Early Stage (lo-fi & med-fi) Prototyping

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Computer Science Department
Stanford University

Autumn 2023
October 16, 2023
Interface Hall of Fame or Shame?

Dyson AirBlade hand dryer example courtesy of Maya I.
Interface Hall of Fame or Shame?

Good
- shape indicates function
- so simple that instructions fit in 1 image
- fun!

Bad
- dripping water?
- too much noise
- still takes too long

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example courtesy of Maya I.
Can We Do Better?

Good
  – Integrate hand dryer into sinks…
Hall of Shame!

Good
- beautiful alternative to the competition & generally easier to read
- turn by turn directions are efficient, clear & functions well – in general

Bad
- despite any aesthetics, the data is wrong & sparse, meaning, it does not perform the one task it should do well
- getting from A to B

iOS 6 Maps
By Apple Inc.
Hall of Shame!

Google Maps Data vs iOS6 Maps Data
A clear example of where no matter how good a design may be, without supporting its most important task, in this case finding a place with correct data, the interface is useless.
Hall of Shame!

Google Maps Data vs iOS14 Maps Data – much closer in quality
Early Stage (lo-fi & med-fi) Prototyping

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Outline

• Sketching vs. Storyboarding
• Prototyping
• Low-fi prototyping
• Conducting a low-fi test
• Medium-fi prototyping
Sketches & Storyboards

• Where do storyboards come from?
  – film & animation

• Give you a “script” of important events
  – leave out the details
  – concentrate on the important interactions
**DESCRIPTION:** EXT. FOREST - MS LUKE & LEIA - TRUCKING


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**NOTES:**

**SHOT #/SEQUENCE:**

BC 28

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Sketches & Storyboards in UX Design

Sketch of an Attendance List:
- Lee, Benjamin
- Santos, Allen
- Schwartz, Jonah
- Vermette, Joshua

Actions:
- Add
- Remove
- Save

Storyboard:
- Attendance View
- Main Menu
- Present, Absent

Technology is a key part of our education. If we don’t have technology, it would take ten times as long to look up information about a subject.
Sketches & Storyboards in UX Design
Starts to tell a story, but still describes the design.
Sketches & Storyboards in UX Design

Task Flow #1

Task Flow (Wireframe)
What is a Prototype?

“A prototype is an early sample or model built to test a concept or process or to act as a thing to be replicated or learned from.”

– Wikipedia

CS147 definition: a working representation of a final artifact

http://www.computerhistory.org/collections/accession/102716262
Types of Prototypes

Prototypes are concrete representations of a design

Prototype dimensions

- representation: form of the prototype
  - off-line (paper) or on-line (software)
- precision: level of detail (e.g., informal or polished)
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- precision: level of detail (e.g., informal or polished)
- interactivity: watch-only to fully interactive
  - fixed prototype (video clips)
  - fixed-path prototype (each step triggered by specified actions)
    - at extreme could be 1 path
  - open prototype (real, but limited error handling or performance)
- evolution: expected life cycle of prototype
  - e.g., throw away or iterative
Fidelity in Prototyping

• Fidelity refers to the level of detail
• High fidelity?
  – prototypes look like the final product
• Low fidelity?
  – (often) sketched renditions with many details missing
What do we like about this prototype?

What do wish could be improved?
What do we like about this prototype?

What do wish could be improved?
The feedback you get is different

Low-fi

Medium-fi
Hi-fi Prototypes Warp

• Perceptions of the tester/reviewer
  - representation communicates “finished”
    • comments focus on color, fonts & alignment

• Time of the designer
  - encourage precision
    • specifying details takes more time

• Creativity of the designer
  - lose track of the big picture
Why Use Low-fi Prototypes?

