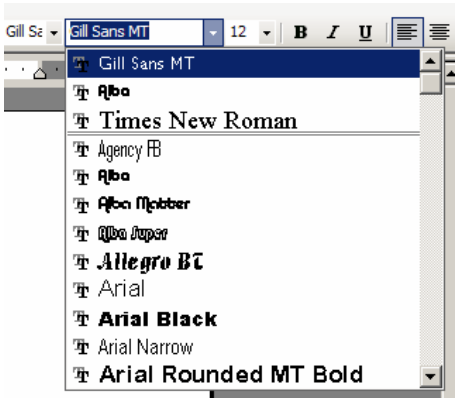
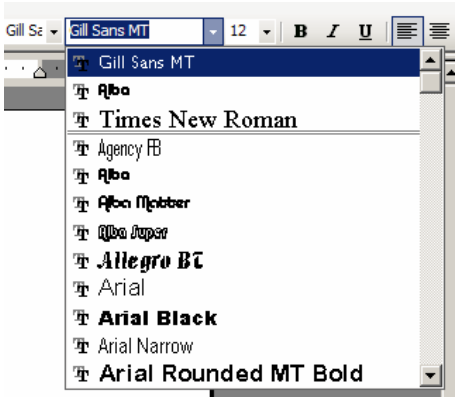
The Design Cycle and Brainstorming

CS160: User Interfaces

Maneesh Agrawala

Slides based on those of John Canny and Francois Guimbretiere

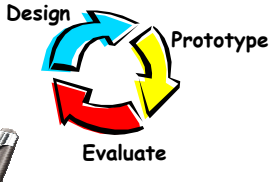




Visual feedback showing available fonts
Most recently used fonts at top (is this good or bad?)

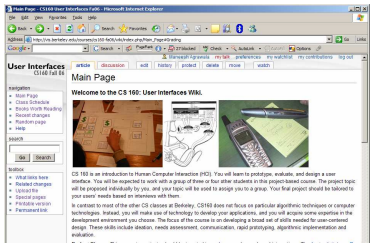
Review

Course overview



Project theme

Course mechanics



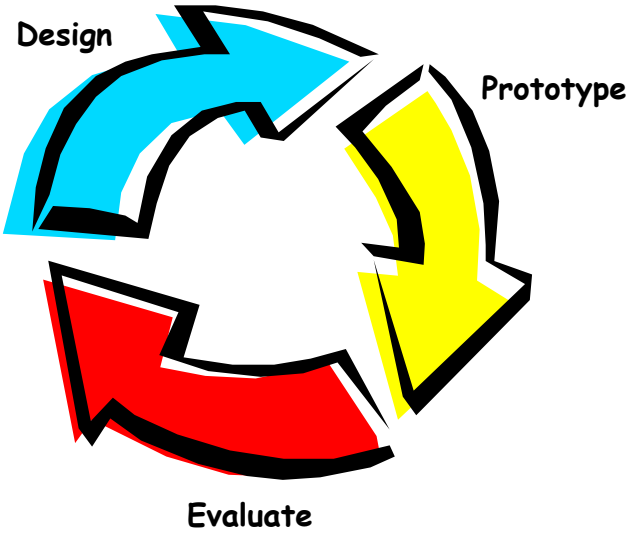
Due Today (before class)

- Creation of wiki account
- Course petition
- 1 comment per reading (cs160/uiISfun)

Topics

- The Design Cycle
- Brainstorming

The Design Cycle

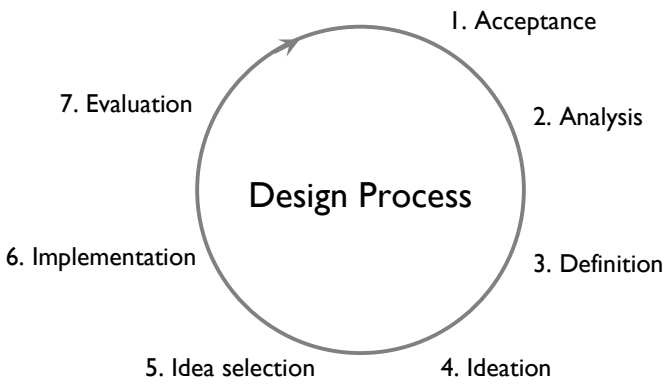


The Art of UI Design

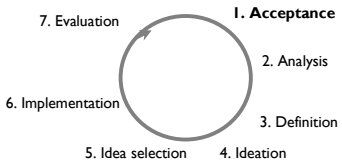
But, there's more to it …

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

The Design Process [Koberg & Bagnall]



Acceptance

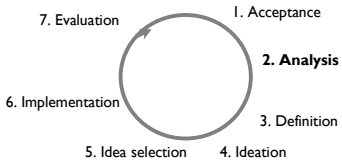


Getting started
- Because of a deadline
- Because of possible reward
- Because you are forced to

Commitment
- Time
- Resources
- Responsibility

Key is to set motivation

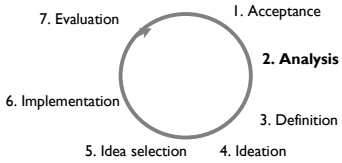
Analysis



Understand users and tasks

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

Analysis



Understand users and tasks

Who are the users?

