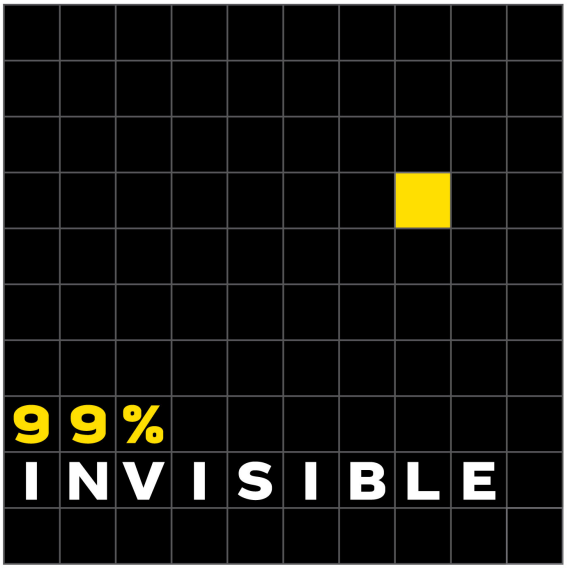
CS160: User Interface Design

Conceptual Models I

2/06/12

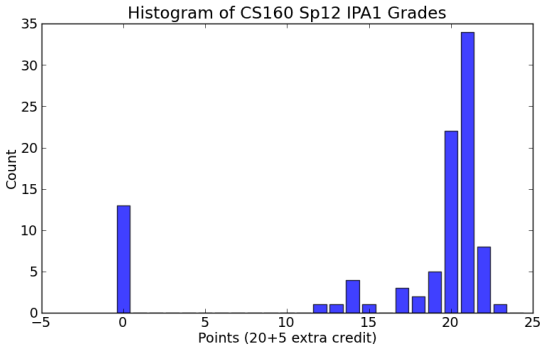
Berkeley
UNIVERSITY OF CALIFORNIA



A TINY RADIO SHOW ABOUT DESIGN
WITH ROMAN MARS

Episode 37:
The Steering Wheel

Due Last Monday: IPA1



Stats: with Zeros
Mean: 17.22
Median: 20.0
Stddev: 7.15

State w/o Zeros
Mean: 19.95
Median: 21.0
Stddev: 2.17

Grades on bSpace now

Regrades: Write down where you think you deserve more points and submit physical copy to us. We will regrade entire assignment. Your grade **can decrease** during regrading.

