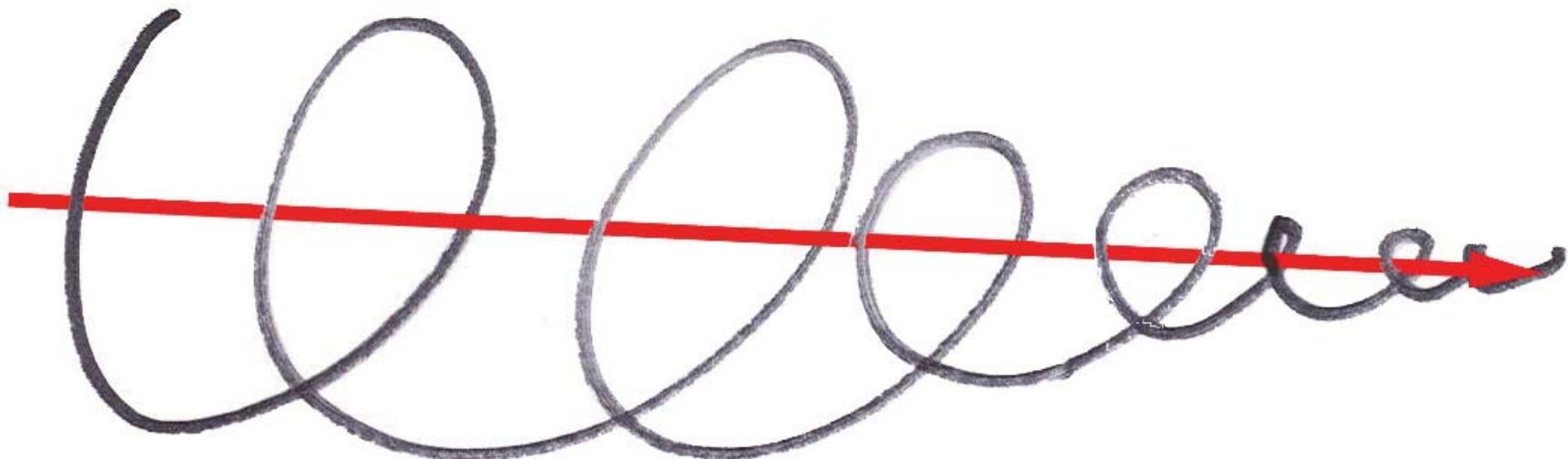
Iterate and develop it



But is it the best idea?

Exploring an idea

Getting the Design Right



The design funnel

Exploring an idea

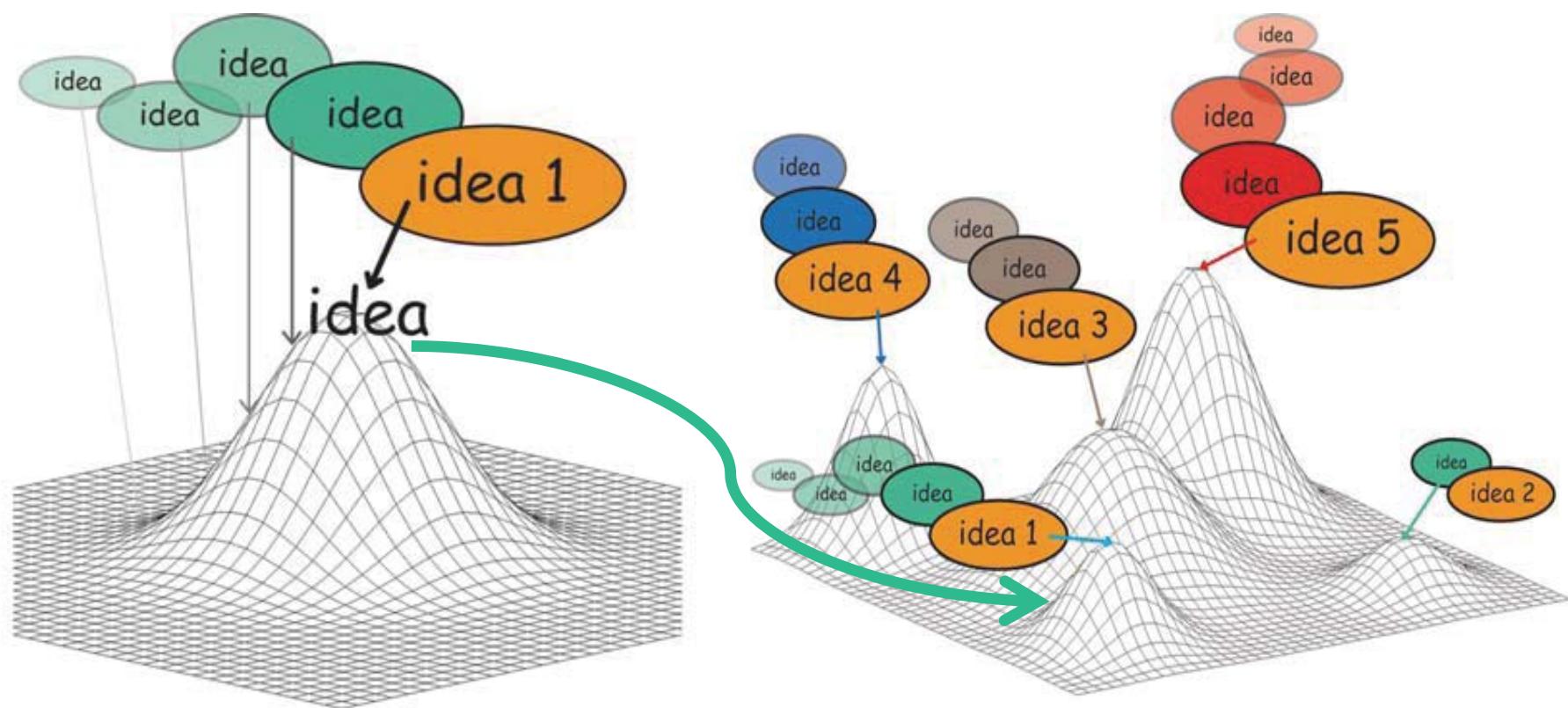
Getting the Design Right

The Problem

fixates on first idea

local hill climbing issue

did you reach local vs. global maxima?



Exploring an idea

Example: Cell phone design

Iterative design

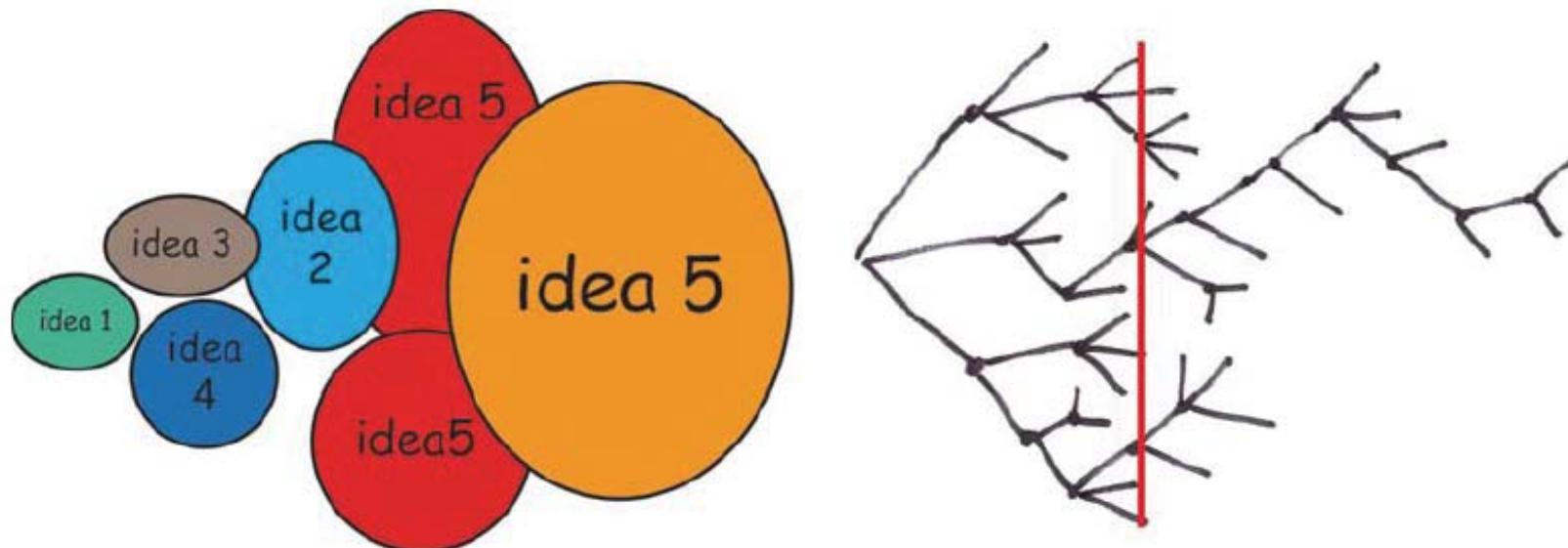


- How will we get here if we only iterate?



Exploring alternatives

Getting the Right Design¹



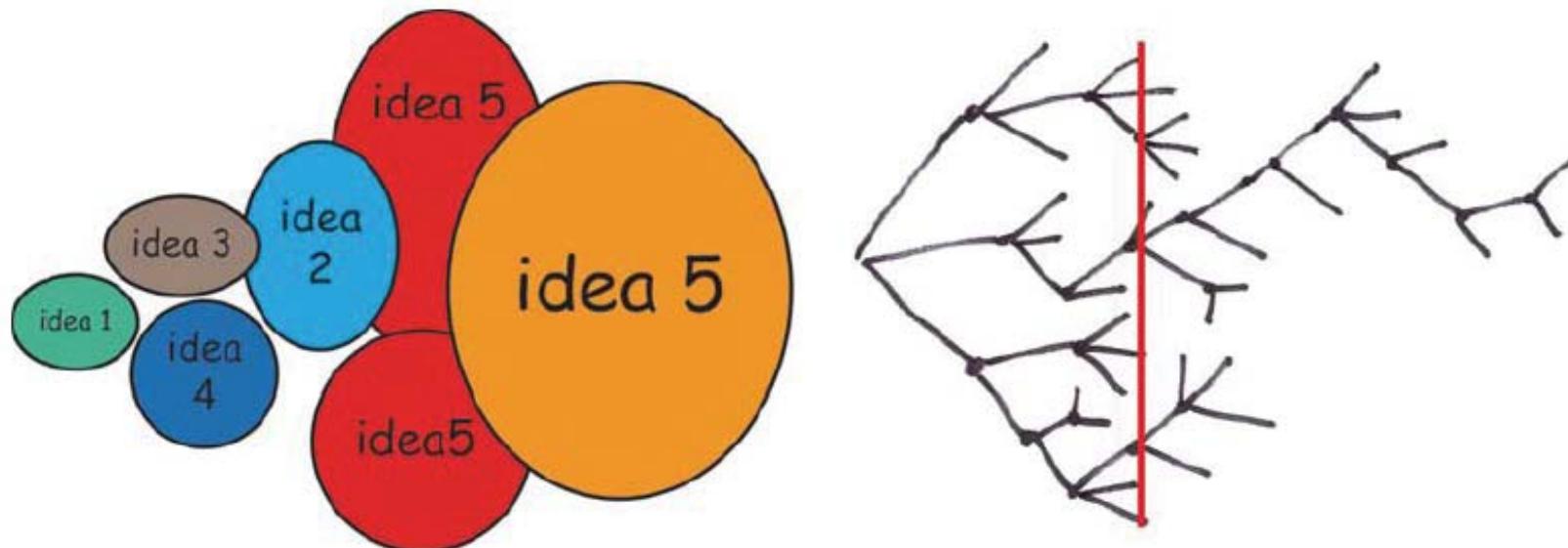
... a designer that pitched three ideas would probably be fired. I'd say 5 is an entry point for an early formal review (distilled from 100s) ... if you are pushing one you will be found out, and also fired ... it is about open mindedness, humility, discovery, and learning. If you aren't authentically dedicated to that approach you are just doing it wrong!

Alistair Hamilton
VP Design
Symbol Technologies

¹Bill Buxton coined the expression ‘Getting the Design Right vs. Getting the Right Design’

Exploring alternatives

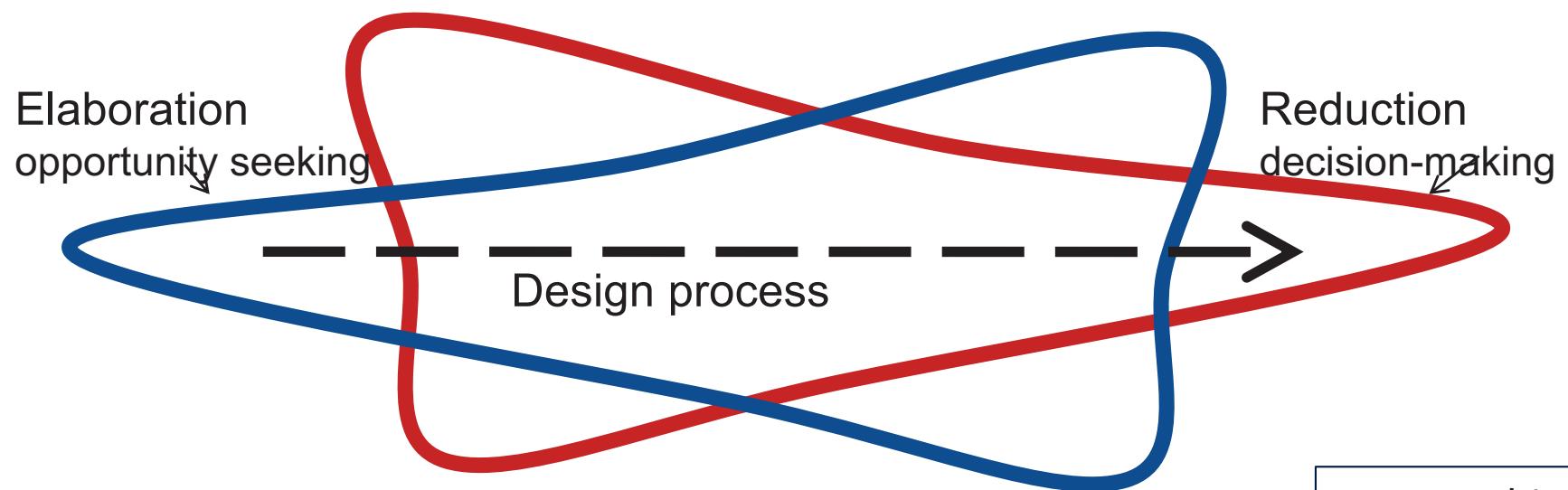
Getting the Right Design



- generate many ideas and variations
- reflect on all ideas
- choose the ones that look most promising
- develop them in parallel
- add new ideas as they come up
- *then* iterate your final choice

Elaboration and Reduction

- **Elaborate** - generate solutions... these are the opportunities
- **Reduce** - decide on the ones worth pursuing
- **Repeat** - elaborate and reduce again on those solutions



This is the idea behind a design funnel → start with lots of concepts and narrow down to design

We saw this
with Ideo
video

You now know

1. Sketching is about design, not just drawing

2. The design process

- get the right design
- then get that design right

3. The design funnel is

- an interplay between elaboration and reduction
- generate and elaborate designs
- choose and reduce between designs

4. Design in product development

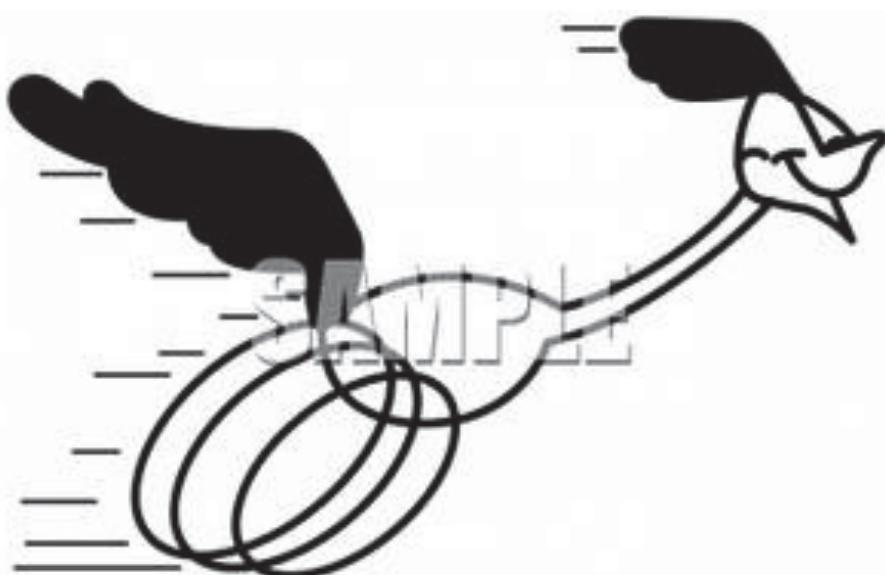
- design to develop ideas with the best ones considered

What is a sketch?



