CSE 440: Introduction to HCI

User Interface Design, Prototyping, and Evaluation

Lecture 07:
Storyboarding and
Video Prototyping

Tuesday / Thursday
12:00 to 1:20

James Fogarty
Kailey Chan
Dhruv Jain
Nigini Oliveira
Chris Seeds
Jihoon Suh

PAUL G. ALLEN SCHOOL
OF COMPUTER SCIENCE & ENGINEERING

Project Status

Looking Forward

- 2e: Task Review due Tonight
- 2f: Design Check-In (3x4) Due Monday 10/23
- 2g: Design Review (1x2) Due Thursday 10/26
- “Getting the Right Design” Report Due Monday 10/30
- “Getting the Right Design” Report Due Wednesday 11/1

Beware the Pitfall of “Splitting” Design Ideation

- It hurts, it hurts so much

Other Assignments

- Reading 2 Due this Saturday 10/21
- Reading 5 Can Be Done Anytime, Sooner is Better

Denny 303 on Tuesday 10/24

James Away on Tuesday 10/24

Design Research Review in Critique

In addition to current milestone, bring your design research review to next three critiques

- Helpful for “what in you research motivated this”
- Helpful for brainstorming other ideas with staff

Look back at design research in defining tasks

- For example, tensions you saw in research might suggest different design approaches

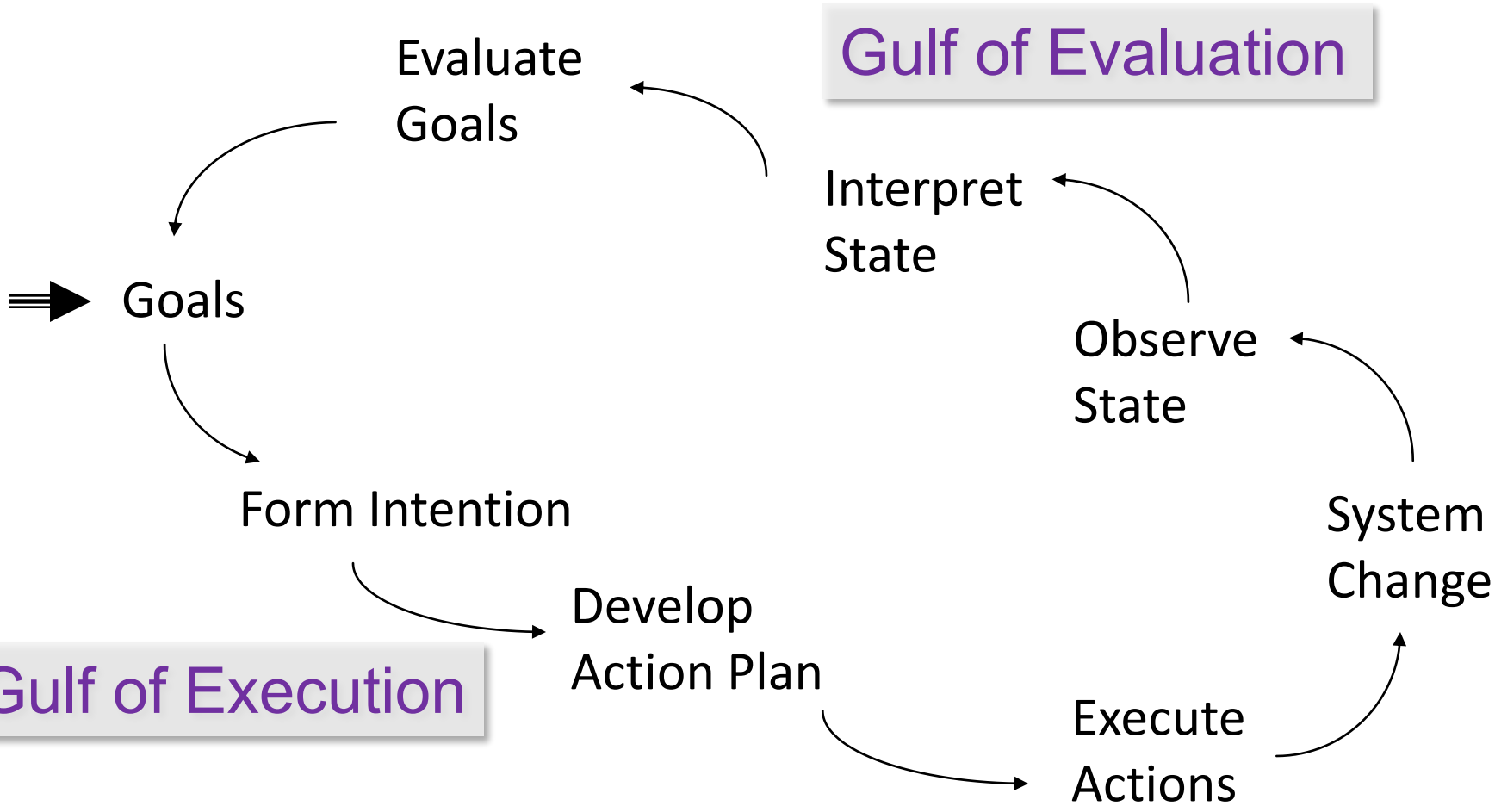
- A common task might be found in those approaches, with designs exploring different tradeoffs relative to that tension

Today

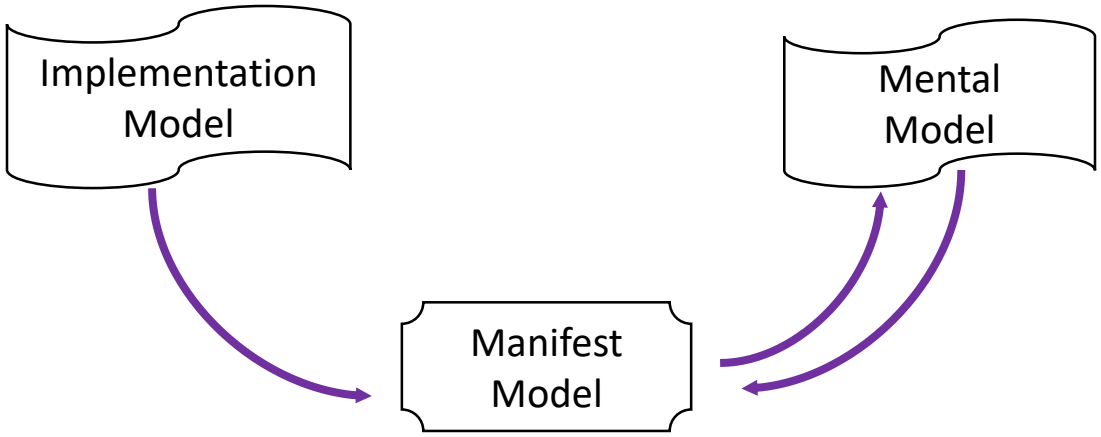
Finishing Design of Everything Things

Storyboarding and Video Prototyping

Norman's Execution-Evaluation Cycle



Manifest and Mental Models



Designer projects their model into an artifact

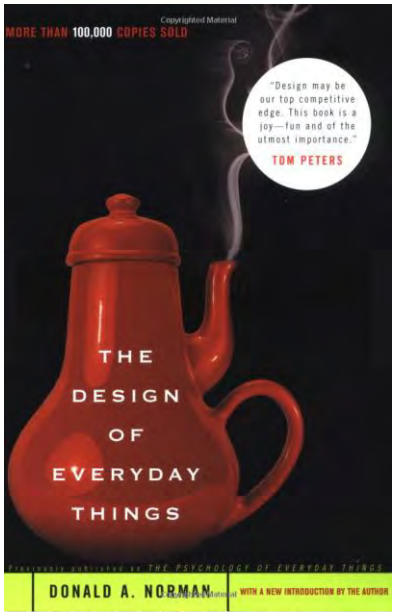
- Person forms their model based on interaction

People struggle until model matches manifest model

- Update mental model in response to breakdowns
- Matching the implementation model is not necessary

Building the Right Model

Having the right model helps people bridge the Gulf of Execution and the Gulf of Evaluation



How can we help people build the right models:

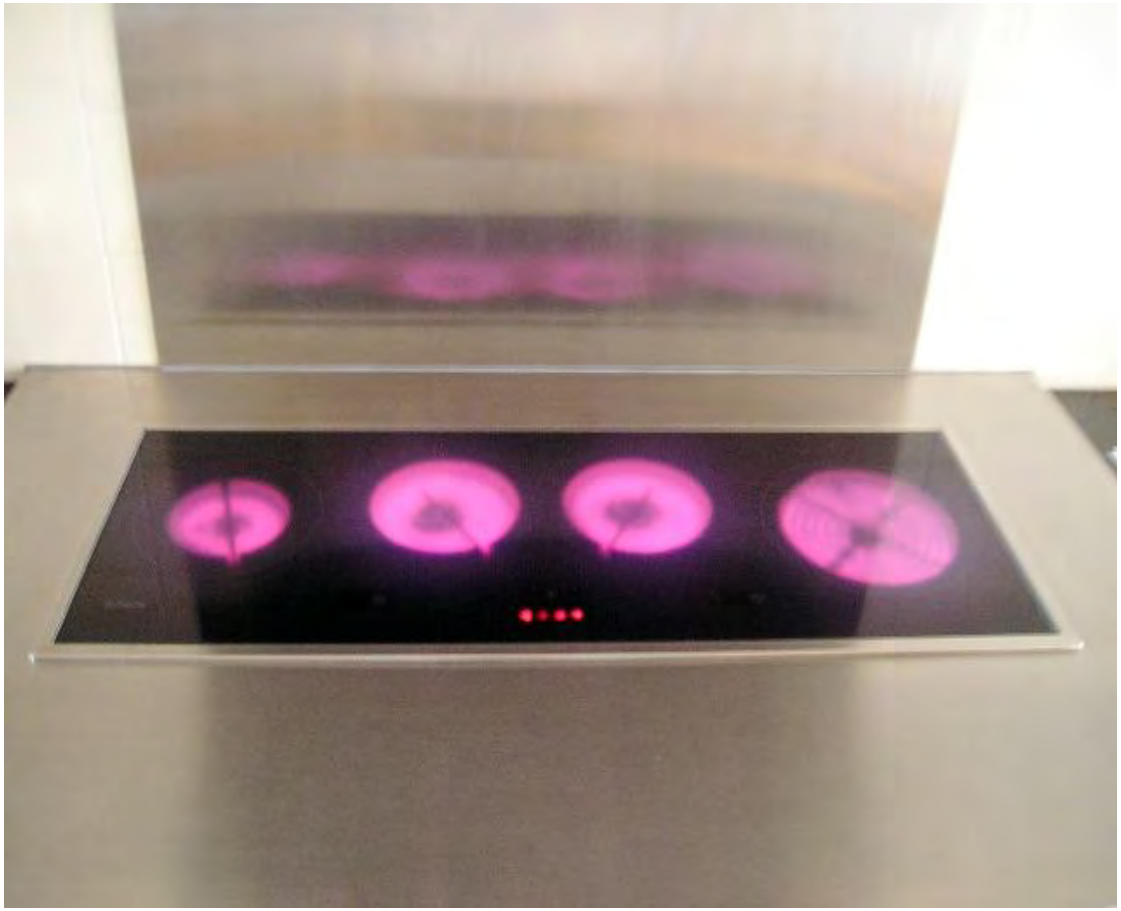
- Affordances
- Visibility
- Constraints
- Consistency
- Metaphors
- Knowledge in the World
- Mapping
- Modes

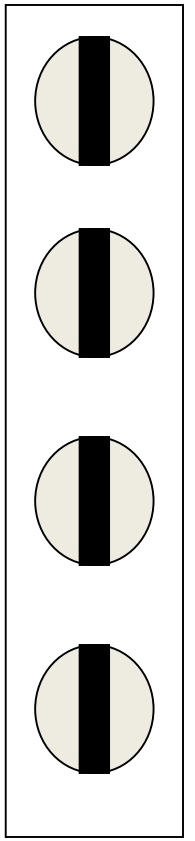
Mapping

Correspondence between an interface and the corresponding action in ‘the world’

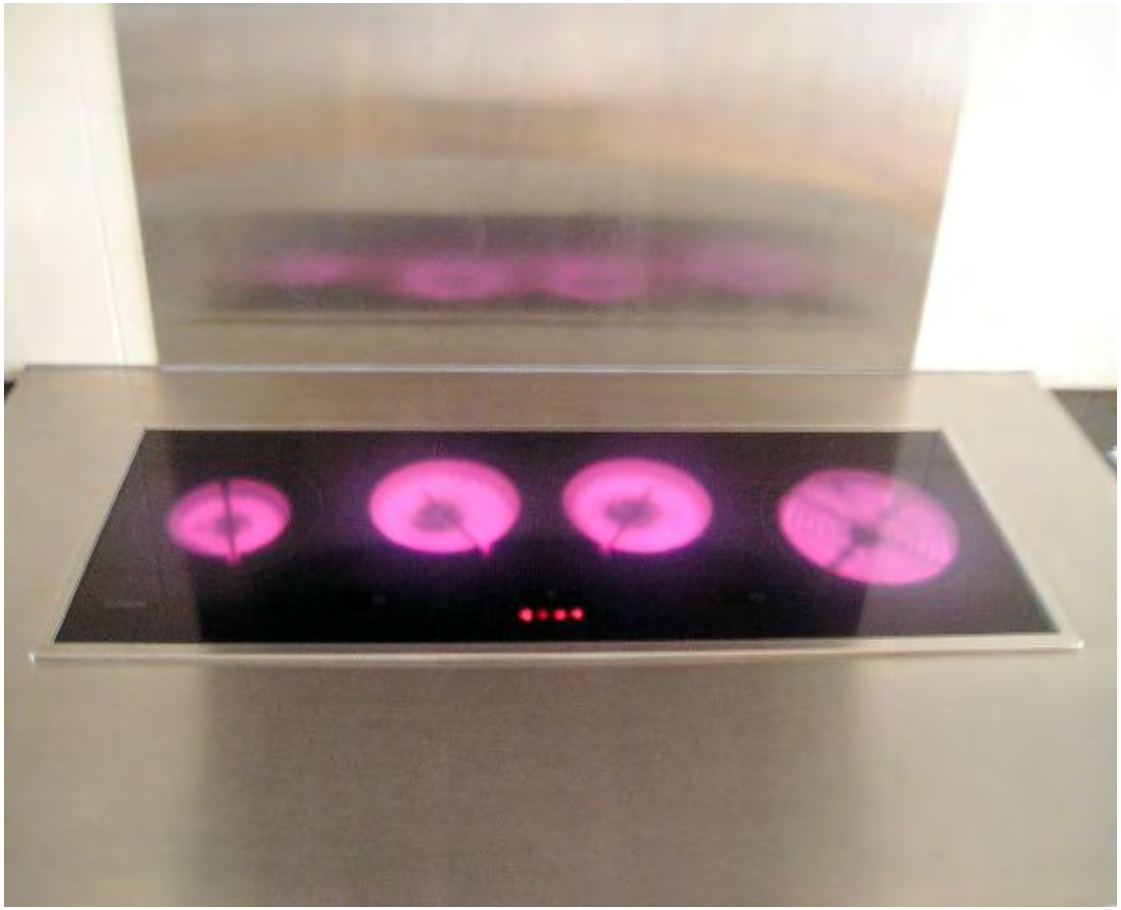
Minimize cognitive steps to transform action into effect, or perception into comprehension (i.e., execution and evaluation)

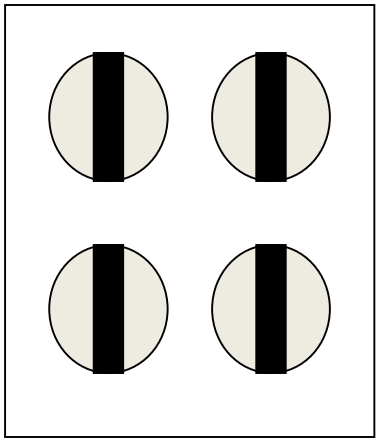
Very Bad Mapping





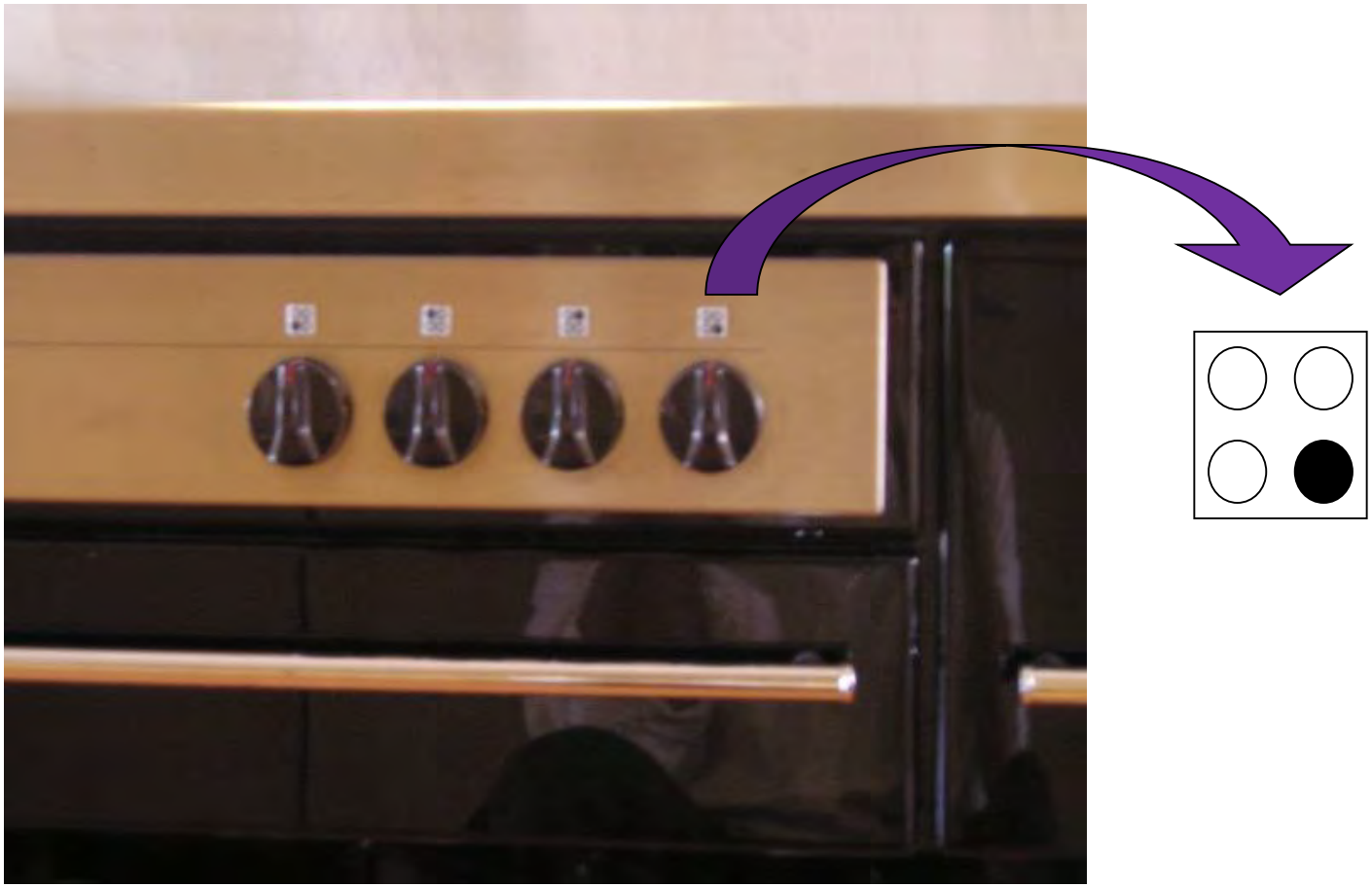
Slightly Better Mapping



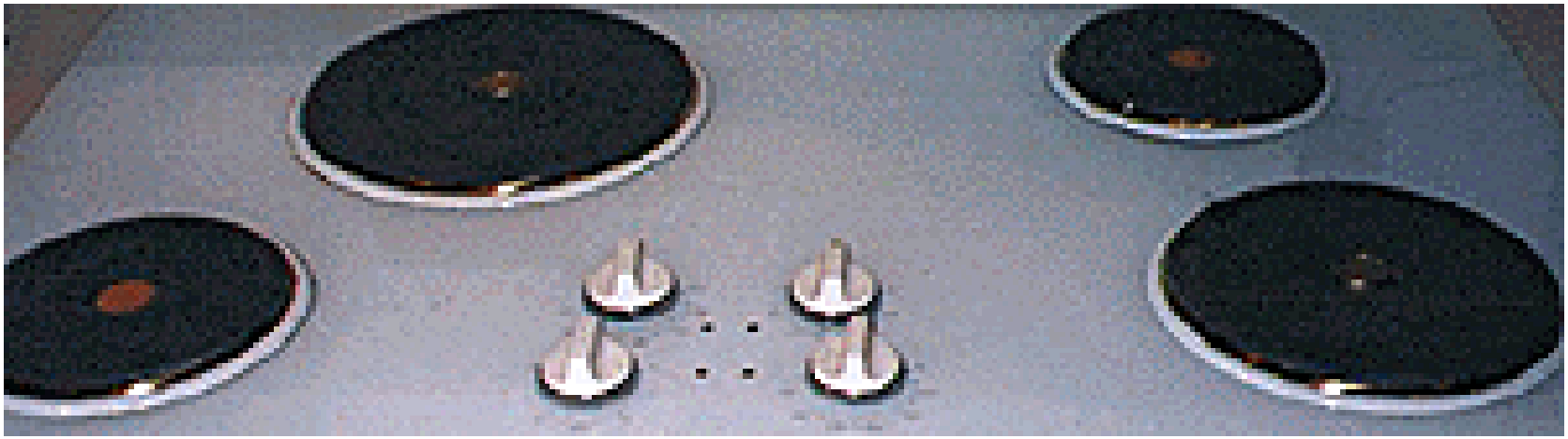


Good Mapping

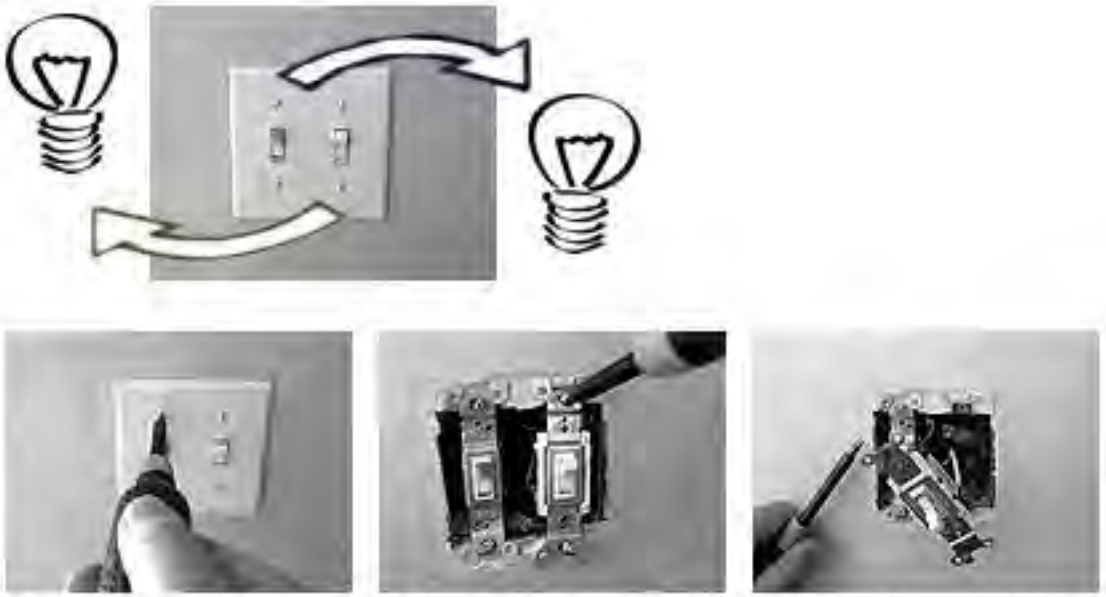
Not this Stove



Great Mapping



Mapping



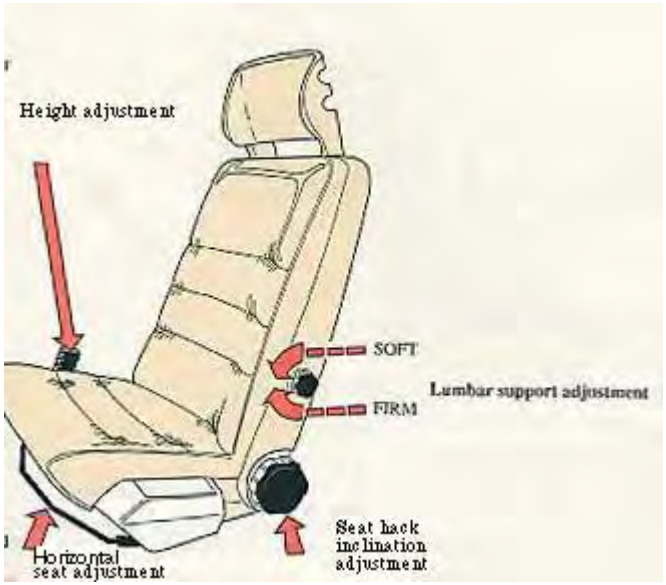
Removing the cover plate, then removing and swapping the switches.