Example Media Browser

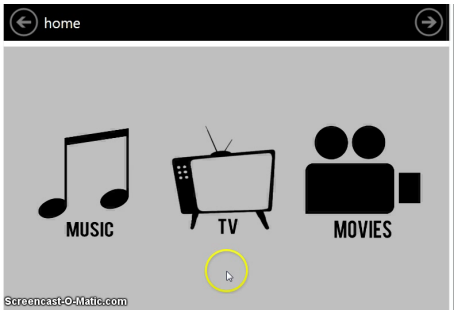
Whitney Lai

Nice overall design

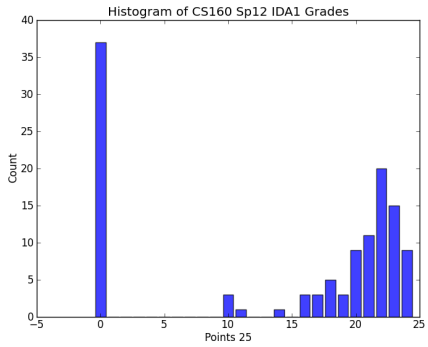
Feedback to show focus

- Enlarge home icons
- Dark bg later

Grayed out buttons when you can't do something



Due Last Monday IDA 1



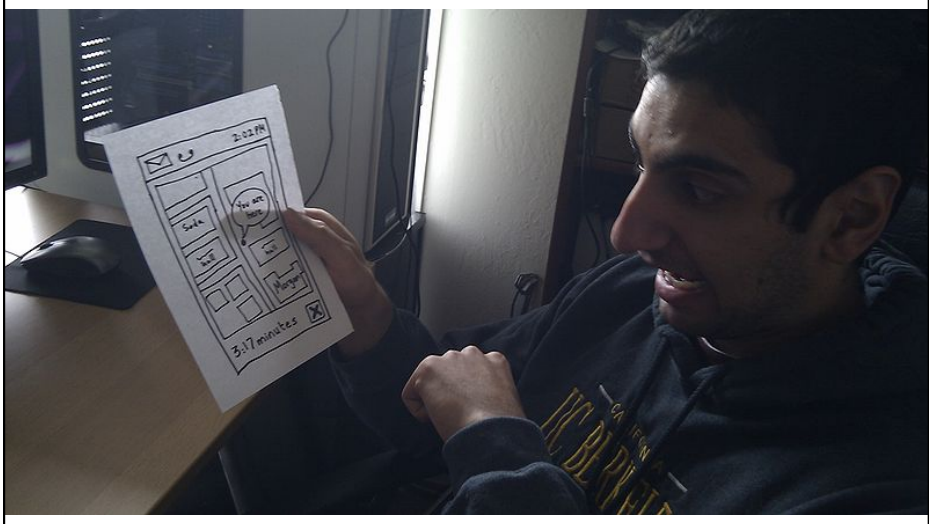
Stats: with Zeros
- Mean: 14.28
- Median: 20.0
- Stddev: 9.91

State w/o Zeros
- Mean: 20.65
- Median: 22.0
- Stddev: 3.22

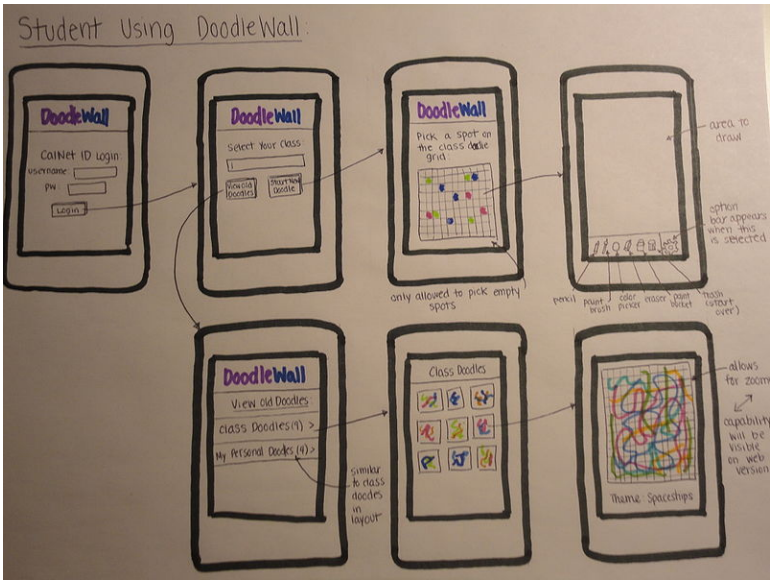
More observations/interviews early on
More detail in prototypes
More extensive user testing

Grades on bSpace now

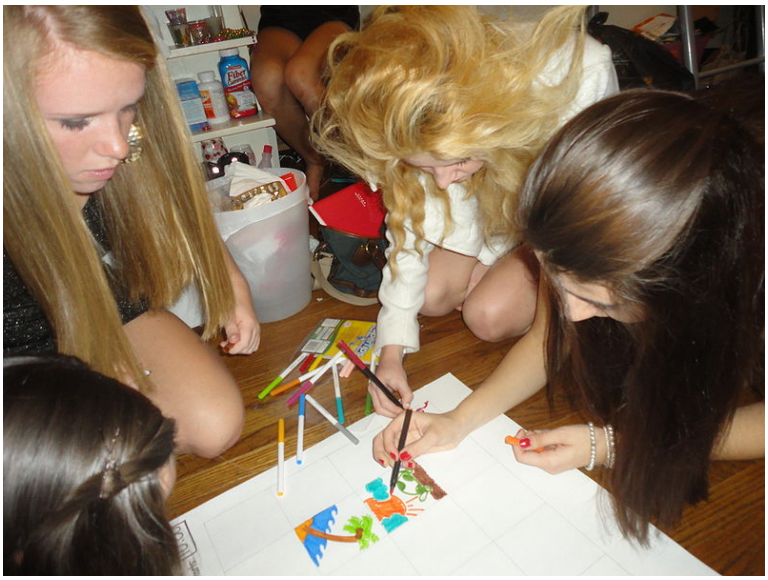
Regrades: Write down where you think you deserve more points and submit physical copy to us. We will regrade entire assignment. Your grade **can decrease** during regrading.