This Photo by Unknown Author is licensed under CC BY

Quick

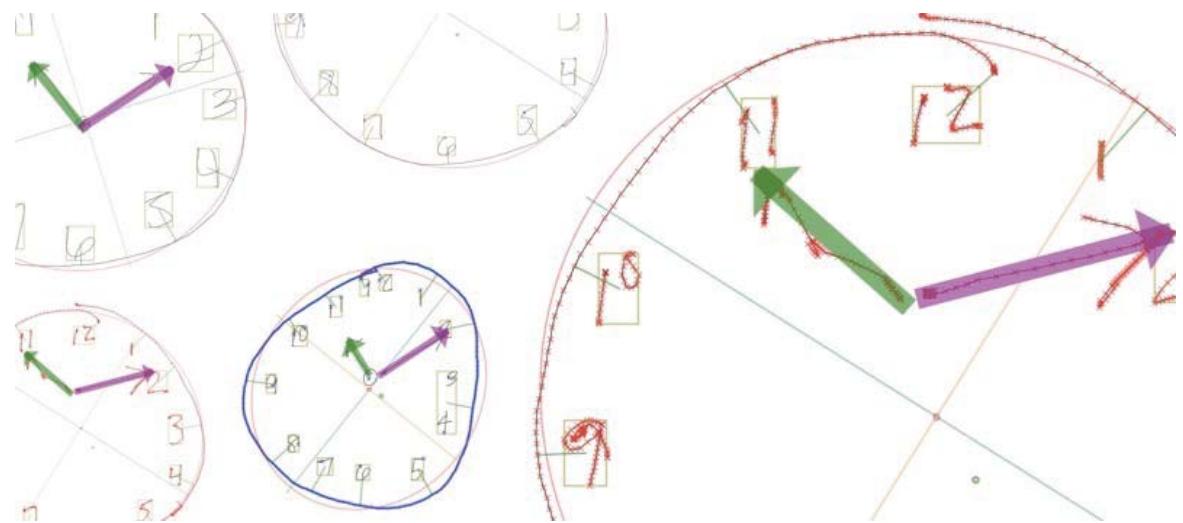


- A sketch is quick to make, or at least gives that impression



Timely

- A sketch can be provided when needed



Inexpensive

- Cost must not inhibit the ability to explore a concept, especially early in design



Disposable

- If you can't afford to throw it away, it's not a sketch
- Investment is in the process, not the physical sketch
- However, not “worthless”

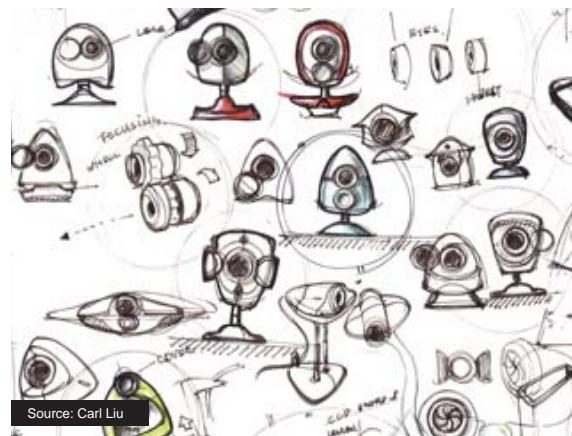


Plentiful

- They don't exist in isolation
- Meaning & relevance is in the context of a collection or series



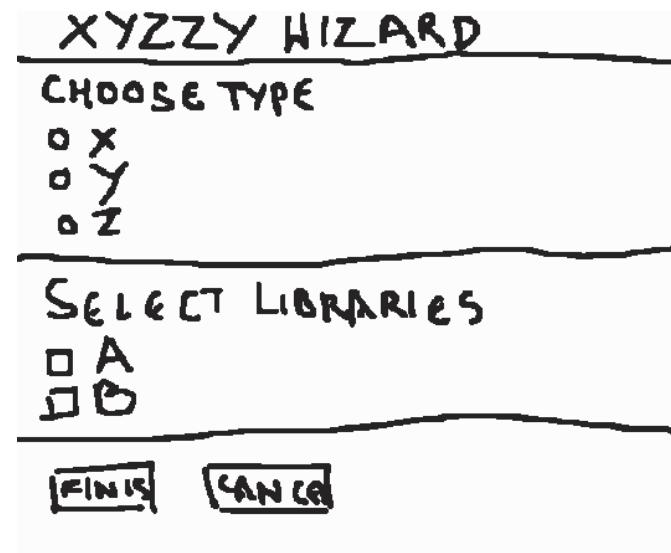
Source: Carl Liu



Source: Carl Liu

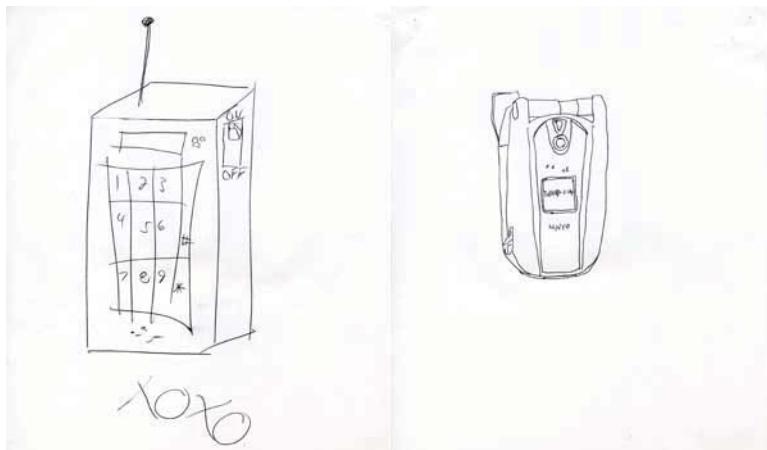
Clear vocabulary

- The way it is **rendered** (e.g., style, form, signals) makes it distinctive that it is a sketch and not an implementation
 - Could be the way that a line extends through endpoints

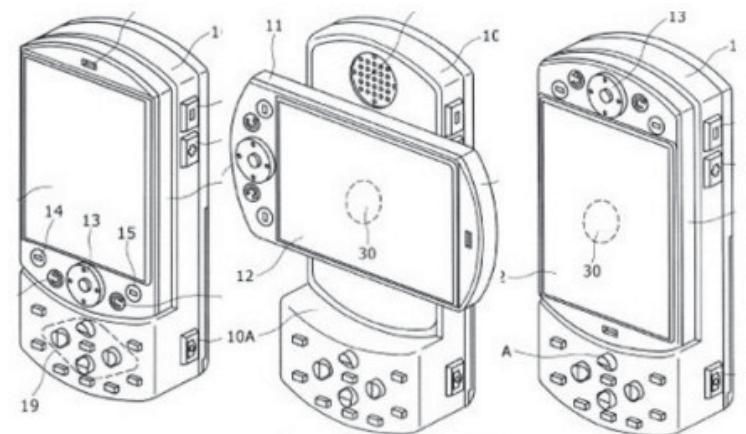


Distinct Gesture

- Openness and freedom
 - Incomplete, room to create
- Tight and precise
 - Complete, nothing left to do

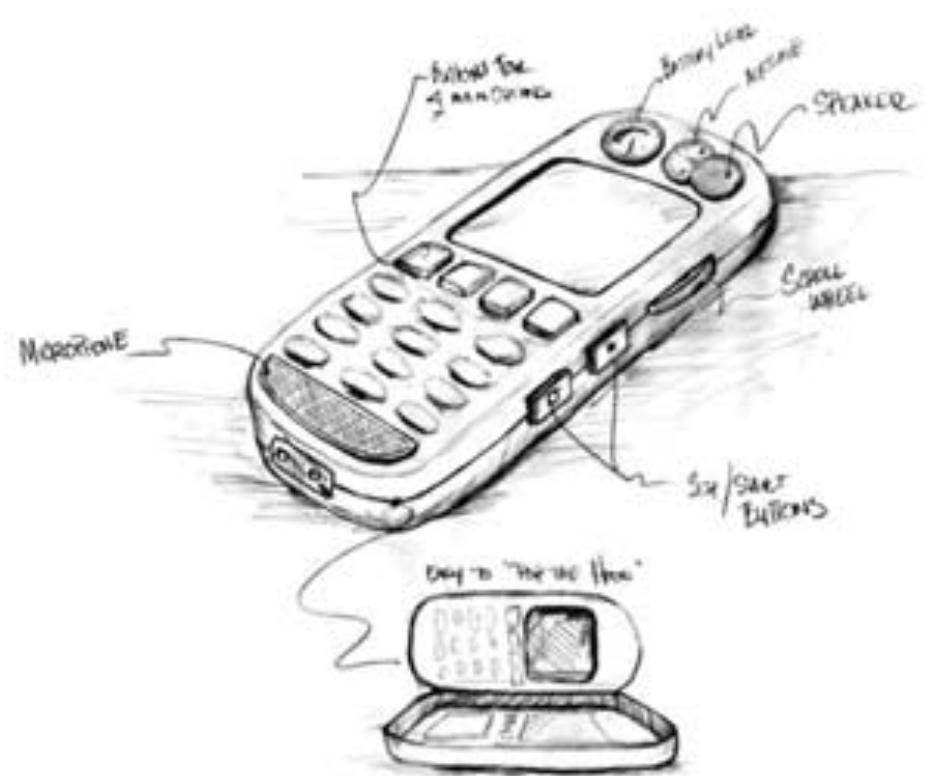


Vs.



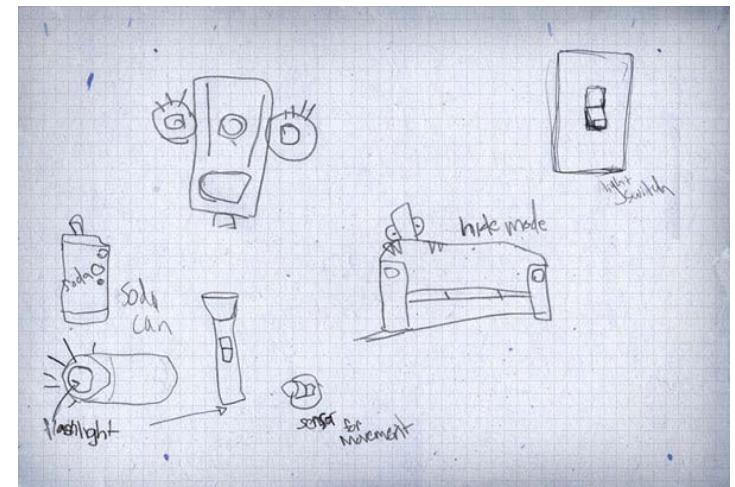
Minimal Detail

- Include only what is required to render the intended purpose or concept



Appropriate Degree of Refinement

- Make the sketch be as refined as the idea
 - If you have a solid idea, make the sketch look more defined
 - If you have a hazy idea, the sketch will look much rougher and less defined



Suggest and explore rather than confirm

- Sketch should act as a catalyst to the desired and appropriate behaviors, conversations, and interactions



Ambiguity

- Intentionally ambiguous
- Value comes from being able to be interpreted in different ways, even by the person who created them



Forms of Sketching?

- Note that the properties don't mention anything about form factor
 - Can be pencil/pen drawing on paper
 - Something scraped together in Photoshop
 - Quick-and-dirty prototyping
 - Magazine cut-outs
 - Modifications to existing objects

A Sketch is not a Prototype

Difference is

- a contrast of purpose (always)
- a contrast in form (usually, but not always)

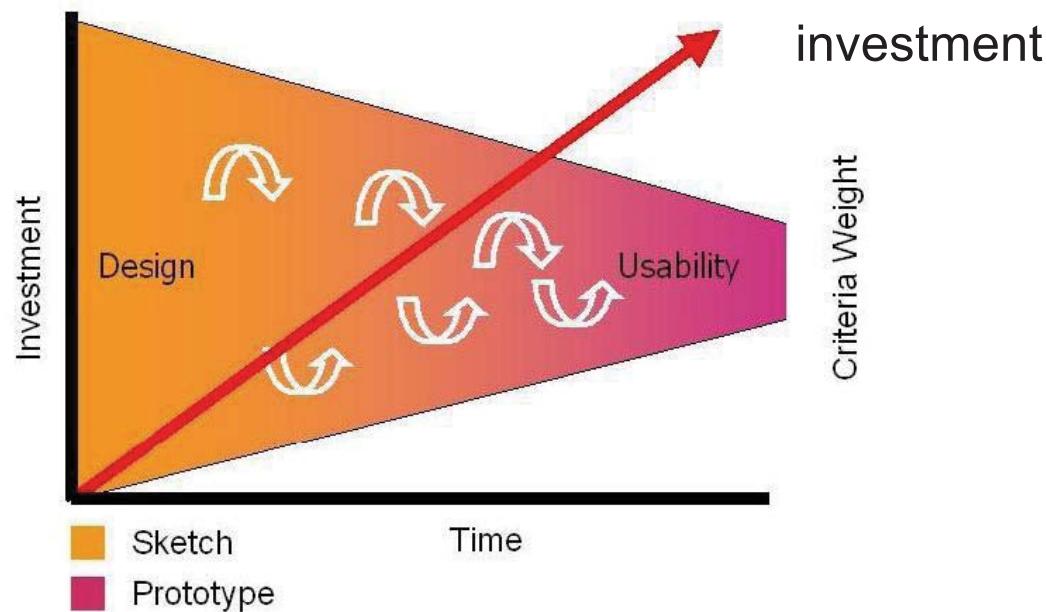


But

- it's a continuum

From Sketches to Prototypes

- Sketches: early ideation stages of design
- Prototypes: capturing /detailing the actual design



SKETCH

PROTOTYPE

EVOCATIVE → DIDACTIC

SUGGEST → DESCRIBE

EXPLORE → REFINE

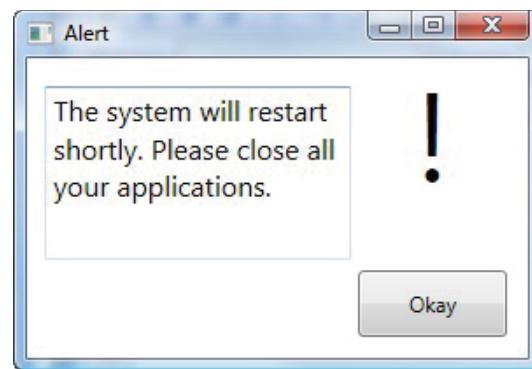
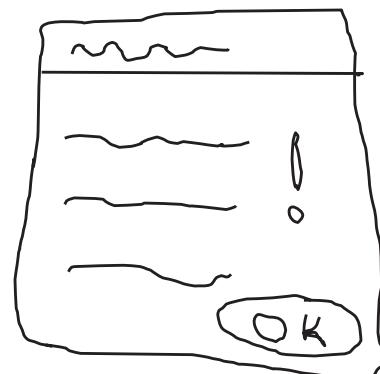
QUESTION → ANSWER

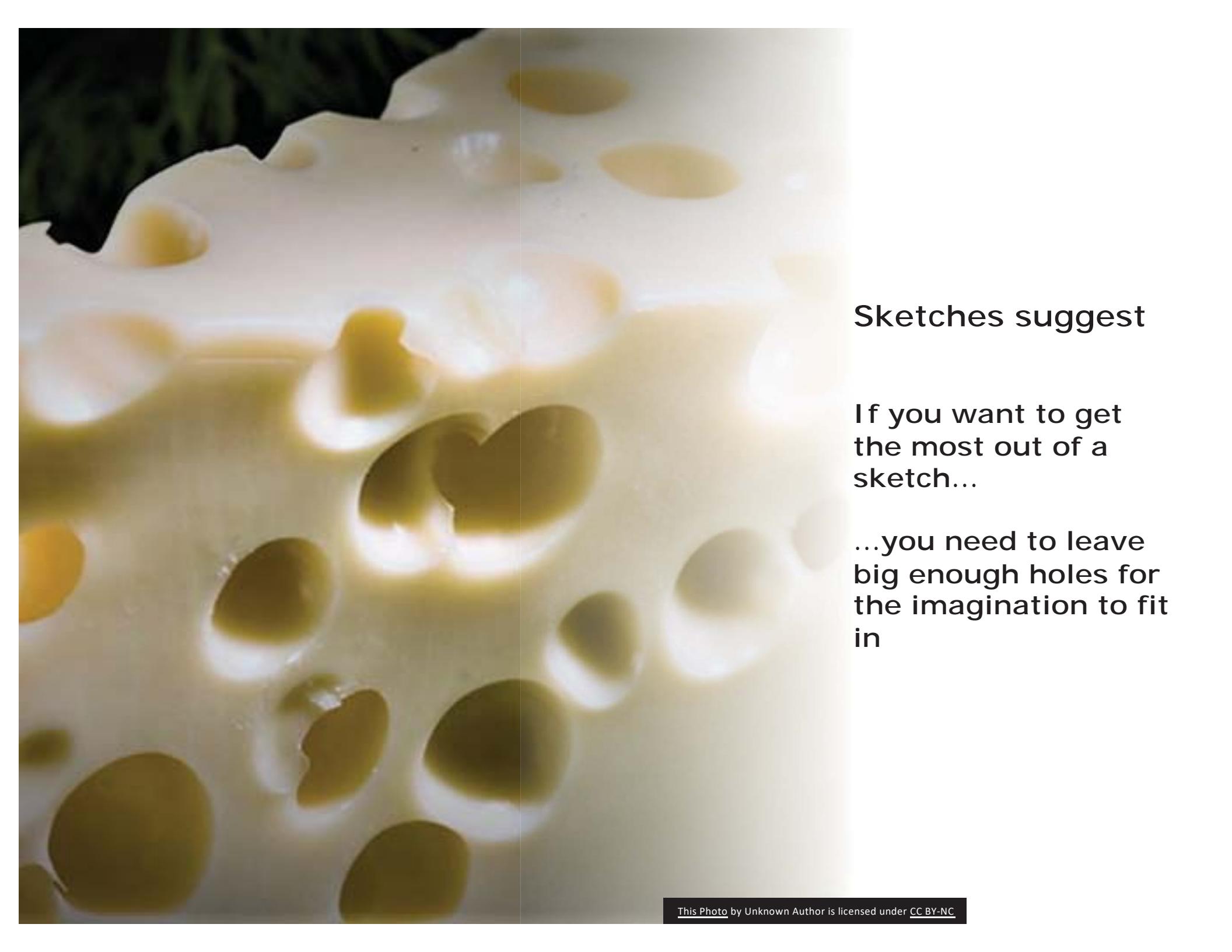
PROPOSE → TEST

PROVOKE → RESOLVE

TENTATIVE → SPECIFIC

NONCOMMittal → DEPICTION





Sketches suggest

**If you want to get
the most out of a
sketch...**

**...you need to leave
big enough holes for
the imagination to fit
in**

You now know

Attributes of a sketch

- quick , timely, disposable, plentiful, clear vocabulary, constrained resolution, consistent with design state