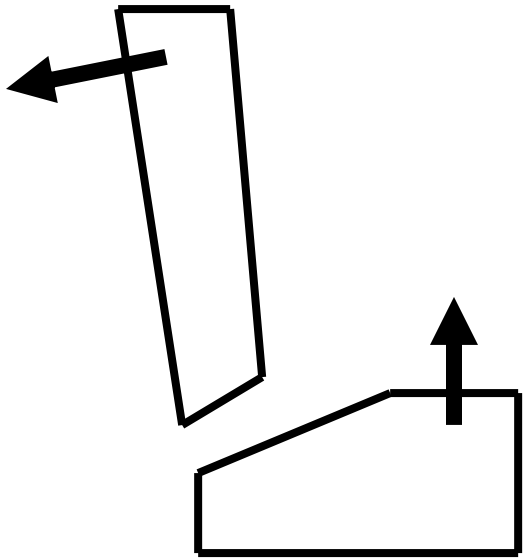
From http:/ /fivesketches.com/2009/11/natural-mapping-of-switches/

Mapping


500
500 EURO
200
200 EURO
200
200
500
500
100
100 EURO
100
100
10
10 EURO
10
10
50
EURO
CENT
20
EURO
CENT
10
EURO
CENT

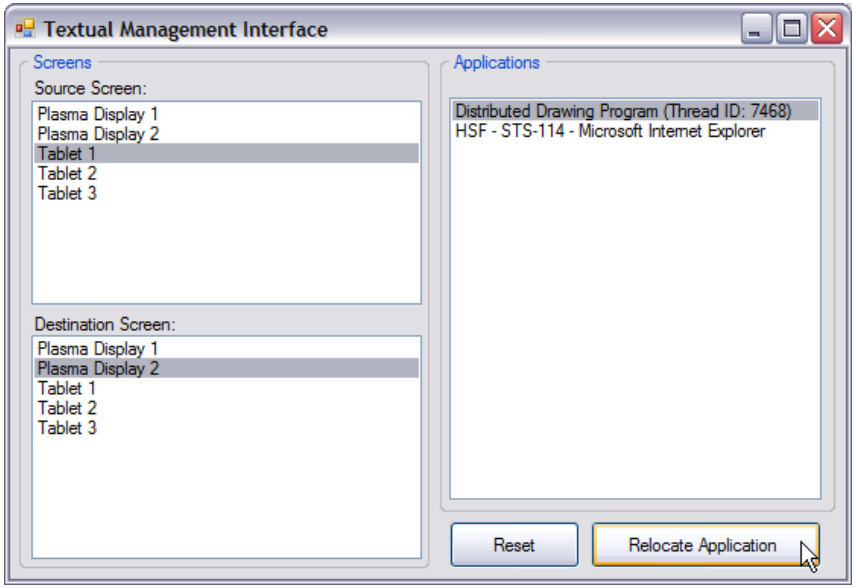
Mapping


Height adjustment
SOFT
Lumbar support adjustment
FIRM
Seat back
inclination
adjustment
Horizontal
seat adjustment

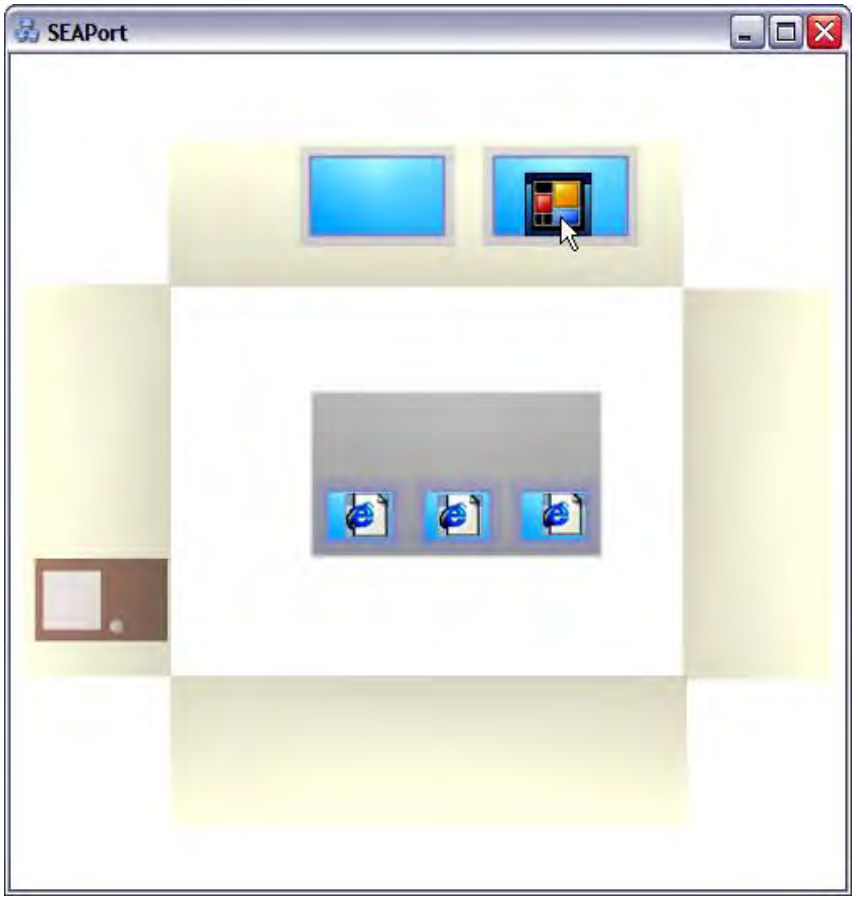


Mapping


ORCHID


Textual Management Interface
Screens
Source Screen:
Plasma Display 1
Plasma Display 2
Tablet 1
Tablet 2
Tablet 3
Destination Screen:
Plasma Display 1
Plasma Display 2
Tablet 1
Tablet 2
Tablet 3
Applications
Distributed Drawing Program (Thread ID: 7468)
HSF - STS-114 - Microsoft Internet Explorer
Reset
Relocate Application

Mapping



Consistency

Interfaces should be meaningfully consistent

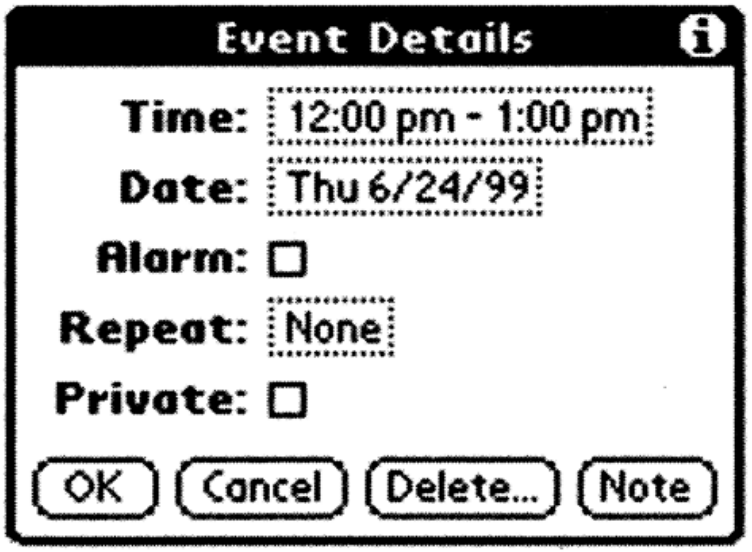
- Ubiquitous use of same keys for cut/copy/paste
- Helps in developing / applying a mental model

Types of consistency

- Internal (i.e., within itself)
  - e.g., same terminology and layout throughout
- External (i.e., with other applications)
  - e.g., common widget appearance
  - e.g., design patterns common across applications

Is Consistent Always Better?

Should “new” & “delete” be in the same place?



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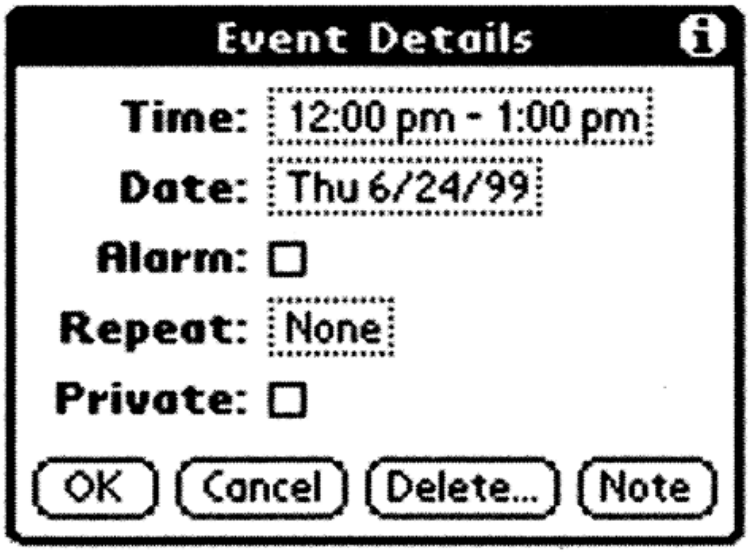
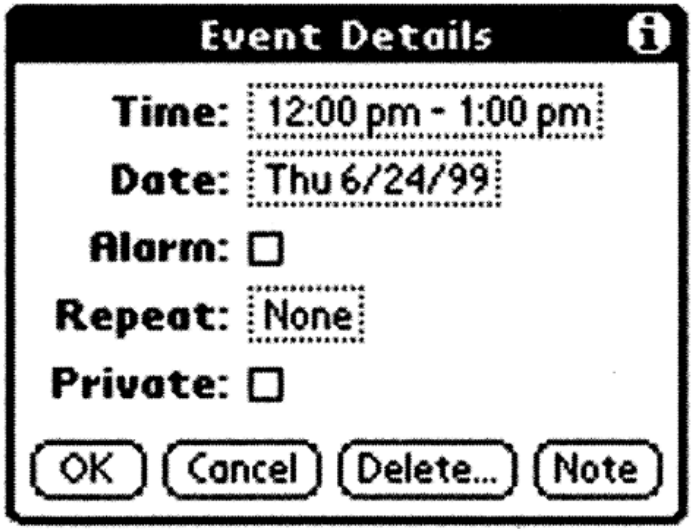


New is common, delete is not

Is Consistent Always Better?



Original focus on consistency, later design for mobile form

Is Consistency Always Better?

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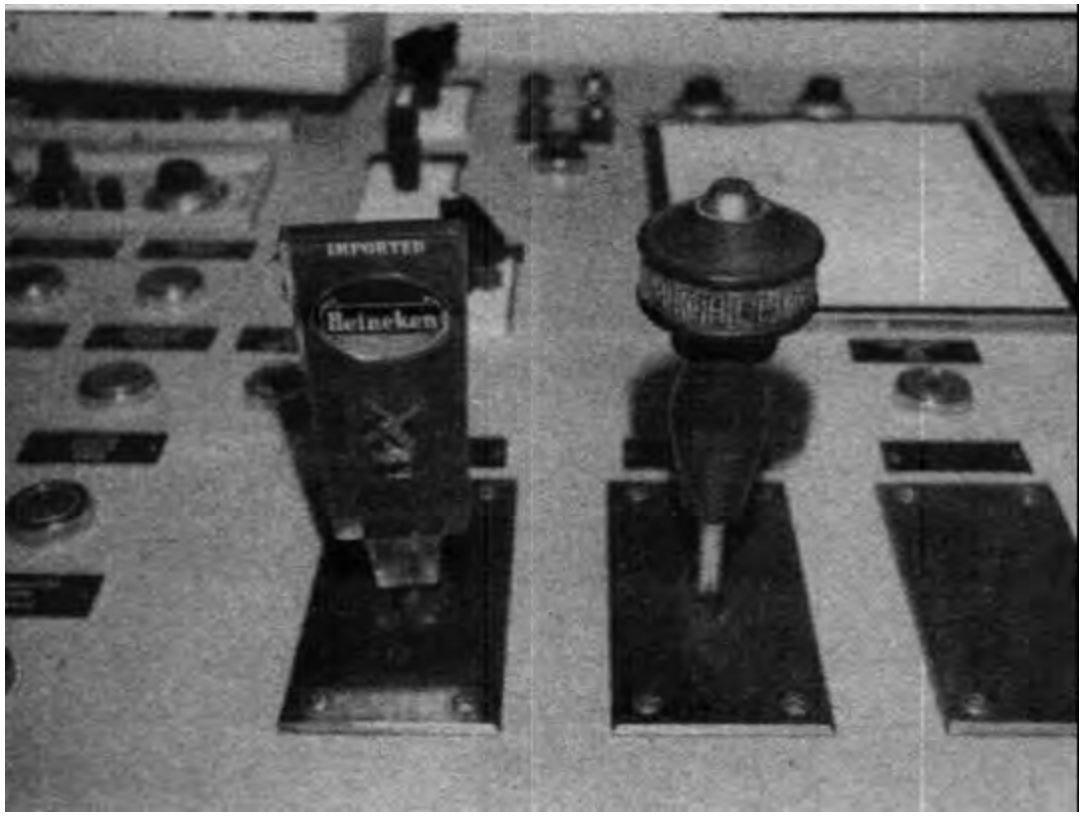
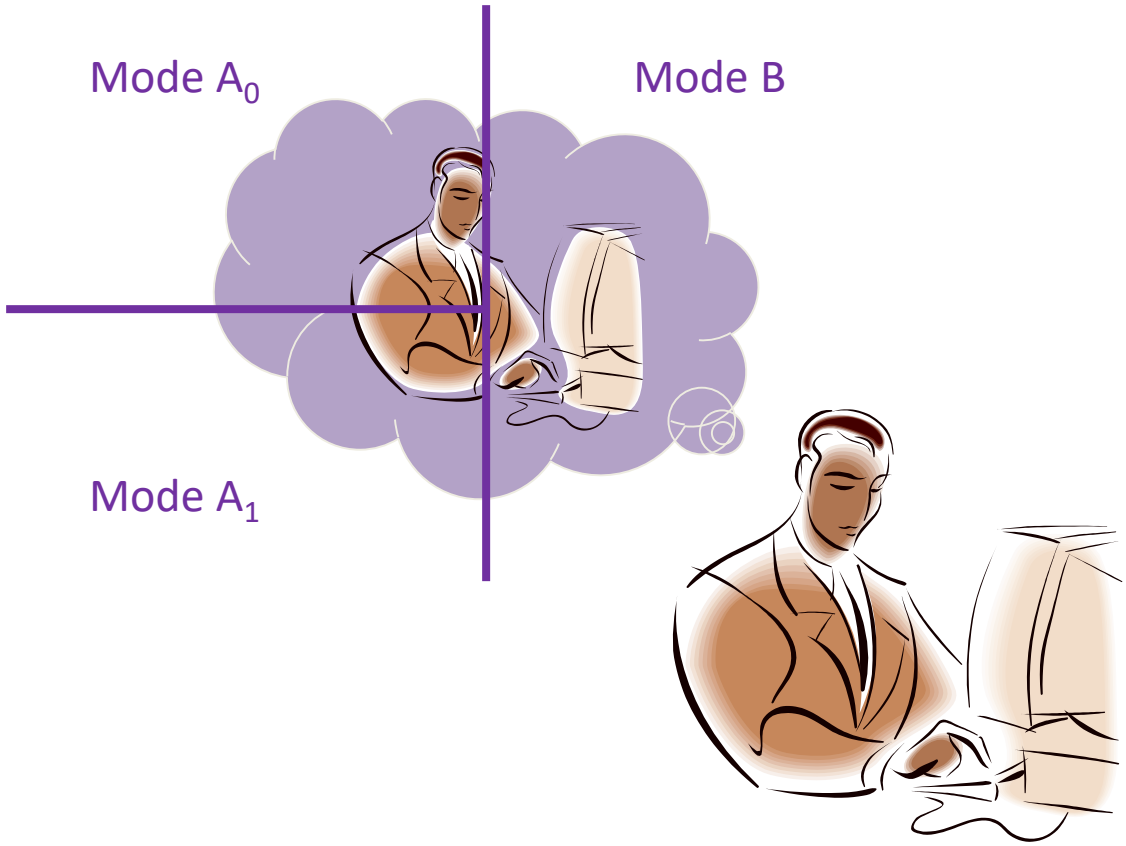


Modes

Modes force people to divide their model



Active versus Passive Modes

Active modes require constant action to maintain

- When that action has ended, so does the mode
- e.g., Shift

Passive modes require action to set, and a separate action to unset, or to set again

- e.g., CAPS LOCK

Active modes are generally preferred

Standardization

If all else fails, standardize

Fewer things to memorize

Reduced learning time

Adapt to new situations faster

e.g., keyboard layout not optimal, but standard

Norman's Seven Principles for Design

Use knowledge in the head and in the world

Simplify the structure of tasks

Making things visible

Get the mappings right

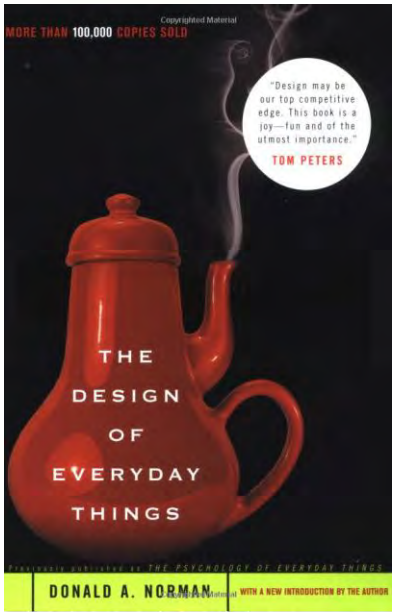
Exploit the power of constraints

Design for error

When all else fails, standardize

Building the Right Model

Having the right model helps people bridge the Gulf of Execution and the Gulf of Evaluation



How can we help people build the right models:

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Today

Finishing Design of Everything Things

Storyboarding and Video Prototyping

Objectives

Be able to:

Describe purposes of storyboards,
as differentiated from sketches and prototypes

Describe varying purposes of video prototypes
(e.g., and why this name is a poor fit)

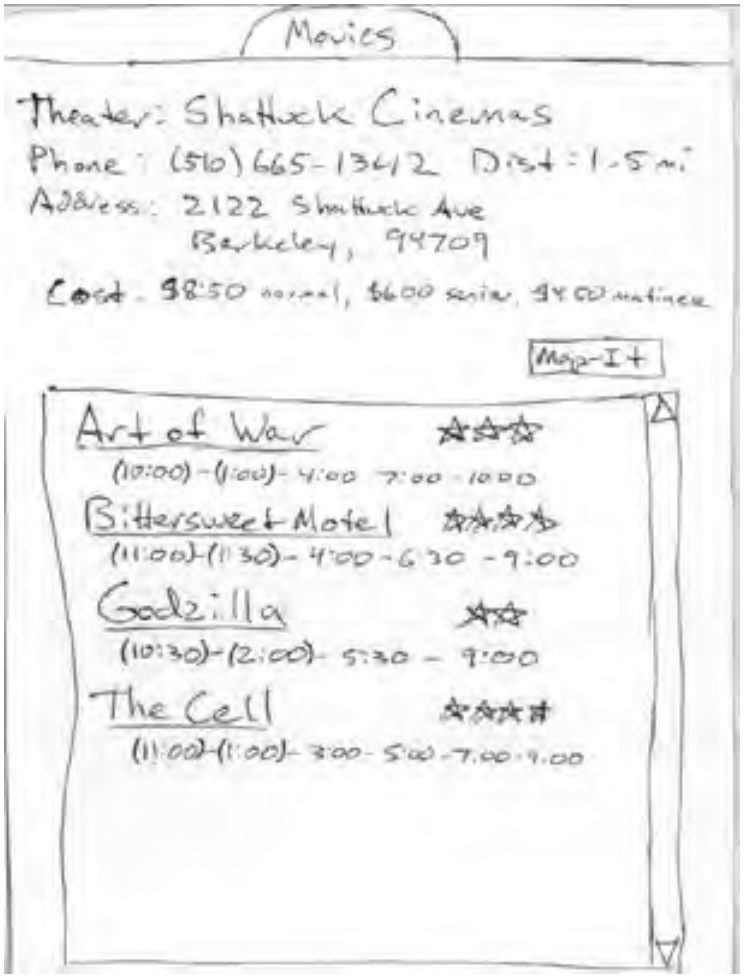
Tasks in Sketching and Design

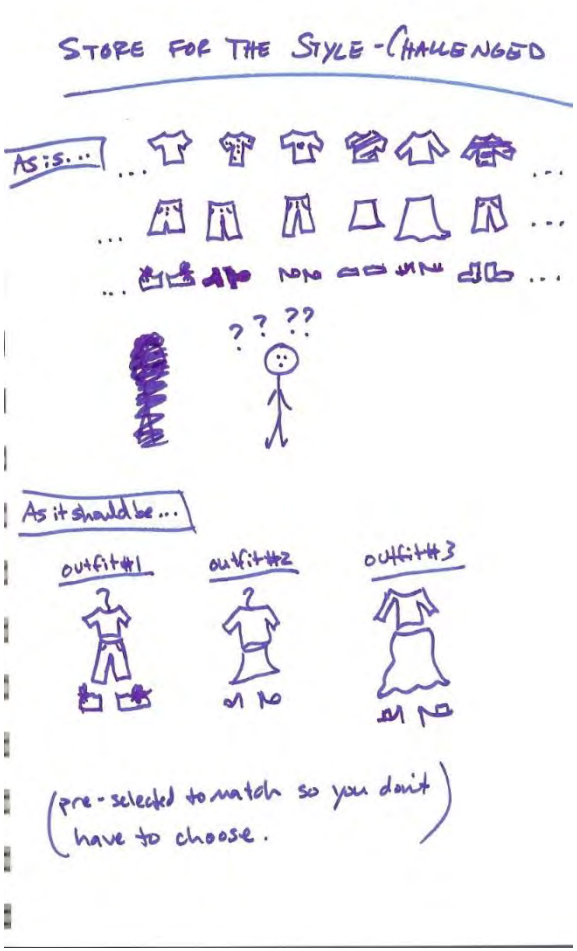
Tasks guide your exploration of a design