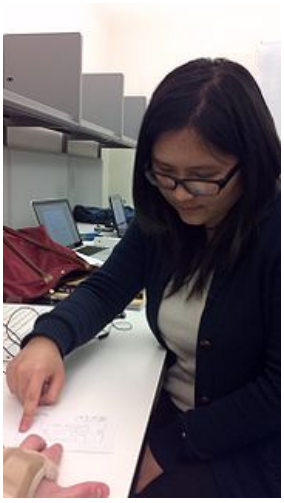
Omar Ali
Time and directions to next class



Sahana Rajasekar
Group doodling



Sahana Rajasekar
Group doodling



Pedro Tanaka
Website displaying interesting slides from previous lectures

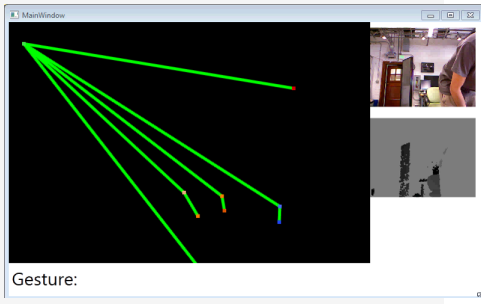
Upcoming Due Dates

Today: Group Brainstorm

(Wiki and printout handed in now)

Mon. Feb 13: Individual Prog. Assignment 2

(Source code, executable and video on wiki)



New Assignment (due 2/22)

Contextual Inquiry and Task Analysis - Due Feb 22 (2.5 weeks)

Find and interview 3 target users (not from class)
Analyze their tasks
Explain how your application addresses their needs
Compile a list of existing related applications
See wiki for details

Start early – there is a lot to do

Finding participants will take time
We will not accept late group project assignments

Review: Task Analysis

Find some real users

Talk to them

Find out what they do now
How would your system fit in?
More on this a bit later

Are they too busy?

Buy their time
t-shirts, coffee mugs, etc.

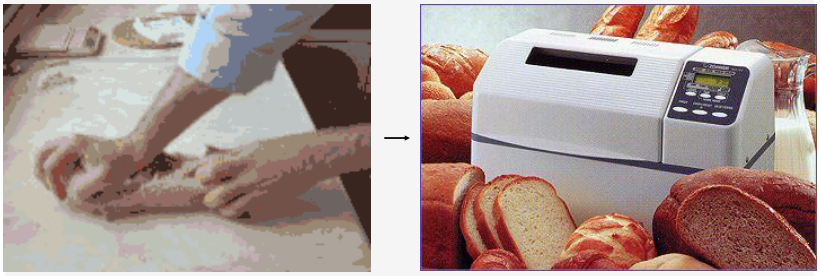
Review: Task Analysis Questions

1. Who is going to use system?
2. What tasks do they now perform?
3. What tasks are desired?
4. How are the tasks learned?
5. Where are the tasks performed?
6. What's the relationship between user & data?
7. What other tools does the user have?
8. How do users communicate with each other?
9. How often are the tasks performed?
10. What are the time constraints on the tasks?
11. What happens when things go wrong?

Review: Master-Apprentice Model

Allows user to teach us what they do

- Skill knowledge is usually tacit (can't put it in books)
- Sometimes literal apprenticeship is best



Matsushita Home Bakery – First automatic bread maker to have twist/stretch motion [Nonaka 95]

Principles of Contextual Inquiry

1. Context
2. Partnership
3. Interpretation
4. Focus

Principles: Context

Go where the work is:
Conduct inquiry in a normal work environment

People summarize, but we want details

Keep it concrete when people start to abstract

"We usually get reports by email", ask "Can I see one?"

Look for skipped steps, ask user to fill them in

Principles: Partnership

Master / Apprentice + intermittent probing

Alternative models (what's wrong with them?)