• Traditional methods take too long
  – sketches → **prototype** → evaluate → iterate

• Can instead simulate the prototype
  – sketches → evaluate → iterate
  – sketches act as prototypes
    • designer “plays computer”; others observe & record

• Kindergarten building skills
  – allows non-programmers to participate
"Prototyping for Tiny Fingers" by Rettig
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Check out our no-hassle return policy.

| Subtotal | $207.99 |
| Tax      | $12.95  |
| Total    | $220.84 |

Continue Shopping

Checkout
Cookable
Cookable

Salad

Favorites

Trending

Mic
Cookable

- Caesar Salad: 30 min
  - Parmesan, lettuce, lemon, Parmesan cheese, lemon juice, olive oil, eggs, basil
  - Salt, pepper, blue cheese

- Greek Salad: 15 min
  - Tomatoes, cucumbers, red onion, olive oil, lemon juice, Diced oregano, salt, pepper, crumbled feta cheese

- Apple Colestock Salad: 25 min
  - Cabbage, apple, cheese, red bell pepper, green onion, mayonnaise, brown sugar, lemon juice

- Black Bean and Corn Salad: 25 min
  - Lime juice, olive oil, garlic, salt, cumin, paprika, black beans, corn, avocado, red bell pepper, onions, green onions

- Simple Potato Salad: 40 min
  - Red potatoes, egg, creamy salad dressing
Caesar Salad

- 2 cloves garlic, finely chopped
- 3 anchovy fillets
- 1/2 lemon, juiced
- 2 tablespoons red wine vinegar
- 1 tablespoon Dijon mustard
- 1 egg yolk
- 1/4 cup Worcestershire sauce
- 1/4 cup olive oil
- pinch salt and ground black pepper
- 1/2 head romaine lettuce, chopped
- 1/4 cup grated Parmesan cheese
- 2 tablespoons croutons

Order  Cook
Caesar Salad

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Order  Cook
Who is Zuki?
Administrivia

• Grading on Assignment #1: Needfinding
  A1 Group Presentation:  -: 0% ✓ - -: 0% ✓ - : 0% ✓ : 48% ✓ +: 50% ✓ ++: 3%
  A1 Individual Presentation:  -: 0% ✓ - -: 0% ✓ - : 0% ✓ : 25% ✓ +: 70% ✓ ++: 5%

• Add these slack channels
  – #ask-for-feedback (feedback from peers and CAs as they get time)
  – #slack-overflow (crowdsourcing tech support – web site and reactive native)
  – If you help your peers in a significant way, we can raise your class participation grade

• Figma Workshop: Wed, Oct 18th 7:30-8:30 PM (interactive hands-on activities & help)

• Web site directories will be created for each team by this week
  – each team needs 1 person to fill out this form by tonight (Monday, Oct 16th)
  – start to get sites up there this weekend
    • should have all your work—not graded until mid-point check-in & near end of quarter
  – CAs will send you your directory path/name on web.stanford.edu
Administrivia: Video Hints

- Under 2 minutes (90 seconds or less even better)

- Add credits at end
  - Team/project name
  - Your names (first name & last initial)
  - “CS 147 – Autumn 2023”
  - Won’t count in your time limit
Administrivia

- Use **must** use handbrake to compress your video
  - It will take your video from 250MB-1GB down to ~50MB
Team Break

• Reflect on last week’s assignment (~5-8 min)
  – what did you like about your teamwork?
  – what do you wish could be improved?
  – share out with each other

• This week’s assignment (~15 min)
  – Get greenlight from CA on solution + tasks
  – work on your video storyboards/editing
TEAM MEETINGS
Constructing the Model

- Set a deadline
  - don’t think too long - *build it!*
- Draw a window frame on large paper
- Put different screen regions on cards
  - anything that moves, changes, appears/disappears
- Ready response for any user action
  - e.g., have those pop-up dialogs, etc. already made
- Use printer/scanner to make many versions
Tasks:
1. Open the EE app
2. Register and Log-in
3. Remove the minutes tile from your home screen
4. Place the "Add $10 Top-up" tile to your home screen
5. Re-arrange the tiles on your home screen

USER NOTIFICATION
INPUT FIELD
PRESSABLE BUTTON
Preparing for a Test

• Select your “customers”
  – understand background of intended users
  – use a screening questionnaire to get the people you need
  – don’t use friends or family
  – **start recruiting today**

• Prepare scenarios that are
  – typical of the product during actual use
  – make prototype support these (small, yet broad)

• Practice to avoid “bugs”
Conducting a Test

Four Roles

- **Greeter** – puts users at ease & gets data
- **Facilitator** – only team member who speaks
  - gives instructions & encourages thoughts, opinions
- **Computer** – knows application logic & controls it
  - always simulates the response, w/o explanation
- **Observers** – take notes & recommendations
Who is Zuki?
Practice: low-fi prototype testing

In a group of 3-4 people around you, you will test the low-fi prototype of Parbon app!