Creating scenarios for each task illustrates

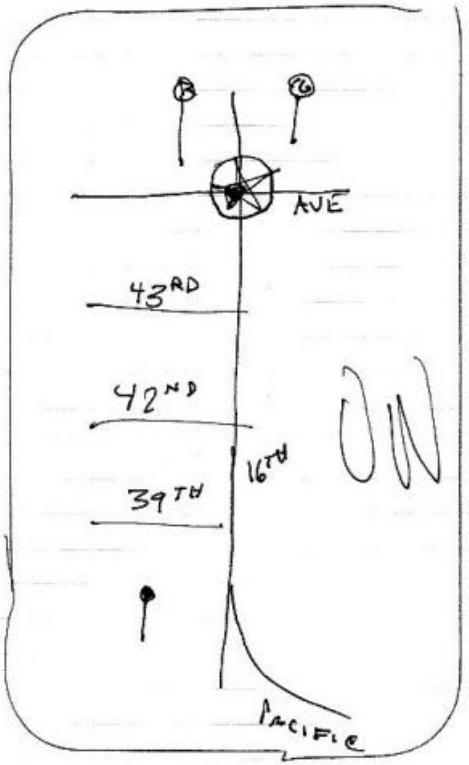
- what a person does
- what they see
- step-by-step performance of task with a design

Sketching

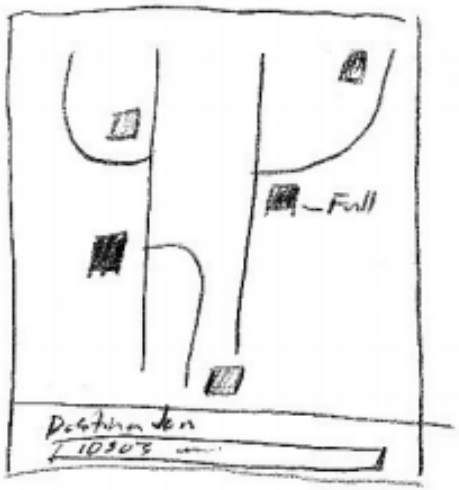

Movies
Theater: Shattuck Cinemas
Phone: (510) 665-1342 Dist: 1.5 mi
Address: 2122 Shattuck Ave
Berkeley, 94709
Cost - $8.50 normal, $6.00 senior, $4.00 matinee
Map-It
Art of War ☆☆☆
(10:00)-(1:00)-4:00-7:00-10:00
Bittersweet Motel ☆☆☆☆
(11:00)-(1:30)-4:00-6:30-9:00
Godzilla ☆☆
(10:30)-(2:00)-5:30-9:00
The Cell ☆☆☆½
(11:00)-(1:00)-3:00-5:00-7:00-9:00


STORE FOR THE STYLE-CHALLENGED
As is...
As it should be...
outfit#1
outfit#2
outfit#3
(pre-selected to match so you don't have to choose.)

Sketching

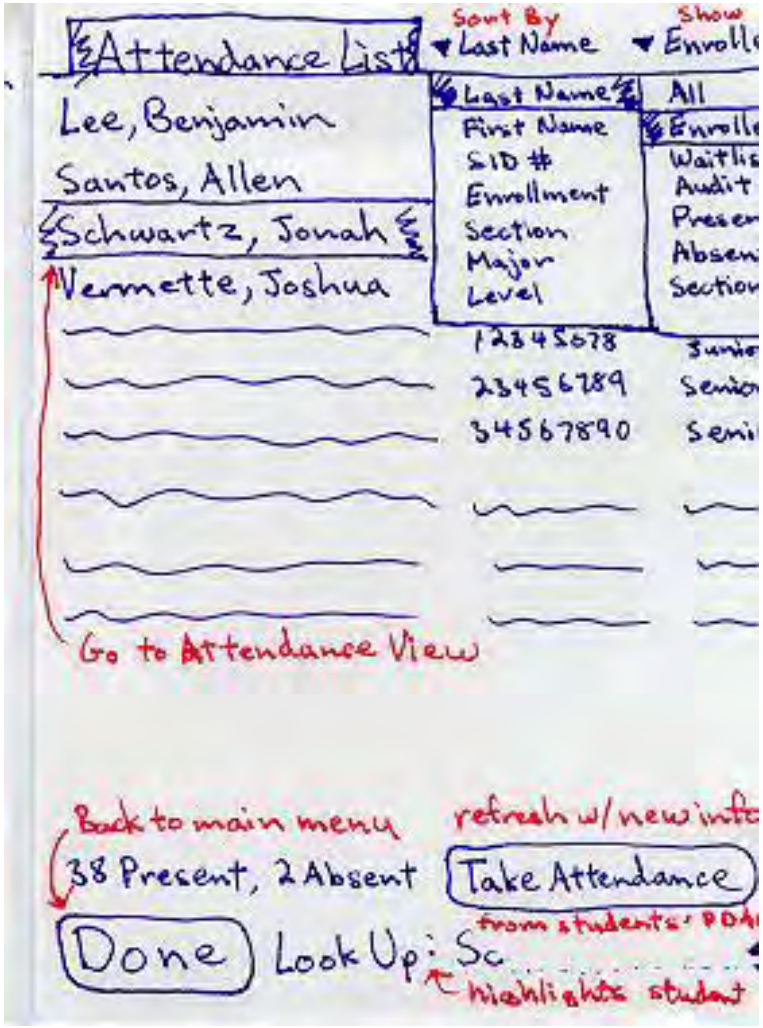


MAP SHOWING PARKING AVAILIBILITY BASED ON INPUTTED DATA, INPUTTED ON MAP

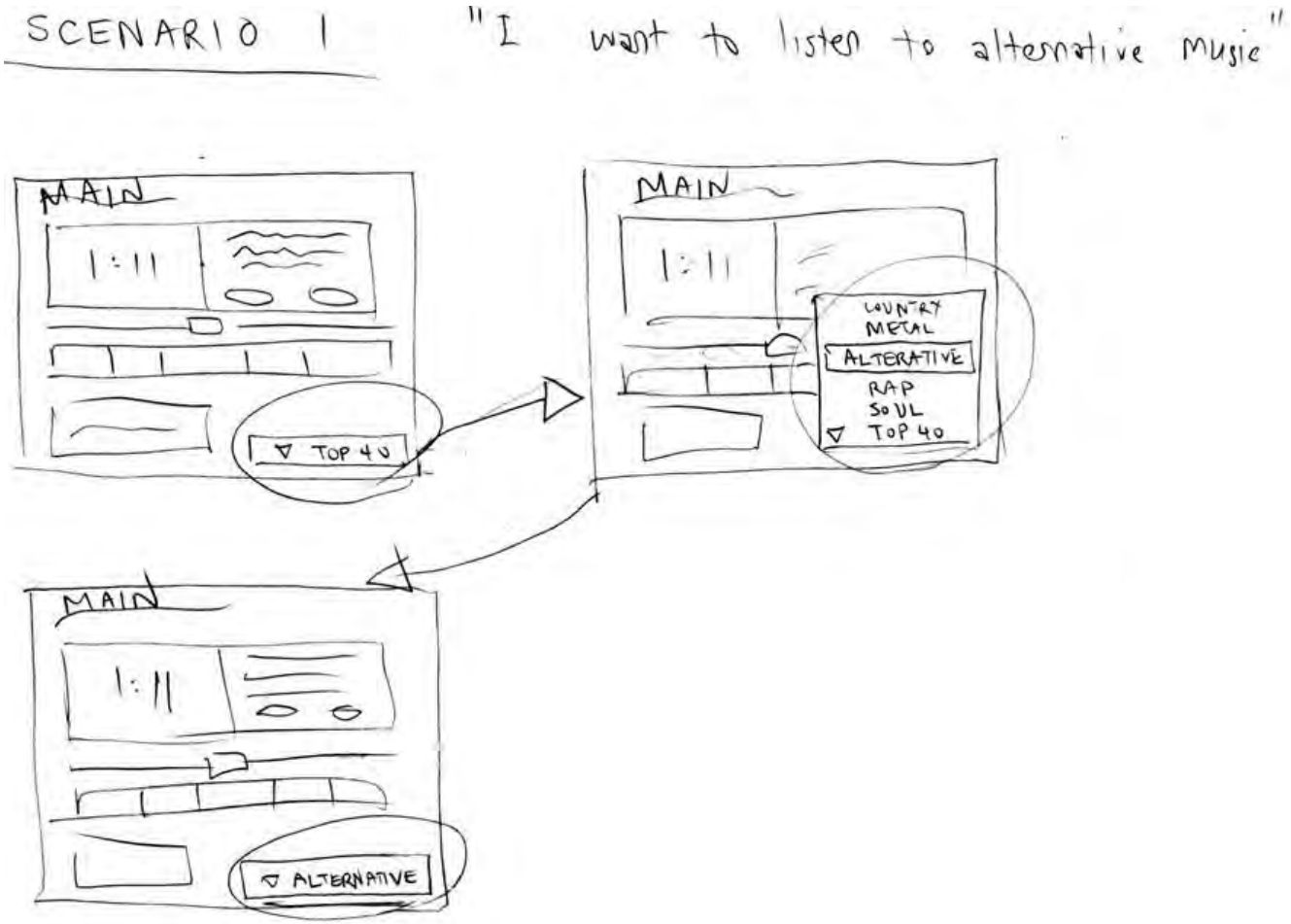


- different colors
- high lights availability
-

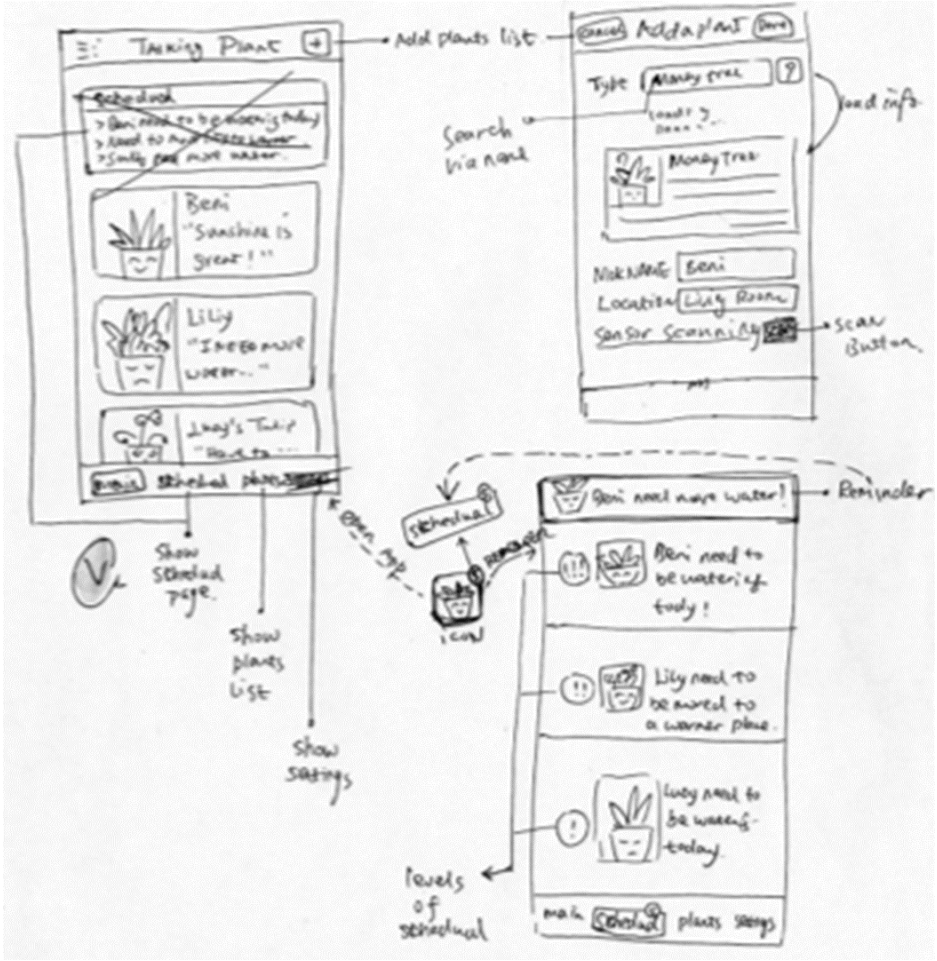
Sketching and Tasks



Sketching and Tasks



Sketching and Tasks



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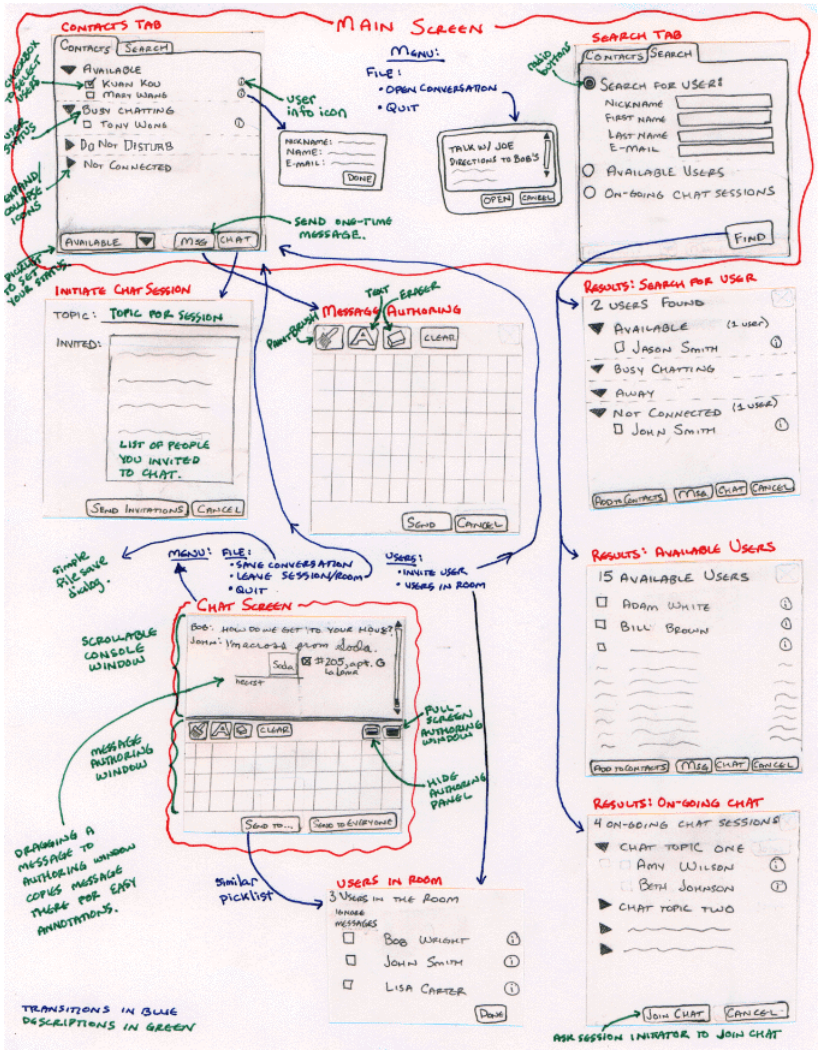
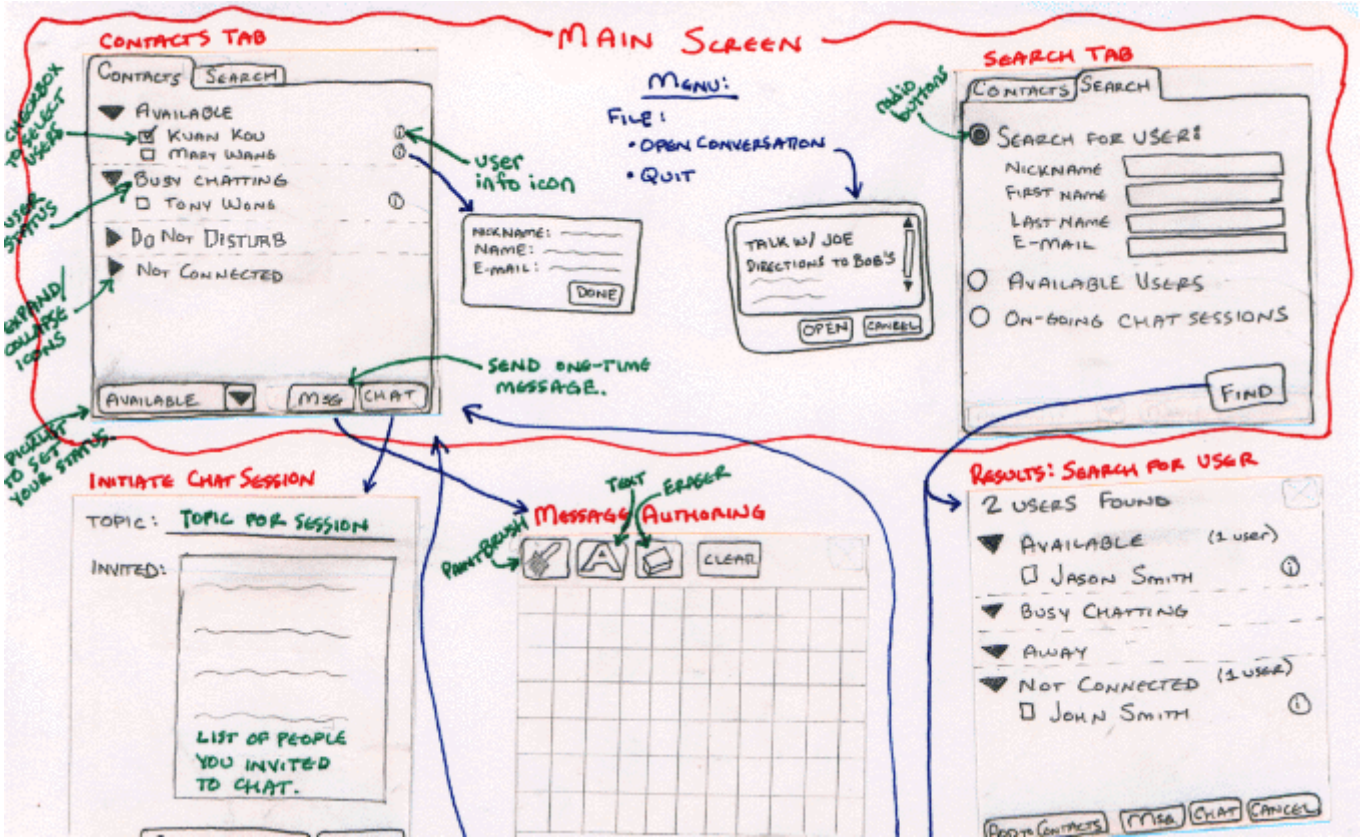