Interviewer / Interviewee

Expert / Novice

Guest / Host

Why not just interview folks?

Principles: Interpretation

Good facts only the starting point

Design based on interpretations

Validate & rephrase

Check interpretations with user

Be committed to hearing what user is really saying

Principles: Focus

You need data about specific tasks

Steer conversation to stay on useful topics

Respect "intrapersonal triggers"
(flags to change focus/understanding)

"Why would they do that?"

Admit your ignorance

Thoughts on Inquiries

Establish rapport before diving in

Use recording technologies

Notebooks, tape recorders, still & video cameras

Master/apprentice can be hard

Staying in role – it's a lot like acting

Don't correct! Its not a lesson!

Its hard not designing on the fly

Topics

Personas

Affordances

Conceptual Models

Design Principles

The Action Cycle

Personas

Personas (from Cooper)

"Hypothetical Archetypes"

Archetype: (American Heritage)

An original model or type after which other similar things are patterned; a prototype

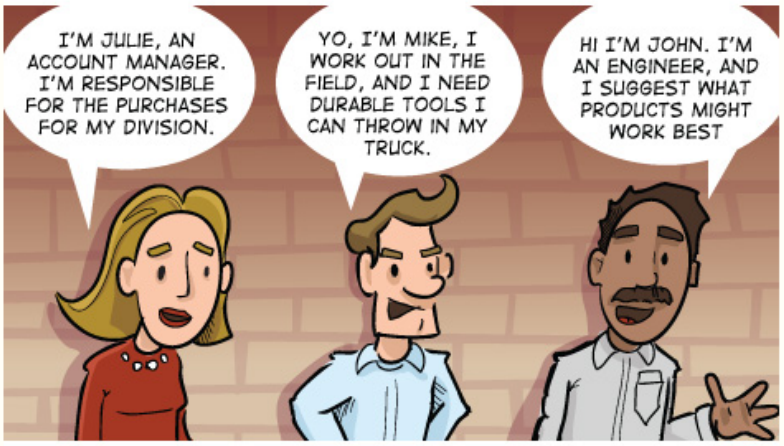
An ideal example of a type; quintessence

A precise description of user in terms of:

Capabilities, inclinations, background

Goals (not tasks)

Persona Examples



Brad Colbow (http://carsonified.com/blog/design/how-to-understand-your-users-with-personas/)

Why Personas?

It's hard to reason about users in aggregate, and impossible to please everyone

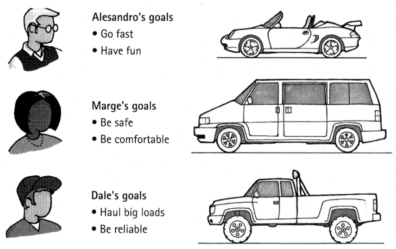
General users have too many conflicting goals

http://simpsons.wikia.com/wiki/File:TheHomer.png

Why Personas?

It's easier to reason about specific fictional people

Specific personas have clear, well-articulated goals



Defining and Using Personas

Defining them

Identify major clusters from multiple user interviews/inquiries

Synthesize their goals

Check for completeness and specificity

Specificity prevents "elastic user"

Try them out by developing narrative

Design each interface for a single primary persona

Yet other type might use the interface

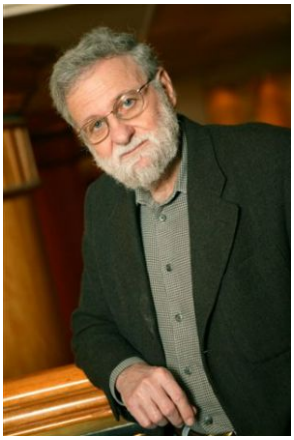
	AMANDA	GLORIA	CHARLES
			
Age	7	34	66
Occupation	Second grade student	Part-time office administrator	Retired accountant
Home Life	Lives with her mother, father, and younger sister in the suburbs of a large city.	Lives with her husband and two children in a mid-sized city.	Lives with his wife in the suburbs; has four children and six grandchildren.
Education	In elementary school	Has a bachelor degree	Has an MBA
		LIFESTYLE	
Activities	Plays soccer, reads, and takes ballet lessons; saves her birthday money and allowance to spend at the mall.	Enjoys crossword puzzles and reading mystery novels. Spends a lot of time driving her children to activities.	Likes to work in the garden and drink wine. Enjoys traveling with his wife and investing in the stock market.
Ultimate Goal	Goal is to turn 10 so that	Goal is to make sure her	Goal is to make sure

Personas vs. Observations

How do personas differ from the people you observed in your inquiry?