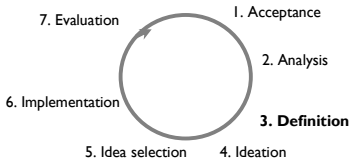
What are their tasks?

Observe and test, don't guess

Tools

- Notebook
- Tape recorder
- Camera
- Video camera

Definition

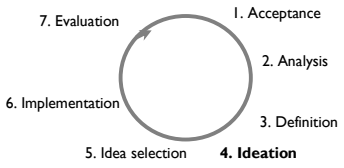


Focus on the problem

- Choose appropriate level of detail

Not "bicycle cup-holders" but "helping cyclists to drink coffee without accidents"

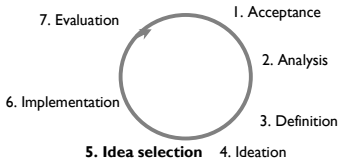
Ideation



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



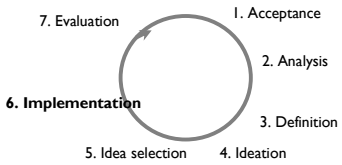
Define importance of each idea
- Does it address problem
- Will target users like it
- Is hardware available
- Is software available
- What is the cost
- Market window
- …

Rank ideas according the your criteria

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

Implementation

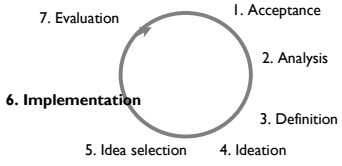
Scale up low → high fidelity

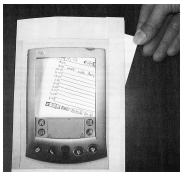


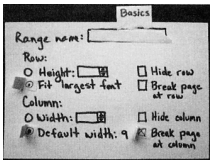
Implementation

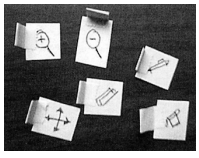
Scale up low → high fidelity

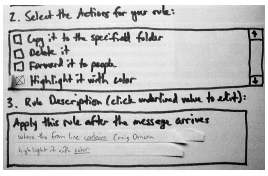
- Low-fidelity (quick, cheap, dirty)
  sketches, paper models, foam core, …

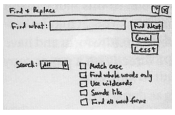




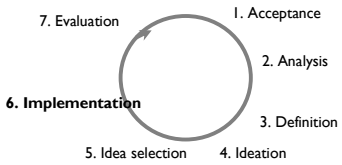






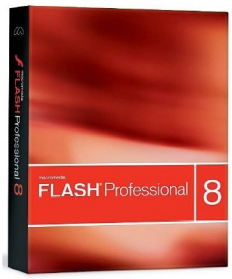


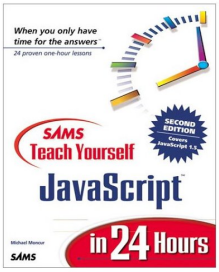
Implementation

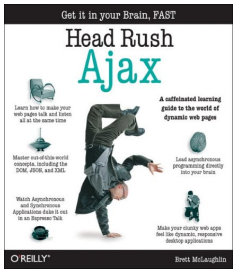


Scale up low → high fidelity

- Low-fidelity (quick, cheap, dirty)
  sketches, paper models, foam core, …
- Medium fidelity (slower, more expensive)
  Flash, JavaScript, AJAX, …







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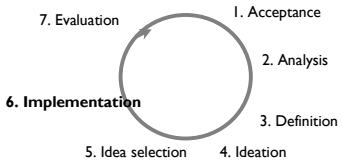
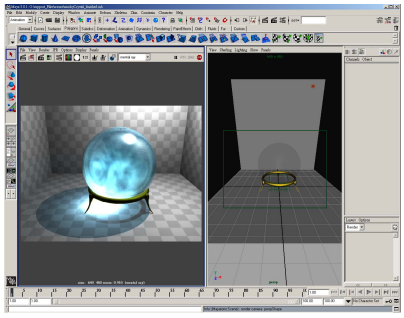