Sketching and Tasks

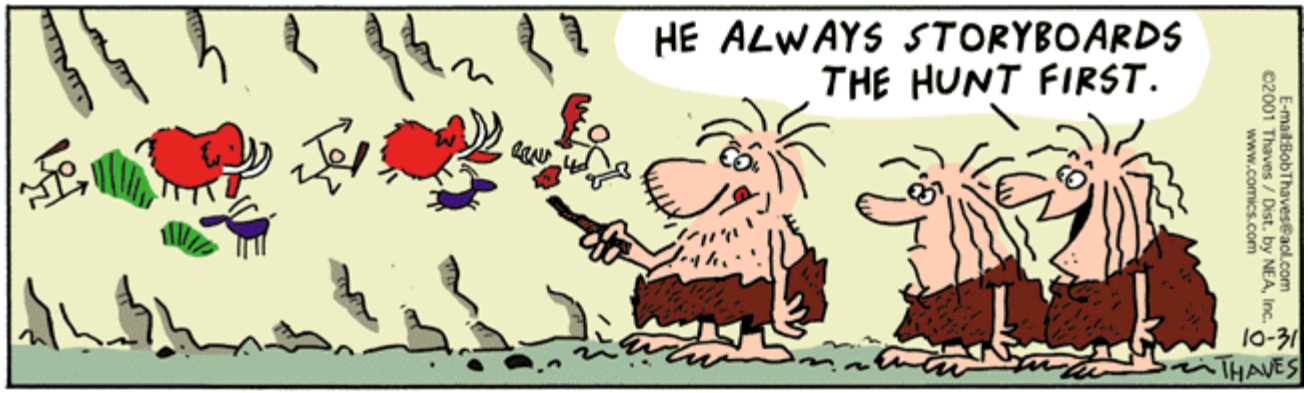


Illustrating Time

Storyboards come from film and animation

Give a “script” of important events

- leave out the details
- concentrate on the important interactions



Storyboards

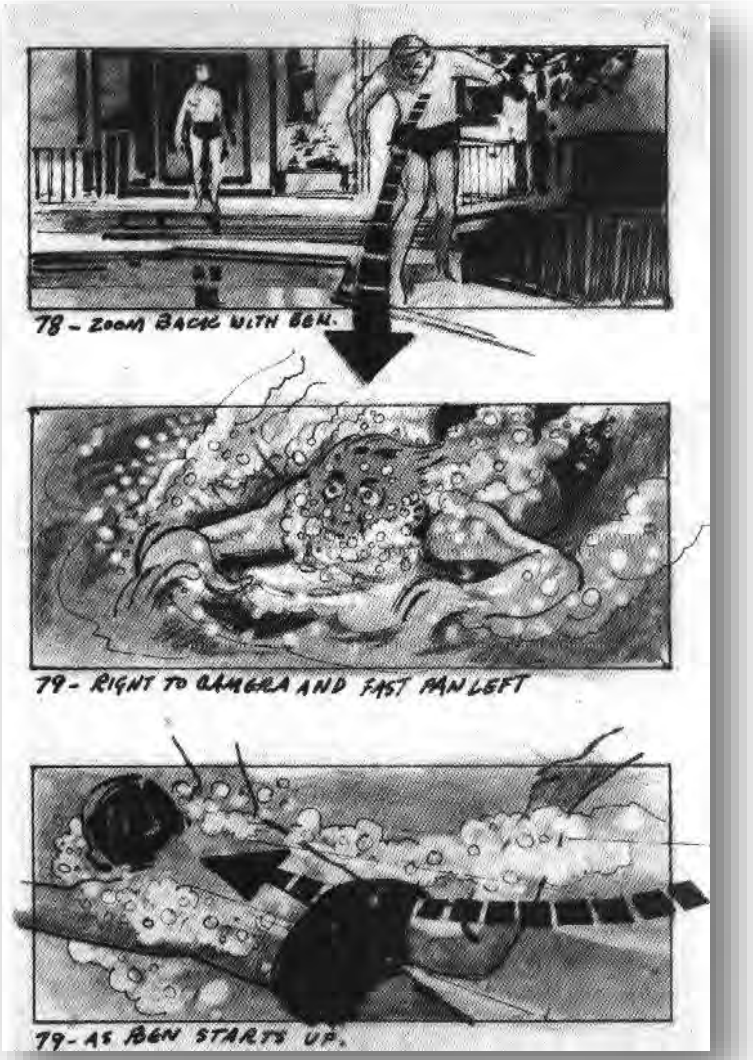
Can be used to explore

Much faster and less expensive to produce

Can therefore explore more potential approaches

Notes help fill in missing pieces of the proposal

Relative to film, these function as sketches



Storyboards

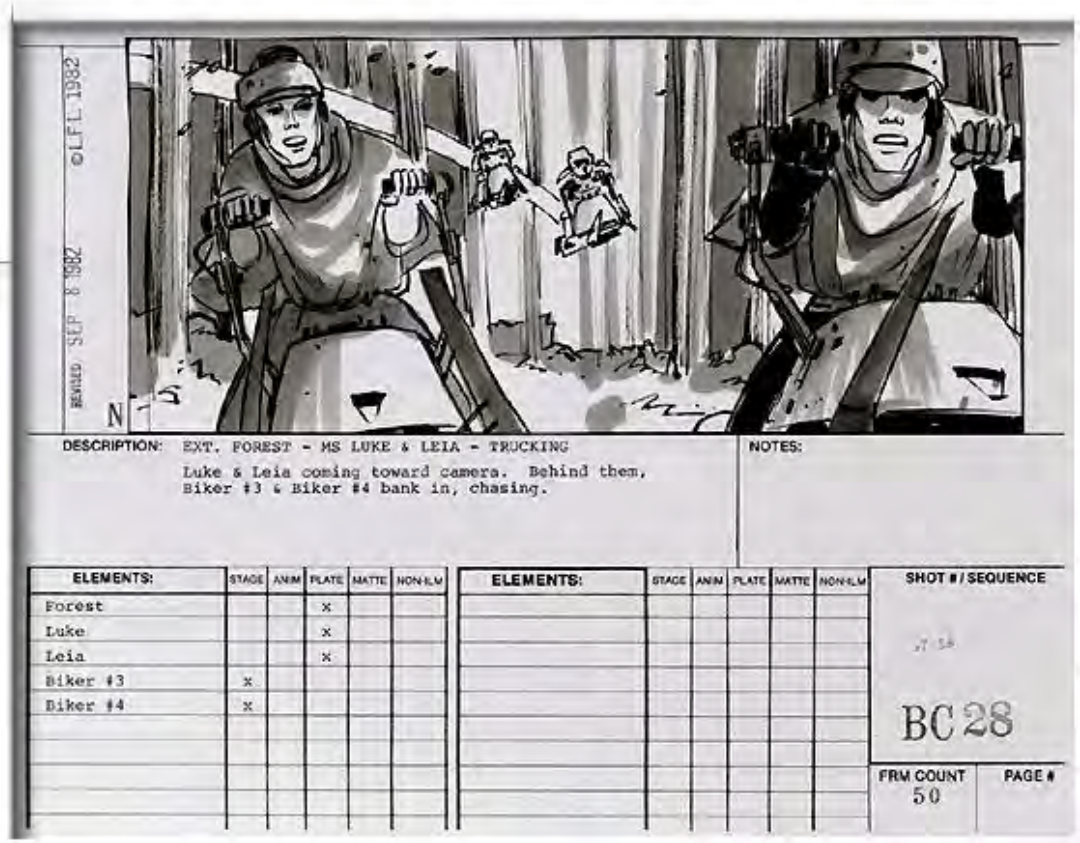
Can be used to convey

Effective storyboards can quickly convey information that would be difficult to understand in text

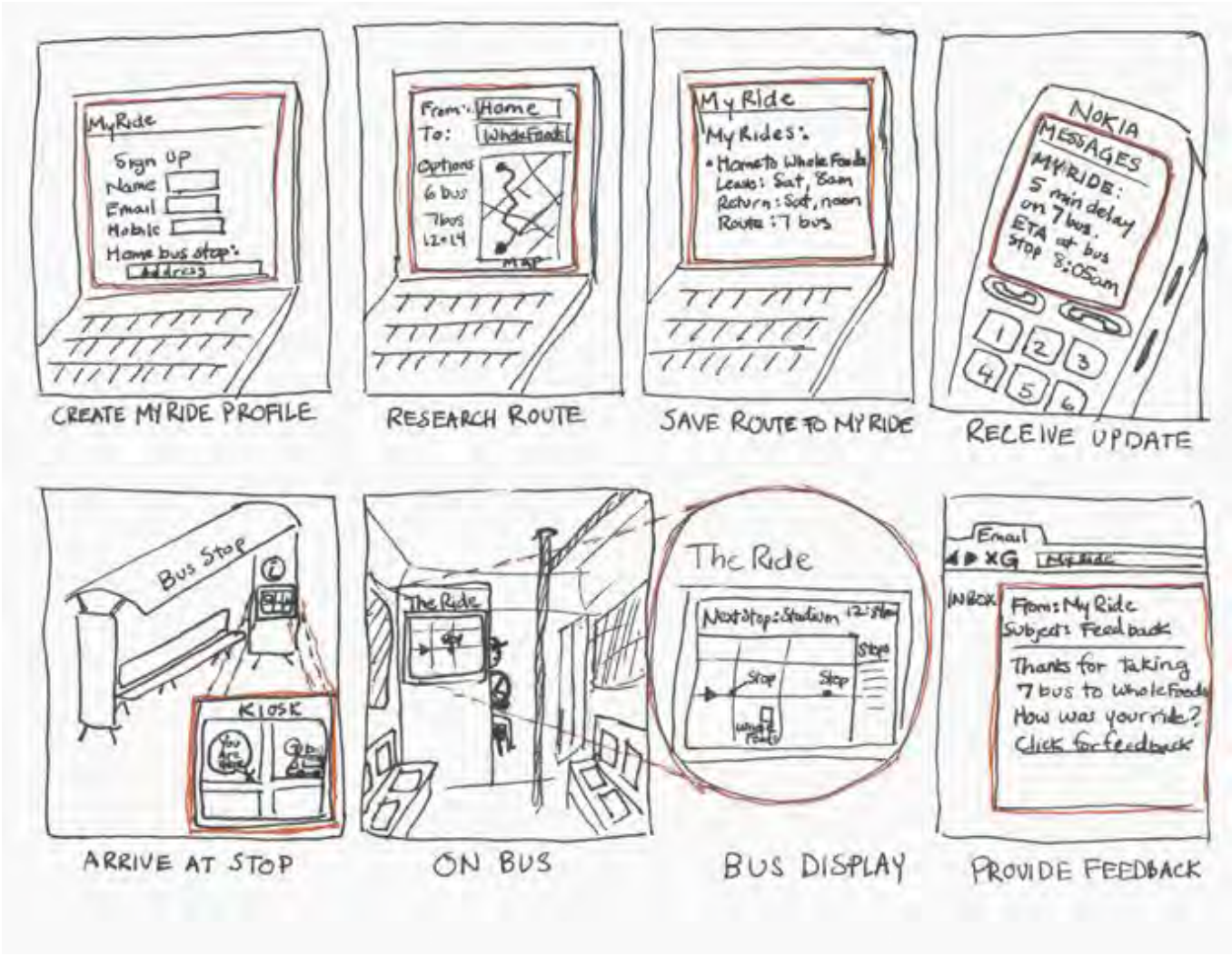
Imagine explaining this in text, for various audiences

Storyboards

Can illustrate key requirements and leave open less important details of design



Basic Storyboard



Storytelling

Stories have an audience

- Other designers, clients, potential end-users, stakeholders, managers, funding agencies

Stories need to match audience and purpose

Quesenberg and Brooks

Potential Purpose of a Story

Purpose allows choosing effective details

Stories have a purpose

- Share information about people, tasks, goals
- Giving insight into people who are not like us, convey details that might be lost in generalities
- Put a human face on analytic data
- Spark design concepts and encourage innovation
- Share ideas and persuade on potential value

Quesenberg and Brooks

Stories Provide Context

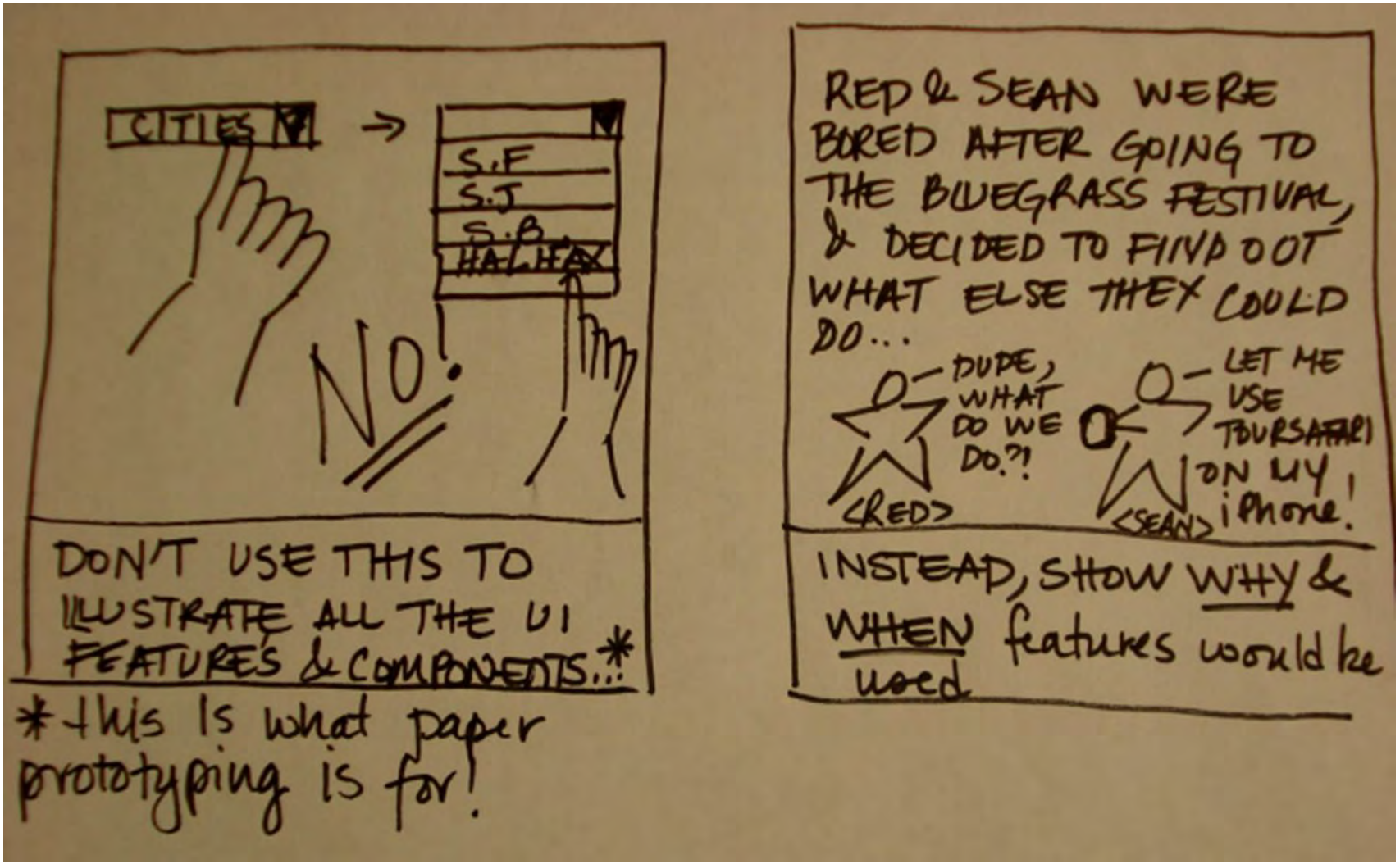
- Characters
  - Who is involved
- Setting
  - Environment
- Sequence
  - What task is illustrated
  - What leads a person to use a design
  - What steps are involved
- Satisfaction
  - What is the motivation
  - What is the end result
  - What need is satisified

Minor interface features and components are not necessarily surfaced, they can often be developed and conveyed more effectively with other methods

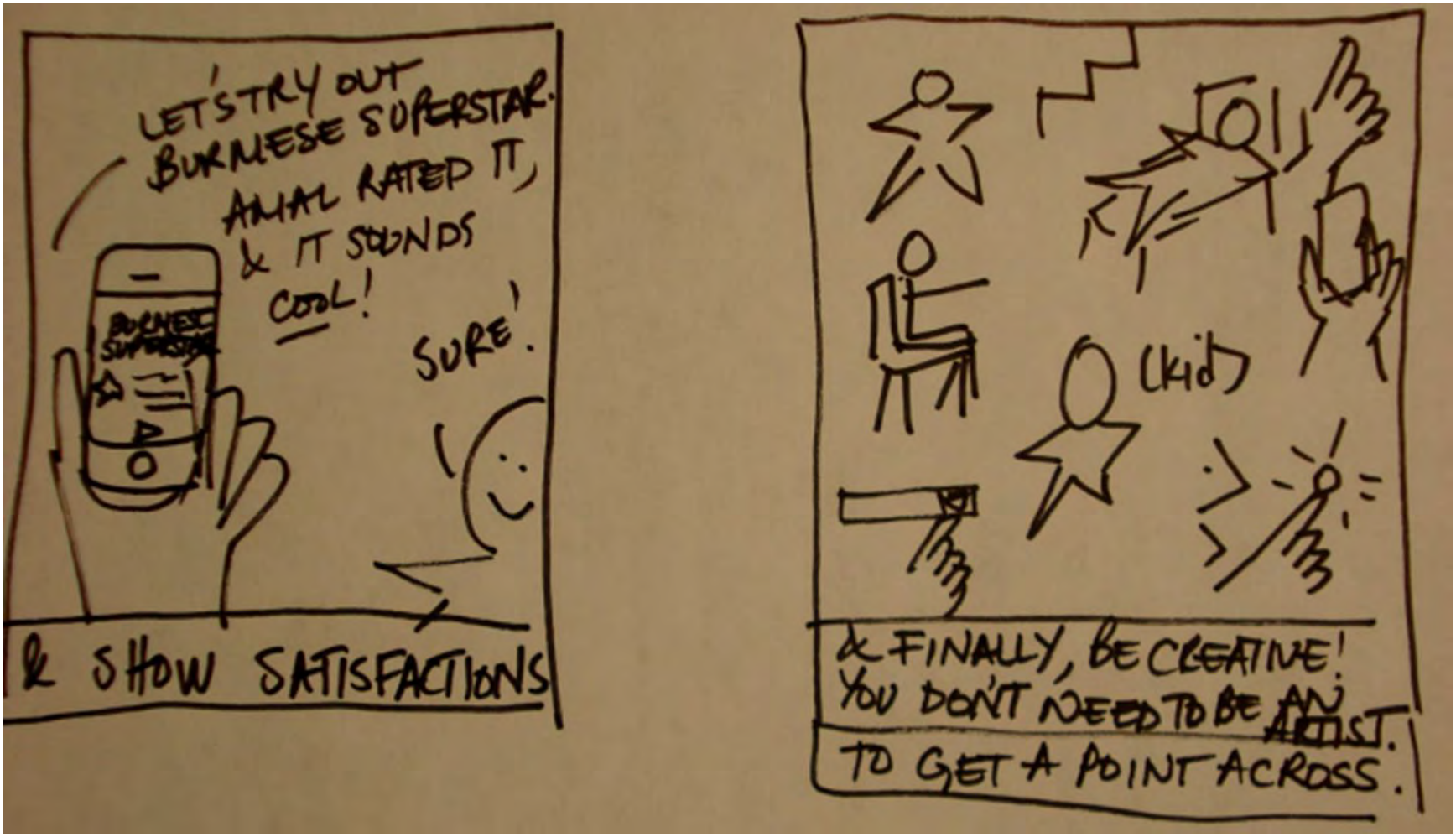
Can help surface details that might otherwise be ignored

Grocery store application:
- use with one hand while pushing a shopping cart
- privacy of speech input
- split attention

Amal's Guide to Storyboarding



Amal's Guide to Storyboarding



Storytelling

Good stories

- Understand audience
- Provide context of use
- Are well-motivated
- Memorable
- Evokes a reaction
- Evokes empathy
- Illustrate experience
- Convey emotions
- Short and to-the-point

Bad stories

- Do not account for audience
- Boring or un-engaging
- Fantastical or unrealistic
- Wrong story for purpose
- Too long to hold attention

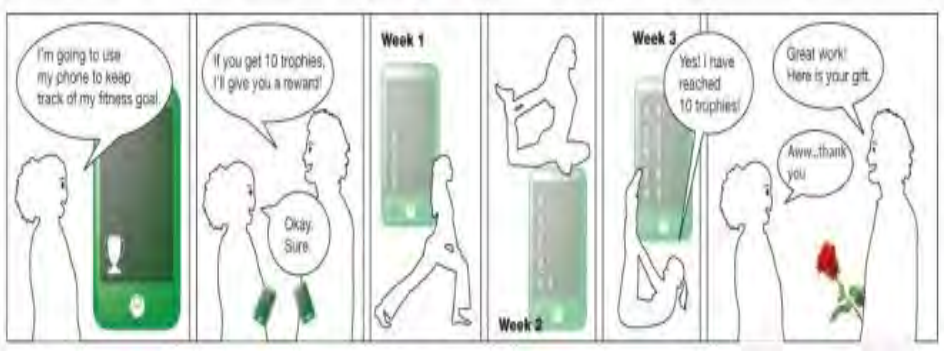
tl;dr

Elements of a Storyboard

Visual storytelling

5 visual elements

- Level of detail
- Inclusion of text
- Inclusion of people and emotions
- Number of frames
- Portrayal of time

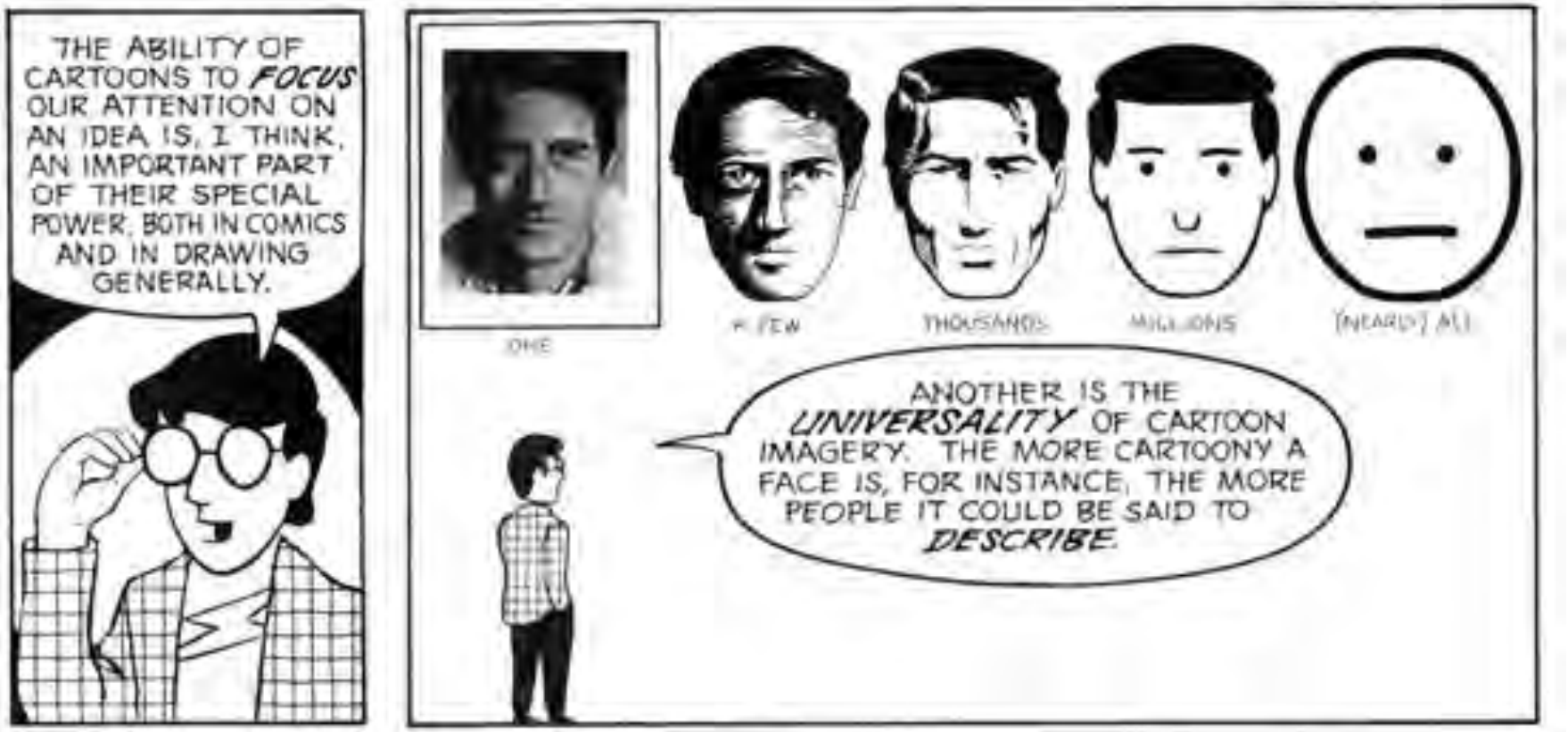


To better characterize design intuitions:
gather and analyze artifacts
semi-structured interviews
survey focused on identified elements

Truong et al, 2006

1. How Much Detail?

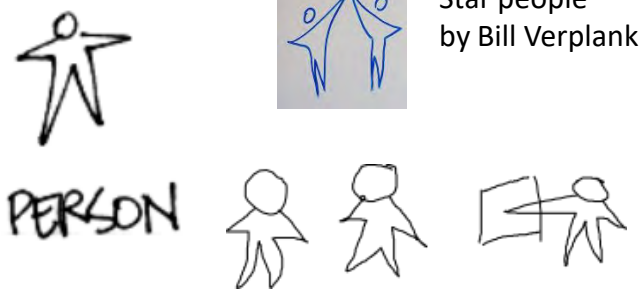
Guideline: too much detail can lose universality



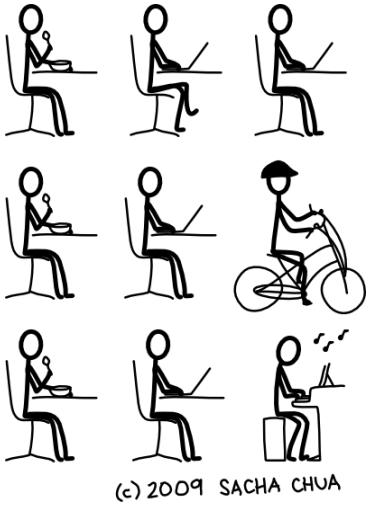
Scott McCloud

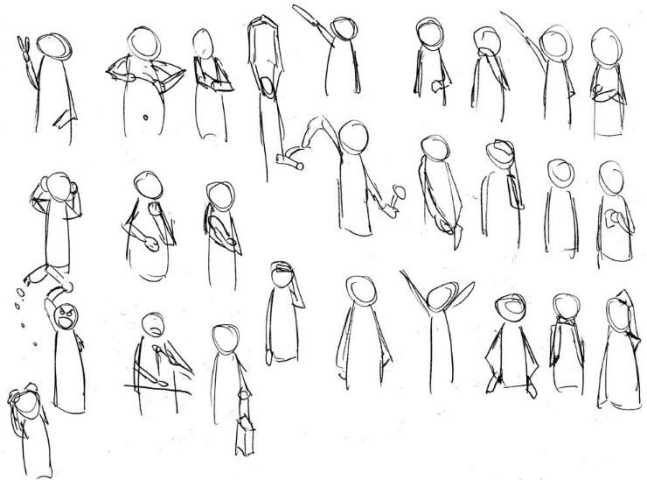
1. How Much Detail?

