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
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

**Gulf of Execution**
- Goals
- Form Intention
- Develop Action Plan
- Execute Actions
- System Change

**Gulf of Evaluation**
- Evaluate Goals
- Interpret State
- Observe State

Goals -> Form Intention -> Develop Action Plan -> Execute Actions -> System Change
Evaluate Goals -> Interpret State -> Observe State
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
- Metaphors
- Visibility
- Knowledge in the World
- Constraints
- Mapping
- Consistency
- 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.

Mapping
Mapping
Mapping
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?
Is Consistent Always Better?
Should “new” & “delete” be in the same place?

New is common, delete is not
Is Consistent Always Better?

Original focus on consistency, later design for mobile form
Is Consistency Always Better?
Is Consistency Always Better?
Is Consistency Always Better?
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:

Affordances
Visibility
Constraints
Consistency

Metaphors
Knowledge in the World
Mapping
Modes
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

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

Art of War ★★★
(10:00)-(11:00)-4:00-7:00-10:00

Bittersweet Motel ★★★★
(11:00)-(1:30)-7:00-9:30-11:00

Godzilla ★★
(10:30)-(2:00)-5:30-7:00-9:00

The Cell ★★★★
(11:00)-(1:00)-7:00-9:00

Store for the Style-Challenged

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 availability based on inputted data, input on map.

- Different colors
- High lights availability
Sketching and Tasks
Sketching and Tasks

SCENARIO 1: "I want to listen to alternative music"

Diagram showing a sequence of user interactions and navigation through a music streaming application.
Sketching and Tasks
Sketching and Tasks
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**
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 satisfied

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 Dar Aziz
Amal’s Guide to Storyboarding

CITIES →
S.F
S.J
S.B
HALIFAX

NO!

RED & SEAN WERE BORED AFTER GOING TO THE BLUEGRASS FESTIVAL, & DECIDED TO FIND OUT WHAT ELSE THEY COULD DO...

Dude, what do we do?!

Let me use our phone!

<RED> <SEAN> INSTEAD, SHOW WHY & WHEN features would be used

DON'T USE THIS TO ILLUSTRATE ALL THE UI FEATURES & COMPONENTS.

* this IS what paper prototyping is for!
Let's try out Burmese superstar. Amal rated it, & it sounds cool! Sure.

& show satisfactions

& finally, be creative. You don't need to be an artist to get a point across.
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

(c) 2009 Sacha Chua

Keith Haring
1. How Much Detail?
1. How Much Detail?

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

1. At home, Mary checks her blood pressure.
2. After a few simple key presses, her blood pressure readings get sent to a clinic.
3. The information is made available to her doctor.

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**

1st Week

1. Hey! You need to exercise at least 20 days a month.
2. Oh! Um... Okay.
3. 1st Day
4. 15/30
5. 19/30
6. 21/30

2nd Week

1. Good job!
2. Phew.

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

**Supportive**

1st Week

1. Hey! I will keep a record of days you exercise.
2. Okay! Let's do it.
3. 1st Day
4. 15/30
5. 19/30
6. 21/30

2nd Week

1. Good job! You've exercised more than 20 days a month!
2. Thanks!

Cell phone is used to keep track of one's fitness goal.
Storyboards for Comparing Ideas

Cooperative

Let’s use our cell phones to keep a record of the number of days that we exercise!

1st Week

2nd Week

Yeah! We are almost there. Good job!

Okay! Let’s work together to meet a goal of exercising for least 2 weeks.

Competitive

Let’s compete to see who exercises more.

1st Week

2nd Week

Yes! I win this week! Let’s see who wins next week.

Okay, let’s do it!
Storyboards for Comparing Ideas

**Negative Reinforcement**

Week 1:
- I’m going to use my phone to keep track of my fitness goals.

Week 2:
- Oh no! My virtual garden on my phone is ugly. I need to exercise to keep the flowers alive!
- Now I have lots of flowers in my garden!

**Positive Reinforcement**

Week 1:
- I’m going to use my phone to keep track of my fitness goals.

Week 2:
- Each time I exercise, I will get another item added to my garden.
- Now I have a full garden!
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?

IT IS SO DARK JANE CAN HARDLY READ HER BOOK

SHE GESTURES IN FRONT OF HER SPECIAL PENDANT TO TURN ON THE LIGHTS

THE LIGHTS TURN ON!

FINALLY, SHE CAN READ HAPPILY.
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
A MONTH GOES BY...

ACCORDING TO ALVERTO, I’VE SAVED A LOT OF MONEY BY TAKING THE BUS.

IT’S A SHAME THAT THERE AREN’T MORE CONVENIENT BUS ROUTES FOR MY COMMUTE!

I’D RATHER WAIT THAN DRIVE IN THIS.

Huh... they’re promoting some sort of transit plugin.

Why don’t I give it a shot?

ONE WEEK LATER...

SOUNDS GOOD. WHAT’S THE BEST WAY TO DRIVE THERE FROM MY PLACE?

Not sure... just Google it.

Will do, CYA later.

aren’t you always telling me about your weekend bike rides?

Why not bike?

AFTER A LONG WORKDAY, JEN DECIDES TO CHECK TRAFFIC BEFORE HEADING HOME...

Ugh! You’ve got to be kidding.

ALVERTO SUGGESTS: TAKE THE BUS AND SAVE MONEY!

Huh, I didn’t know this route. The bus is then.

I’d rather wait than drive in this.

later that same year...

MORE BIKE LANES DOWNTOWN WOULD MAKE MY COMMUTE A LOT SAFER. I SHOULD DO THE CRITICAL MASS RIDE.

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 the same during and after the field trial.

Gukeisen et al., 2007
Selective Use of Color
Route Maps
Route Maps

You... Central Park
2 hours until dinner
with Simon
What to do?

You enable geocaching mode
on your phone and spend
the next two hours exploring

Dinner!
Route Maps

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...

and discuss the food options with your friends...

...eventually settling on a diner and getting directions through your phone.
Mapping the Space of Interaction
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
Most Important Trick: Stop Motion

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

Prototyping Microsoft Surface

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

Don't Forget
by Carolyn Holmes and Fred Potter

http://courses.cs.washington.edu/courses/cse440/videos/videtototyping/Don't-Forget-1.mp4
Narration, Pace, and Flair

Don't Forget!
Video Prototype
1 February 2007

http://courses.cs.washington.edu/courses/cse440/videos/videoprototyping/Don't-Forget-2.mp4
Narration, Pace, and Flair

"Don't Forget" Video Prototype
Chris Govella - Peter Woodman

http://courses.cs.washington.edu/courses/cse440/videos/videoprototyping/Don't-Forget-3.mp4
Using Projectors and Simple Props

Team Buddy Map

Backcountry Savior

Craig Panthen : Philip Kuo : Heidi Tanamulia : Christopher White
CSE 440F : Professor Landay

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
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/vidpprototyping/Pickup.mp4
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/videопrototyping/Parksmart.mp4

But watch for pace and scene relevance
Playful while Keeping Pace

http://courses.cs.washington.edu/courses/cse440/videos/vidoprototyping/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

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?

Completely made-up bar length
But it is probably at least this bad
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)

Corning’s “A Day Made of Glass” (2011)

Summary

Think about your audience
Think about your time constraints
Think about the purpose of your story

Think about options for effective presentation
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