Scale up low → high fidelity

- 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



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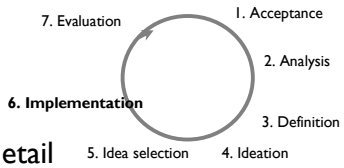
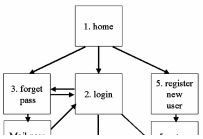
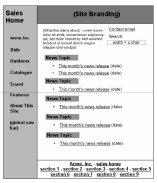


Web design

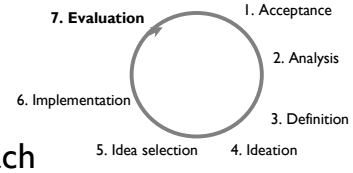
- Sites *created* at multiple levels of detail
- Sites iteratively *refined* at all levels of detail
- Iterate quickly to see what works

Site Maps → Storyboards → Schematics → Mock-ups



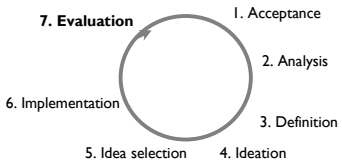


Evaluation

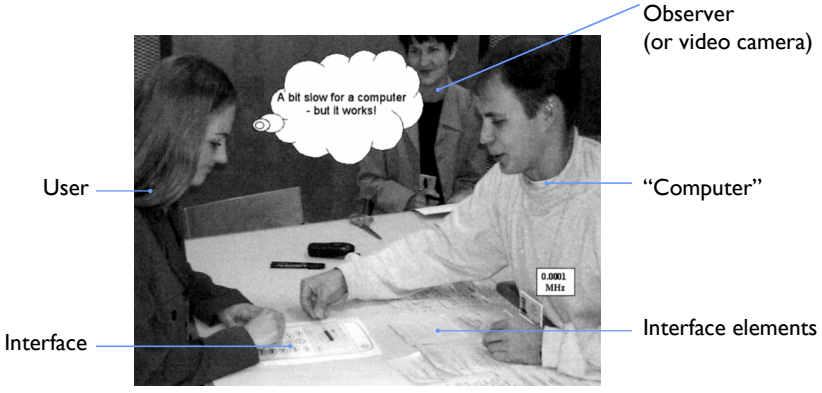