A sketch is not a prototype

- difference is a contrast of purpose (always), and form (mostly)

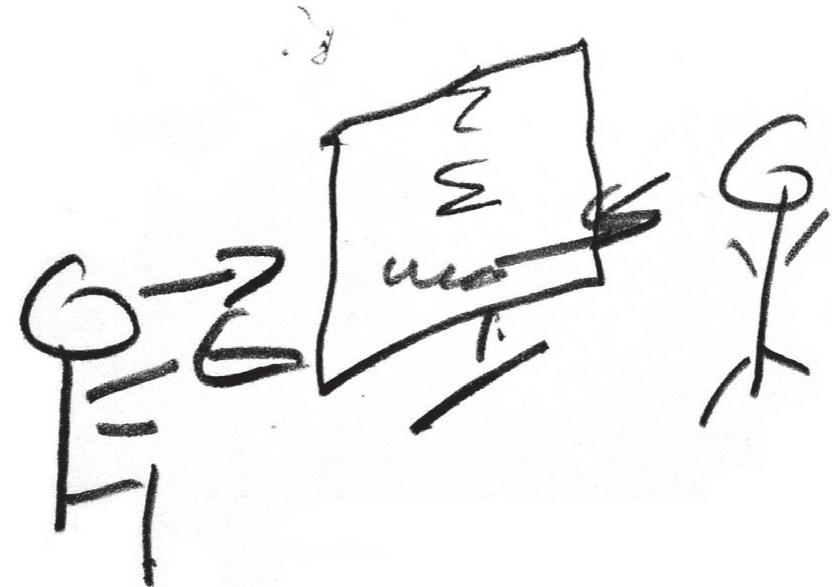
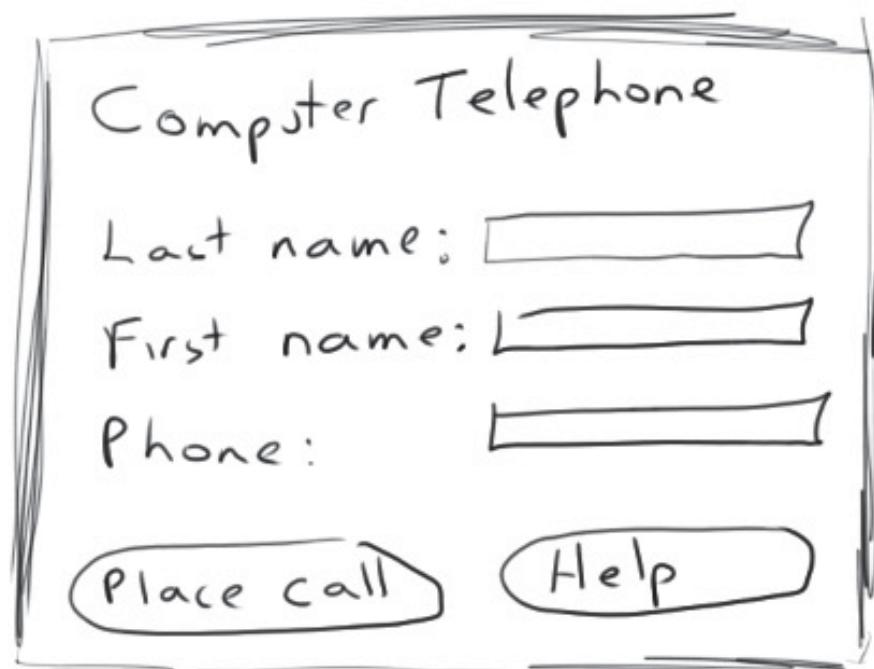
Sketch properties

- suggest, explore, question, propose, provoke

Prototype properties

- Didactic/informative, describe, refine, answer, test, resolve, specific, depiction

Scribble Sketching



Ideas can occur any time

- reflection while walking inspires different solution
- conversation sparks a thought
- a sci-fi movie depicts something interesting
- an interaction element in something you are using
- wake up from a dream
- eureka moment



Image from <http://skyvington.blogspot.ca/2010/11/eureka.html>

How do you capture that idea?

Scribble sketching

- Sampling the real world by rapidly sketching out ideas to capture the essence of the idea

How

- draw very quickly (few seconds)
- very low fidelity
- focus and emphasis on idea essence
- sacrifice all other details



« 581 Presentations > SketchMethods



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Views



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Name



25b-postitvideosketch.wmv



CellPhonePhoto.png



CellPhoneTracing.doc



CellPhoneTracing.png



crossY.mov



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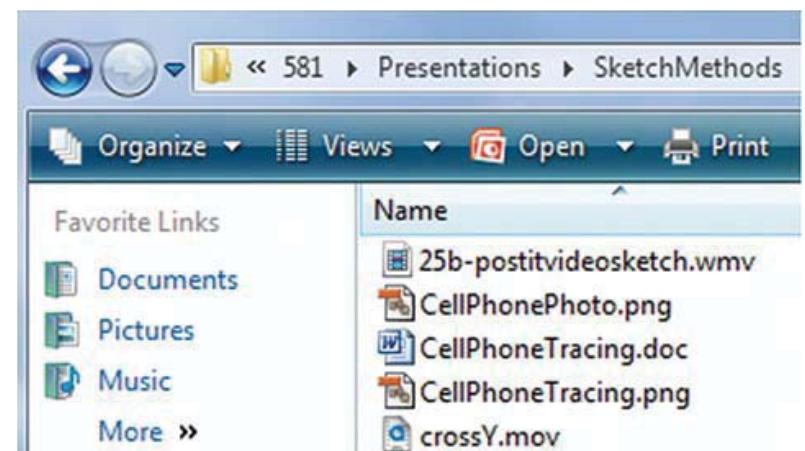
Scribbling Example results

Emphasis: layout

Details: highlight structures of panes, key buttons & fields

Abstracted: icons/labels/ text as caricature scribbles

Left out: decorations, actual text, lesser interface controls



Example results

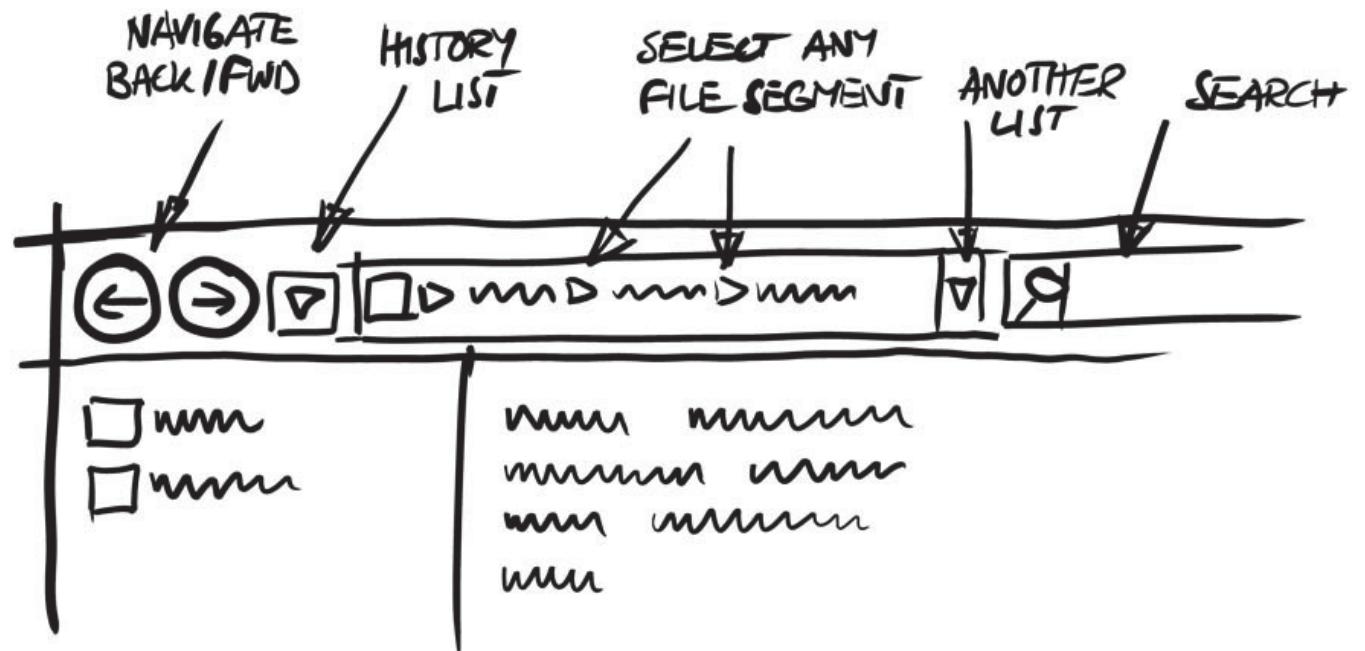
Can provide labels to explain function

Emphasis: folder navigation

Details: annotated interaction methods in the navigation bar

Abstracted: icons/labels/ text as caricature scribbles

Left out: decorations, actual text, lesser interface controls

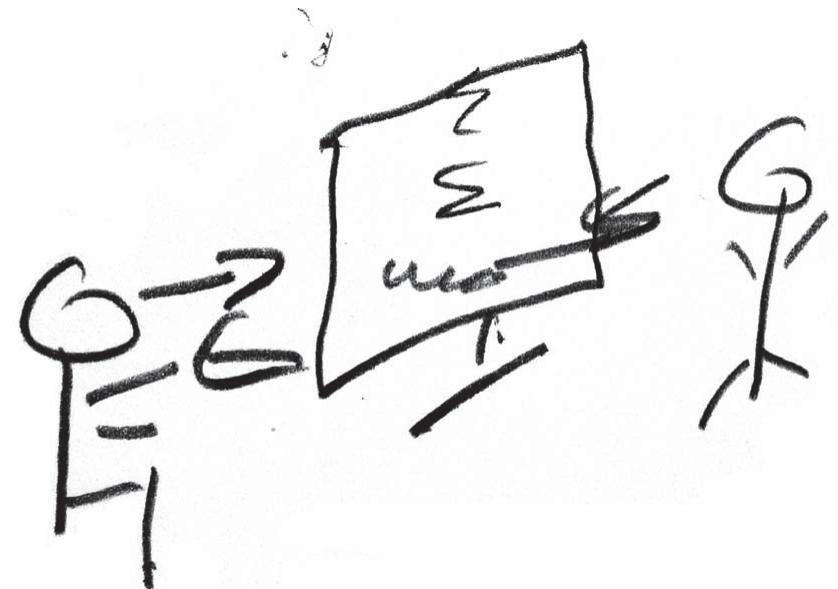


Sketching in the dark

So you can do it even when not looking

- movie theatre, meetings...

Example: While watching Avatar: transparent displays for communication



Try it

I will show you an image

15 seconds: choose a single idea or concept from that image to capture

30 seconds: scribble-sketch it

You try: non-rectangular touch screen



Photo from TCARS interface from *Star Trek: Voyager*, “Relativity” (Season 5, Episode 24, 1999). In Shedroff and Noessel, “Make it So”. Rosenfeld Press, 2012.

You try: a hinged tablet

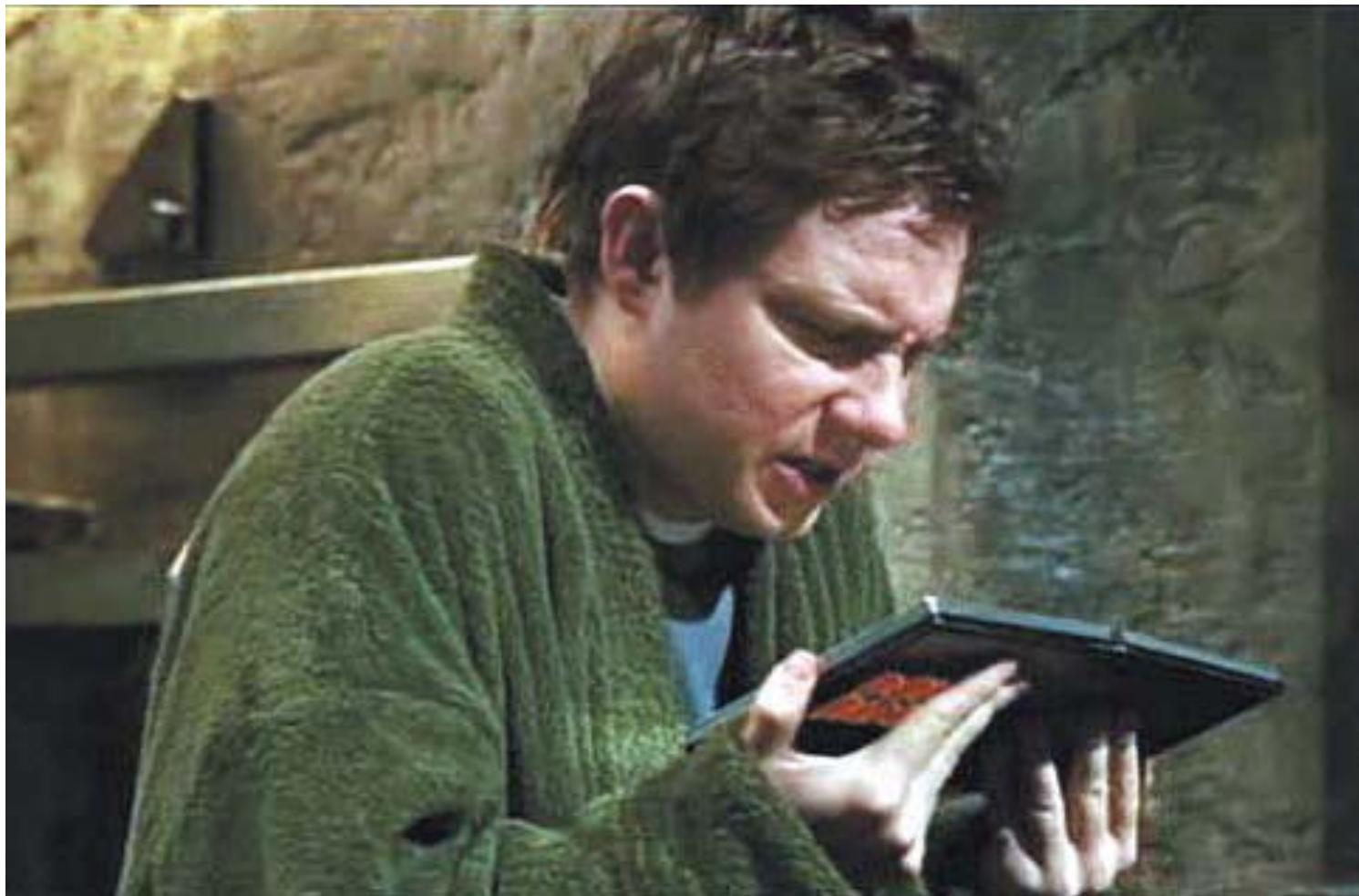


Photo from The Hitchhiker's Guide to the Galaxy (2005). In Shedroff and Noessel, "Make it So" . Rosenfeld Press, 2012.