Sketching People



Star people
by Bill Verplank





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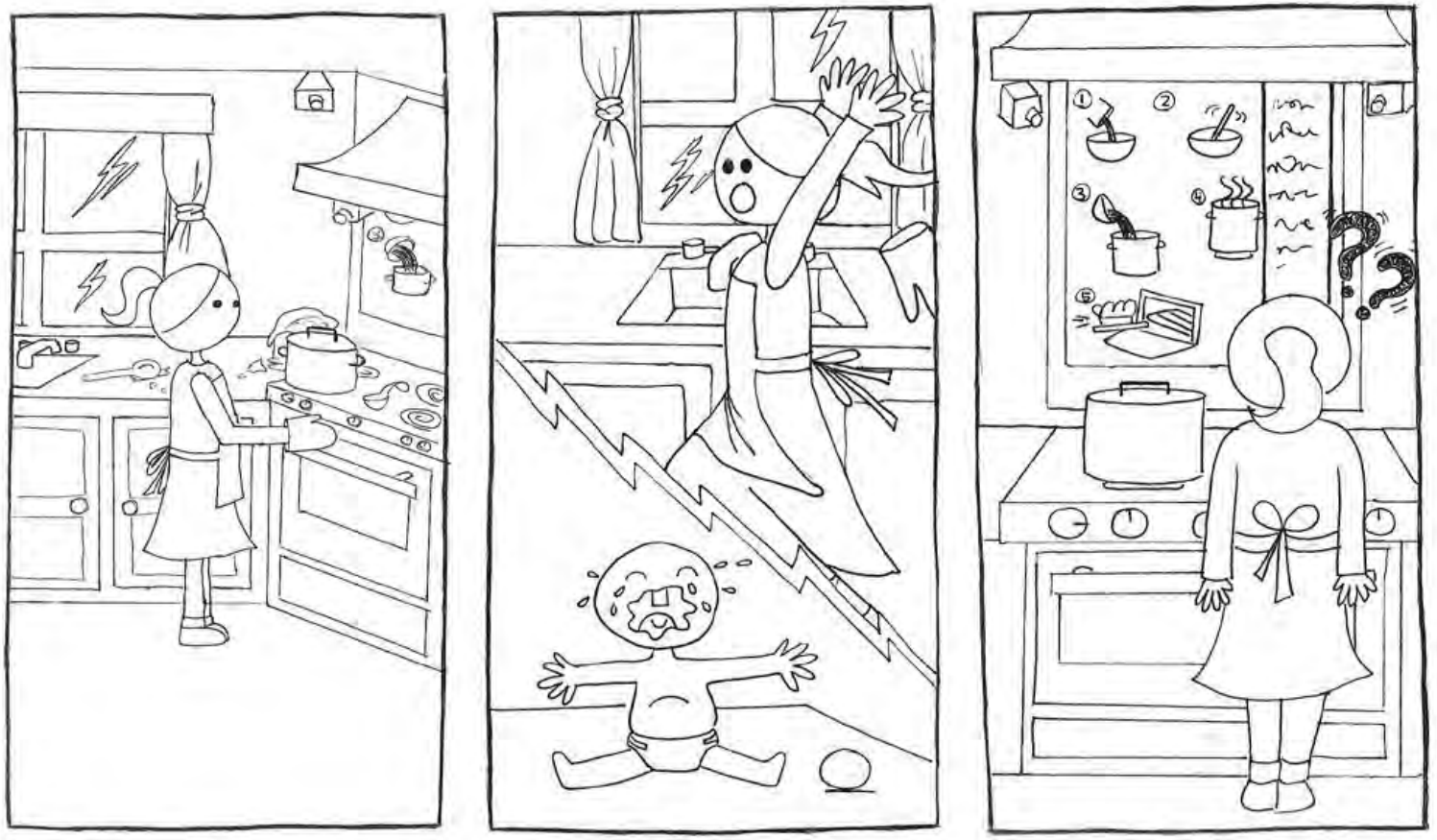

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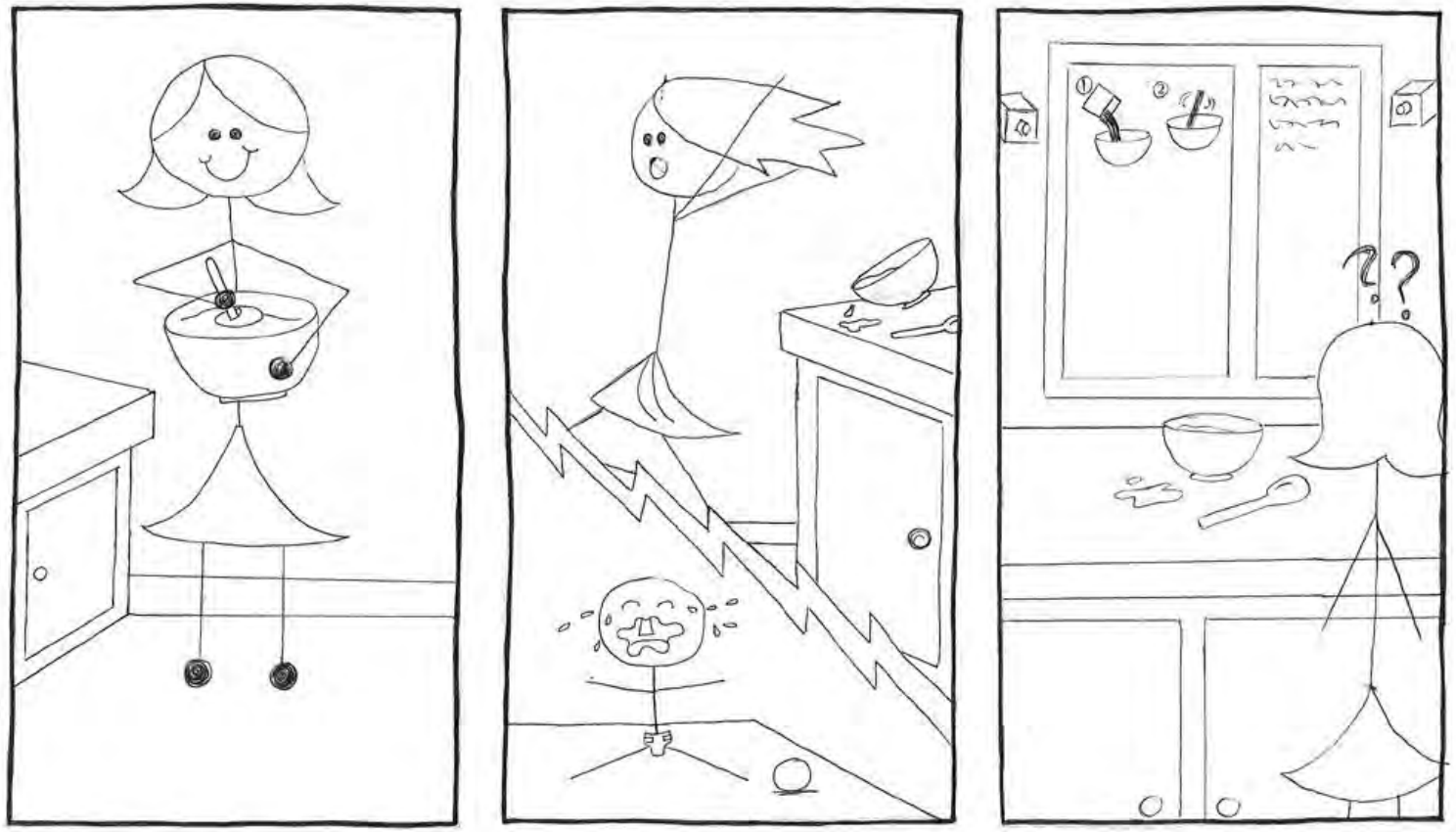
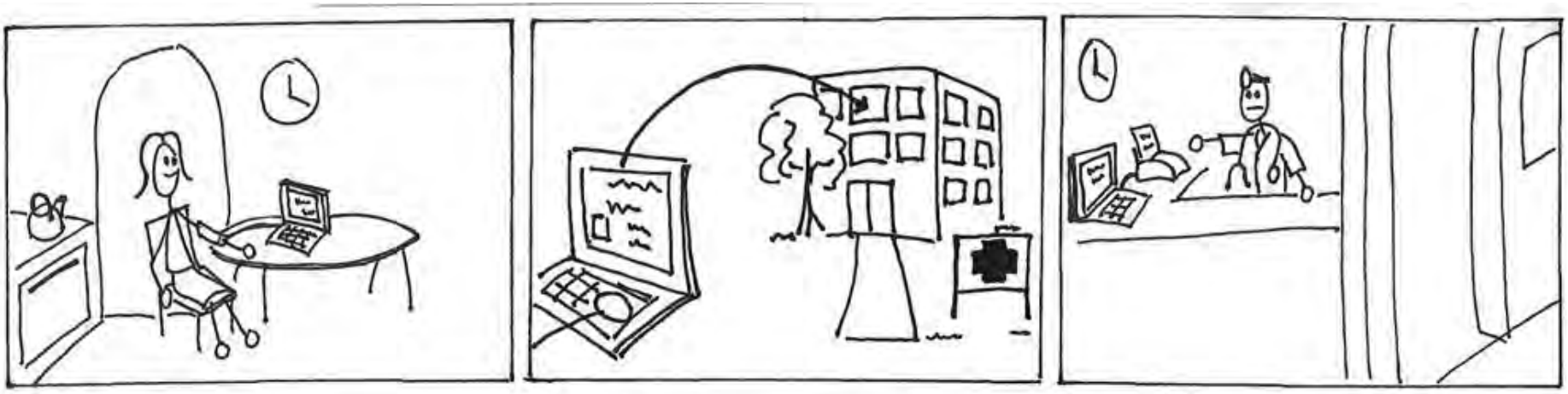


Unnecessary details distract from the story

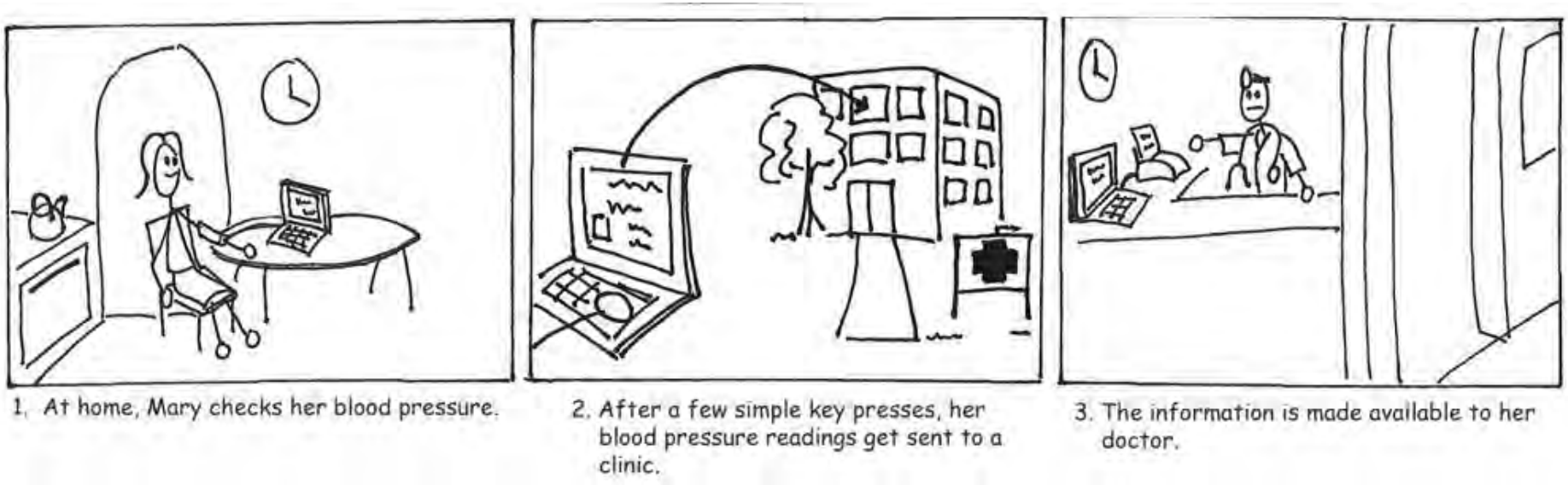
2. Use of Text

Guideline: It is often necessary, but keep it short



2. Use of Text

Guideline: It is often necessary, but keep it short

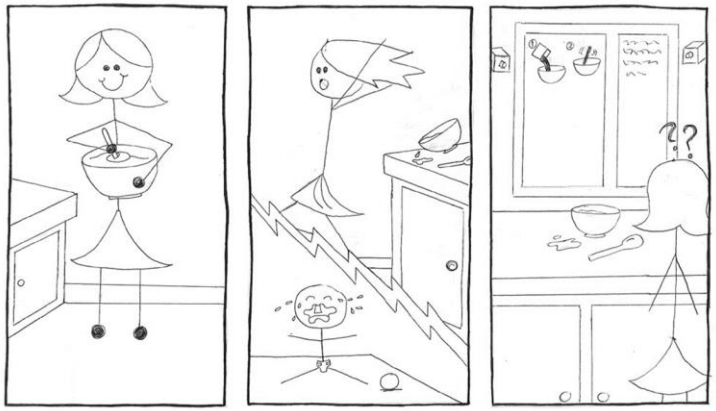


Short text is more effective, less likely to over-explain

Watch for cases where text induces weird biases

3. Include People and Emotions

Guideline: Include people experiencing the design and their reactions to it (good or bad)



Remember, the point of storyboards is to convey the experience of using the system

4. How Many Frames?

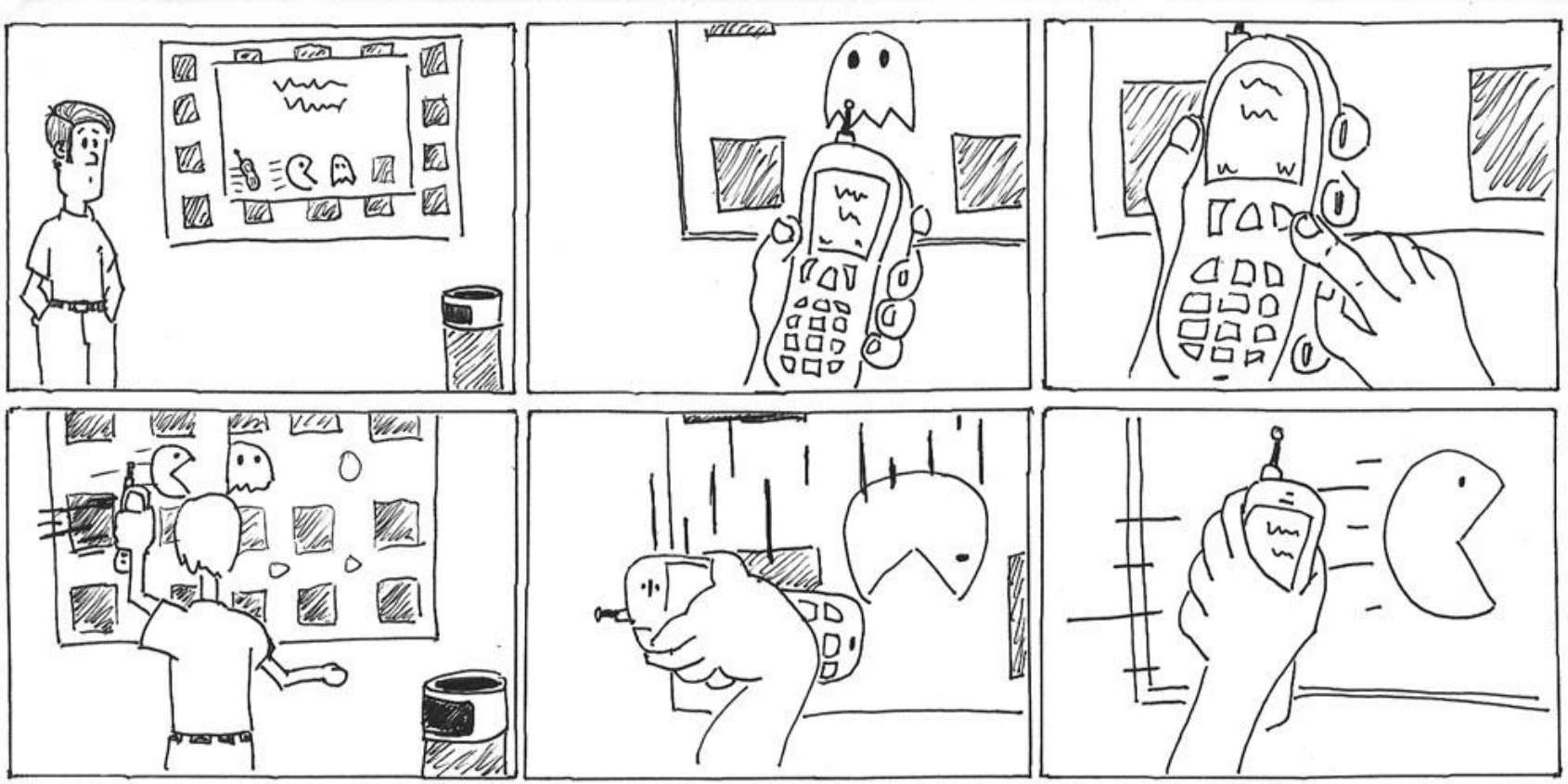
Guideline: 4-6 frames is ideal for end-users

- Less work to illustrate
- Must be able to succinctly tell story
- Potentially longer for design clients

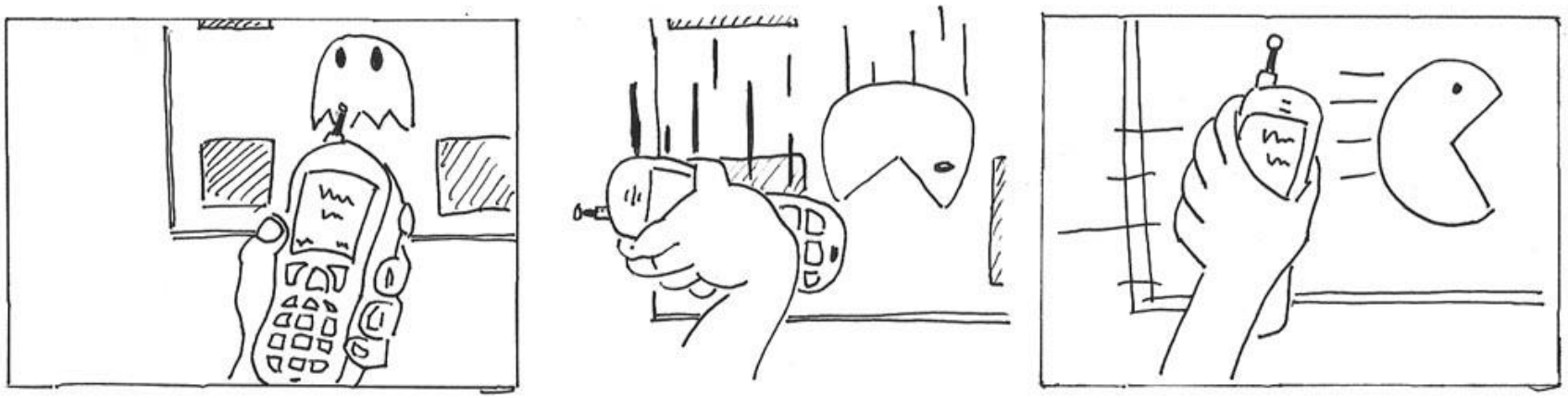
More is not always better

- May lose focus of story
- May lose attention

4. How many frames?



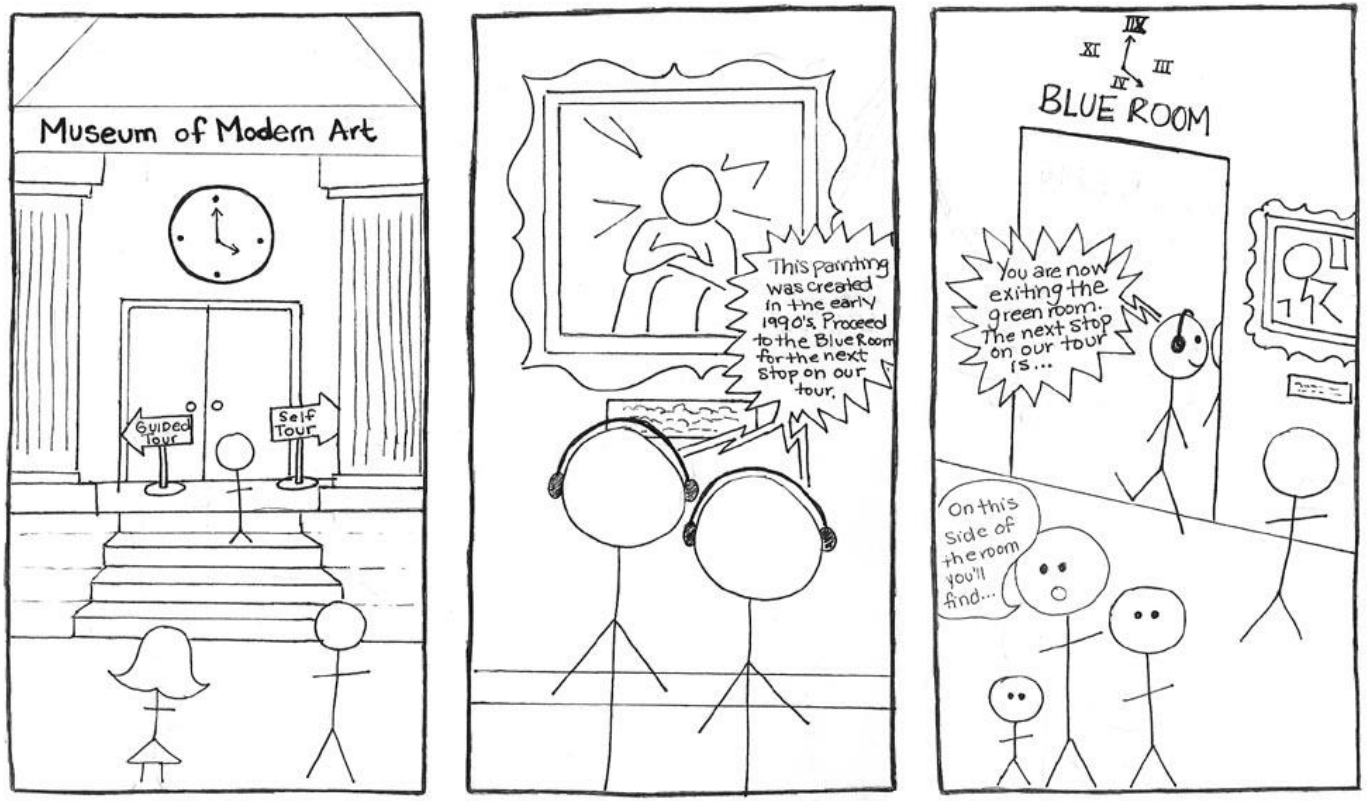
4. How many frames?