Early tests - Wizard of Oz approach

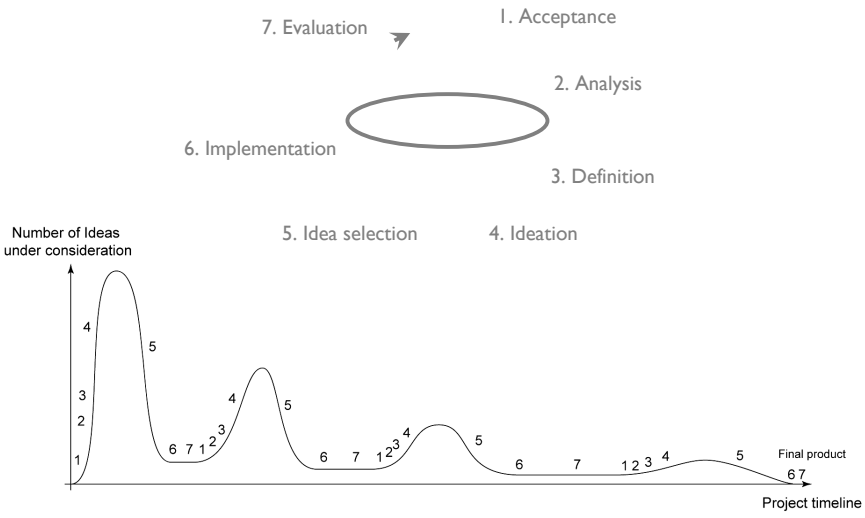
Evaluation



Walk-through prototype design



Design Cycle Over Project Lifespan



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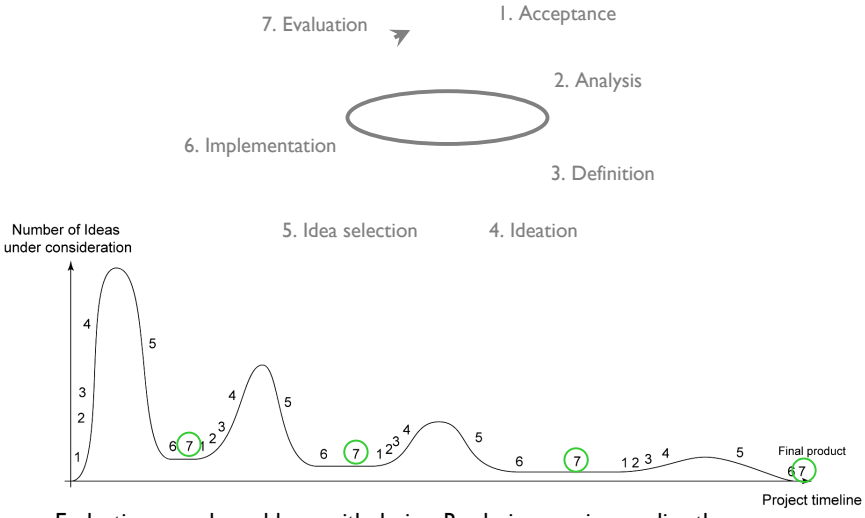
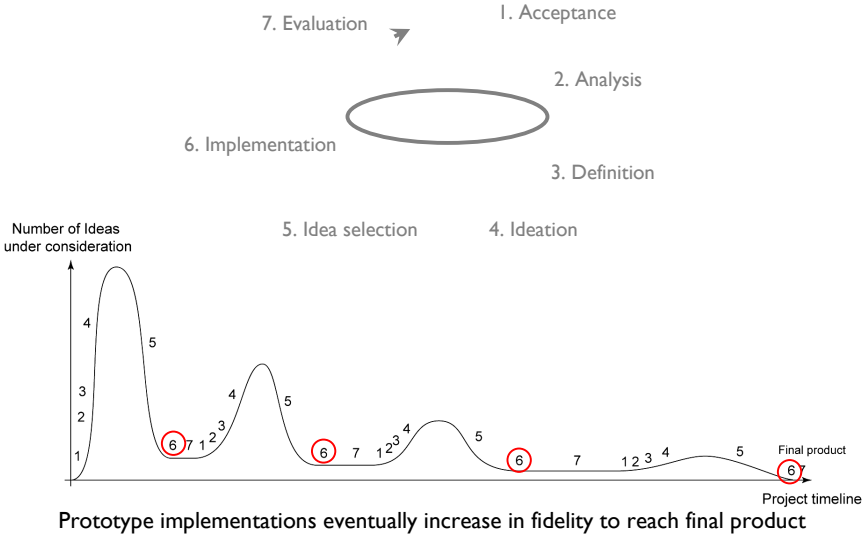


Evaluation reveals problems with design. Re-design requires cycling the process.

Design Cycle Over Project Lifespan



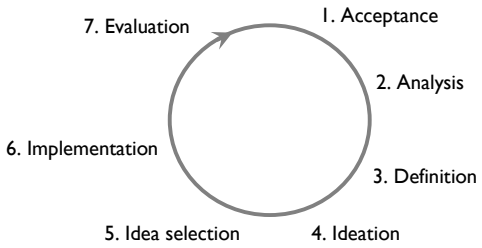
Prototype implementations eventually increase in fidelity to reach final product

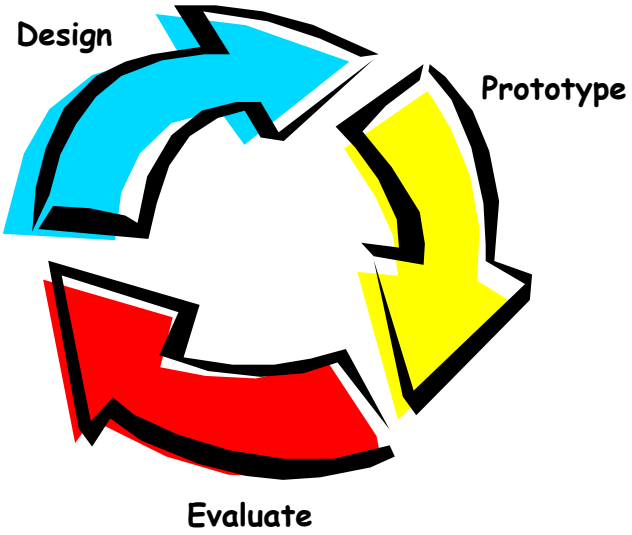
Comparison

[Lewis & Rieman]