You now know

Scribble sketches

- are done very rapidly (few seconds)
- serve to capture critical ideas on the fly
- sacrifice detail and fidelity to speed
- Can even be done without looking

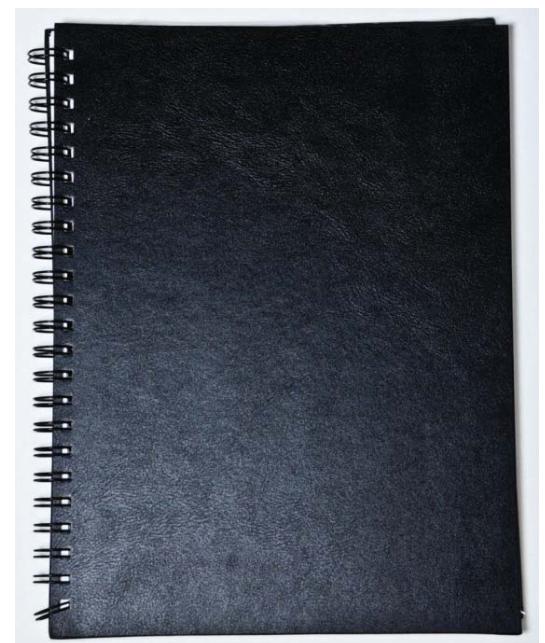
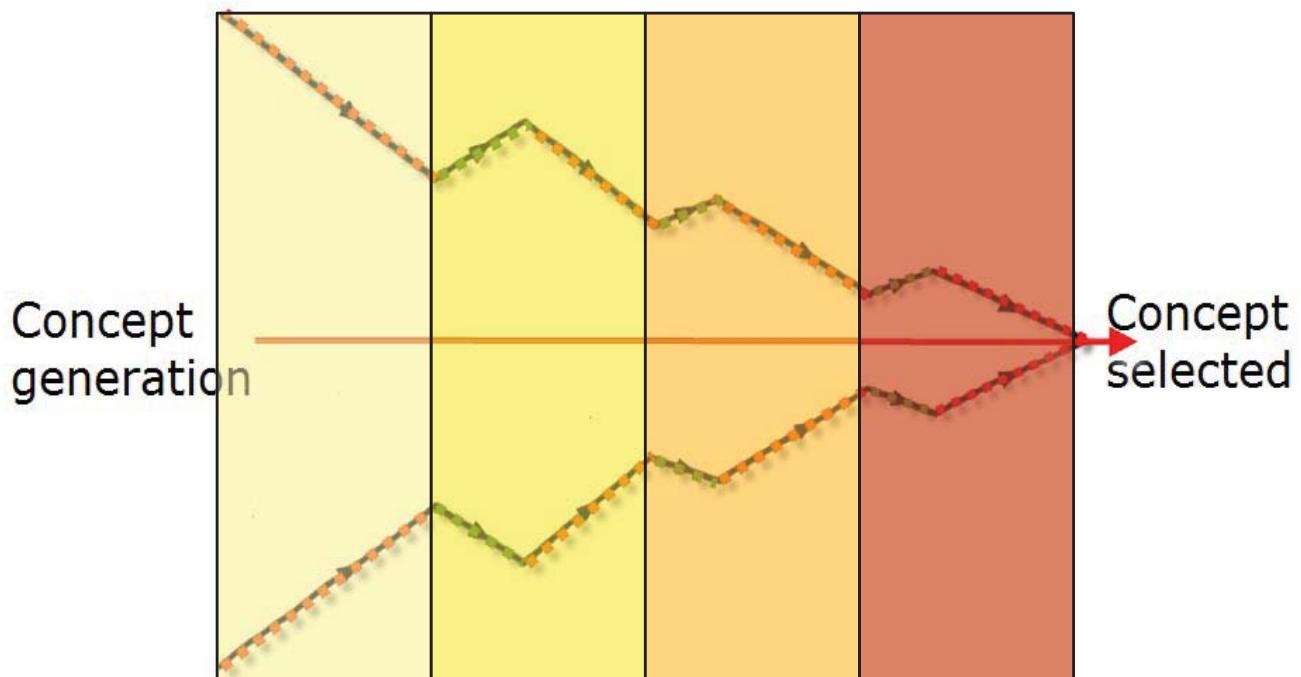
The Sketchbook



The Sketchbook

Why a sketchbook?

- *supports the design funnel process*



Sketchbook instruments

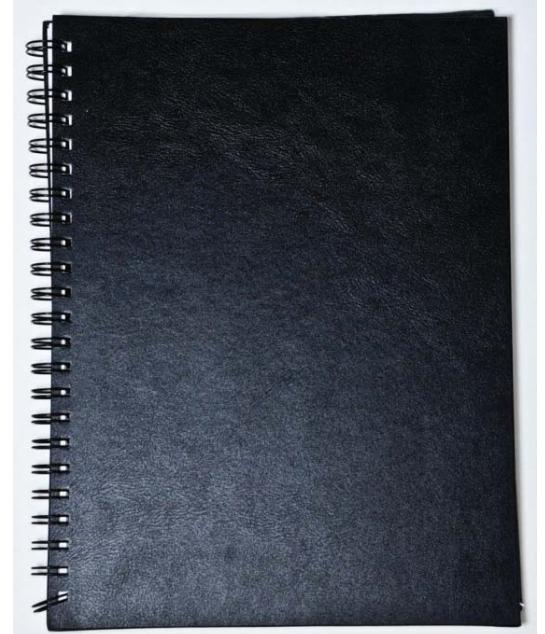
The pencil

- cheap, flexible
- easy to carry (in coil binding)
- always carry one with you



camera

- for taking photos of interesting ideas
- select, print and tape photos into your sketchbook



Other media

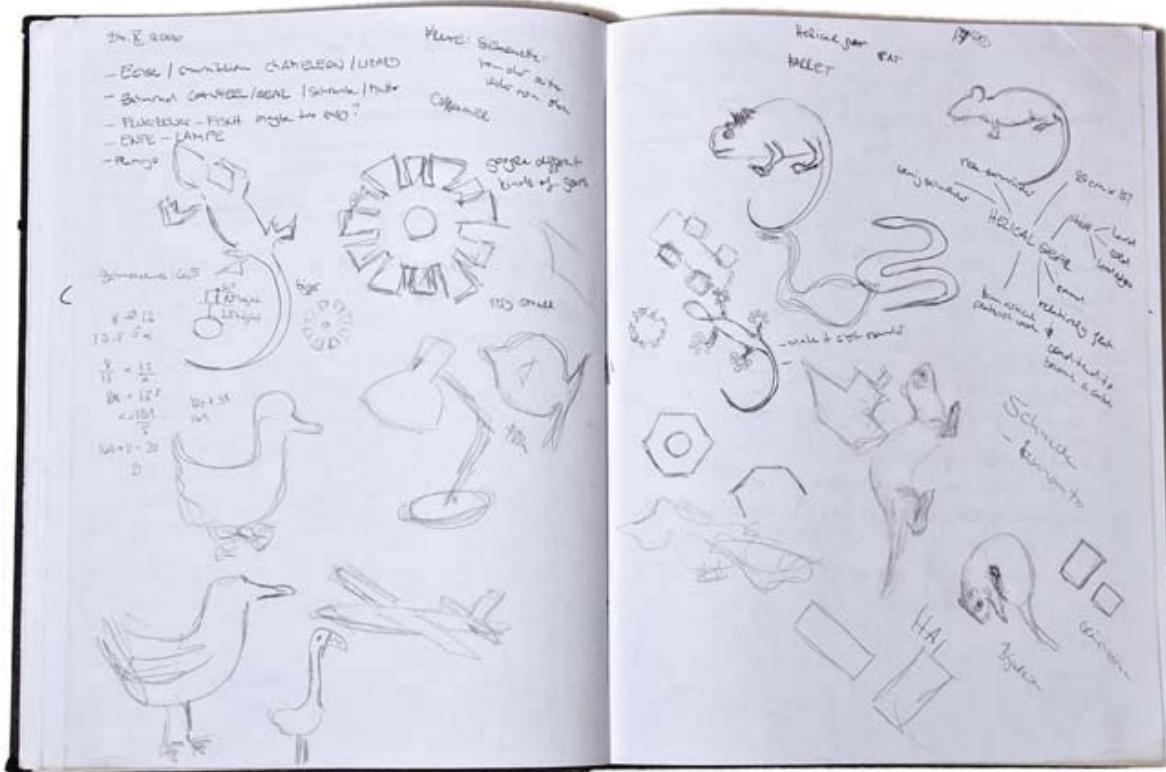
- *sure, as long as it doesn't get in the way*



Best practices

Carry and use your sketchbook regularly and frequently

- sketch anywhere, anytime, frequently
- only works if you carry it with you



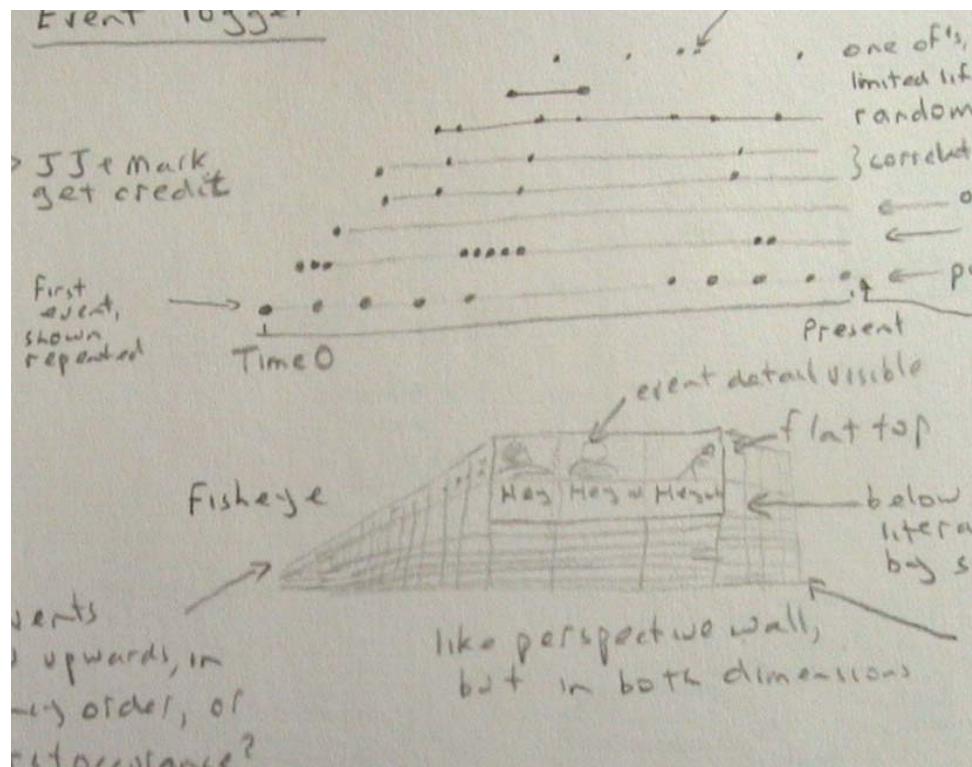
Best practices

Fill your pages

- a single well composed idea
- a series of related drawings about a design idea
- things you see that inspire ideas

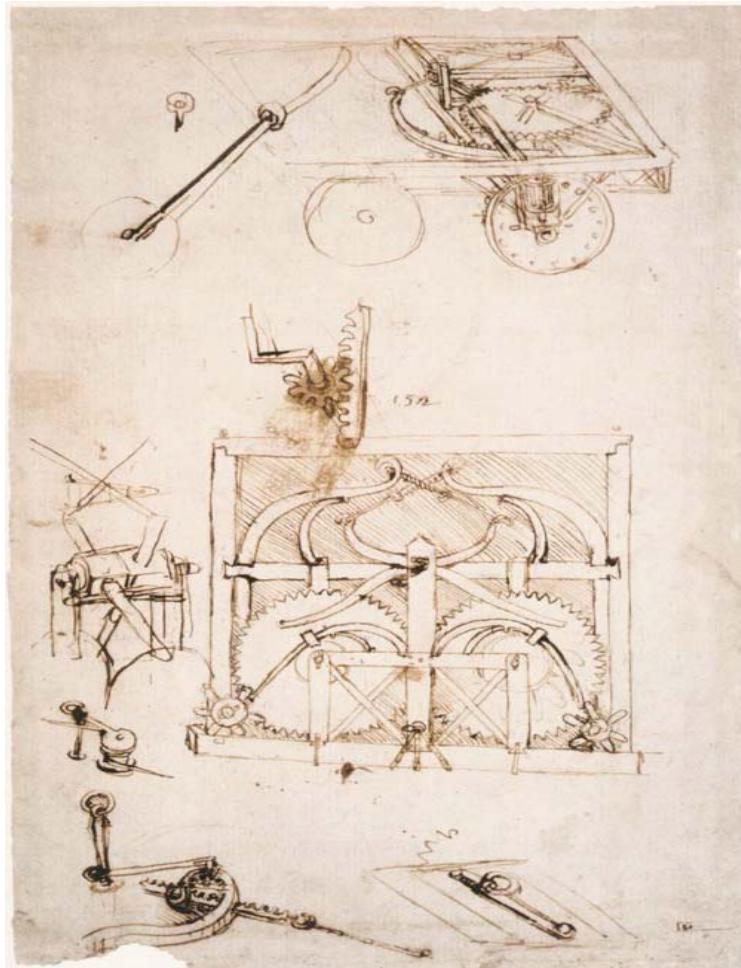


You don't need to be an artist

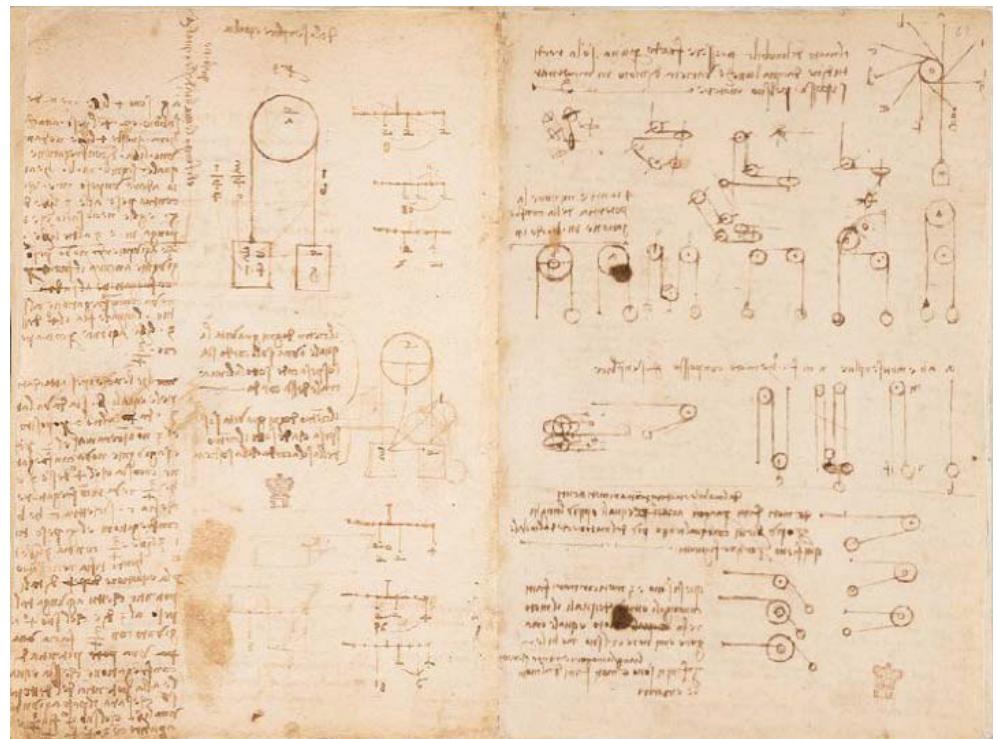


portion of a page from Saul Greenberg's sketchbook

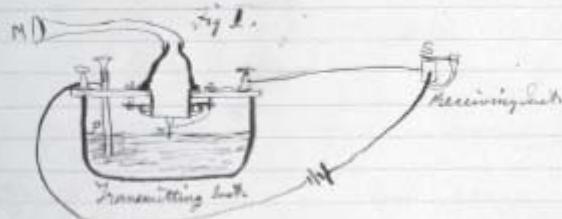
Sketchbook Examples



- Leonardo DaVinci
- <http://www.bl.uk/onlinegallery/ttp/ttpbooks.html>



March 10th 1876



1. The improved instrument shown in Fig. I was constructed this morning and tried this evening.
P is a brass pipe and W the platinized wire.
M the mouth piece and S the armature of
the Receiving Instrument.

W. Watson was stationed in one room with the Receiving Instrument. He pressed one ear closely against S and closed his other ear with his hand. The Transmitting Instrument was placed in another room and the doors of both rooms were closed.

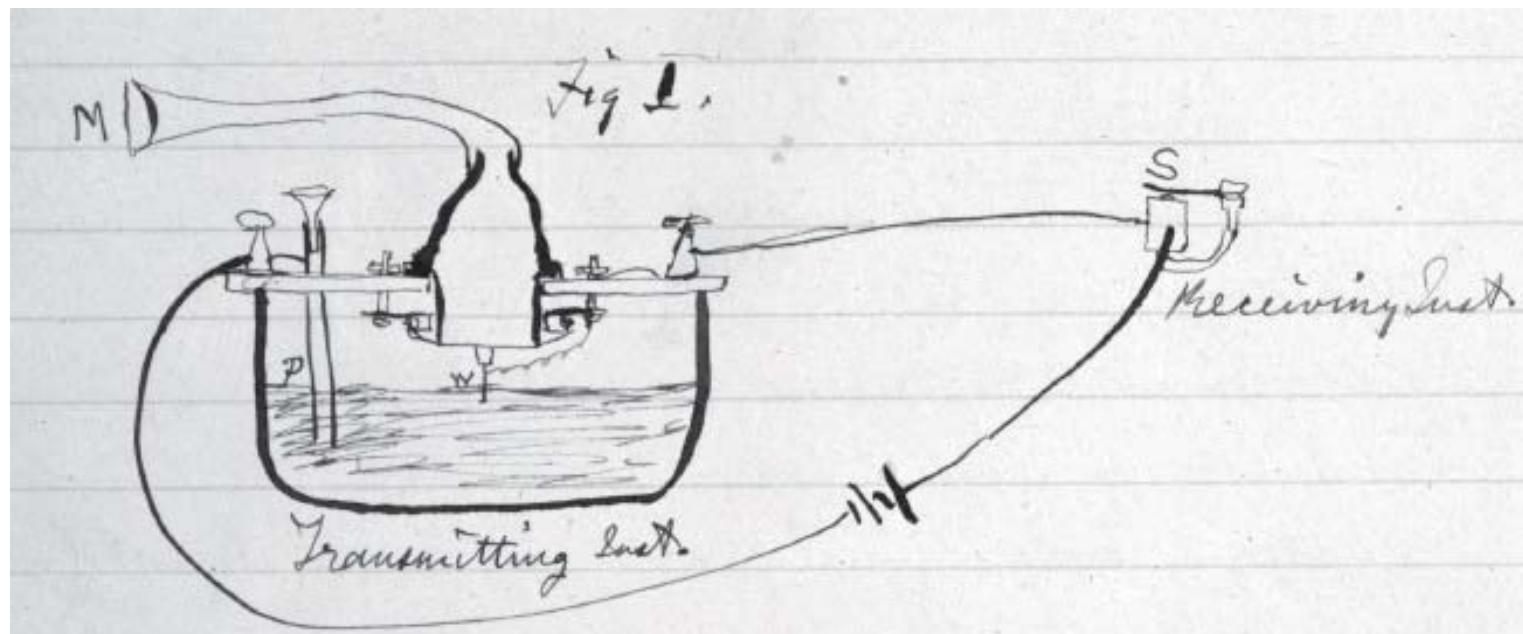
I then shouted into M the following sentence: "Mr. Watson - come here - I want to

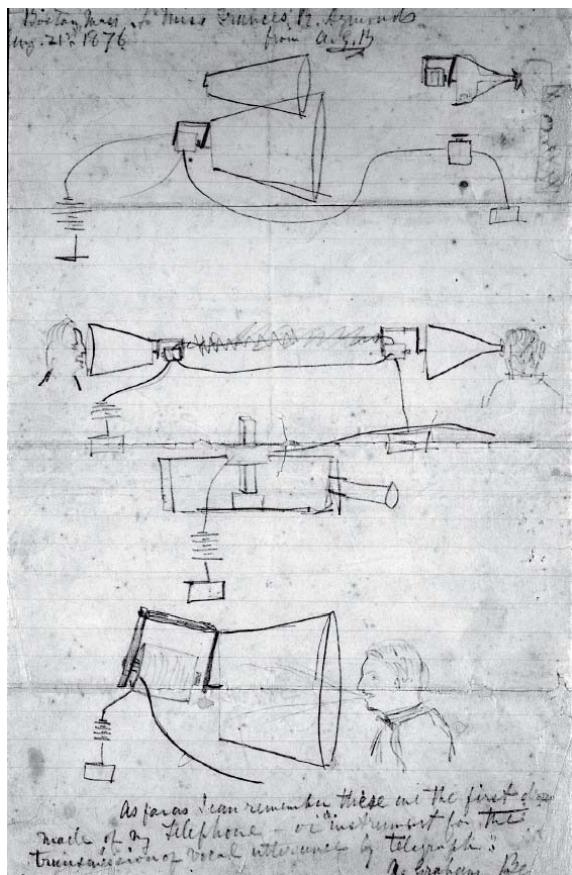
see you". To my delight he came and declared that he had heard and understood what I said. I asked him to repeat the words. He answered "You said 'Mr. Watson - come here - I want to see you'". W. Watson changed places and I listened at S while Mr. Watson read a few passages from a book into the mouth piece M. It was certainly the case that articulate sounds proceeded from S. The effect was loud but indistinct and muffled.