One will play **user**, one will play **facilitator**, and 1-2 will play **observers** taking notes.

Share the **critical incidents** (both **positive** and **negative** events) from your test in Slack.

Note: If you are the user, remember to talk-aloud about what you are thinking as you navigate the prototype!
Practice: low-fi prototype testing

Parbon allows users to log and track their carbon usage from commutes, understand what their carbon footprint means relative to the world around them, and buy carbon offsets.

- Simple task: Log your personal carbon emissions data
- Moderate task: Purchase carbon offsets to counteract your emissions
- Complex task: Post your carbon metrics to share with friends and family

Evaluating Results

- High level questions about your design
  - does it **address the problem** you want to solve?
  - is this the **right realization** of your solution?

- Sort & prioritize observations
  - what was **important**?
  - lots of **problems in the same area**?

- Make changes & iterate
  - even **iterate between tests**
Advantages of Low-fi Prototyping

- Takes only a few hours
  - no expensive equipment needed
- Can test multiple alternatives
  - fast iterations
    - number of iterations is tied to final quality
- Almost all interaction can be faked (Wizard of Oz)
Problems with Low-fi Prototypes

• “Computer” inherently buggy
• Slow compared to real app
  – timings not accurate
• Hard to implement some functionality
  – pulldowns, feedback, drag, viz …
• Won’t look like final product
  – some widgets/controls hard to recognize
• End-users can’t use by themselves
  – not in context of user’s work environment
Interactive Lo-fi Tools

Balsamiq Mockups
http://balsamiq.com

POP
https://marvelapp.com/pop
Remote Testing of Low-fi Prototypes

1. Participant runs & records prototype (e.g., Balsamiq/POP) on their phone [hardest]
   - user records interaction by recording screen on iOS/Android
   - you record zoom meeting while participant speaks aloud
   - https://uxdesign.cc/moderating-ux-research-with-zoom-1d4e89614277

2. Participant runs zoom on their phone while you screen share prototype [moderate]
   - user taps on items & verbalizes aloud
   - you control prototype & record meeting
   - https://uxdesign.cc/moderating-ux-research-with-zoom-1d4e89614277

3. Participant hugs their laptop [easiest]
   - user runs your prototype (e.g., Balsamiq/POP) on their own phone
   - you record zoom meeting of their screen as captured by their laptop camera
   - https://medium.com/@beparticular/were-still-hugging-our-laptops-8c7f22ed800e
Fidelity in Prototyping:
Instagator

Moderate Task: Start new trip

1. View all trips ("My Trips home")
2. Click for new trip
3. Select people
4. Add person to group
5. Click to add person to group
6. Drag to send
7. Search for friend
8. Name + description
9. Add trip

Tap for step
Fidelity in Prototyping
Task 1: Take a Destination Poll

Low-fi

Medium-fi
Summary

- Prototypes are a concrete representation of a design or final product

- Low-fi testing allows us to quickly iterate
  - get feedback from users & change right away
Further Reading

Prototyping

• Books
  – Paper Prototyping: The Fast and Easy Way to Design and Refine User Interfaces, by Carolyn Snyder, Morgan Kaufmann, 2003

• Articles
Next Time

• Lecture on Wednesday: Human Abilities

• Read/Listen
  – “Learning From Design Critiques” by Fowler and Haskins
  – Wait Wait... Tell Me!, 99% Invisible, Episode 369 (36 minutes)

• Project next week
  – 15-20 sketches of 3-5 design realizations (start in studio…)
  – pick the top two & storyboard/task flow those
  – pick the top 1 & build/test low-fi prototypes using 3 key tasks for next week’s studio presentation
    • recruit representative participants now!