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

Lecture 07: Design Diamond

James Fogarty
Daniel Epstein
Brad Jacobson
King Xia

Tuesday/Thursday
10:30 to 11:50
MOR 234
Today

Reminder on Tasks

Reminder on Designs and Page Limit

Reminder on Teams

Design Diamond
Tasks, Personas, and Scenarios

**Task**: a design-agnostic objective

**Persona**: a fictional person with a backstory

**Scenario**: narrative that demonstrates a persona completing a task using a particular design

**Use Case**: in software engineering, describes requirements using one or more scenarios
Task: Park in a New Neighborhood

Peter is going to brunch on a Sunday with his roommates. He is trying a new place he found on Yelp. He has the address for the place and he is using a smartphone GPS for directions. He leaves the apartment with his roommates at around 8:30am and he wants to beat the crowd so they won’t have to wait in line. He is driving a Toyota Corolla that he has owned for five years. It is a rainy day and he doesn’t have an umbrella.
Hierarchical Task Analysis

Steps of the task execution (detailed in a hierarchy)

- park in new neighborhood
  - determine destination
  - drive to destination
  - locate parking spot
  - secure parking spot
  - park
  - enter address in GPS
  - follow directions
  - arrive at destination
  ...

University of Washington
Hierarchical Task Analysis

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... Or step back a level and motivate Uber
Tasks in Your Projects

Say what is accomplished, not how

Real tasks that people currently encounter, or new tasks your design will enable

Reasonable coverage of the interesting aspects of your problem and your design space

Range of difficulty and complexity

Park at the zoo, Friday night in Ballard, at the airport
Today

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Design Diamond
Working as Teams

We have had some absences in critiques

   It is absolutely good to stay home sick

But some have been unexpected by teams

   Revealed incomplete project knowledge

Highlights you working as groups instead of teams
Teams vs. Groups

There is a place for groups:

Working groups are both prevalent and effective in large organizations where individual accountability is most important. The best working groups come together to share information, perspectives, and insights; to make decisions that help each person do his or her job better; and to reinforce individual performance standards. But the focus is always on individual goals and accountabilities.
Teams vs. Groups

Teams differ fundamentally from working groups... they require both individual and mutual accountability. Teams rely on more than group discussion, debate, and decision; on more than sharing information and best practice performance standards. Teams produce discrete work-products through the joint contributions of their members. This is what makes possible performance levels greater than the sum of all the individual bests of team members.

A team is more than the sum of its parts.
## Teams vs. Groups

<table>
<thead>
<tr>
<th>Groups</th>
<th>Teams</th>
</tr>
</thead>
<tbody>
<tr>
<td>strong leader</td>
<td>shared leadership</td>
</tr>
<tr>
<td>individual accountability</td>
<td>individual &amp; mutual accountability</td>
</tr>
<tr>
<td>organizational purpose</td>
<td>specific team purpose</td>
</tr>
<tr>
<td>individual work products</td>
<td>collective work products</td>
</tr>
<tr>
<td>efficient meetings</td>
<td>open-ended meetings</td>
</tr>
<tr>
<td>measures performance by influence on others</td>
<td>measures performance from work products</td>
</tr>
<tr>
<td>delegates work</td>
<td>does real work together</td>
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</tbody>
</table>
Keys to Team Success

Common commitment
requires a purpose in which team members believe

Specific performance goals
comes directly from the common purpose
helps maintain focus – start w/ something achievable

A right mix of skills
technical/functional expertise (programming/design/writing)
problem-solving & decision-making skills
interpersonal skills

Agreement and mutual accountability
who will do particular jobs, when to meet & work, schedules
Working as Teams

School has taught you to succeed as an individual

Too many projects are done in groups

   Drawing boundaries between code responsibilities

This class requires you to work as teams

   You can split up, but you have to come back together
   Use complementary skills, be mutually accountable

The “real world” requires this too
Working as Teams

Get to know each other

Figure out strengths of team members

Assign each person a role

- responsible for seeing work is organized and done
- not responsible for doing it themselves

Names/roles listed on major reports

Group Manager (coordinate team)
Documentation (coordinate writing)
Design (coordinate visual/interaction design)
Fieldwork and Testing (coordinate fieldwork and testing)
Today

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Design Diamond
Quantity over Quality

One class told they will be graded on quality, another on quantity.
Quantity v. Quality?

“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.

Bill Buxton

Sketching User Experiences
getting the design right and the right design
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, 50 cent matinee

Art of War  ★★★
(10:00)-(1:00)-4:00-7:00-10:00
Bittersweet Motel  ★★★★
(11:00)-(1:30)-4:00-6:30-9:00
Godzilla  ★★
(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 it should be...

outfit#1
outfit#2
outfit#3

(pre-wealth to watch so you don't have to choose.)
Sketching

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

UBIGIITOUS RICE COOKER

- LCD display shows number of cups + time remaining
- # pad 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).
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
Sketching

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

vs.
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, the sketch will look much 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
Sketch vs. Prototype

<table>
<thead>
<tr>
<th>Sketch</th>
<th>Prototype</th>
</tr>
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<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.
Idea Oscillation
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
ABC News and IDEO’s Deep Dive

http://courses.cs.washington.edu/courses/cse440/videos/designdiamond/IDEO-DeepDive.mp4
Sketching the Mouse

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

... a designer that pitched three 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
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
share multiple: better, more clicks

- Share multiple
- Share best
- Make one

Expert quality rating (0-7)

Clicks per million impressions

Dow et al. TOCHI 2010.
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?

Quick-and-Dirty Prototyping

HOW: Using any materials available, quickly assemble possible forms or interactions for evaluation.

WHY: This is a good way to communicate a concept to the team and evaluate how to refine the design.

IDEO team members designing a shopping device quickly prototyped various concepts to evaluate qualities like weight, size, and orientation.
Is this a sketch? Why or why not?
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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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