If I had read beforehand the passage given by W. Watson I should have recognized every word. As it was I could not make out the sense - but an occasional word here and there was quite distinct. I made out "to and out" and "further"; and finally the sentence "Mr. Bell do you understand what I say? Do - You - un-der - stand - what - I - say" came quite clearly and intelligibly. No sound was audible when the armature S was removed.

Alexander Graham Bell

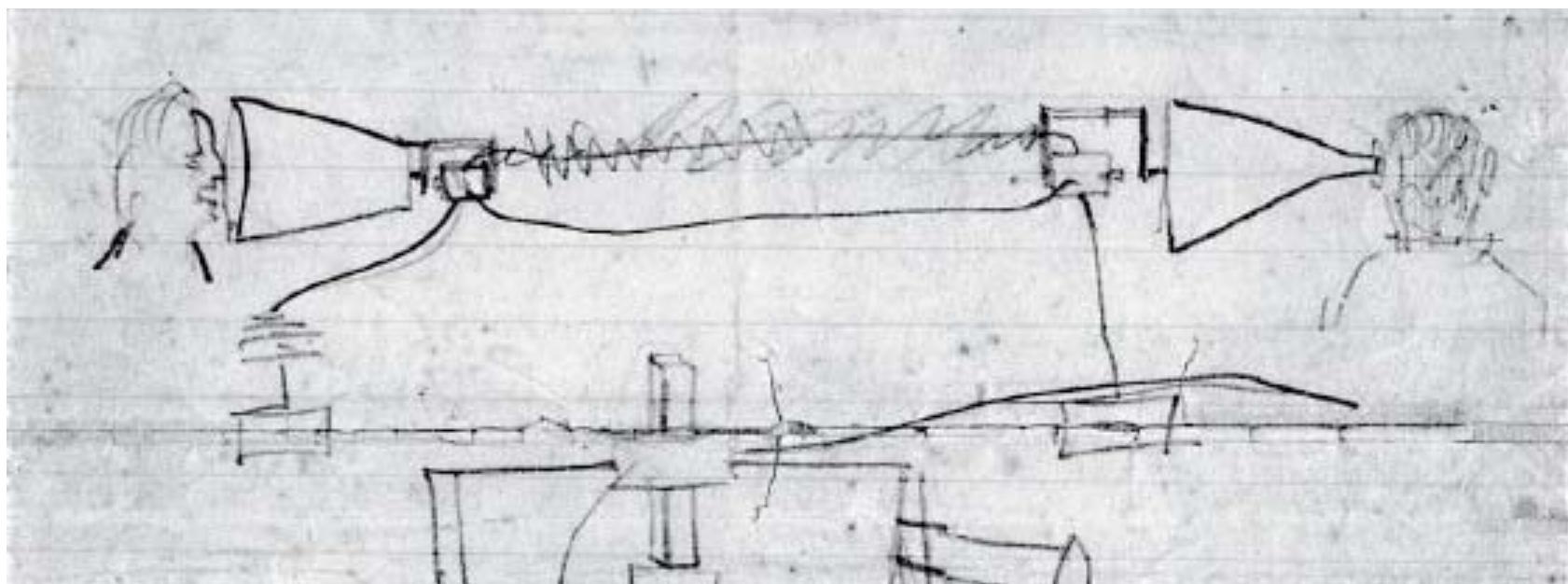
Source: The Library of Congress
<http://memory.loc.gov/ammem/bellhtml/bellhome.html/>



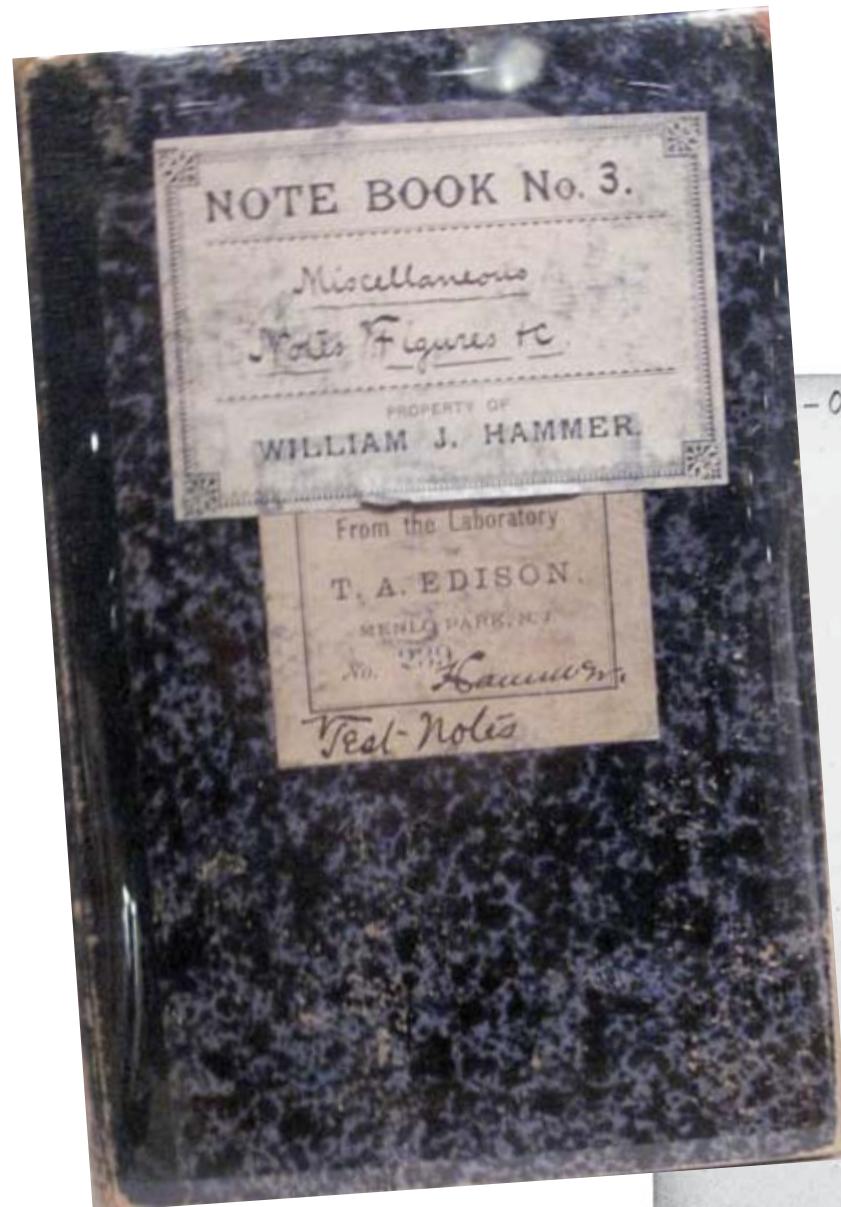


Alexander Graham Bell

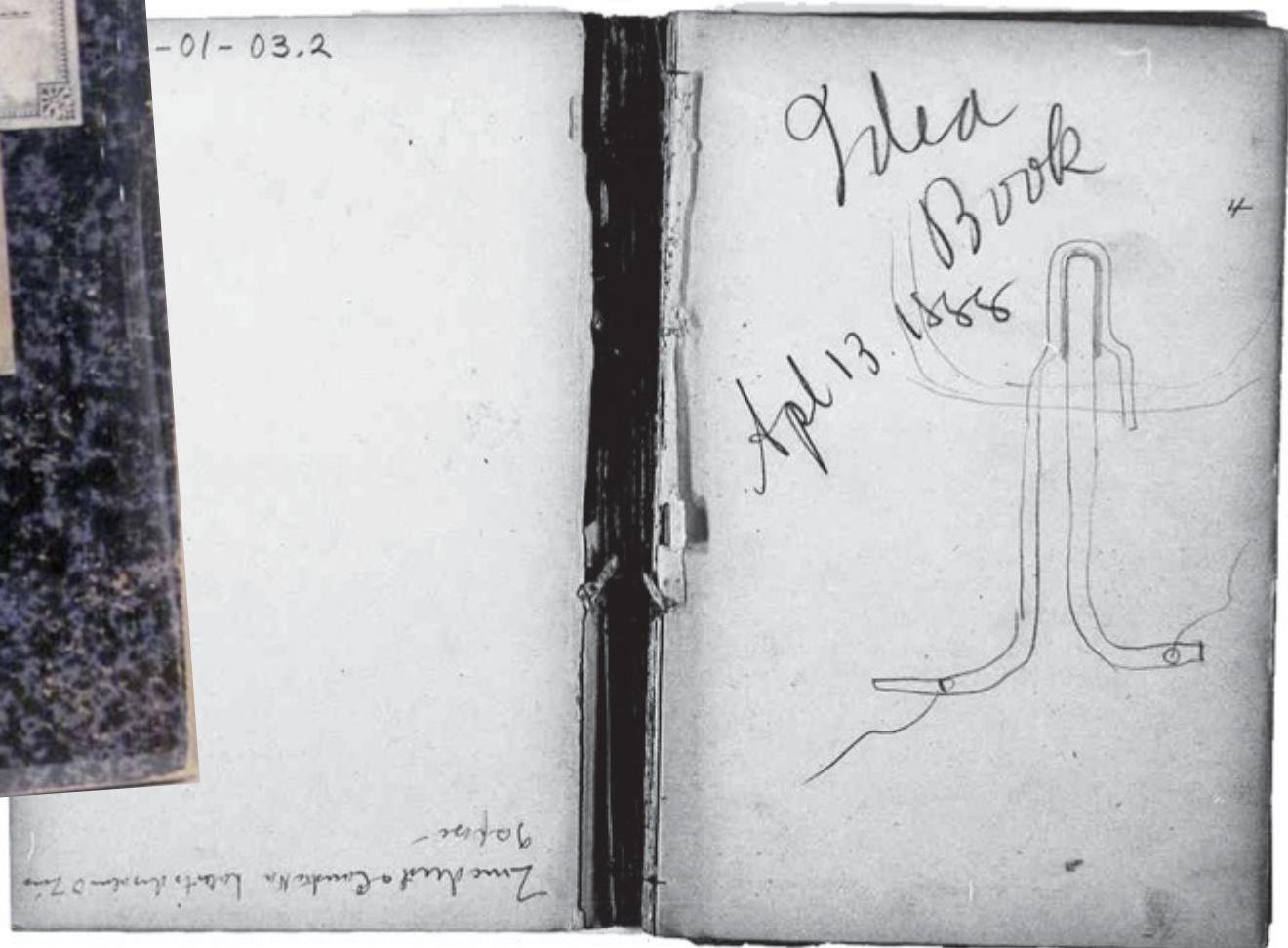
Source: The Library of Congress
<http://memory.loc.gov/ammem/bellhtml/bellhome.html/>



Thomas Alva Edison

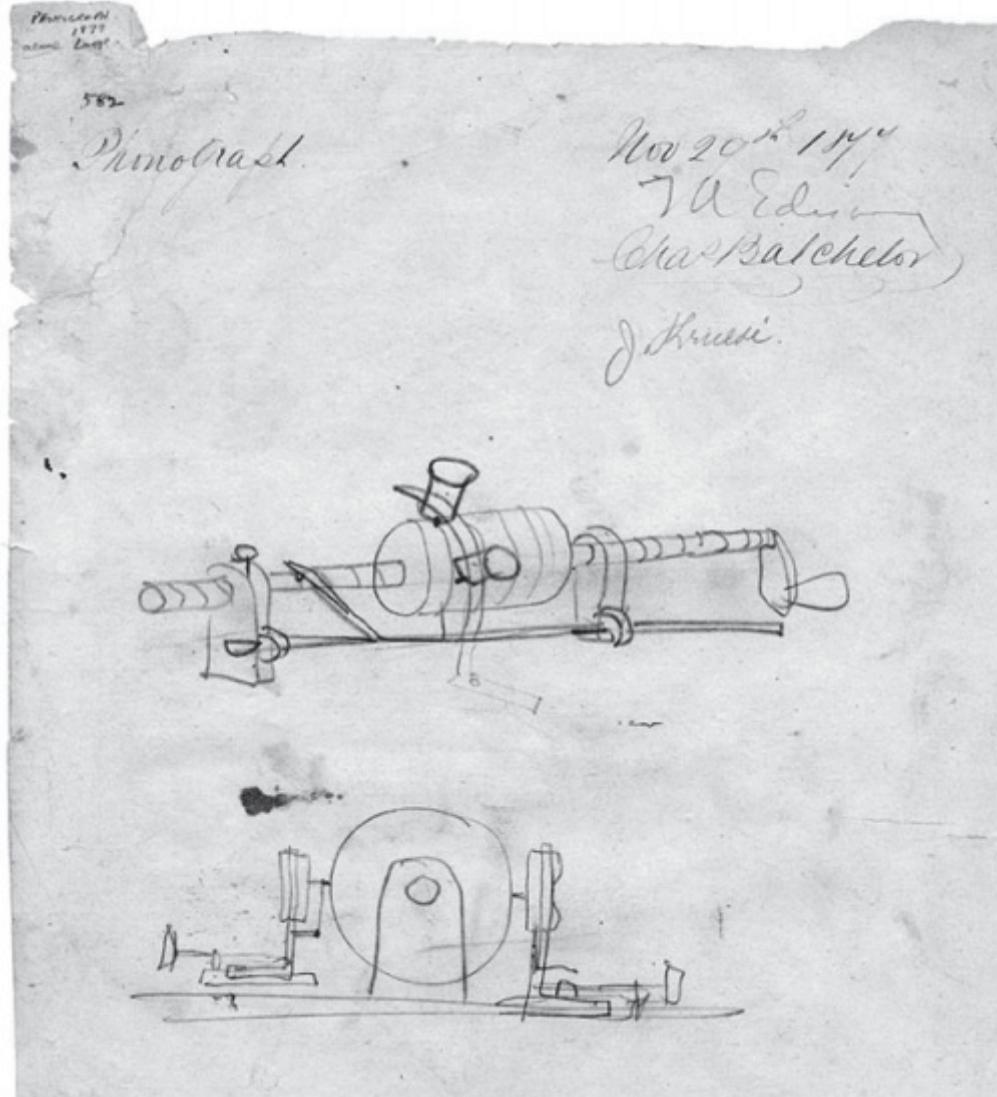
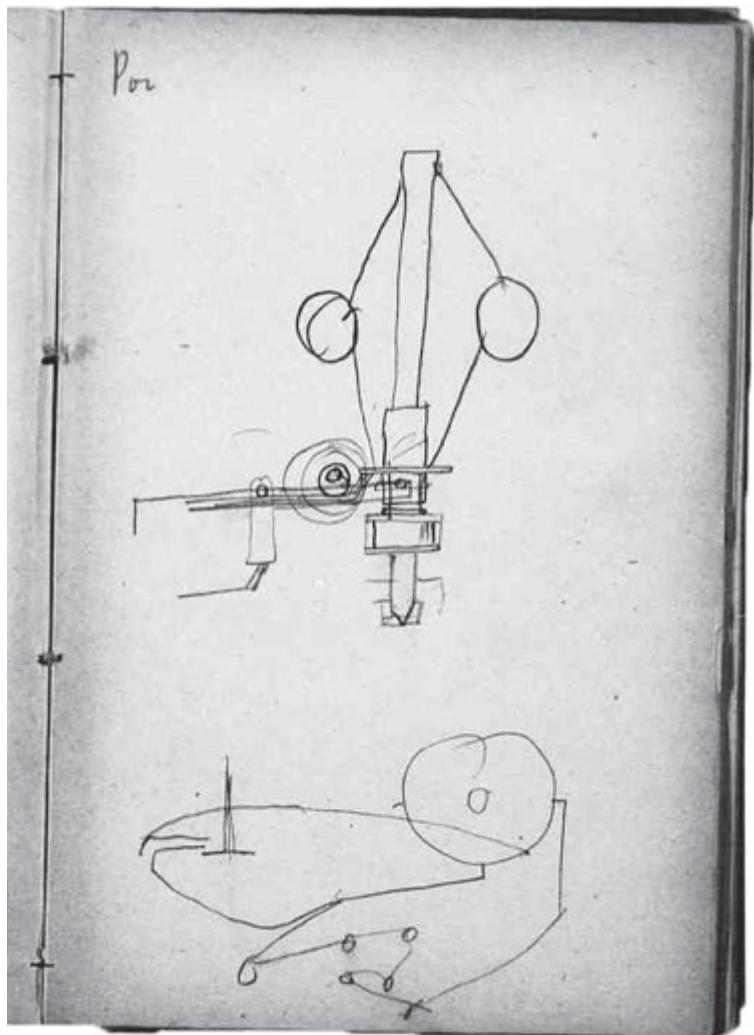