People found the extra panels were not needed

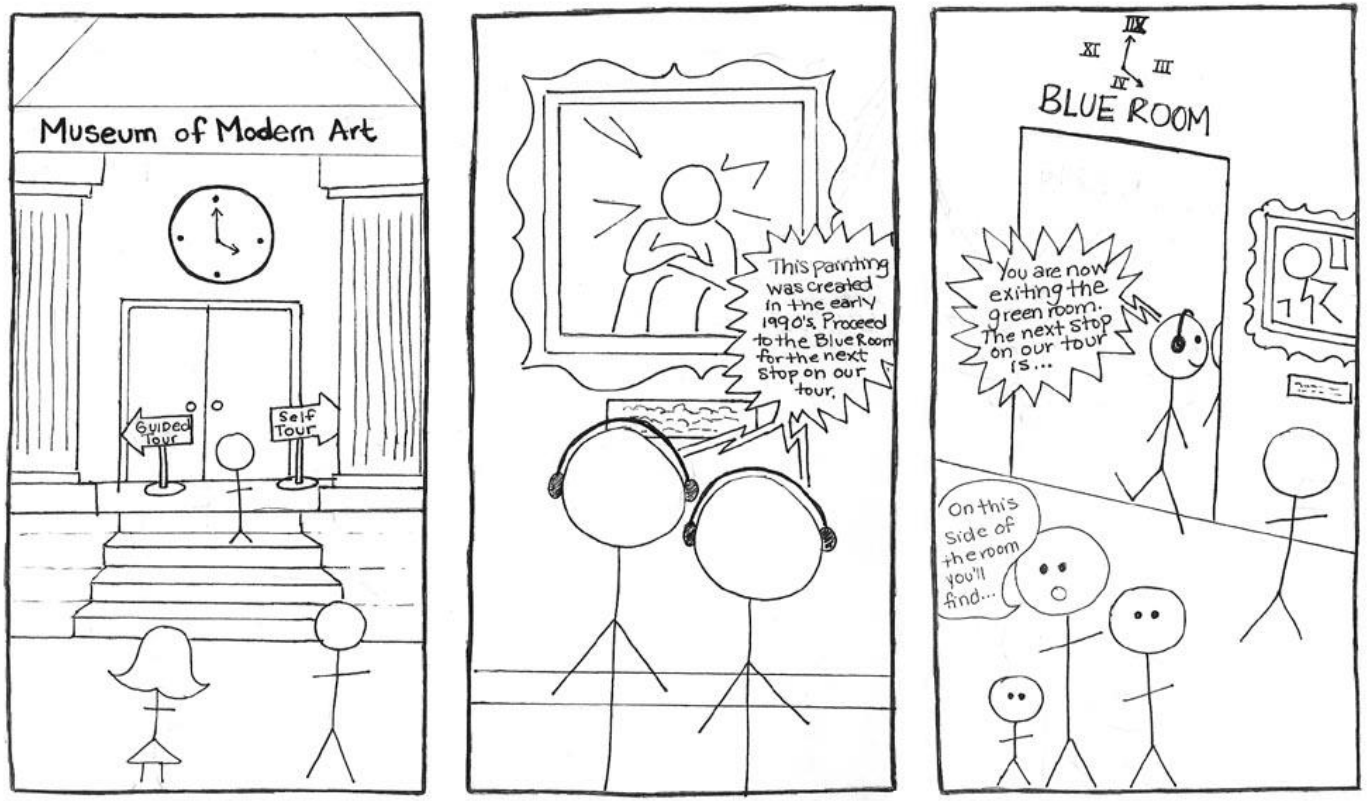
5. Passage of Time

Guideline: Only use if necessary to understand



5. Passage of Time

Guideline: Only use if necessary to understand



Inclusion of the clock distracts

Storyboards for Comparing Ideas

Authoritative

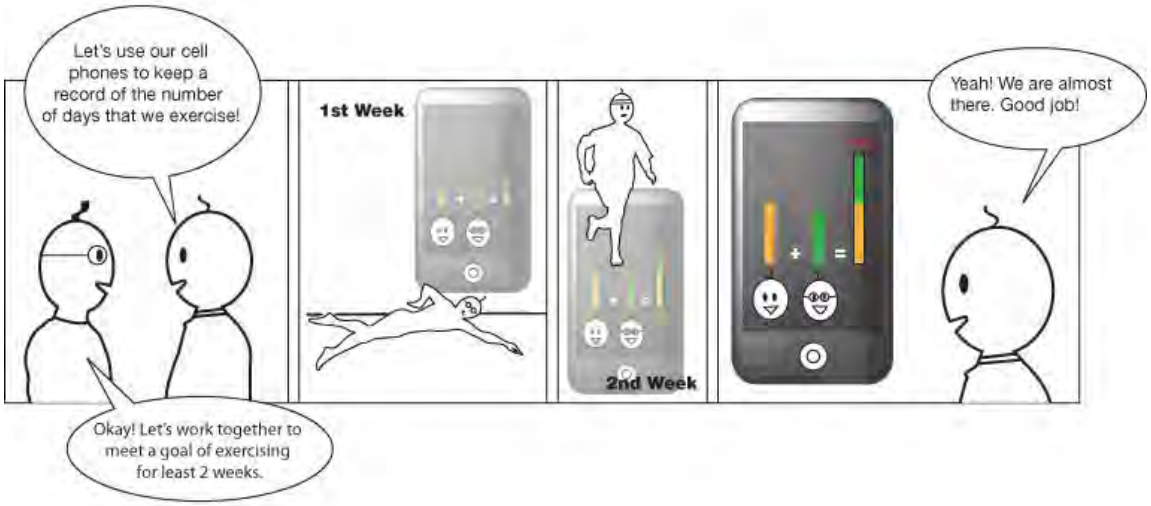
Cell phone is used to keep track of one's fitness goal.

Supportive

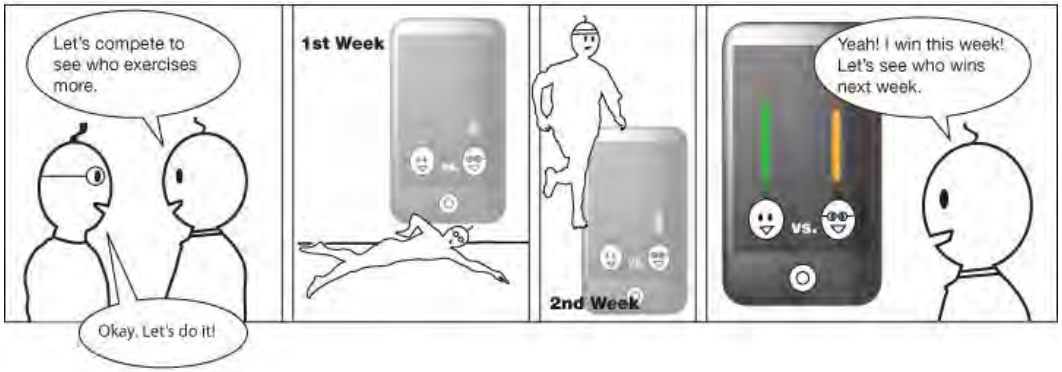
Cell phone is used to keep track of one's fitness goal.

Storyboards for Comparing Ideas

Cooperative

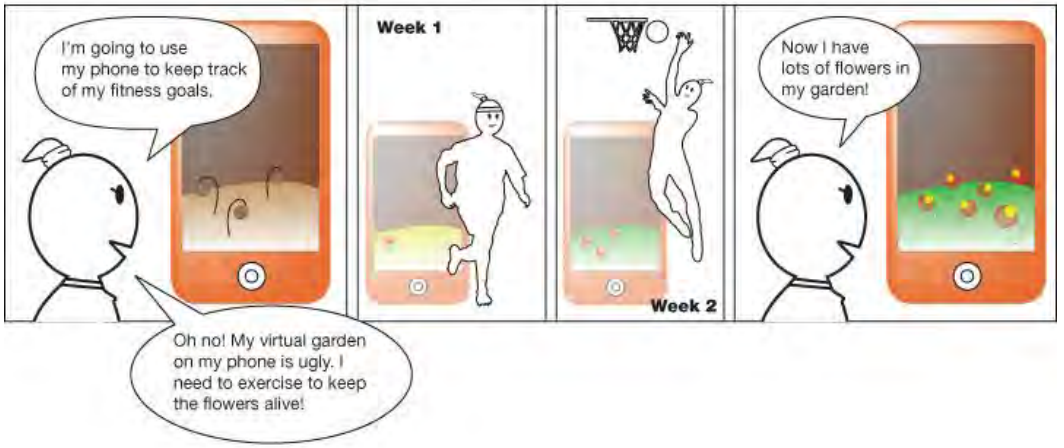


Competitive

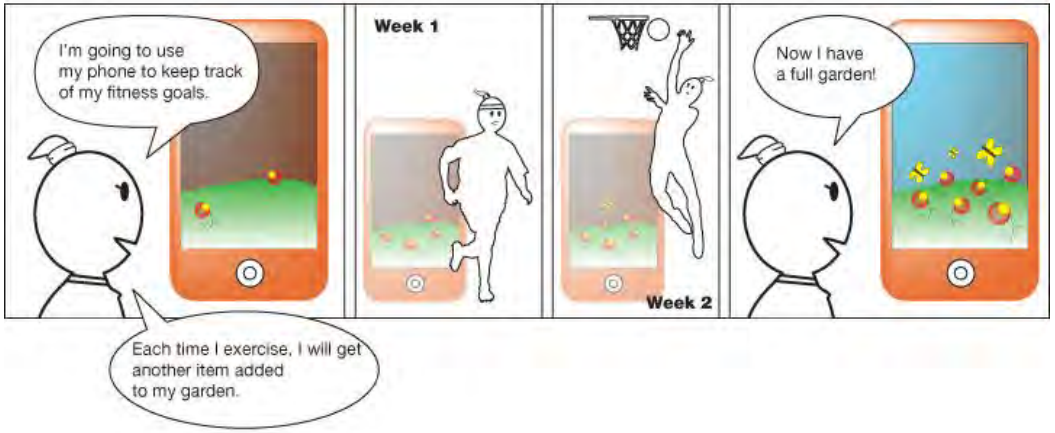


Storyboards for Comparing Ideas

Negative Reinforcement



Positive Reinforcement



Examples and Tricks in Storyboarding

This is also the focus of Reading 2

- Due Saturday night
  (not needed for Friday section)

Will go over these quickly, especially the videos

- You then view them outside of class

Drawing is Hard

Will a picture work instead?

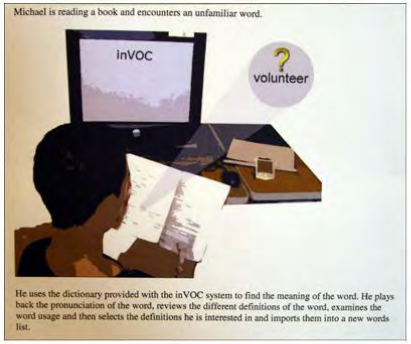
Existing Images from Other Sources

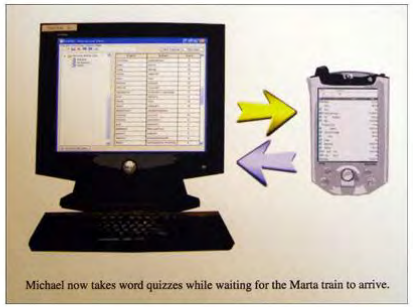
http://designcomics.org/

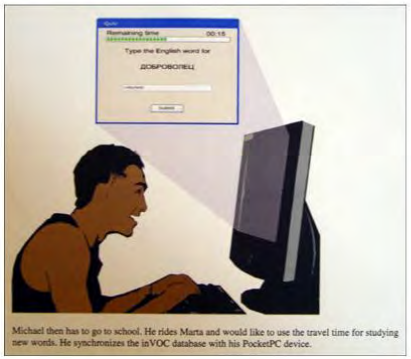
http://www.pdclipart.org/

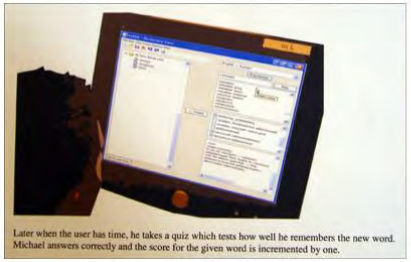
Blur Out Distracting Details

Using image editing software to simplify photos into sketches

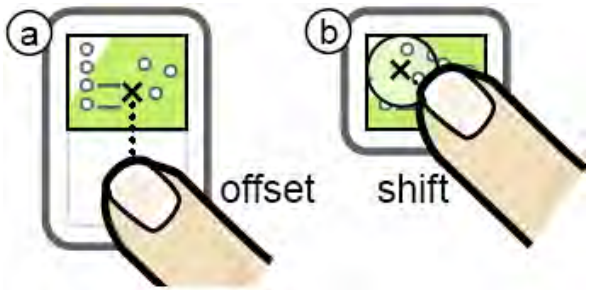


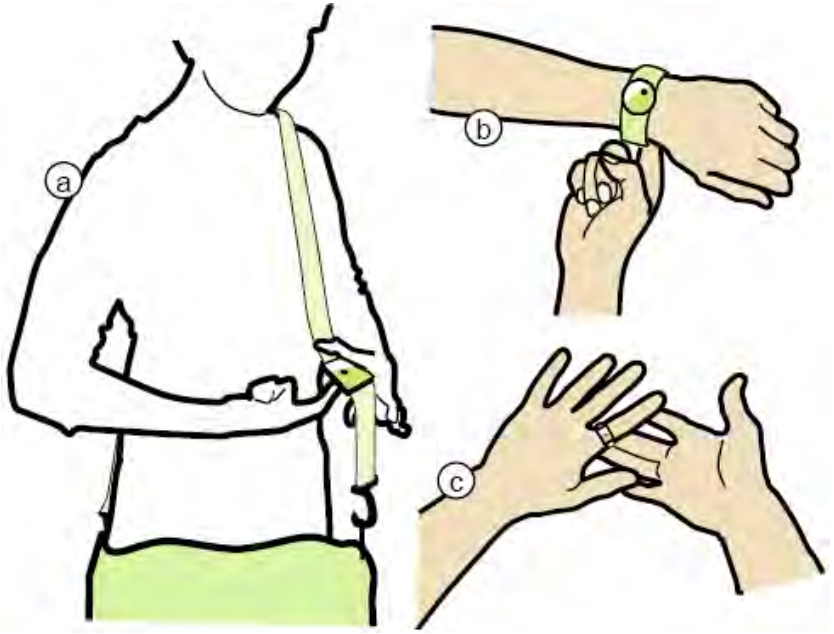






Tracing Photos

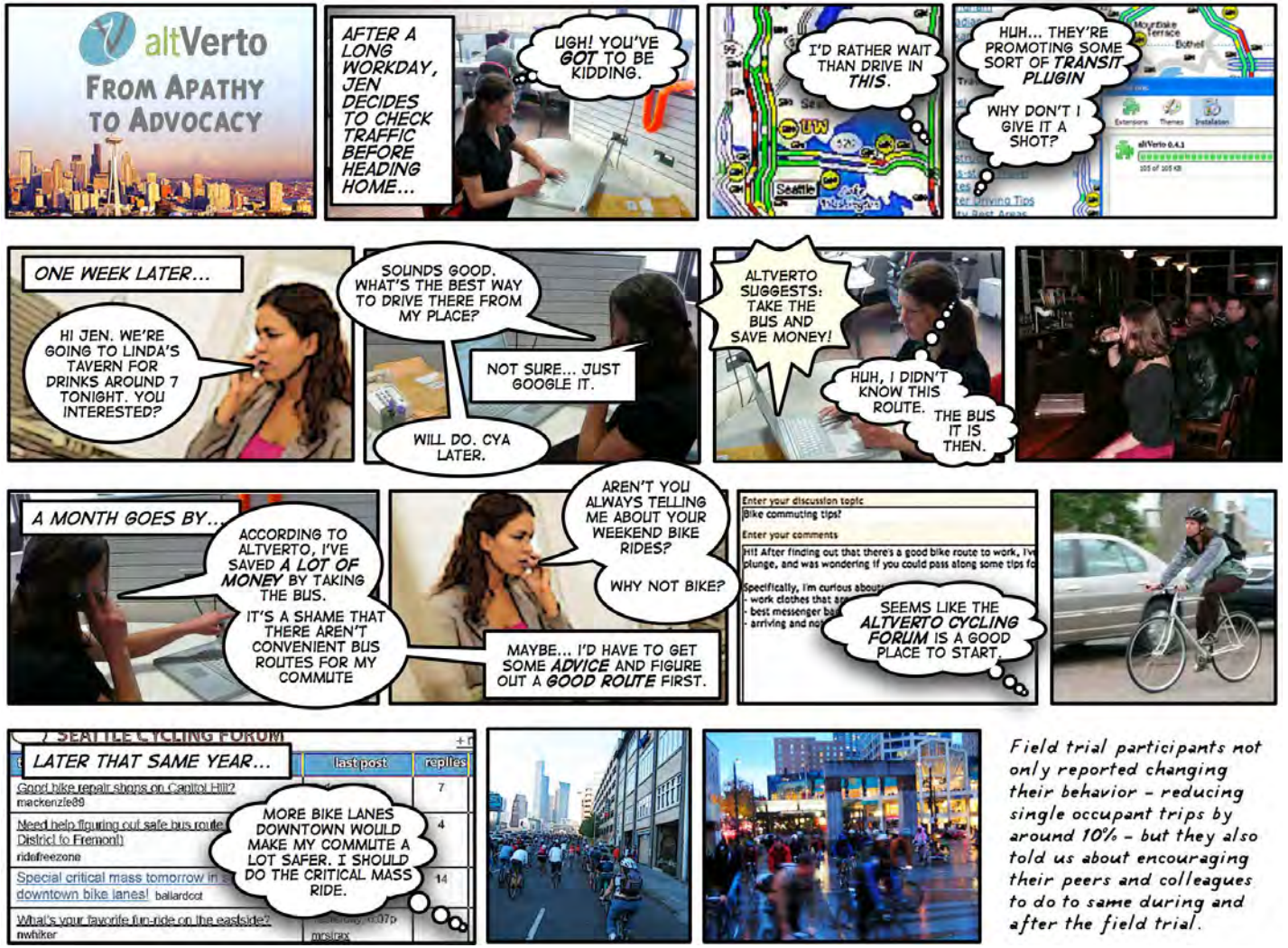




Baudisch and Chu, 2009

Comic Presentation

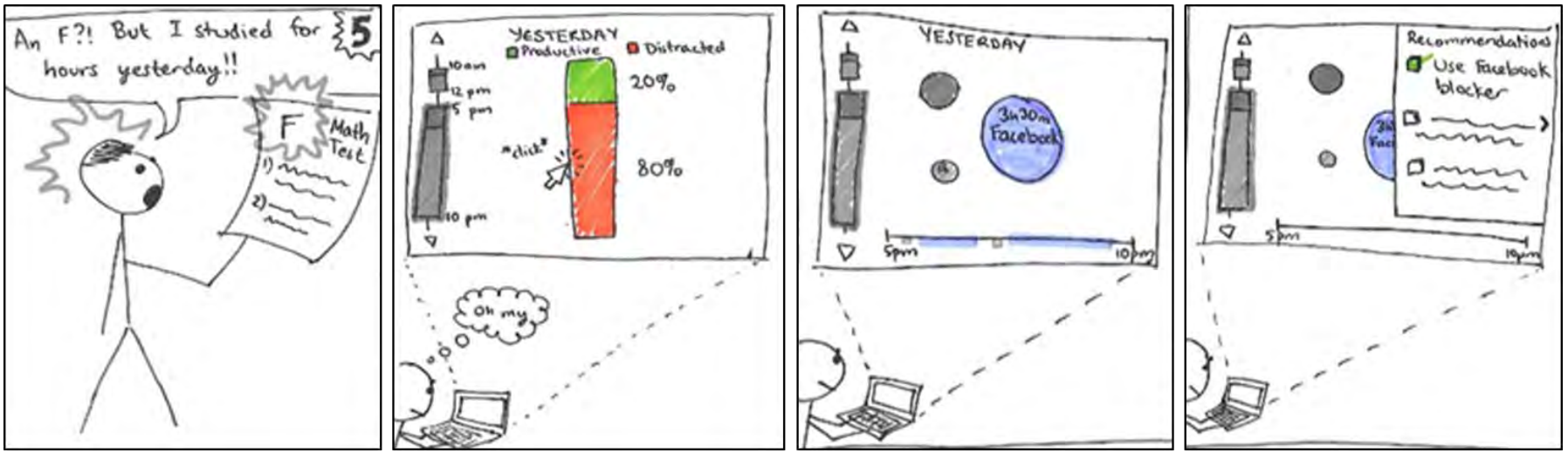
Thought bubbles argue for the design



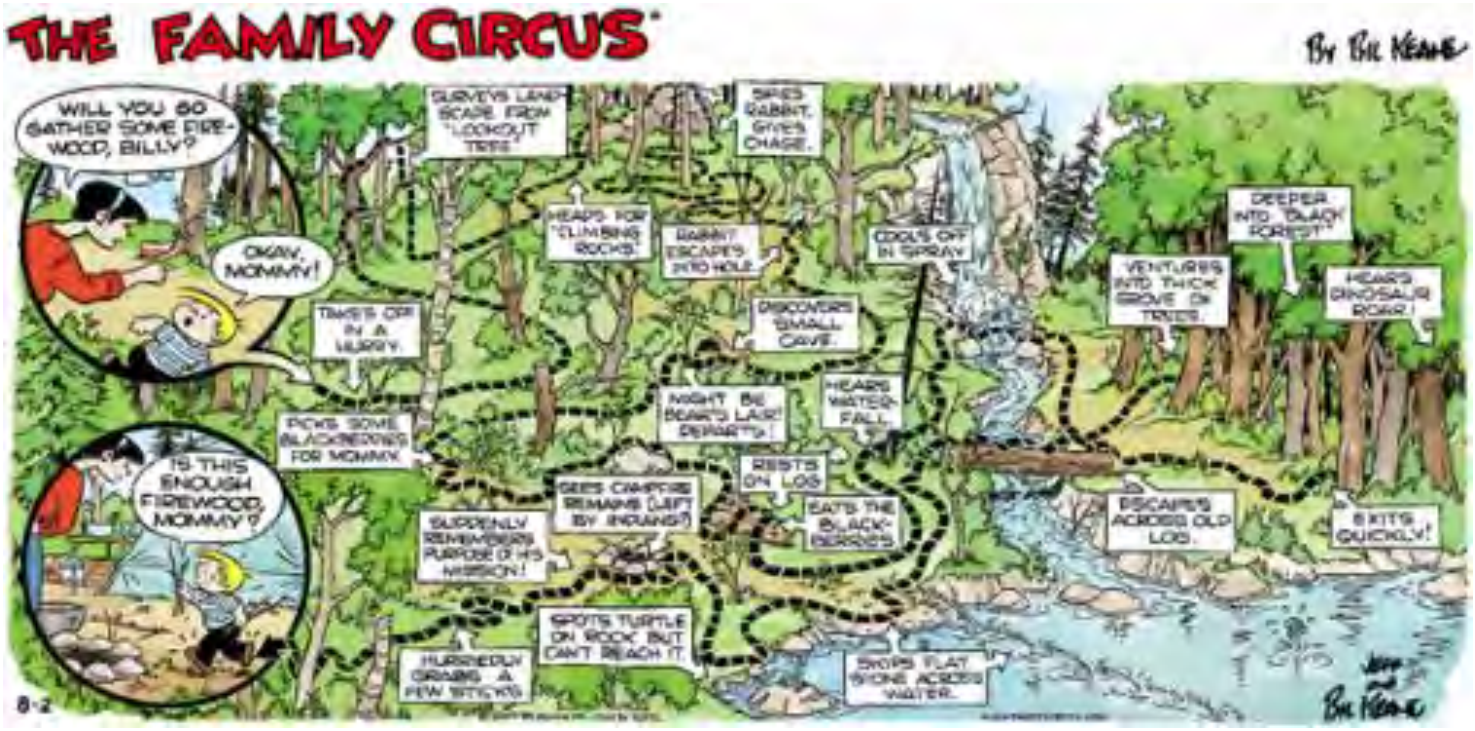
Field trial participants not only reported changing their behavior – reducing single occupant trips by around 10% – but they also told us about encouraging their peers and colleagues to do to same during and after the field trial.