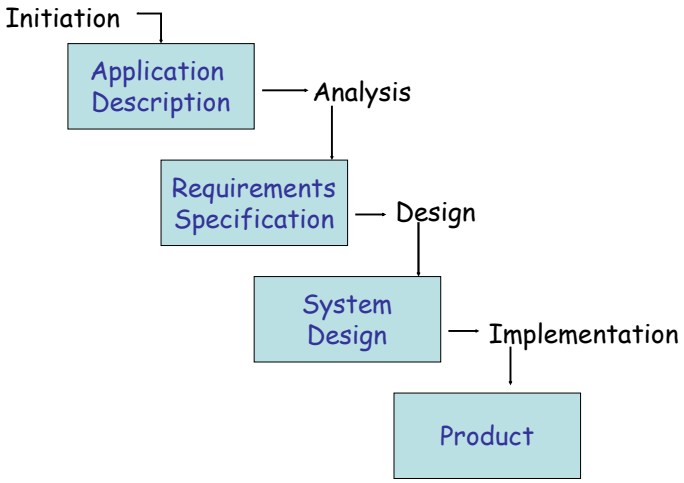
- Who will use?
- What are their tasks?
- Plagiarize
- Rough out a design
- Think about design
- Create a prototype
- Test it with users
- Iterate
- Build a production version
- Track use
- Evolve the design

[Koberg & Bagnall]





Waterfall Model (Soft. Eng.)



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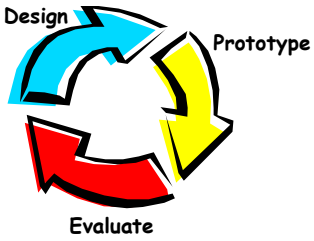
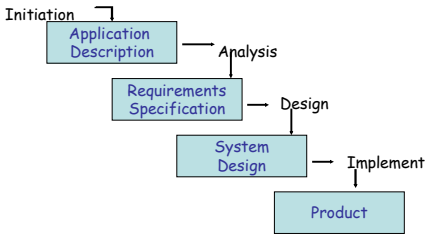
Comparison

Focus differs

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





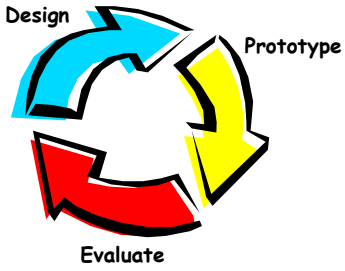
Assignment: Individual Project Proposal

Propose idea for course project

- Based on digital pen and paper 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 on Sept 11.

Video: The Deep Dive



How well do the 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

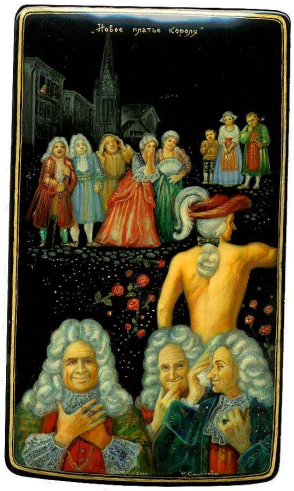
Part of "brand" or "corporate identity"

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 on of them…

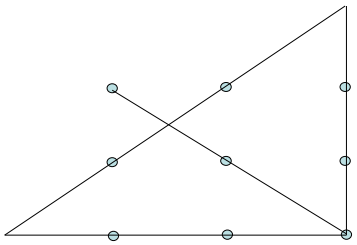
People in minority will adopt majority opinion and even manufacture their own explanation of it.



Enhancing Creativity

Thinking outside the box:

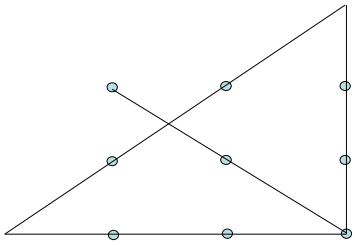
Draw a series of 4 straight lines through all the points below, without lifting pen from paper:



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

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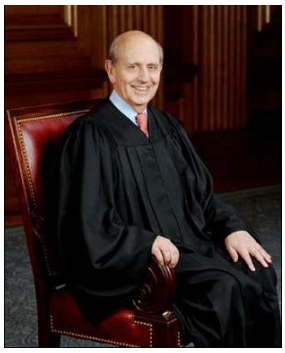

Dissent and Authenticity

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 brainstomer

Get Physical

Sketch

Make models

Act out

Next Time

Waitlisted students will be admitted based on petition by Mon.

- We will email the final list to everyone who has sent a petition

No class Monday
Sections will meet on Tuesday

The Affordances of Pens and Paper

- The Hot New Medium: Paper. (local copy). *Wired Magazine*. 9.04. 2001. Silberman.
- PADD: The Paper Augmented Digital Document infrastructure. *UIST*. 2003. Guimbretiere.
- ButterflyNet: A Mobile Capture and Access System for Field Biology Research. *UIST*. 2006. Yeh et al.

Don't forget to write one comment per reading → 3 comments