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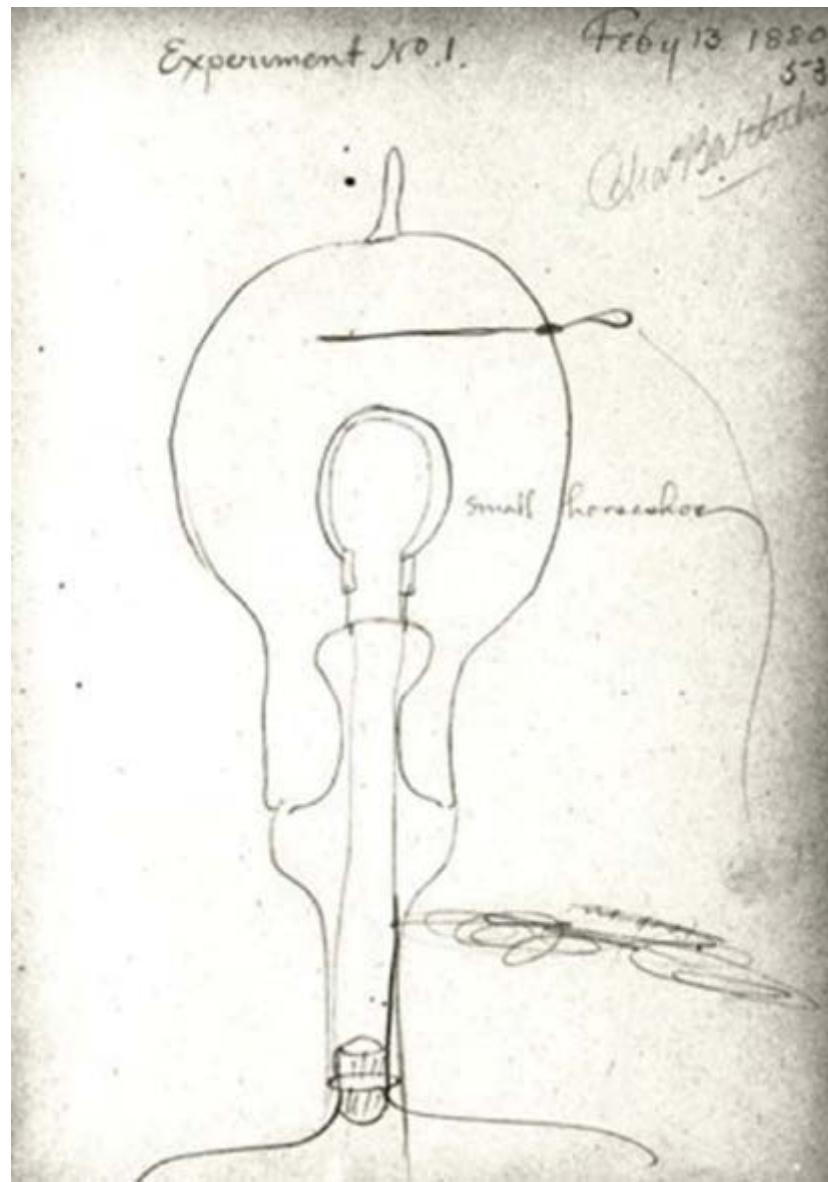
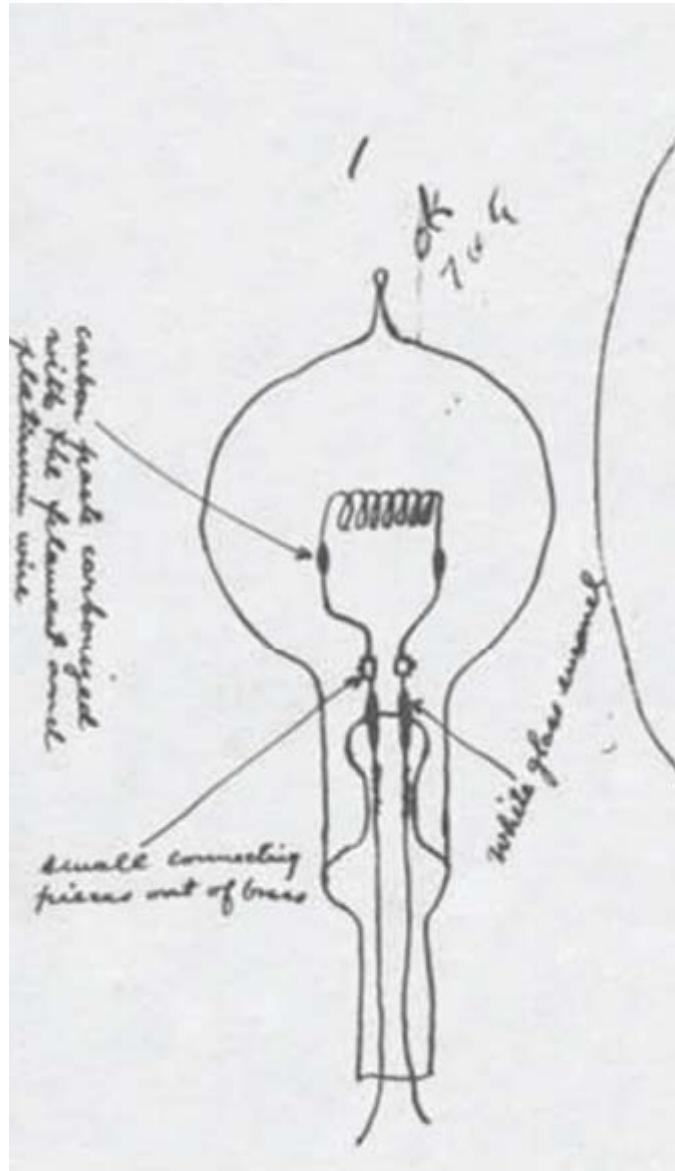
Source: The Thomas Edison Papers, Rutgers University
<http://edison.rutgers.edu/>

Thomas Alva Edison



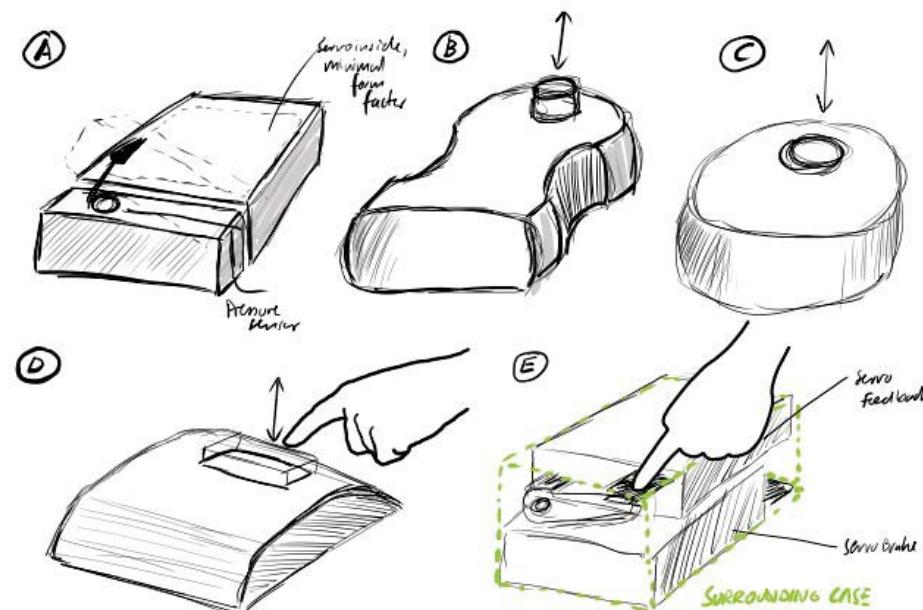
Source: The Thomas Edison Papers, Rutgers University
<http://edison.rutgers.edu/>

Thomas Alva Edison



Source: The Thomas Edison Papers, Rutgers University
<http://edison.rutgers.edu/>

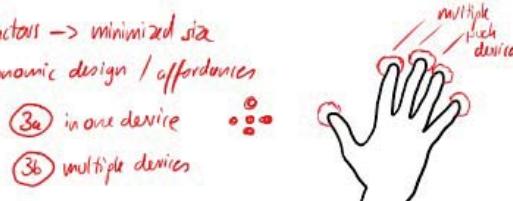
Sketchbook examples - HCI



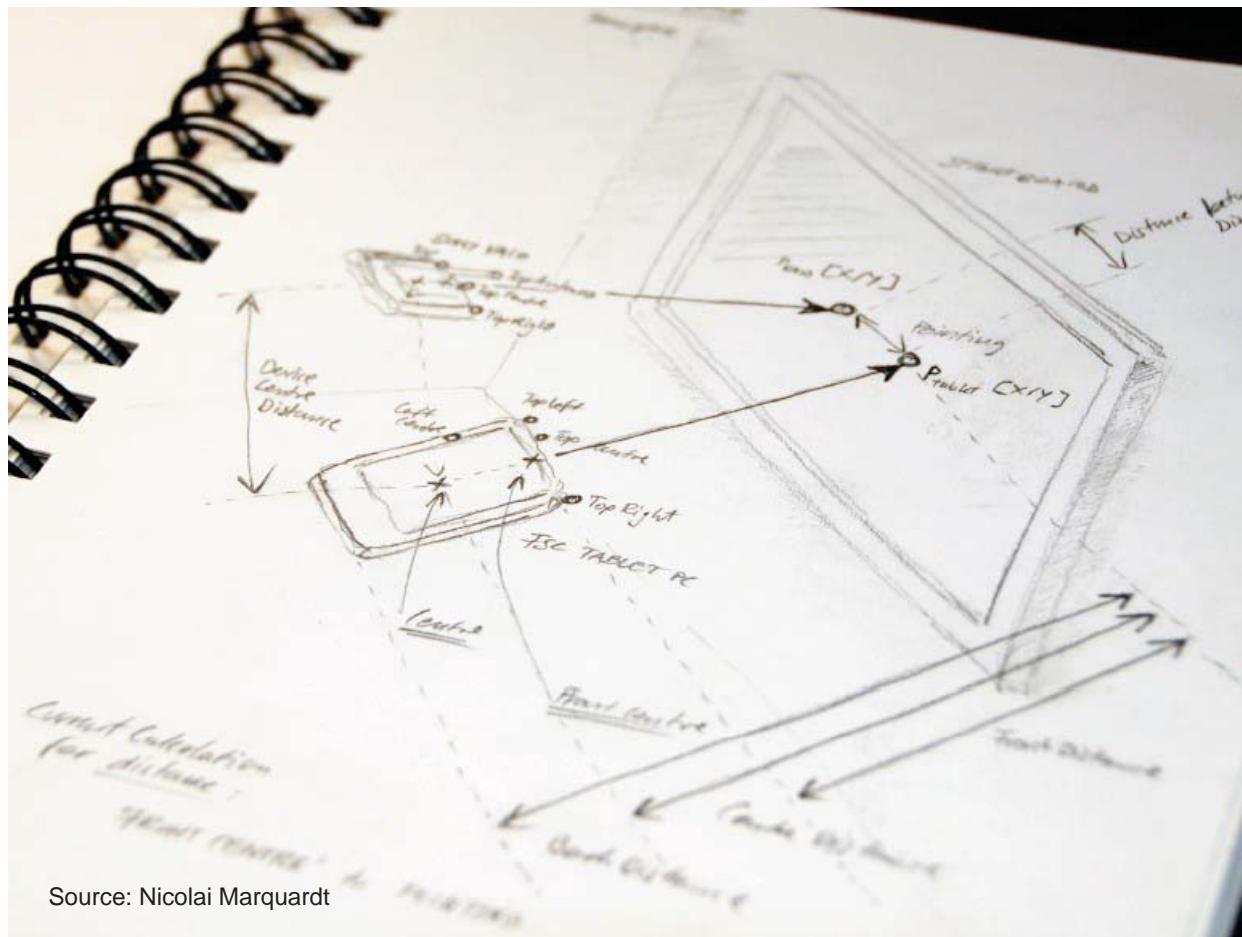
APPROACHES

- ① Small device form factors → minimized size
- ② Form design / ergonomic design / affordances
- ③ Multiplicity → ③a) in one device ③b) multiple devices

Source: Nicolai Marquardt



Sketchbook examples - HCI



You now know

Sketchbooks are:

- a designer's most fundamental tool
- convenient (pages, size, fold over), durable archive, aesthetic

Sketchbooks are for:

- brainstorming, exploring, refining, varying, archiving, reflecting, communicating and choosing ideas
- recording good ideas you see elsewhere

Sketchbook instruments are:

- pencil
- optional eraser, sharpener, glue, tape, scissors, camera, and other media

Sketchbooks can be filled with:

- Your sketches (many different kinds) and found objects

Sketchbooks are used regularly

- sketch anywhere, anytime

Sampling the real world

The 10 plus 10 method

The 10 plus 10 Method

- 1) State the design challenge
- 2) Generate 10 different designs – as creative and diverse as possible
- 3) Reduce the number of design concepts
- 4) Choose the most promising designs as a starting point
- 5) Sketch 10 details and/or variations of design concepts
- 6) Present ideas to a group
- 7) As your ideas change, sketch them out.

The 10 plus 10 Method

1. State your design challenge
 - problem to solve (maybe a client need)
 - novel system that takes advantage of particular technology...
2. Generate 10+ different design concepts that addresses that challenge
 - Brainstorming to be as creative and diverse as possible
 - don't judge designs
 - capture essence of idea, not details
3. Reduce the number of design concepts OR repeat
 - review all designs and discard ones that don't have merit
 - use sketch to explain and get feedback on remaining designs from others to gather reactions (including your own) OR based on reflection, repeat step 2
4. Choose the most promising concept(s)
 - Your starting point
5. Produce 10 details / variations of that concept
 - explore the concept
 - generate different ways of realizing the concept
 - dig deeper in a particular way (i.e., flesh out details)
6. Present your ideas to a group
 - coffee / donuts go a long way
 - solicit feedback (positive, what could be improved, etc.) and suggestions about redesigns
7. As your ideas change, sketch them out
 - that is, go back to step 1, but deeper into the design funnel

Example: Design Challenge

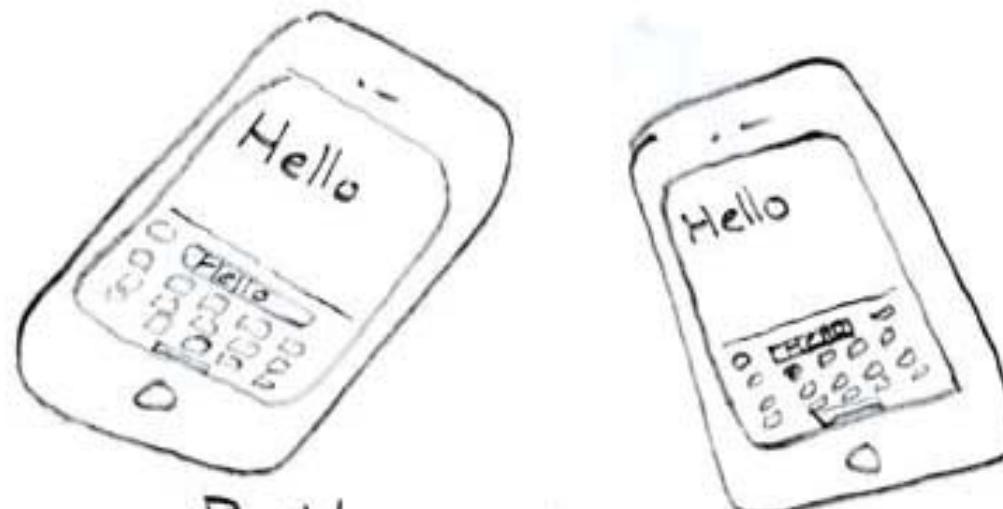
How can two people connect their mobile devices for to create a larger display to view things (e.g., slides from class)?

Assumptions

- mobile device detects nearby phones
- they can initially do some limited communication
- you and the person can perform some action that both phones recognize as a ‘handshake’ affirming a full connection is desired. That is, it exploits social convention where you both agree to do something.