Affordances

"… the term **affordance** refers to the *perceived* and *actual* properties of the thing, primarily those fundamental properties that determine just how the thing could possibly be used.



The Design of Everyday Things.
Don Norman

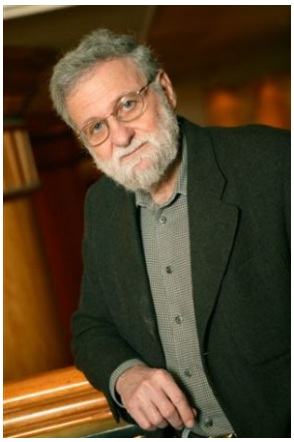
"… the term **affordance** refers to the *perceived* and *actual* properties of the thing, primarily those fundamental properties that determine just how the thing could possibly be used.

Some affordances obvious

Knobs afford turning

Buttons afford pushing

Glass can be seen through



The Design of Everyday Things.
Don Norman

"… the term **affordance** refers to the *perceived* and *actual* properties of the thing, primarily those fundamental properties that determine just how the thing could possibly be used.

Some affordances obvious

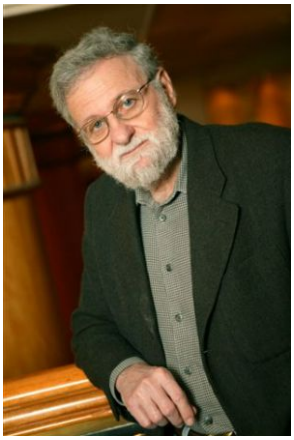
Knobs afford turning

Buttons afford pushing

Glass can be seen through

Some affordances learned

Glass breaks easily



The Design of Everyday Things.
Don Norman

Affordances

Clues about how object/interface works

Affordances

Clues about how object/interface works

Affordances

holes for insertion of fingers

blades for cutting

Implications clear for how operating parts work

Door Handles

Affordances suggest how to use the object

Door Handles

Affordances suggest how to use the object

Door Handles

Affordances suggest how to use the object

Cultural Dependencies

Affordances suggest how to use the object

Can be dependent on the

Experience

Knowledge

Culture

Cultural Dependencies

Affordances suggest how to use the object

Can be dependent on the

Experience

Knowledge

Culture

Switches (US down=off, UK down=on)

red = danger, green = go

Can make an action easy/difficult

Perceived Affordances

Affordances suggest how to use the object

Can be dependent on the
Experience
Knowledge
Culture of the actor

Can make an action easy/ difficult

Affordances may be *perceived* without actually existing

Screen-Based Interfaces

Physical affordances

Screen, pointing device, physical buttons, keyboard
These afford touching, pointing, clicking on every pixel

Screen-Based Interfaces

Physical affordances

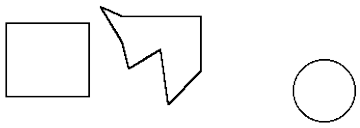
Screen, pointing device, physical buttons, keyboard

These afford touching, pointing, clicking on every pixel

Physical affordances of screens often unused

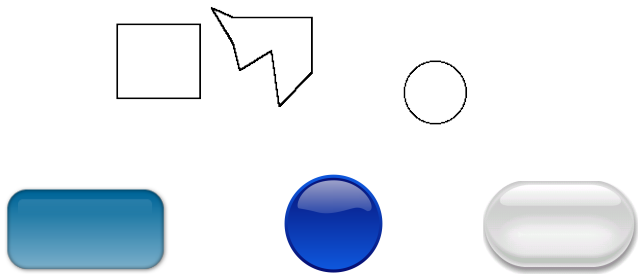
Screen affords touching, but most screens are *not* touch sensitive