Gukeisen et al, 2007

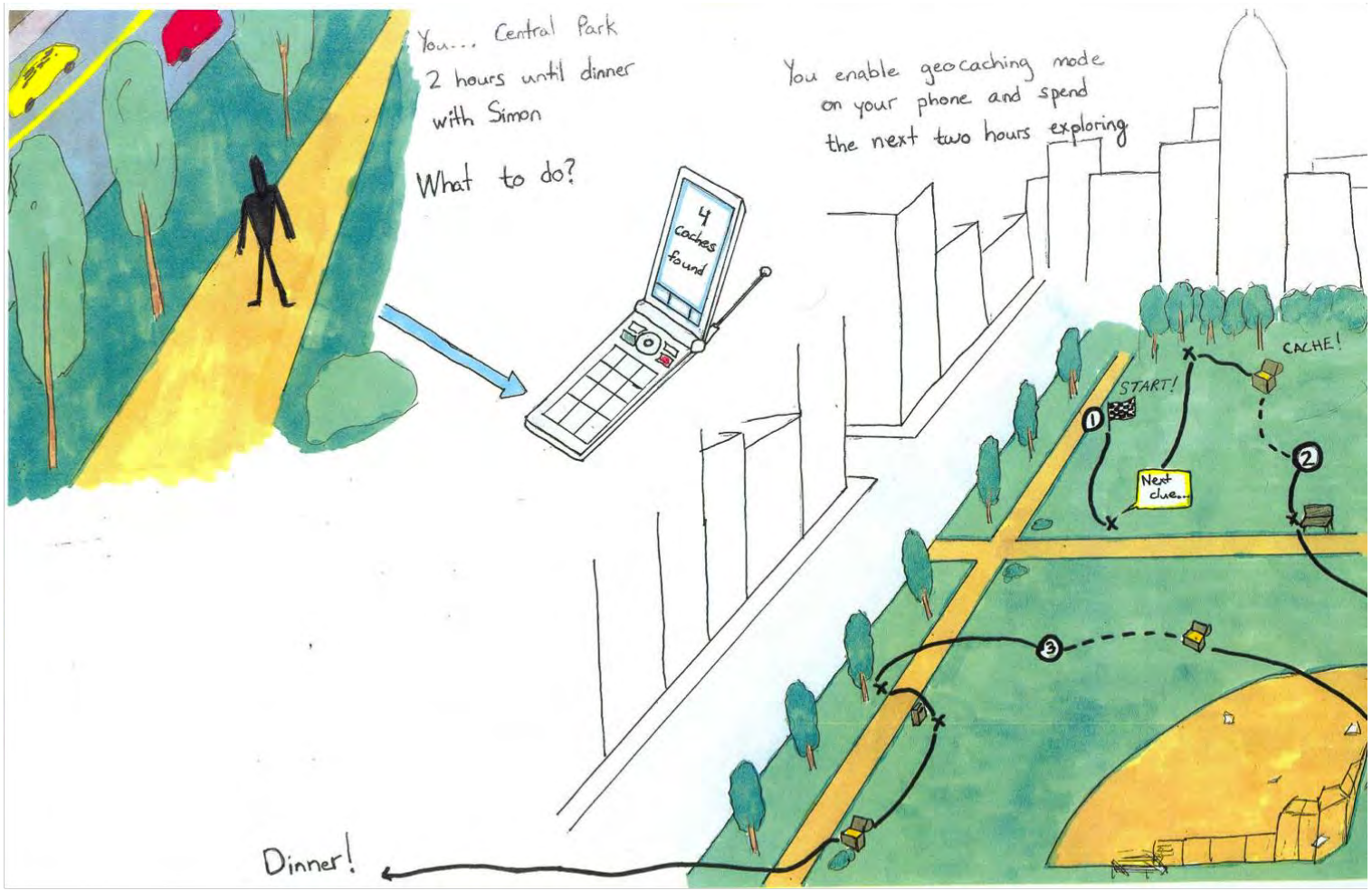
Selective Use of Color



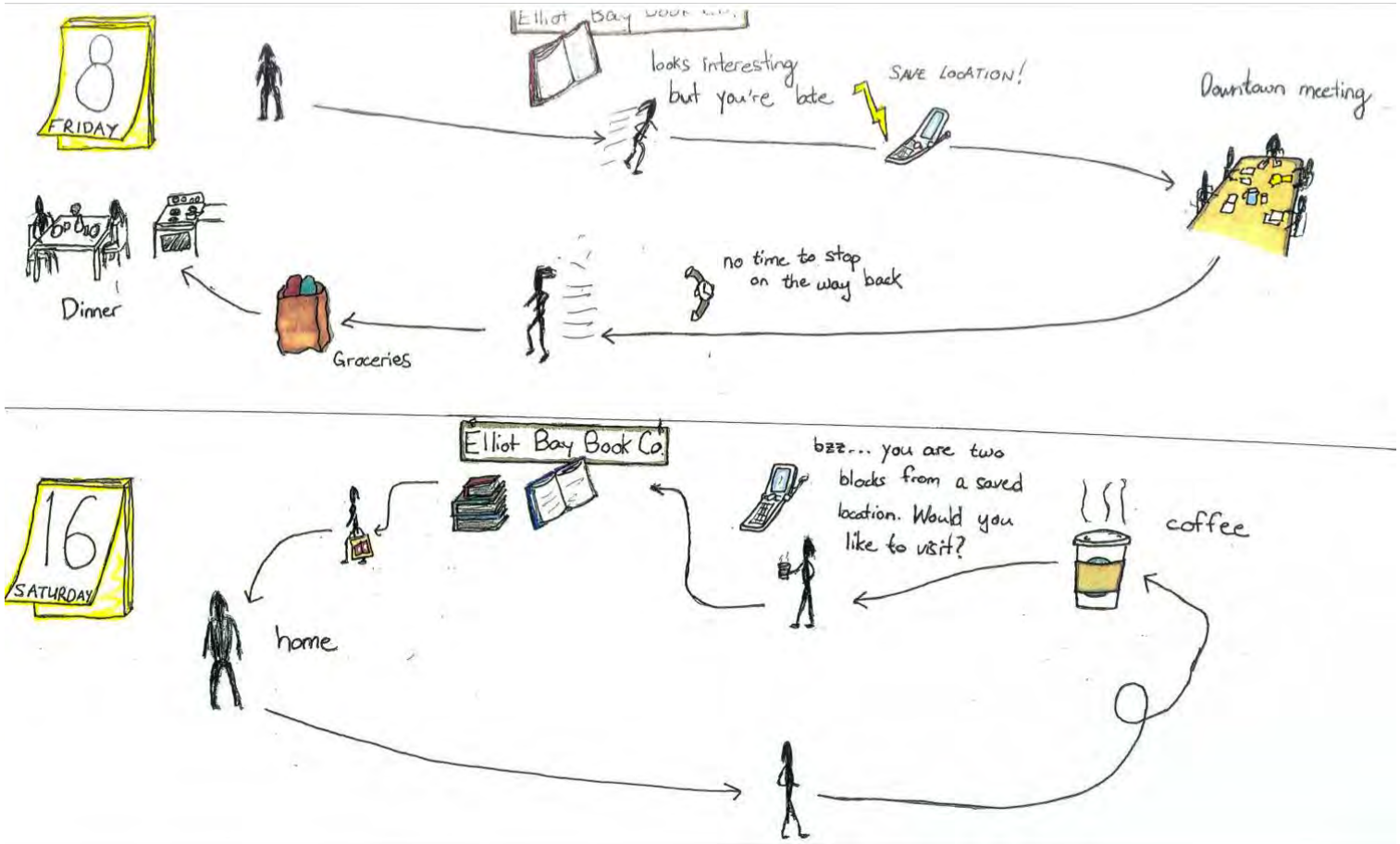
Route Maps


THE FAMILY CIRCUS
By Bil Keane
WILL YOU GO GATHER SOME FIRE-WOOD, BILLY?
OKAY, MOMMY!
TAKES OFF IN A HURRY.
PICKS SOME BLACKBERRIES FOR MOMMY.
IS THIS ENOUGH FIREWOOD, MOMMY?
SURVEYS LAND SCARE FROM "LOOKOUT TREE"
HEADS FOR "CLIMBING ROCKS"
SPIES RABBIT, GIVES CHASE.
RABBIT ESCAPES INTO HOLE
DISCOVERS SMALL CAVE.
NIGHT BE BEAR'S LAIR! DEPARTS!
SEES CAMPFIRE REMAINS (LEFT BY INDIANS?)
SUDDENLY REMEMBERS PURPOSE OF HIS MISSION!
HURRIEDLY GRABS A FEW STICKS
SPOTS TURTLE ON ROCK BUT CAN'T REACH IT
COOLS OFF IN SPRAY
HEARS WATER-FALL
RESTS ON LOG
EATS THE BLACK-BERRIES
SKIPS FLAT STONE ACROSS WATER.
VENTURES INTO THICK GROVE OF TREES
DEEPER INTO "BLACK FOREST"
HEARS DINOSAUR ROAR!
ESCAPES ACROSS OLD LOG.
EXITS QUICKLY!
8-2

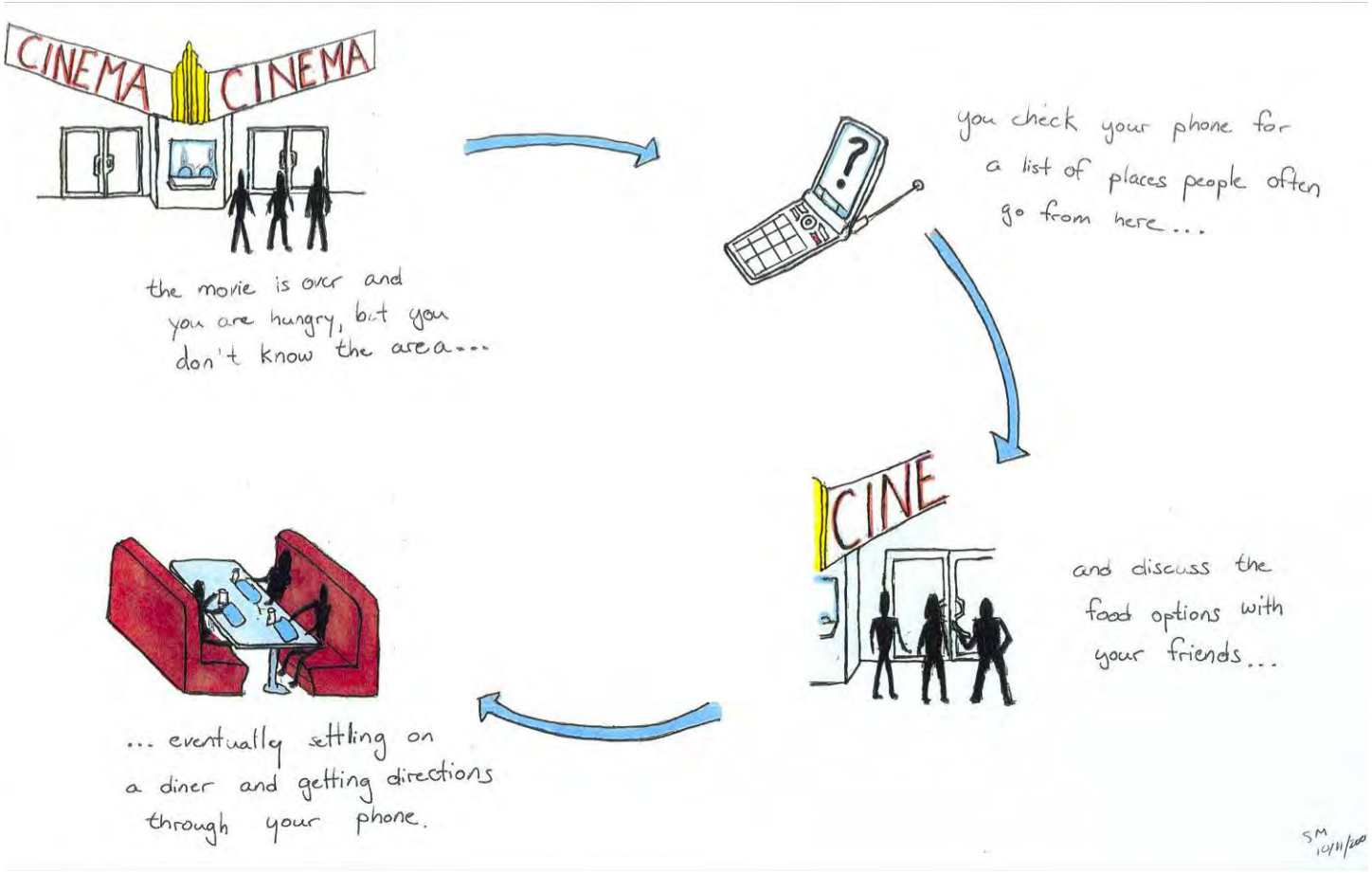
Route Maps


You... Central Park
2 hours until dinner with Simon
What to do?
4 caches found
You enable geocaching mode on your phone and spend the next two hours exploring
START!
CACHE!
Next clue...
Dinner!

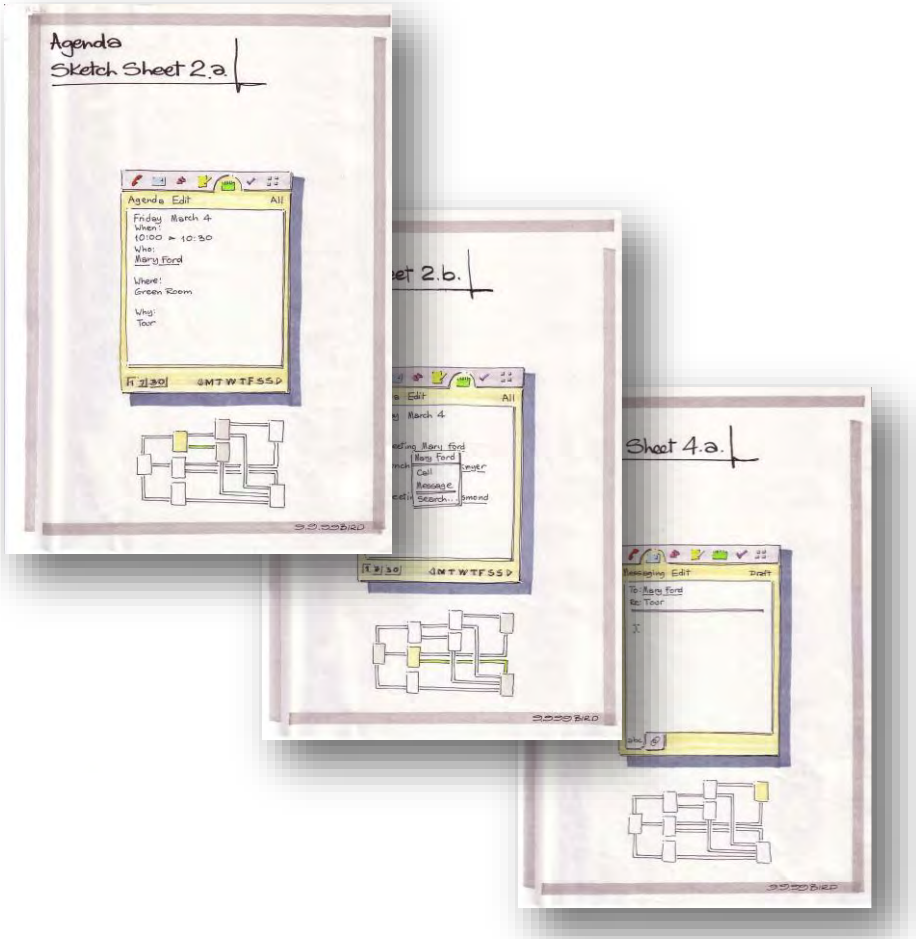
Route Maps

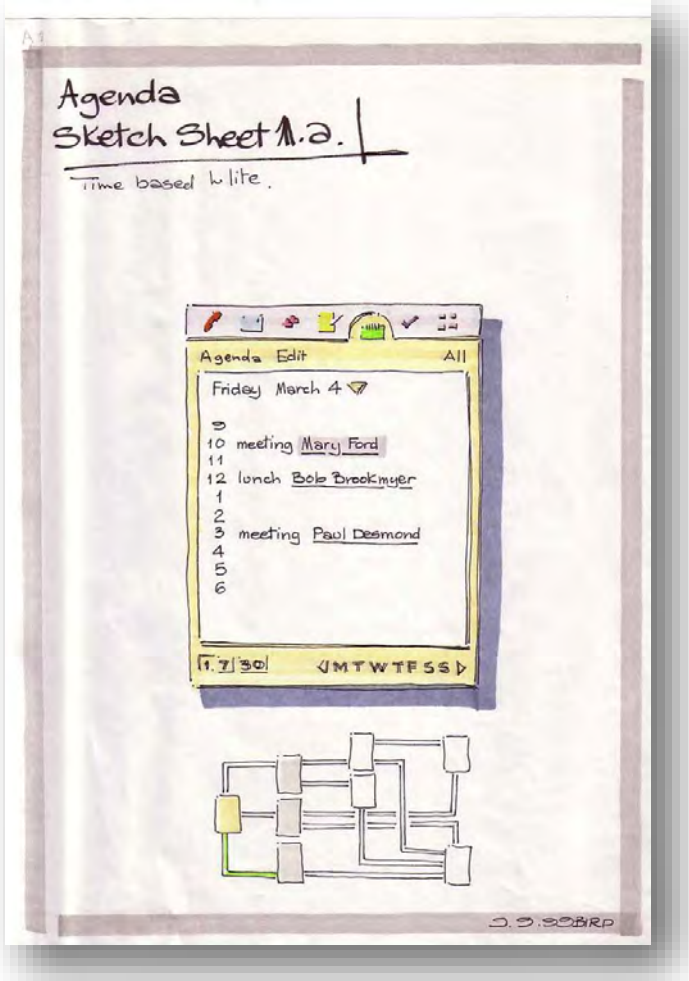

8
FRIDAY
looks interesting but you're late
SAVE LOCATION!
Downtown meeting
Dinner
Groceries
no time to stop on the way back
16
SATURDAY
Elliot Bay Book Co.
bzz... you are two blocks from a saved location. Would you like to visit?
coffee
home

Route Maps


CINEMA CINEMA
the movie is over and you are hungry, but you don't know the area...
you check your phone for a list of places people often go from here...
CINE
and discuss the food options with your friends...
... eventually settling on a diner and getting directions through your phone.
SM 10/11/2008

Mapping the Space of Interaction





Ron Bird

Value of Animation or Video

Can illustrate critical timing

Can be more engaging than written or storyboard

Can help convey emotion (e.g., voice, music)

Can show interactive elements more clearly

Can be self-explanatory

If done well, can be an effective pitch

But you need to keep it quick and effective

Most Important Trick: Stop Motion

http://courses.cs.washington.edu/courses/cse440/videos/videoprototyping/Mackay-StopAction.mp4

Mackay

Most Important Trick: Stop Motion

http://courses.cs.washington.edu/courses/cse440/videos/videoprototyping/Mackay-StopActionResult.mp4

Mackay

Video Prototypes

May build upon paper prototypes,
existing software, and images of real settings

Narration optional

- Narrator explains,
  actors move or illustrate interaction
- Actors perform movements and viewer
  expected to understand without voice-over