Generate 10 competing concepts

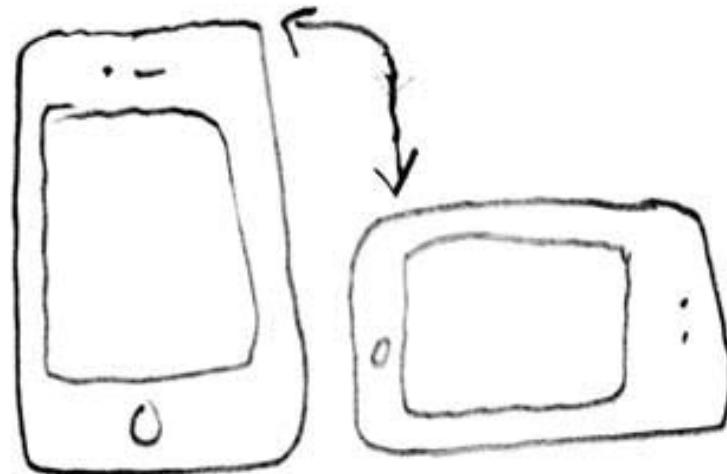
- i) Enter an agreed upon keyword to join the phones for communication



Both people type a word chosen by them

Generate 10 competing concepts

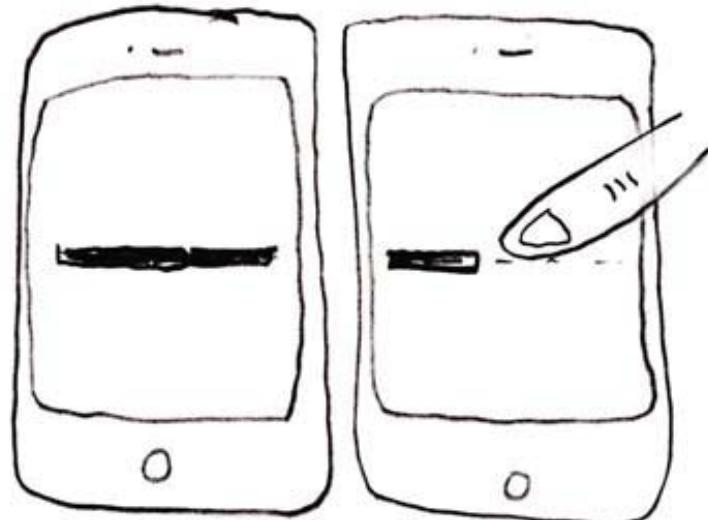
ii) Mimic a rotation pattern



Rotate in a pattern, where other person has to mimic it (accelerometer)
(within 5 seconds)

Generate 10 competing concepts

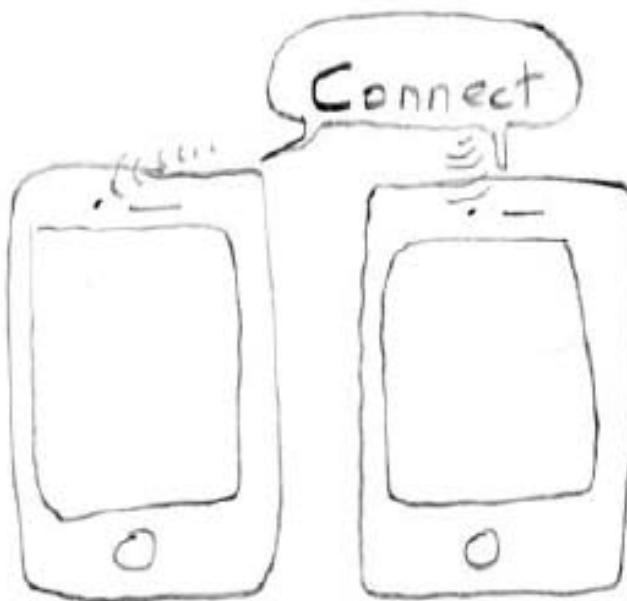
iii) Tracing across displays



Synchronous gesture
Trace a line
across both
side by
side devices
as a single
stroke

Generate 10 competing concepts

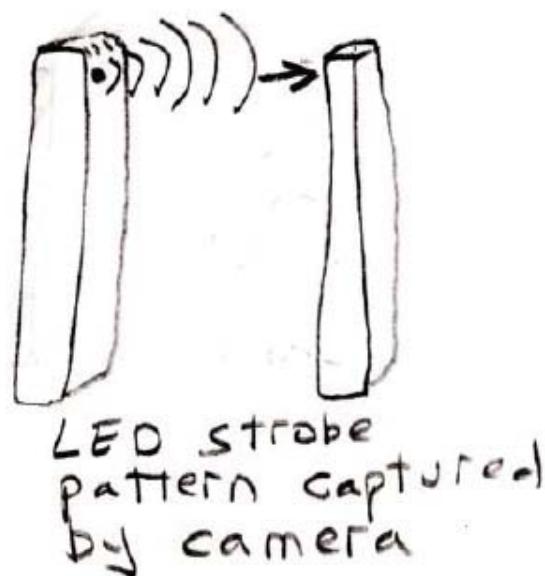
iv) Speak a command



Microphones pick
up spoken
command at
similar volume

Generate 10 competing concepts

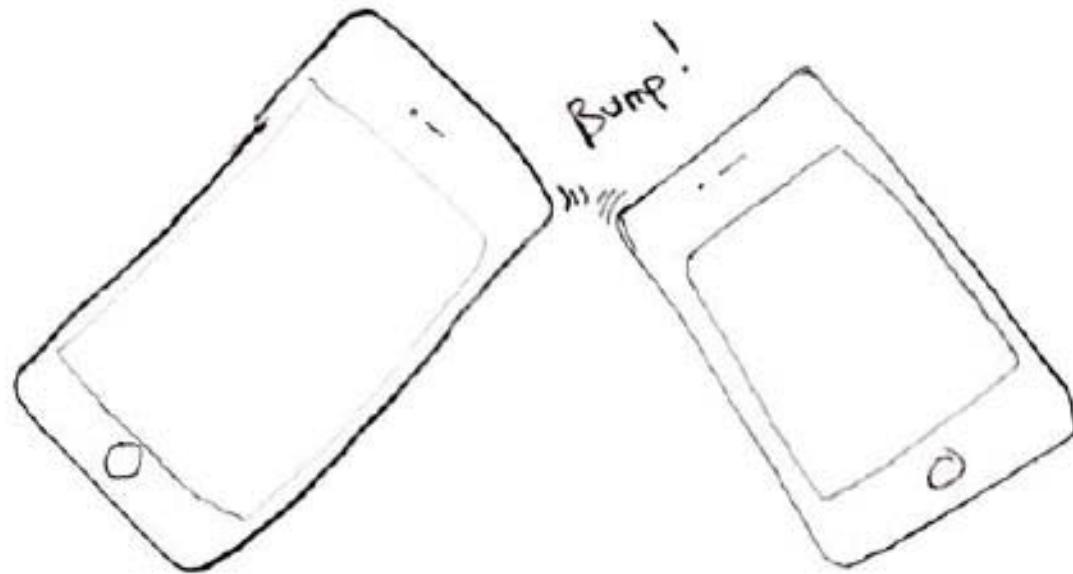
v) Recognize a phone's flash strobe pattern



Generate 10 competing concepts

vi) Bump two phones together

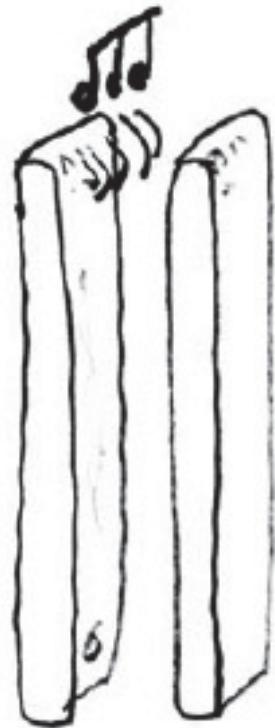
(credit: Bump Technologies)



Bump. Accelerometer matches
bump vibrations

Generate 10 competing concepts

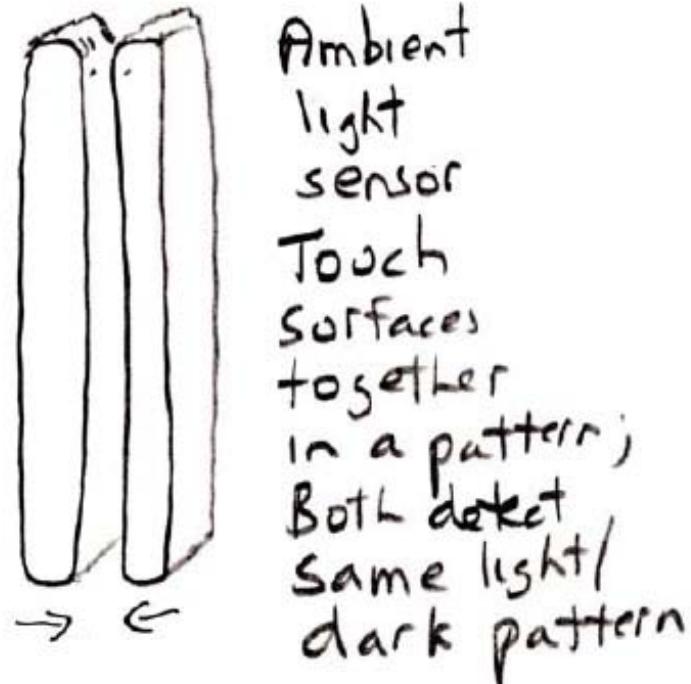
vii) Musical sequence



Faint musical sound played on one device picked up by the other device

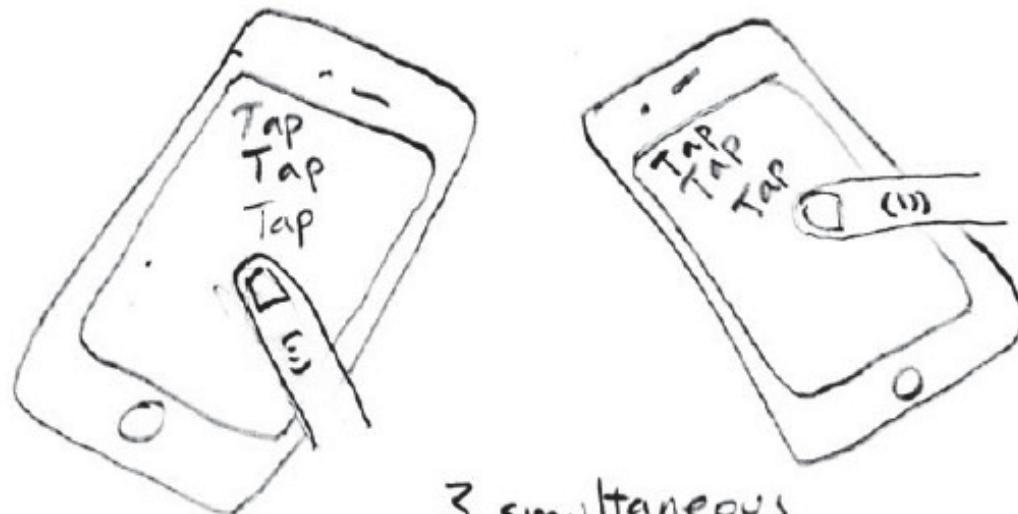
Generate 10 competing concepts

viii) Light / dark patterns



Generate 10 competing concepts

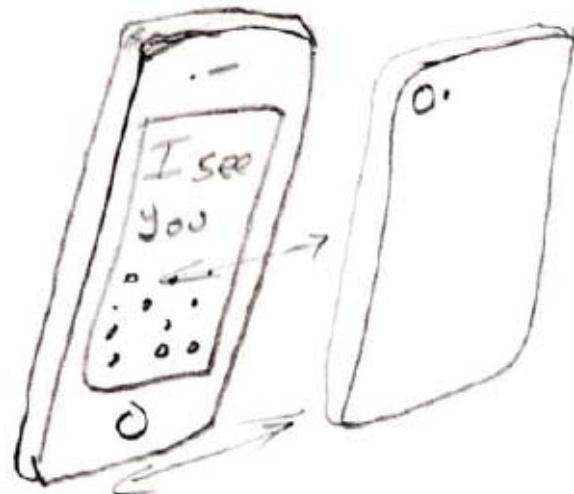
ix) Three simultaneous taps



3 simultaneous
taps on both
phones

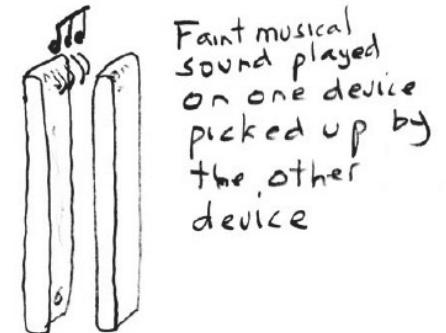
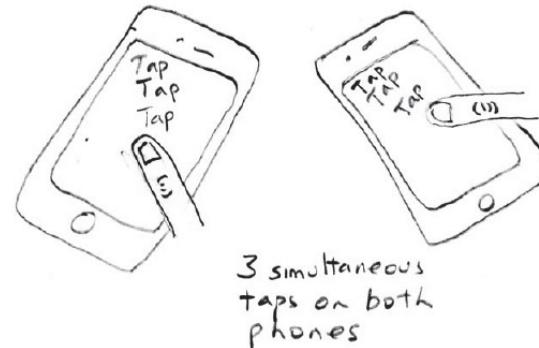
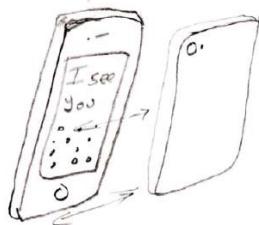
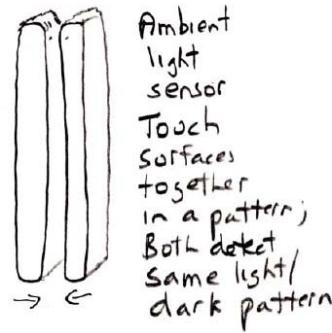
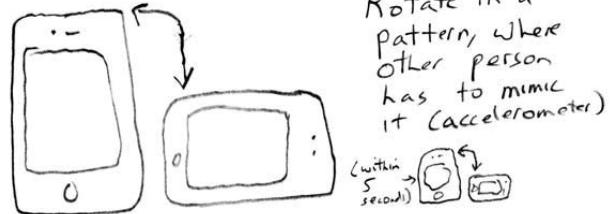
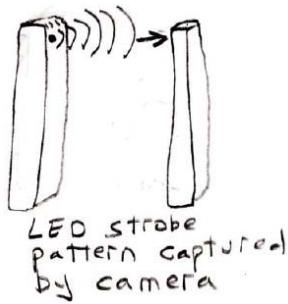
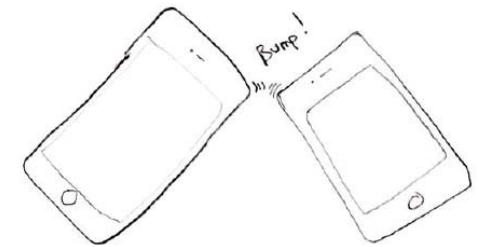
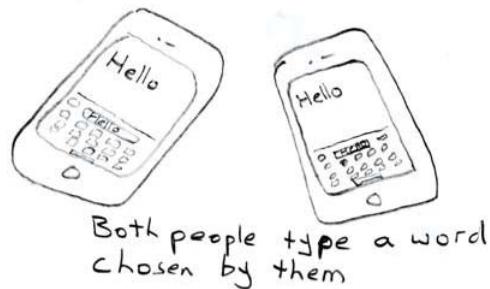
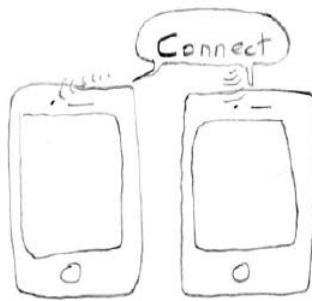
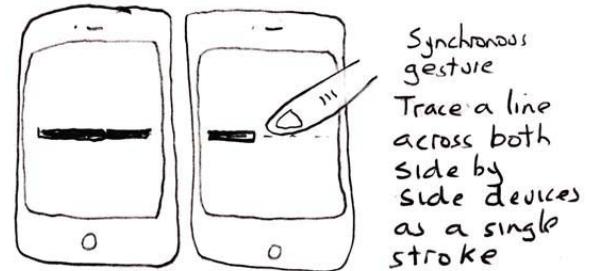
Generate 10 competing concepts