Designer Controls Perceived Affordances



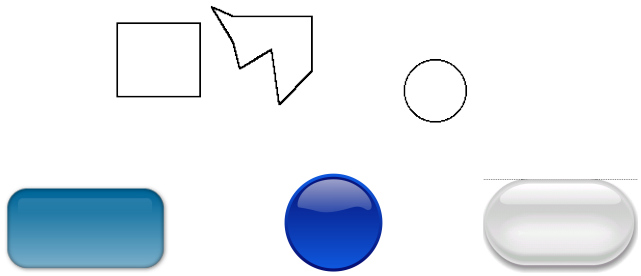
What are the affordances of these graphical objects?

Designer Controls Perceived Affordances



What are the affordances of these graphical objects?

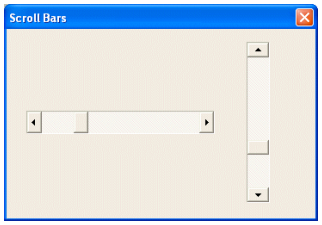
Do Graphical Objects Afford Clicking?

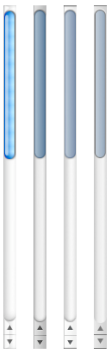


Graphic design emphasizes affordances

Helps user recognize objects as buttons

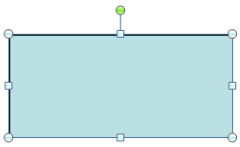
Scrollbar Affordances?



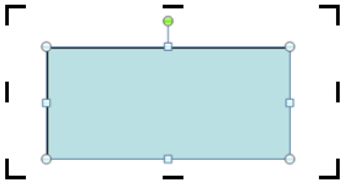


Widget Affordances

Well-designed widgets have clear affordances
e.g. resize handles:



crop handles:



motion arrows

Conceptual Models

Mental Representations

Users' understanding of how interface works

People have preconceived models

1+1 * 7 =

Mental Representations

Users' understanding of how interface works

People have preconceived models

1+1 * 7 =

1 + 1*7 =

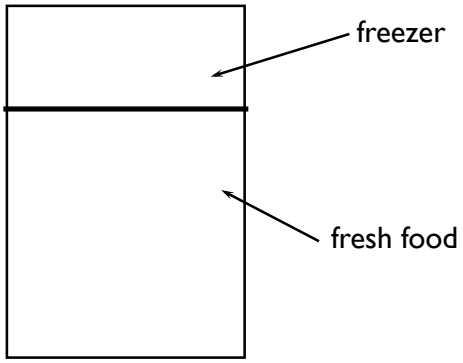
Changing mental models can be difficult

For more on visual grouping and math eqns see work of Landy and Goldstone.

Interfaces Must Communicate Model

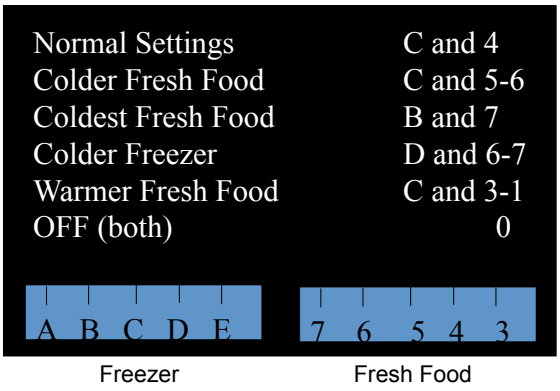
Online help / documentation useful (but shouldn't be necessary)

Refrigerator



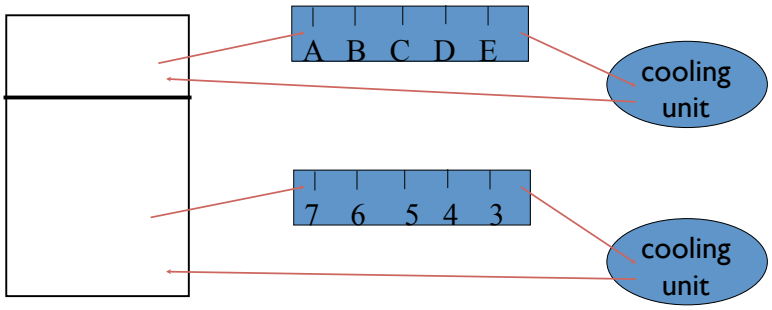
Problem: freezer too cold, but fresh food just right

