CSE440: Introduction to HCI

Methods for Design, Prototyping and Evaluating User Interaction

Lecture 05: Design Process and Design Diamond

Nigini Oliveira
Manaswi Saha
Liang He
Jian Li Zheng
Jeremy Viny
What we will do today

Design Process and Design Diamond

Sketching

Creativity
Design Process in a Nutshell
Getting the Right Design

“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.
Design Process in a Nutshell

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

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

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

**Refining the solution**
- Wireframes
- Lo-fi prototypes
- Early evaluations
- Mockups/mid-fi prototypes
- Additional evaluations
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Design as a Choice

Elaboration
palette of choices

Reduction
heuristics to choose
The Design Diamond

- start
- generate
- intentional!
- select
- danger!
Critiquing design ideas 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
Idea Oscillation

```
start -> generate
       ^          v
Critique
       ^          v
intentional!  intentional!
select -> prototype
       ^          v
Critique
       ^          v
```
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
Sketching

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

Different colors
highlight 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>
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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 (3 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
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?
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”
More Evidence

Task:
Create a web banner ad for Ambidextrous magazine.
More Evidence

Parallel condition

Serial condition

Dow et al. TOCHI 2010.
More Evidence

serial prototyping condition

parallel prototyping condition
More Evidence

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?
Ask me something!