- x) Take a picture of an identifying feature on the other person's phone



mutual
Video/photos
captures
identifying
images such
as tags via
camera

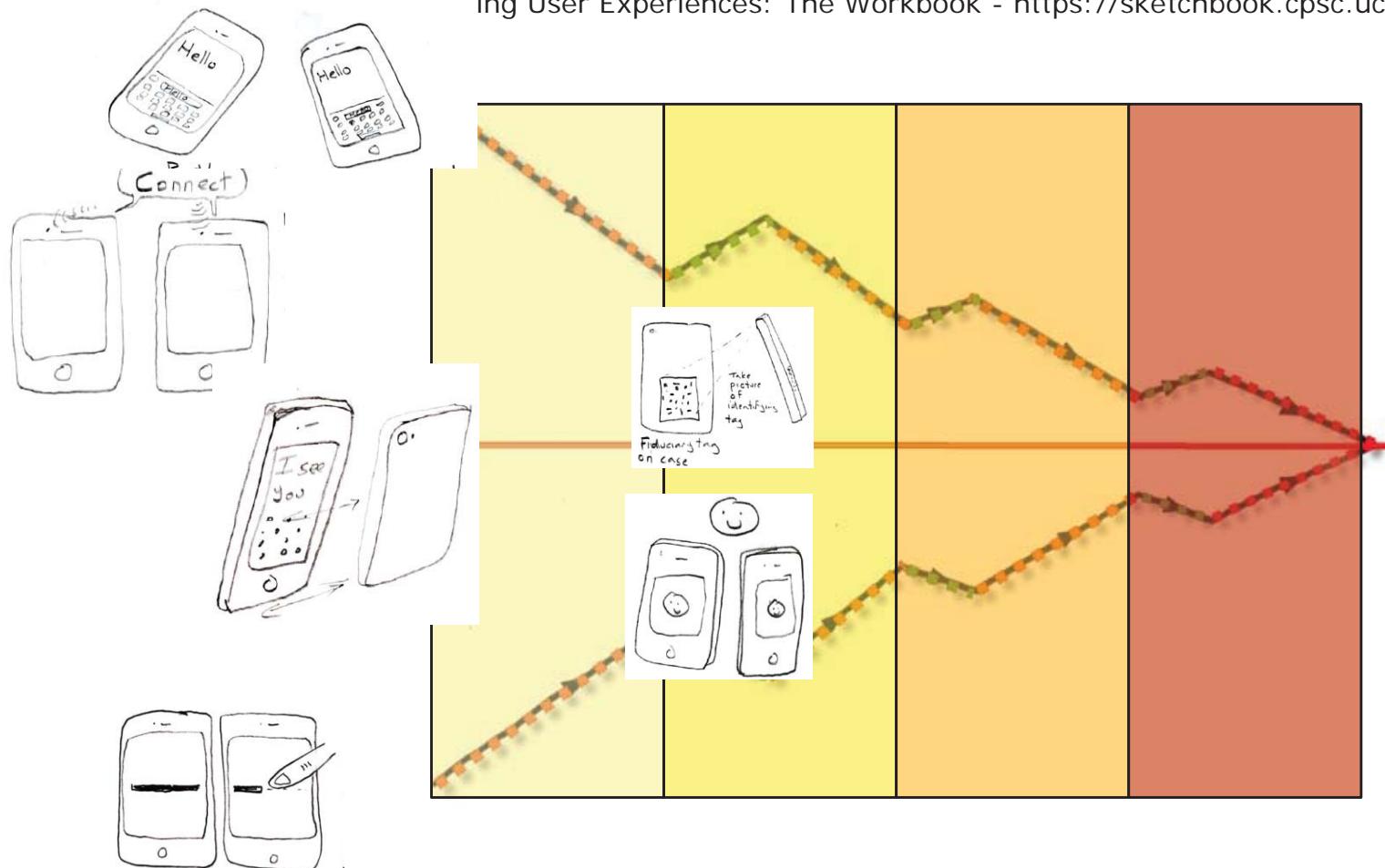
Generate 10 competing concepts



10+10

Descending the Design Funnel

Sketching User Experiences: The Workbook - <https://sketchbook.cpsc.ucalgary.ca>



Example: Reduce and / or repeat

Theme:

you and the person perform some action that both phones recognize as a ‘handshake’ affirming a full connection is desired. That is, it exploits social convention where you both agree to do something.

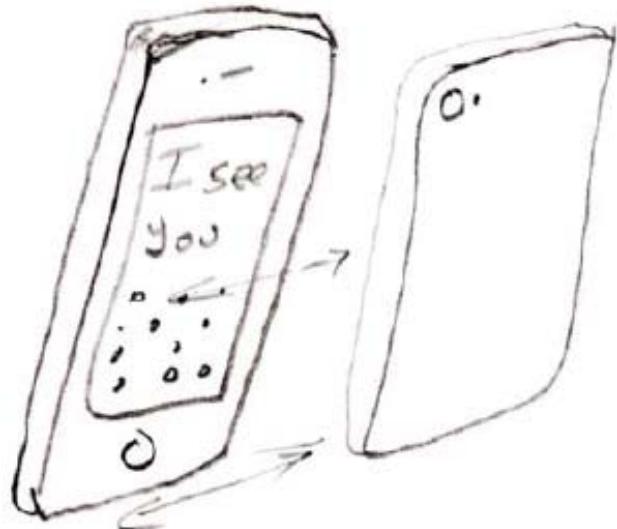
Repeat ?

other variations based on this notion *or* other themes?

Example: Choose (Reduce)

Choice

Cameras are lowest common denominator, so choose:

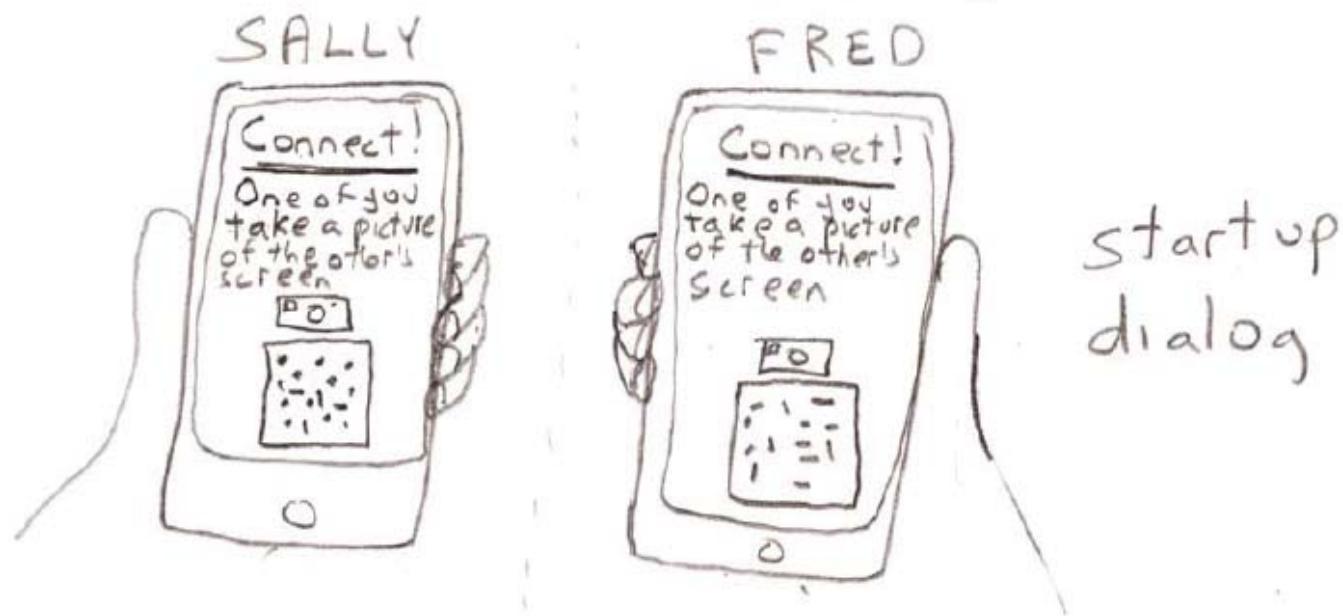


Mutual
Video/photos
captures
identifying
images such
as tags via
camera

Example: Choose (Reduce)

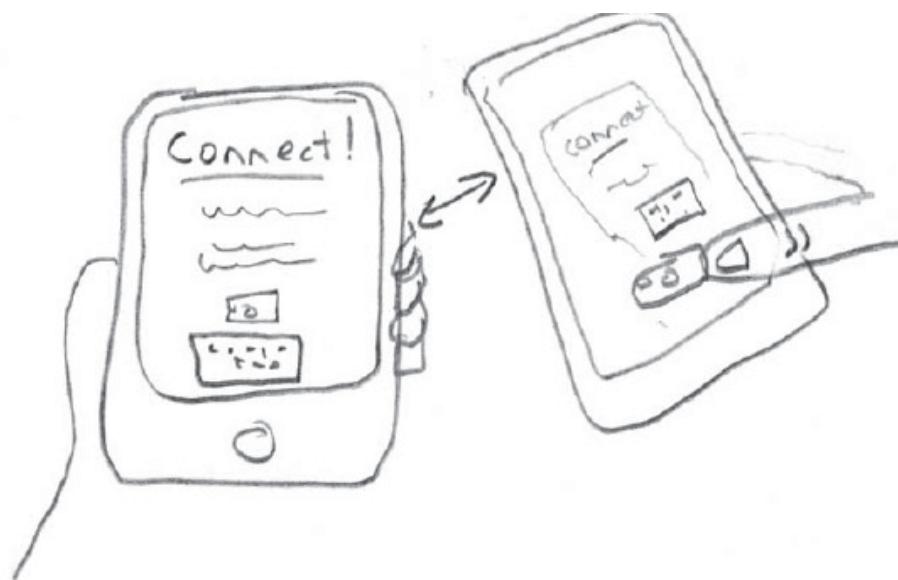
i) Detail a

- Both Start Connect! App



Example: Choose (Reduce)

i) Detail b

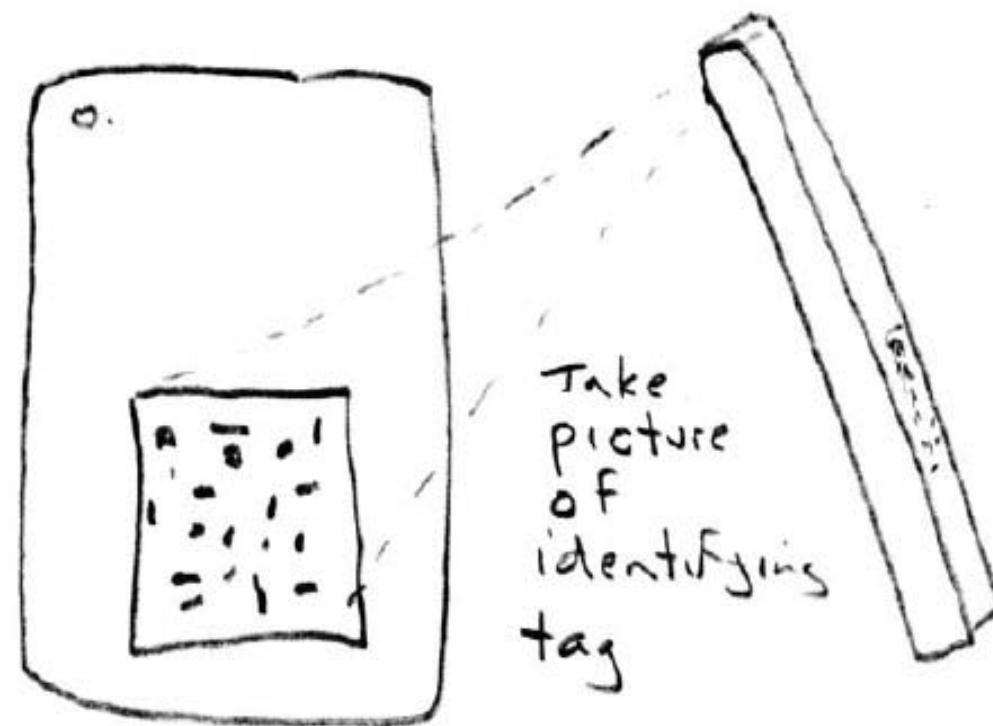


One person
takes
picture of
the other's
Screen

Example: Choose (Reduce)

ii) Variation: Fiduciary Tags

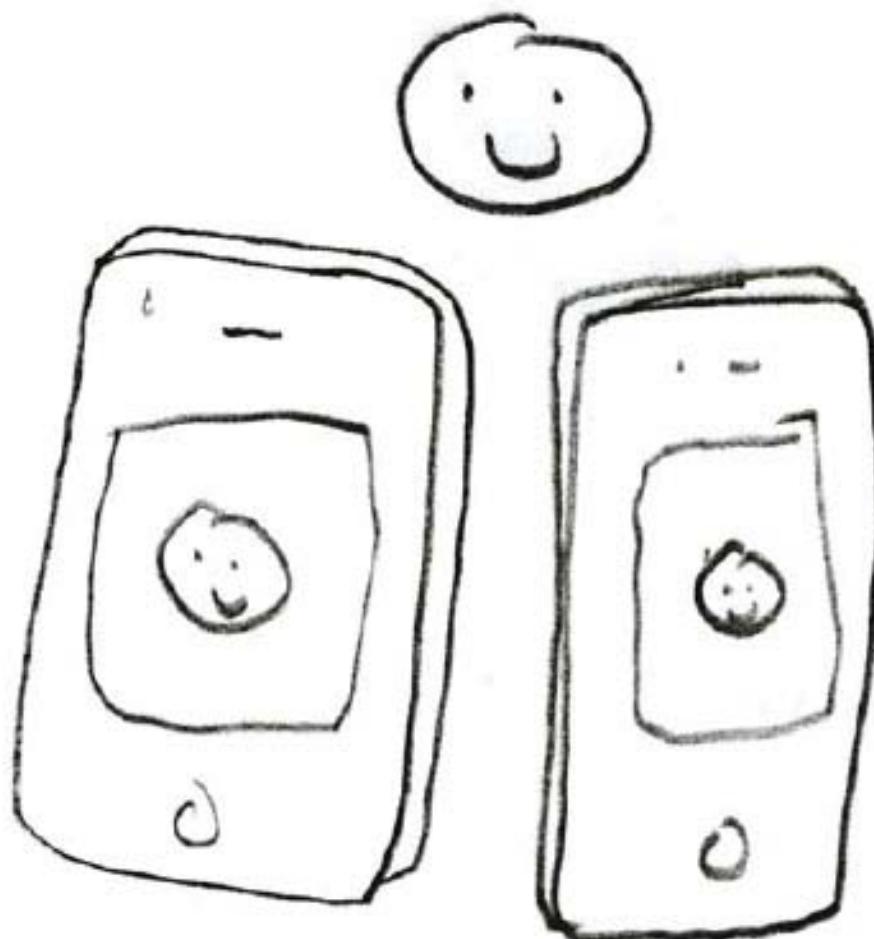
Note: for added security, both phones would have to do it



Fiduciary tag
on case

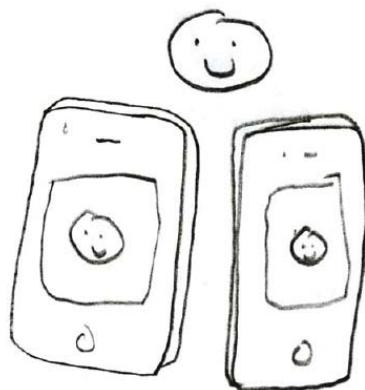
Example: Choose (Reduce)

iii) Variation: Same picture

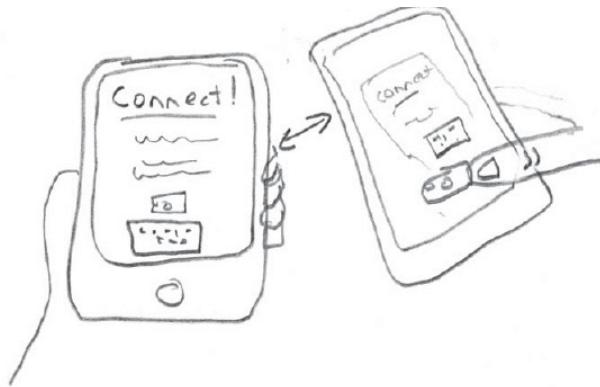


Take
picture of
the same
thing at
the same
time.

Example: Choose (Reduce)

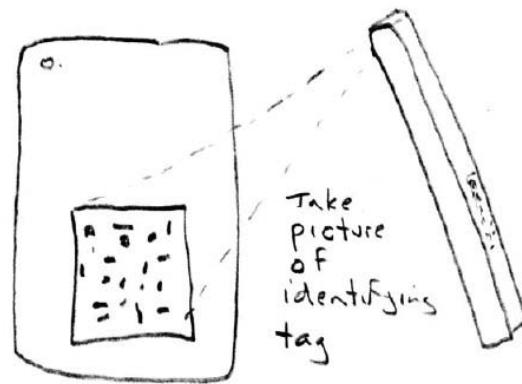


Picture of
the same
thing at
the same
time.

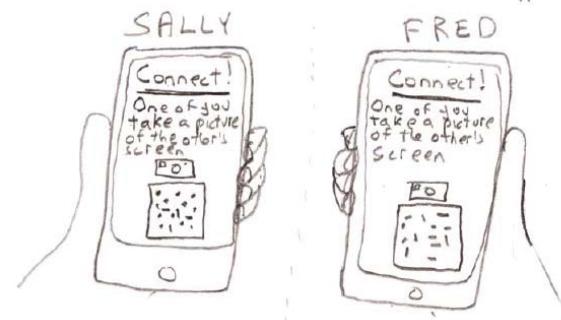


One person
takes
picture of
the other's
screen

Both start Connect! App



Fiducial tag
on case



start up
dialog

You now know

10 + 10

- method to descend the design funnel
 - first 10: elaboration
 - choosing: refinement
 - second 10: elaboration on refinement
- a cycle with no hard boundaries

In-class exercise: Start building your AD (Affinity Diagram)

- Using your notes (interviews, observations, etc.) from your study, use the given stickies notes and create the notes
- **Steps in class**
 - Every member should go through all the notes and come up with their set of 'notes/stickies'
 - List every possible aspect of work that could be improved, user suggestions, weaknesses of current system, without indicating how it could be improved, data and insights → all notes need to be traceable (need to know where they come from in case you need more information)
- **Steps in the lab**
 - arrange the other post-its around it, **grouping** by affinity to each other. **iteration** will be required.
 - look at each group and see what it has in common; **name and describe** each group.
 - “**snapshot**” the result for documentation