Refrigerator Controls



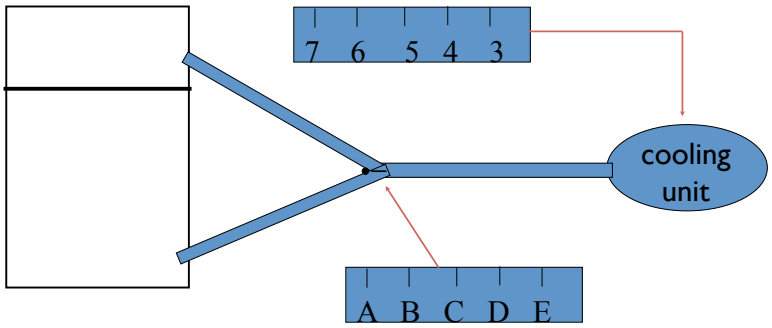
What is your conceptual model?

Most Likely Conceptual Model



Independent Controls

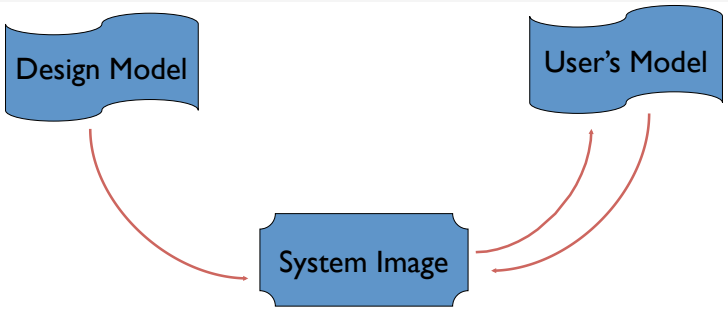
Correct Conceptual Model



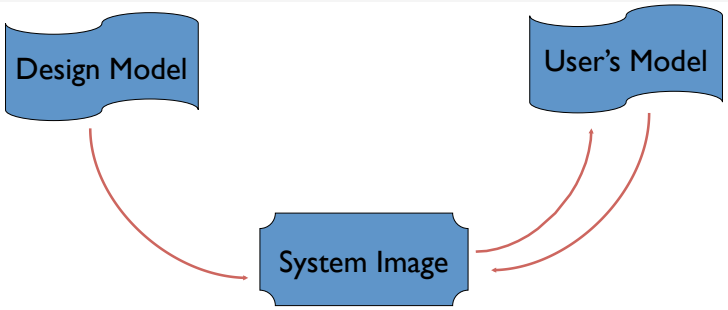
Possible solutions:

- Make controls map to user's model
- Make controls map to actual system

Conceptual Models



Conceptual Models



Designers model may not match user's model

Users get model from experience & usage

Users only work with system image, not with designer

What if the two models don't match?

Preconceived Models

People have preconceived models of how things work

how does your car start?

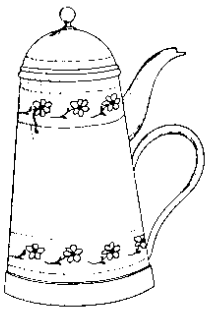
how does an ATM machine work?

how does your computer boot?

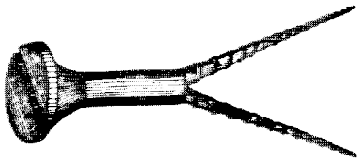
Allow us to predict how things will work or not work

BASED ON SLIDE BY SAUL GREENBERG

Preconceived Models



Teapot



Screw

Preconceived Models Often Wrong!

Extracted from fragmentary evidence

People find ways to explain things

Certain you're driving on the correct road

Design Principles

1. Make Controls Visible

Poor Visibility (BMW's iDrive)

How do you put someone on hold?

How do you set the alarm?

Primary controls are visible

But how to set a radio station preset?