The Design Cycle and Brainstorming

CS160: User Interfaces
Maneesh Agrawala
Visual feedback showing available fonts
Most recently used fonts at top (is this good or bad?)

Review

Course overview

Project theme

Course mechanics
Due Today (before class)

- Creation of wiki account
- Course petition
- 1 comment per lecture (cs160/cs160Readings)

Topics

- The Design Cycle
- Brainstorming
The Design Cycle
The Art of UI Design

But, there’s more to it …

A soufflé is eggs, butter, milk & flour, but the difference between soaring and sinking is in the execution.

The Design Process [Koberg & Bagnall]

1. Acceptance
2. Analysis
3. Definition
4. Ideation
5. Idea selection
6. Implementation
7. Evaluation

Design Process
Acceptance

Getting started
– Because of a deadline
– Because of possible reward
– Because you are forced to

Commitment
– Time
– Resources
– Responsibility

Key is to set motivation

Analysis

Understand users and tasks

Who are the users?
What are their tasks?
Observe and test, don’t guess
Analysis

Understand users and tasks

Tools
- Notebook
- Tape recorder
- Camera
- Video camera

Who are the users?
What are their tasks?
Observe and test, don’t guess

Definition

Focus on the problem
- Choose appropriate level of detail

Not “bicycle cup-holders” but “helping cyclists to drink coffee without accidents”
Ideation

Brainstorming

– Stretch mental muscles
  • Loosen up with simple games
  • Do homework
  • Seed with related ideas/objects
– Get physical
  • Sketch
  • Make models
  • Act out
– IDEO rules
  • One conversation at a time
  • Stay focused
  • Encourage wild ideas
  • Defer judgment
  • Build upon idea from others

Aim for quantity

Idea Selection

Define importance of each idea

– Does it address problem
– Will target users like it
– Is hardware available
– Is software available
– What is the cost
– Market window
– …

Rank ideas according the your criteria

Pick top N

– Choices depend on resources and stage of the project
Implementation

Scale up low → high fidelity

– Low-fidelity (quick, cheap, dirty)
sketches, paper models, foam core, …
Implementation

Scale up low → high fidelity

- Low-fidelity (quick, cheap, dirty)
  sketches, paper models, foam core, …

- Medium fidelity (slower, more expensive)
  Flash, JavaScript, AJAX, …

- High fidelity (slowest, most expensive)
  The full interface
Web design
- Sites created at multiple levels of detail
- Sites iteratively refined at all levels of detail
- Iterate quickly to see what works

Site Maps → Storyboards → Schematics → Mock-ups

Evaluation

Early tests - Wizard of Oz approach
Evaluation

Walk-through prototype design

Observer (or video camera)

“Computer”

Interface elements

User

Interface elements

Design Cycle Over Project Lifespan

Number of ideas under consideration

Project timeline
Evaluation reveals problems with design. Re-design requires cycling the process.

Prototype implementations eventually increase in fidelity to reach final product.
Comparison

[Lewis & Rieman]

• Who will use?
• What are their tasks?
• Plagiarize
• Rough out a design
• Think about design
• Create a prototype
• Test it with users
• Iterate
• Build a production version
• Track use
• Evolve the design

[Koberg & Bagnall]

1. Acceptance
2. Analysis
3. Definition
4. Ideation
5. Idea selection
6. Implementation
7. Evaluation
Waterfall Model (Soft. Eng.)

Initiation → Application Description → Analysis

Analysis → Requirements Specification → Design

Design → System Design → Implementation

Implementation → Product

Comparison

Focus differs
- WF has no feedback
  - High cost of fixing errors
  - Increases by 10x at each stage
  - Iterative design finds problems earlier

Design → Prototype → Evaluate

Evaluate → Initiation → Application Description → Analysis

Analysis → Requirements Specification → Design

Design → System Design → Implement

Implement → Product
Assignment: Individual Project Proposal

Propose idea for course project
  – Based on mobile applications/Android theme
  – Exciting to you
  – Be creative!
  – Consider needs of a well-defined target user group
  – Include sketches as appropriate

Description must be posted to wiki before class Jan 31.

Video: The Deep Dive

How well do they follow the cycle?
What do they do for each step of the cycle?
How many cycles do you think they went through?
Brainstorming

The Psychology of Creativity

Conformity: the enemy of creativity

Groups and organizations encourage conformity

Part of “brand” or “corporate identity”
The Psychology of Creativity

Pressure to conform affects judgment and perception:
- The emperor’s new clothes
- McCarthyism: if you’re not one of us, you’re one of them…

People in minority will adopt majority opinion and even manufacture their own explanation of it.

Enhancing Creativity

Thinking outside the box:

Draw a series of 4 straight lines through all the points below, without lifting pen from paper:
Why Is This Hard?

We adopt expectations about the solution
- Based on conventions
- Based on what we believe the questioner expects

Creativity and Dissent

**Authentic dissenters** – people who really disagree with group
- can enhance group creativity

Their opinion needn’t be right – but they can free the group from stagnant thinking.

The originality of the minority stimulates the majority
Creativity and Dissent

**Authentic dissenters** – people who really disagree with group – can enhance group creativity

Their opinion needn’t be right – but they can free the group from stagnant thinking.

The originality of the minority stimulates the majority.

Dissent and Authenticity

The benefits of dissent are weakened if

**Dissent is not real:** A deliberate “devil’s advocate” in the group can actually stifle dissent, because the majority know the opinion is manufactured.

**Dissent is not encouraged:** Polite or pro-forma acceptance is not enough.
IDEO’s Brainstorming Rules

1. Sharpen the Focus
2. Playful Rules
3. Number your Ideas
4. Build and Jump
5. The Space Remembers
6. Stretch Your Mental Muscles
7. Get Physical

Aim for quantity
Hope for quality

Sharpen the Focus
Posing the right problem is critical – neither too narrow, nor too fuzzy

Not “bicycle cup-holders” but “helping cyclists to drink coffee without accidents”
Number Your Ideas

Obvious but very useful

Helps keep track of them when the brainstormer is successful (and 100 or more ideas are in play)

Allows ideas to take on an identity of their own

Build and Jump

Build to keep momentum on an idea:

- “shock absorbers are a great idea; what are other ways to reduce coffee spillage on bumps?”

Jump to regain momentum when a theme tapers out:

- “OK, but what about hands-free solutions?”
Concept Refinement

Premature idea rejection is a serious barrier to good design.

One big differentiator between good designers and great ones is the latter’s ability to successfully develop unusual ideas.

This requires a strong instinct to be able to distinguish fatal vs. minor flaws in an idea.

The Space Remembers

Covering whiteboards or papering walls with text is extremely useful in group work.

It’s a very effective form of external (RAM) memory for group.

Even better, its shared RAM. Helps group share understanding.
Stretch your Mental Muscles

Warmups: word games, puzzles

Get immersed in the domain: go visit the toy shop, or the bicycle shop, phone shop etc…

Bring some examples of the technology to the brainstormer

Get Physical

Sketch

Make models

Act out
Next Time

Sections will meet next Tuesday

The Affordances of Mobile Devices
  – TBD: Check the wiki, should be listed by sometime tomorrow

Don’t forget – read, then write a comment on the wiki