CSE 440: Introduction to HCI
User Interface Design, Prototyping, and Evaluation

Lecture 06:
Design Diamond

James Fogarty
Alex Fiannaca
Lauren Milne
Saba Kawas
Kelsey Munsell

Tuesday/Thursday
12:00 to 1:20
Quantity versus Quality

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

The quantity class produces better pots. Why?
Quantity versus Quality

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”

Bayles and Orland, 2001
Sketching User Experiences

“Bill Buxton brings design leadership and creativity to Microsoft. Through his thought-provoking personal examples he is inspiring others to better understand the role of design in their own companies.”

Bill Gates—Chairman, Microsoft Corp.

Sketching User Experiences
getting the design right and the right design

Bill Buxton
Sketching

Movies

Theater: Shattuck Cinemas
Phone: (510) 665-1342 Dist: 1.5 mi
Address: 2122 Shattuck Ave Berkeley, 94709
Cost: $8.50 regular, $6.00 children, $4.50 matinees

Art of War  ★★★
(10:00-1:00) 4:00-7:00-10:00

Bittersweet Motel  ★★★★★
(11:00-11:30) 9:00-6:30-9:00

Gordilla  ★★
(10:30-2:00) 5:30-9:00

The Cell  ★★★★★
(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-washed to match so you don’t have to choose.)
Sketching

Map showing parking availability based on inputted data, inputted on map.
Sketching
Sketching

UBIGITOUS RICE COOKER

- LCD display shows number of cups & time remaining
- keypad for cups of rice input
- eject button opens drawer

"Just another drawer in your kitchen"

The uncooked rice is stored in a hidden reservoir. Water is acquired through a hose attached to your water source (similar to an espresso machine).
Sketching

A process that enables you to think through ideas and convey design ideas to others very early in the design phase
Quintessential Activity of Design
Design as Choice

Elaboration
palette of choices

Reduction
heuristics to choose
Design as Choice

Two openings for creativity

Palette of choices
Heuristics used to choose

Why is your contextual inquiry so important?
What you learn directly informs both of these, shaping everything you do this entire quarter
The Design Diamond

start \rightarrow generate \rightarrow select \rightarrow intentional!

\textit{danger!}
Properties of Sketches

Quick            Distinct Gesture
Timely           Minimal Detail
Inexpensive      Appropriate Refinement
Disposable       Suggest and Explore
Plentiful        Ambiguous
Clear Vocabulary
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

Investment is in the process, not the physical 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
Sketching as Conversation

Mind
knowledge, new knowledge

Sketch
representation

Create

Interpret

Requires ambiguity
### 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>
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<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.
ABC News and IDEO’s Deep Dive
Sketching the Mouse

Making the Macintosh:
http://www-sul.stanford.edu/mac/index.html
Sketching the Mouse

[Image of mouse prototypes]

Making the Macintosh:
http://www-sul.stanford.edu/mac/index.html
Physical Sketching
Physical Sketching

Mueller, WirePrint, UIST 2014
Physical Sketching

traditional workflow

low-fi fabrication

3D model

3D model

low-fi fabricated

low-fi fabricated

low-fi fabricated

hi-fi fabricated

hi-fi fabricated

Mueller, WirePrint, UIST 2014
Physical Sketching

(a) LEGO design
(b) 3D printing
(c) Assembly
(d) Final design
Physical Sketching
Idea Oscillation

- start
- generate
- select
- intentional!
- danger!
Critiquing Sketches is Important

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

Sketching generates too many ideas to implement
Idea Oscillation

start → generate

intentional!

select

intentional!

protoype
Iteration Toward a Design
Exploration of Alternatives
Exploration of Alternatives

... a designer that pitched 3 ideas would probably be fired. I'd say 5 is an entry point for an early formal review (distilled from 100's). ... 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
The Converging Path
Is this a sketch? Why or why not?
Is this a sketch? Why or why not?
Is this a sketch? Why or why not?
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Is this a sketch? Why or why not?
Some Evidence

Task:

Create a web banner ad for Ambidextrous magazine.
Feedback in Parallel or Serial

Parallel condition

Serial condition

Dow et al. TOCHI 2010.
Procedure

serial prototyping condition

parallel prototyping condition

Dow et al. TOCHI 2010.
Parallel: more diverse, better, more clicks

Dow et al. TOCHI 2010.
Share one or share your best?

- Share multiple condition
- Share best condition
- Make one condition

Dow et al. TOCHI 2010.
Share Multiple: better, more clicks

- Make one
- Share best
- Share multiple

**Expert quality rating (0-7)**

- Make one
- Share best
- Share multiple

**Clicks per million impressions**

Dow et al. TOCHI 2010.
Some Evidence

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

Alternatives facilitate feedback
  Enable comparison
  Can improve tone of critique
Sketching and the Design Diamond

The design diamond is fundamental to understanding what you are doing here

Much of your education, including in CSE, has taught you to focus on having the right answer

Here it matters what you do long before the end

Most ideas get thrown out, including yours

Better ideas are great criticism, and frequently would never have come about otherwise
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