CSE440: Introduction to HCI
Methods for Design, Prototyping and Evaluating User Interaction

Lecture 05:
Design Process and Design Diamond

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Week calendar

Apr 16
Design Process and Design
Diamond
10:00 - 11:20 | OUG 136
2a - Project Ideation

Apr 17
Nigiri's office hours
10:00 - 12:00
Allen Center 338

Apr 18
User Research
10:00 - 11:20 | OUG 136
Reading 1: Empathy on the Edge

Apr 19
Section
10:30 - 11:20 | MGH 058
11:30 - 12:20 | MGH 058
1:30 - 2:20 | MGH 058
2:30 - 3:20 | MGH 058
2b - Design Research Plan
What we will do today

Design Process and Design Diamond

Sketching

Creativity
Design Process in a Nutshell
Getting the Right Design
Design Process in a Nutshell

**Framing the problem**
- User research
- Competitive analysis
- Data analysis and summary

**Explored the solution space**
- Brainstorming
- Ideation through sketching

**Finding a good solution**
- Scoping
- Consideration of constraints
- Scenarios, storyboards, personas
- Design rationale

**Refining the solution**
- Wireframes
- Io-fi prototypes
- Early evaluations
- Mockups/mid-fi prototypes
- Additional evaluations
Design Process in a Nutshell

Framing the problem
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Design as a Choice

Elaboration
palette of choices

Reduction
heuristics to choose
The Design Diamond

start

generate

select

intentional!

danger!
Critiquing design ideas

Ideas are both good and bad

Both are useful in design

By making clear what is a bad design,
we can avoid actually implementing it

Bad ideas help you justify your good ideas

Feedback can turn a good idea into a great idea
Idea Oscillation

start → generate

Critique

Critique

select → prototype

intentional!

intentional!
Cost of Iteration Toward a Design
Exploration of Alternatives
The Converging Path
Let ideas oscillate...

The fourth generation of the iPod was successful
Sketching as a way to boost creativity
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, $5.00 matinee

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

**Bittersweet Motel**
(11:00) (11:30) - 4:00 - 6:30 - 9:00

**Godzilla**
(10:30) (2:00) - 5:30 - 9:00

**The Cell**
(11:00) (11:30) - 2:00 - 5:00 - 7:00 - 9:00

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**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, INPUTTED ON MAP.

- Different colors
- Highlights availability
Sketching
Sketching

A process that enables you to think through ideas and convey design ideas to others very early in the design phase
Sketching = Quintessential Activity of Design
Properties of sketches

Quick
Timely
Inexpensive
Disposable
Plentiful
Clear Vocabulary

Distinct Gesture
Minimal Detail
Appropriate
Refinement
Suggest and Explore
Ambiguous
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 cannot afford to throw it away, then it is not a sketch

But they are not "worthless"
Plentiful

Sketches do not exist in isolation

Meaning and relevance is in the context of a collection or series
Clear Vocabulary

The way it is rendered makes it distinctive that it is a sketch (e.g., style, form, signals)

Could be how a line extends through endpoints
Distinct Gesture

Fluidity of sketches gives them a sense of openness and freedom

Opposite of engineering drawing, which is tight and precise
Minimal Detail

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

When we abstract an image through cartooning, we're not so much eliminating details as we are focusing on specific details.

By stripping down an image to its essential "meaning," an artist can amplify that meaning in a way that realistic art can't.
Appropriate Degree of Refinement

Make the sketch as refined as the idea

If you have a solid idea, make the sketch look more defined

If you have a hazy idea, make the sketch look 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

Sketches have holes

https://www.deviantart.com/tomalex123/art/Holes-sketch-298354319
Sketching as Conversation

Mind
knowledge, new knowledge

Sketch
representation
## Sketch vs. Prototype

<table>
<thead>
<tr>
<th>Sketch</th>
<th>Prototype</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invite</td>
<td>Attend</td>
</tr>
<tr>
<td>Suggest</td>
<td>Describe</td>
</tr>
<tr>
<td>Explore</td>
<td>Refine</td>
</tr>
<tr>
<td>Question</td>
<td>Answer</td>
</tr>
<tr>
<td>Propose</td>
<td>Test</td>
</tr>
<tr>
<td>Provoke</td>
<td>Resolve</td>
</tr>
<tr>
<td>Tentative, non committal</td>
<td>Specific Depiction</td>
</tr>
</tbody>
</table>

The primary differences are in the intent.
Beyond sketches on paper...
Physical sketching
Physical sketching

Mueller, WirePrint, UIST 2014
Lets try it!
Sketching exercise Part 1 (5 minutes)

by yourself, sketch at least 5 new designs for a cup

when you are finished, pin them to the wall
What are the dimensions of this design space?
Sketching exercise Part 2 (6 minutes)

throw out your old ideas and sketch 10 new cup designs following the different design dimensions
What was your experience?
Design Ideation

People become **fixated** in their design ideas.

Examples can lead to reinterpretation and recombination of ideas.

Defining the solution space increases people’s creativity.

Creativity
More Evidence
Duncker's (1945) Candle Problem  The subjects are asked to attach a candle to the wall and are given a box of tacks, candles, and matches, as shown in panel A. The solution is shown in panel B.
Quantity versus Quality

Pottery study:

One class was told they will be graded on quality, another one on quantity
Quantity versus Quality

The quantity class produces better pots. Why?
The quantity class produces better pots. Why?

“While the quantity group was busily churning out piles of work—and learning from their mistakes—the quality group had sat theorizing about perfection, and in the end had little more to show for their efforts than grandiose theories and a pile of dead clay”
More Evidence

Task:
Create a web banner ad for Ambidextrous magazine.

about us

A note to our community

We know it's been a while and you've maybe wondered what has been going on with us. The global financial crisis, consolidation, The New York Times now charging online... a lot has happened. And with the downturn and the state of publishing, it has been tough. We thought as long as we could and unfortunately must now close Ambidextrous. The magazine has been a labor of love; but, it has unfortunately not been organizationally and financially sustainable.

Since 2005, we've done our best to help designers share their stories and to build community around that. The process of making Ambidextrous has been so rewarding for us to take part in, and the best part has always been the people, our contributors and our subscribers. We would like to thank you as much for your support and for sharing your work, passions, and lives with us. It's been a joy and an honor.

As a movement, Ambidextrous will live on, and we should have conversations about what great next steps are for fostering intellectual discussion and sharing in the design community. It's the community that makes us hopeful and pushes us to find the next avenue, the next forum, the next thing for us to collaborate on. So keep in touch. Share your ideas. Let's meet again soon.

Until then,
-Wendy Ju & the Ambidextrous Editorial team
More Evidence

Parallel condition

Serial condition

Dow et al. TOCHI 2010.
More Evidence

serial prototyping condition

parallel prototyping condition
The parallel prototyping condition also led to significantly higher click-through rates.
Summary

Greater divergence in designs
  Prevents sticking with the first idea
  Allows mashing ideas together

Alternatives facilitate feedback
  Enable comparison
  Can improve tone of critique
So how do people do this in practice?
IDEO Shopping Card Project (start 4:55)
Ask me something!