The Design Cycle and Brainstorming

CS160: User Interfaces

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Review

Course overview

Prototype

Design

Evaluate

Project theme

Model 160 - 500 Gb

Course mechanics
Assignments

Due today
• Creation of wiki account
• Course petition
• 1 comment per lecture

Due next Wednesday
• Individual project proposal

Due on Sept 13
• Individual programming assignment 1
Topics Today

• 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.
Lewis and Rieman’s cycle

1. Choose Users
2. Select tasks
3. Plagiarize
4. Rough out a design
5. Think about it
6. Prototype
7. Evaluate
8. Iterate
9. Build the design
10. Track the design
11. Change the design
Understand Users

User-centered design starts and ends with real users.

Observation, surveys, interviews

Two ways to summarize traits:

• Abstraction
• Archetypes
Understand Users

User-centered design starts and ends with real users.

Observation, surveys, interviews

Two ways to summarize traits:

• Abstraction

• Archetypes

Personae
What are the tasks?
Observe and test, don’t guess

Tasks:
• Finding a point-of-interest
• Sending a message
• Taking/sharing a photo

Mixture of easy/hard
• Browse for a contact
• :              :               :
• Create a location-based reminder

Support strange paths..
Definition

Focus on the problem
– Choose appropriate framing

Not “bicycle cup-holders” but “helping cyclists to drink coffee without accidents”
Or, helping users work out more regularly
Or, helping users learn during their commute
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 ideas from others

Aim for quantity
Plagiarize

“Good artists borrow (from other artists), but great artists steal!”
- Pablo Picasso

Compelling design takes practice and experience – a natural part of which is study and critique of other’s work.

Csikszentmihalyi “Creativity” – most creative people were also experts in the history of their field.
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 – don’t kill ideas with “fatal flaws” too early.

Pick top N
- Choices depend on resources and stage of the project
Design Discipline

Great design is about choosing what to leave out.

Takes a clear understanding of users’ needs.

SIMPLIFY whenever possible.
Rough it out

Sketch

Argue

Get criticism from others
  • Seeing through many eyes

Studio model
  • The space is a cognitive extension
Think
Step back...
Critique your own design
Why did you make the choices you did?
What is the real design space you are working in?
Try to avoid “overthinking” before your first sketch.
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, …

• Refactor/rethink
Implementation

Scale up low $\rightarrow$ 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
Implementation

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)

User

“Computer”

Interface elements

Prototype

Design

Evaluate
Build, Track, Change

Design continues after the product ships.

Quality – bug fixes.

Track usage, seek user feedback (support!).

Do something about the problems you find.
A bit of history

Q: What was the Zoomer?
A: The Palm Pilot’s parent.
It failed in the marketplace.
Palm Pilot

- Intensive studies of Zoomer users began in 1994.
- Decided the PDA should be a paper replacement, not a PC replacement.
- Switched to graffiti.
- Shrank to pocket size.
- Unveiled the Palm Pilot in 1994.
What are?

• Apple Lisa
• Windows 1.0 and 2.0
• IBM’s Simon?
What are?

- Apple Lisa
- Windows 1.0 and 2.0
- IBM’s Simon?
  Touchscreen phone in 1994
Design → Prototype → Evaluate → Design
Waterfall Model (Soft. Eng.)

- **Initiation**
  - Application Description
  - Requirements Specification
  - System Design

- **Analysis**
  - Requirements Specification

- **Design**
  - System Design

- **Implementation**
  - Product
Comparison

Focus differs

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

However, **agile** SWE processes (e.g. extreme programming, SCRUM) adopt a similar iterative model.
Comparison

Extreme programming:
• Very short, test-driven cycles
• Reprioritization of features
• Customer always on hand

SCRUM:
• Small team (< 10 people)
• Weekly “sprints” followed by meetings with all stakeholders
• Increments in customer-facing features
• Any design spec can change
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.
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 Scholarship

“Good artists borrow (from other artists), but great artists steal!”
- Pablo Picasso

Mihaly Csikszentmihalyi studied creative individuals from many disciplines and found they had tremendous knowledge of the history and prior work in their discipline.
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
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?”
Build and Jump

Premature idea rejection is a serious barrier to good design.

One of the biggest differentiators 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.
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 brainstomer
Get Physical

Sketch

Make models

Act out
Next Time

Sections will meet this Friday

Readings: Sketching

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

Project proposal (individual) due on Weds.
Assignment: Individual Project Proposal

Propose idea for course project

– Based on mobile app. 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 9/8/10.
Assignment: Individual Programming 1

Make sure you can get Android code compiled and running in emulator.

Lots of resources on web and wiki for Android development.

Assignment must be posted to wiki by 5pm 9/13/10.