Steps to Create a Video Prototype

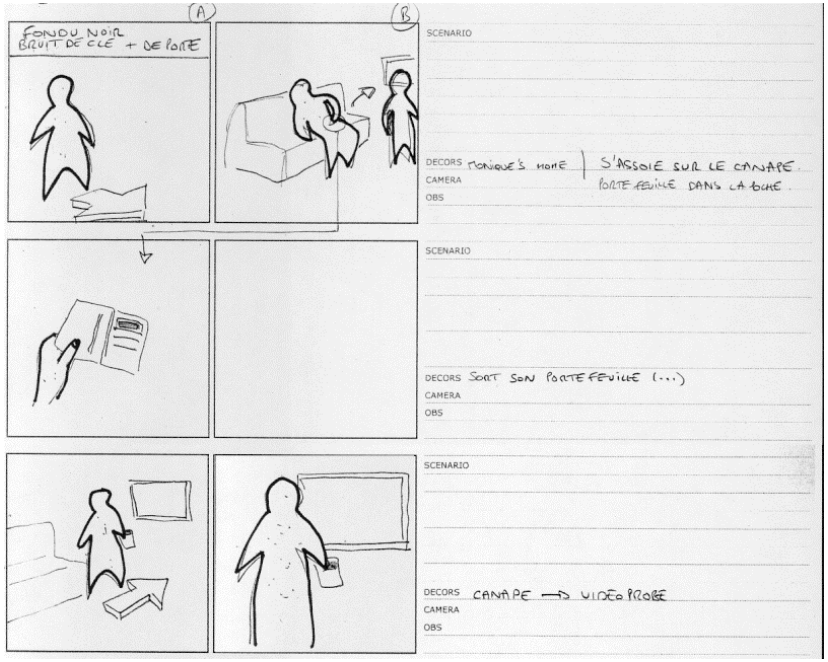
Review field data

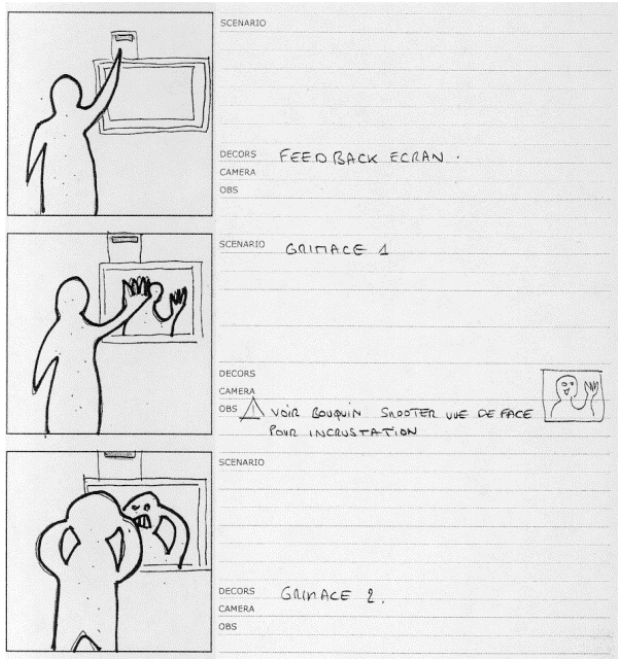
Review ideas from brainstorm

Create text for usage scenarios

Develop storyboard, with each scene on a card, illustrating each action/event with annotations explaining what is happening

Steps to Create a Video Prototype





Steps to Create a Video Prototype

Shoot a video clip for each storyboard card

- Avoid editing in the camera, just shoot scenes

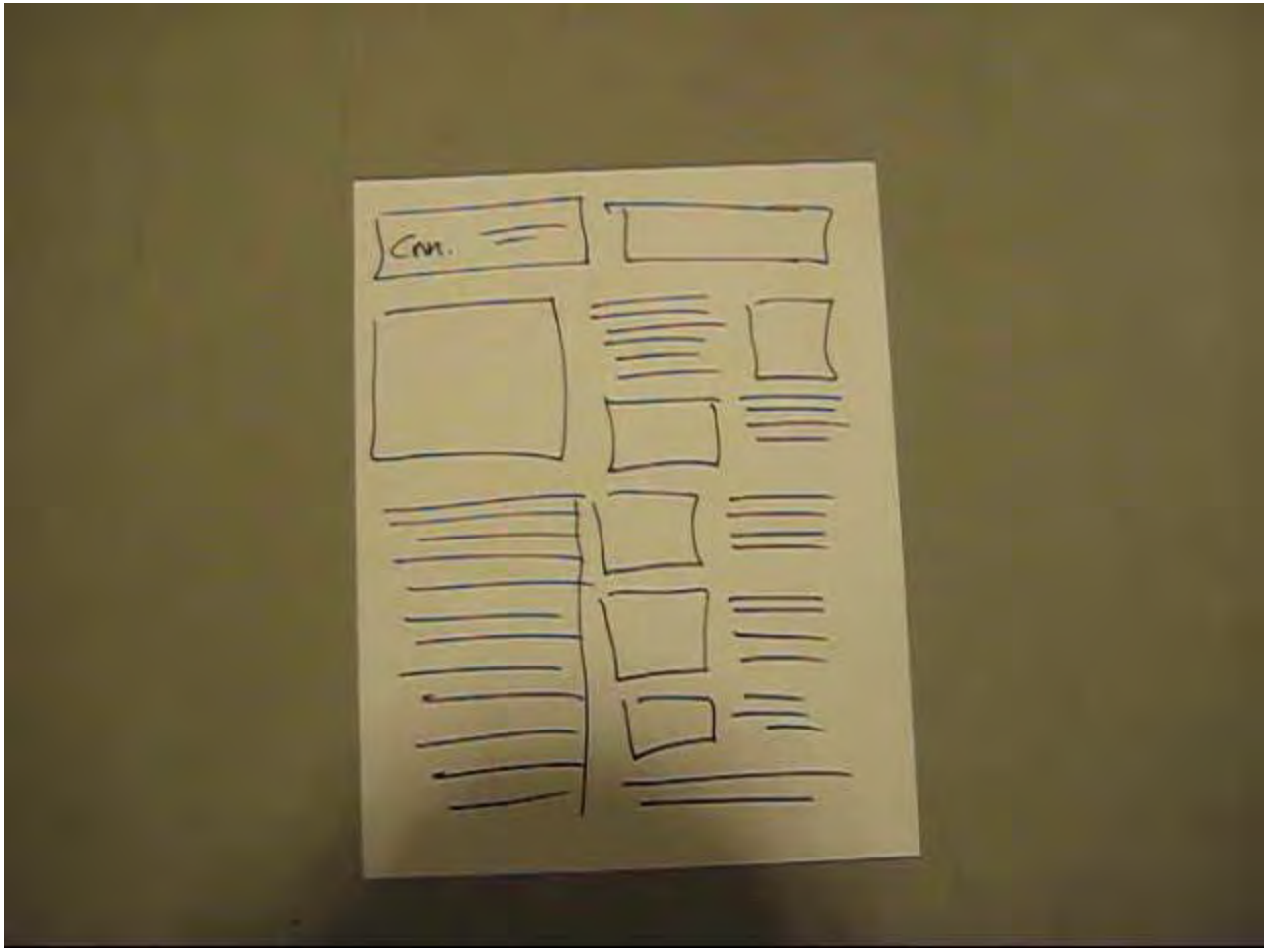
Use titles to separate clips

- Like a silent movie

Digital changes these tradeoffs, but respect the spirit of doing this quickly to get point across

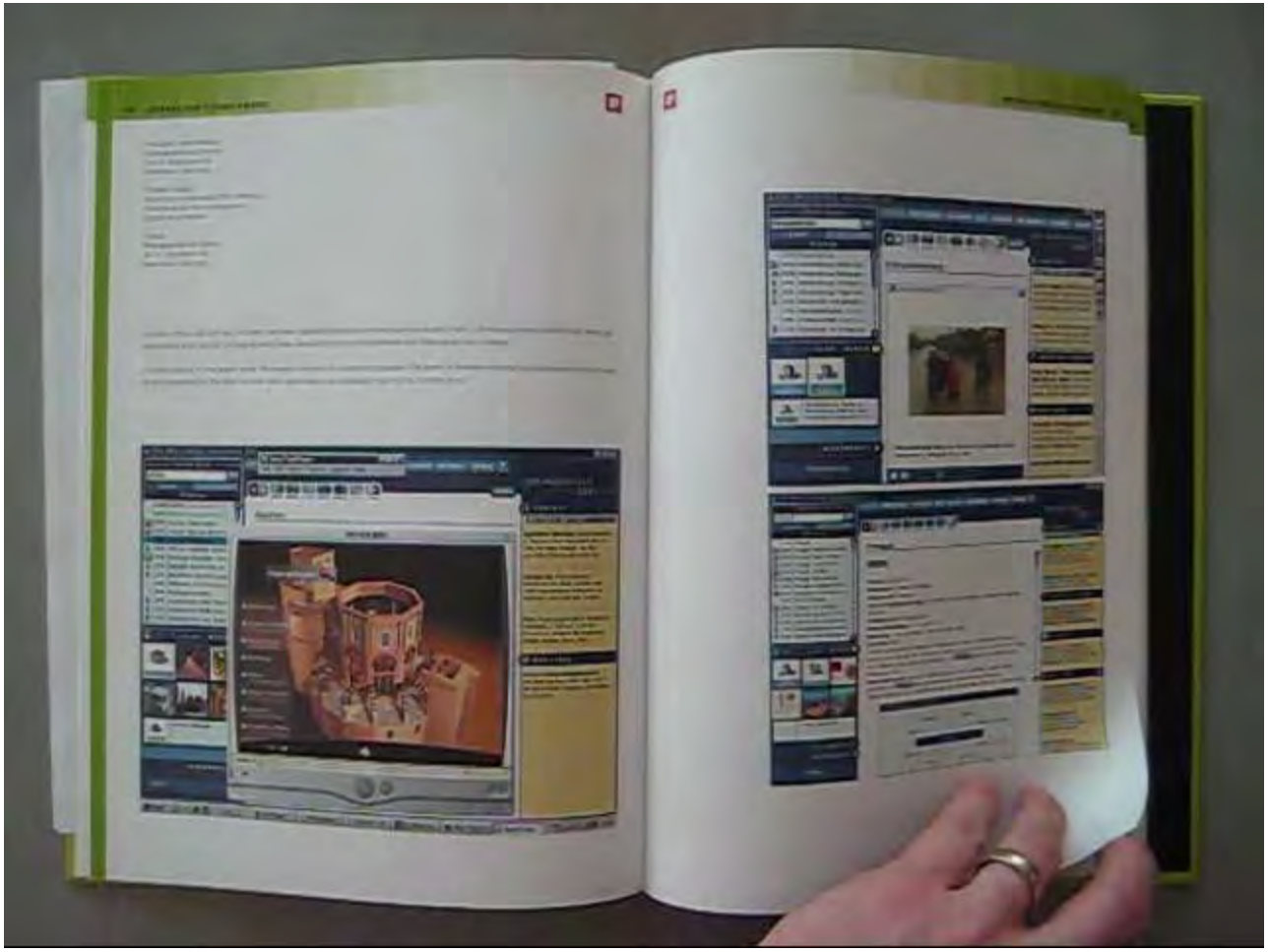
- If you make an error, just reshoot it

Prototyping Microsoft Surface



http://courses.cs.washington.edu/courses/cse440/videos/videoprototyping/Surface-Document-Interaction.mp4

Prototyping Microsoft Surface



http://courses.cs.washington.edu/courses/cse440/videos/videoprototyping/Surface-Context-Lens.mp4

Lessons from Prior Video Prototypes

Narration, Pace, and Flair

- Three versions of “Don’t Forget”

Using Projectors and Simple Props

- “Buddy Map”

Watch for Pace and Scene Relevance

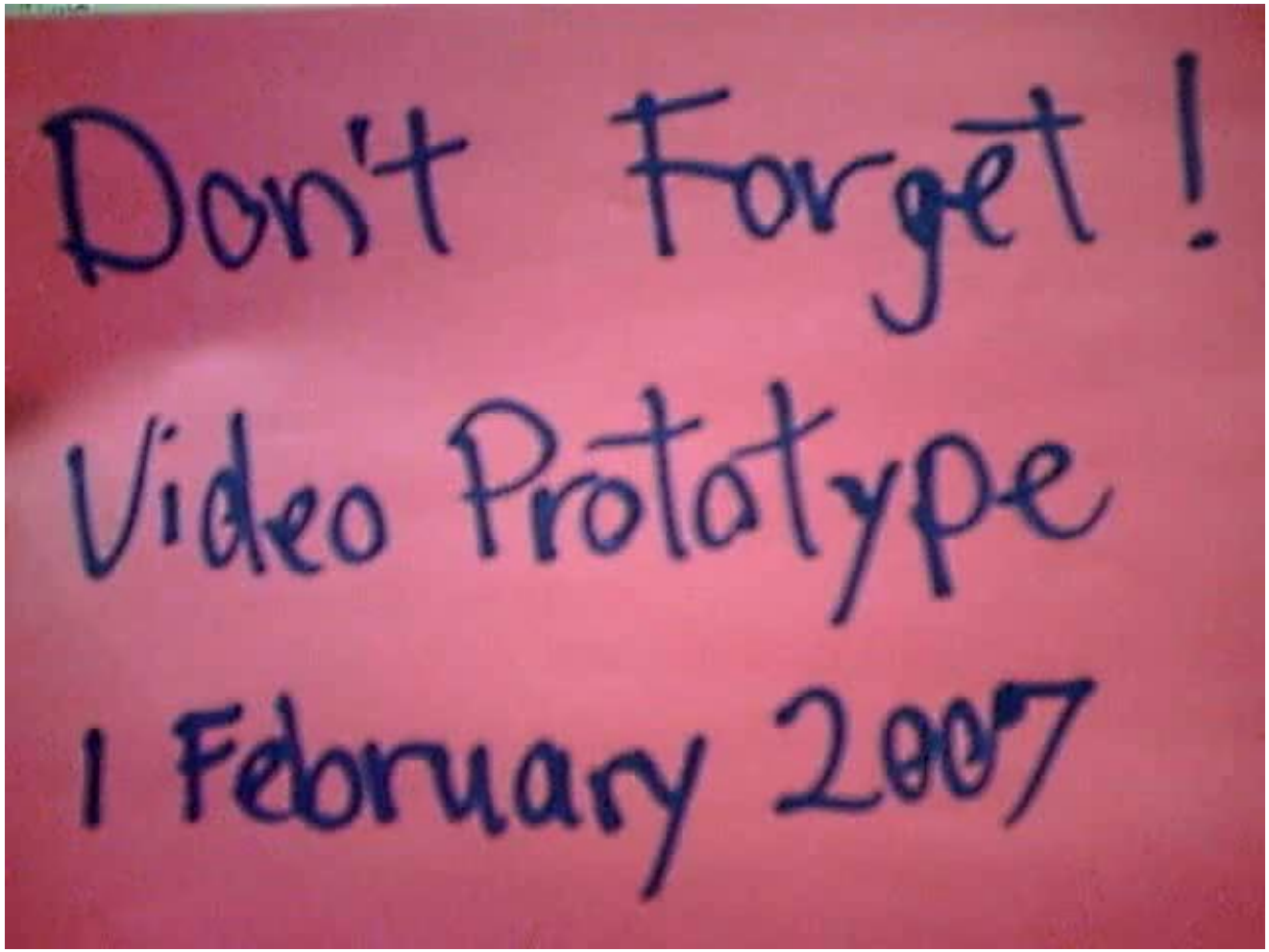
- “Consumester”

Narration, Pace, and Flair

http://courses.cs.washington.edu/courses/cse440/videos/videoprototyping/Don't-Forget-1.mp4

Don’t Forget Version 1

Narration, Pace, and Flair



http://courses.cs.washington.edu/courses/cse440/videos/videoprototyping/Don't-Forget-2.mp4

Don’t Forget Version 2

Narration, Pace, and Flair

http://courses.cs.washington.edu/courses/cse440/videos/videoprototyping/Don't-Forget-3.mp4

Don’t Forget Version 3

Using Projectors and Simple Props

http://courses.cs.washington.edu/courses/cse440/videos/videoprototyping/Buddy-Map-Backcountry.mp4

Watch for Pace and Scene Relevance

http://courses.cs.washington.edu/courses/cse440/videos/videoprototyping/Consumester.mp4

Consumester

Lessons from Prior Video Prototypes

Split Presentation, Simple Effects

- “PickUp”

Still-Frame, More Effects

- “Graffiti Karma”

Split Presentation, Simple Effects

http://courses.cs.washington.edu/courses/cse440/videos/videoprototyping/Pickup.mp4

Pickup

Still-Frame, More Effects

http://courses.cs.washington.edu/courses/cse440/videos/videoprototyping/Graffiti.mp4

Lessons from Prior Video Prototypes

Scenario with a Contrast

- “ParkSmart” (note that screens are static images)

Playful while Keeping Pace

- “Plantr”

Scenario with a Contrast

http://courses.cs.washington.edu/courses/cse440/videos/videoprototyping/Parksmart.mp4

But watch for pace and scene relevance

ParkSmart

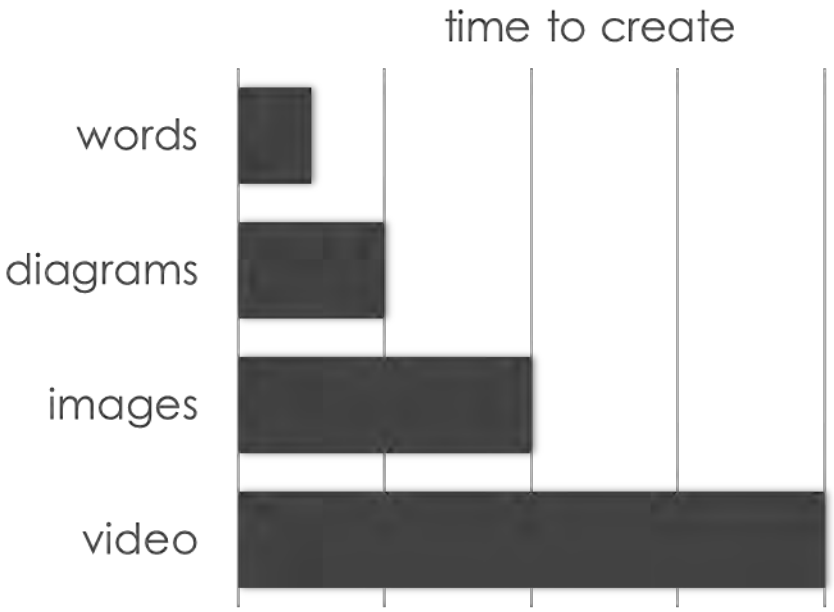
Playful while Keeping Pace

http://courses.cs.washington.edu/courses/cse440/videos/videoprototyping/Plantr.mp4

Reminder on Fidelity

http://courses.cs.washington.edu/courses/cse440/videos/videoprototyping/Mug-Sketch.mp4
http://courses.cs.washington.edu/courses/cse440/videos/videoprototyping/Mug-HiFi.mp4

Fidelity Takes Time: Stay Low Fidelity



Completely made-up bar length

But it is probably at least this bad

If you need a video,
do you really need footage?

If you need an animation,
do you really need Flash?

If you need a photo,
do you really need to shoot?

Range of Purposes

Illustrating Low-Level Techniques

- Microsoft Surface examples convey timing

Illustrate Designs in Context, Convey Satisfaction

- Focus in this course

High-Level Visions

- StarFire
- Knowledge Navigator
- A Day Made of Glass

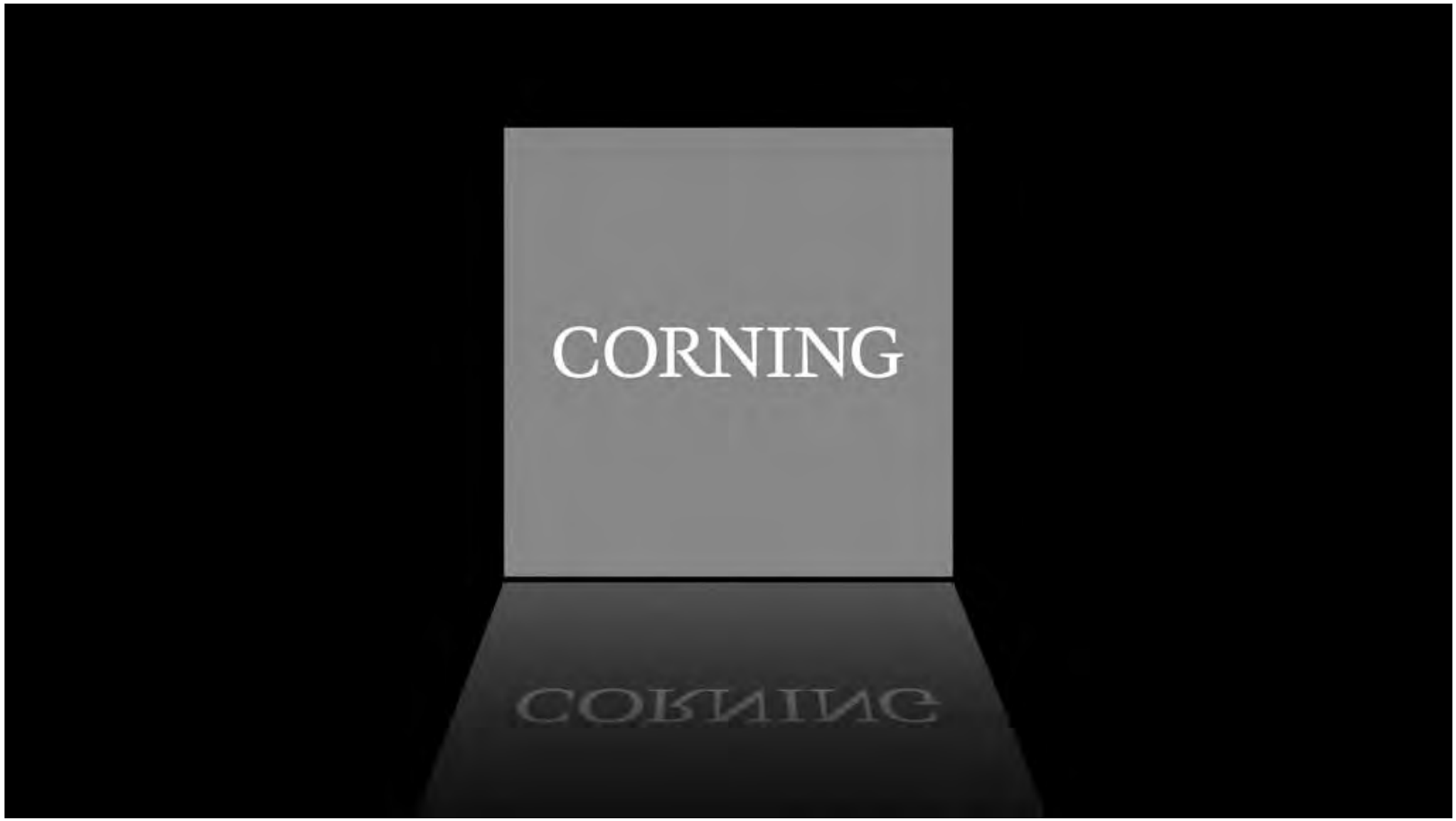
Sun's "Starfire" (1994)

http://courses.cs.washington.edu/courses/cse440/videos/videoprototyping/Vision-Sun-Starfire.mp4

Apple's "Knowledge Navigator" (1987)

http://courses.cs.washington.edu/courses/cse440/videos/videoprototyping/Vision-Apple-Knowledge-Navigator.mp4

Corning's "A Day Made of Glass" (2011)



http://courses.cs.washington.edu/courses/cse440/videos/videoprototyping/Vision-Corning-A-Day-Made-Of-Glass.mp4

Summary

Think about your audience

Think about your time constraints

Think about the purpose of your story

Think about options for effective presentation

CSE 440: Introduction to HCI

User Interface Design, Prototyping, and Evaluation

Lecture 07:
Storyboarding and
Video Prototyping

Tuesday / Thursday
12:00 to 1:20

James Fogarty
Kailey Chan
Dhruv Jain
Nigini Oliveira
Chris Seeds
Jihoon Suh

PAUL G. ALLEN SCHOOL
OF COMPUTER SCIENCE & ENGINEERING