Plagiarism 101

Plagiarism = fail this course.

Review

- What are the four big areas of HCI?
- Why is visibility important in design?
- What are affordances?

Example: Chairs

- The shape of a chair suggests (“affords”) sitting
- Other actions (lift it up, stand on it, ...) are possible as well
- But: They are not those the design suggests most directly
- A simple chair is intuitively usable
- No label needed (“sit down here”)

Example: Doors

- Door design suggests how to use it
  - Small door knobs suggest pulling
  - Large, flat vertical surfaces suggest “press here”
- “Designer doors” often consciously hide suggestions (where are the hinges, where do I have to push/pull?)
  - Is this useful?
  - A label “PUSH” / “PULL” is essentially a one-word manual. Should it be necessary to study even such a short manual, just to open a door?
By the way, the doorbell is to the left!

This door does not show whether to push or pull, and on which side.

Better escape door: “Press to the right” is clearly suggested.

Mappings
Mappings

- Connect UI elements to real world
  - Examples for input and output?

Good mappings are natural
- Use physical analogies
- Use cultural standards

Results:
- Understood immediately
- Easier to remember
- Enable better ease-of-use

Natural Mappings: Spatial Analogies

- Most prominent example of natural mappings
- How would you arrange the controls for this lifting platform?

Rule: arrange controls in the same way that their real-world counterparts are arranged
- Room lamps
- Driving wheel
- Car stereo audio fader
What’s Wrong with This Stove?

- Controls do not use a natural mapping
  - In-line leads to $4! = 4 \cdot 3 \cdot 2 \cdot 1 = 24$ possible arrangements
  - Left/right pairing still leaves 4 possible arrangements
  - Labeling required (often indicates bad design)
- Plus: Labeling only visible by stepping away from the stove beyond operating range
- Better solutions!
Natural Mappings: Perceptual Analogies

- The input devices for controlling something (or output devices for monitoring its state) look like the actual thing itself
- Think of it as “the Voodoo Principle”
- Example: Mercedes car seat controls [Norman ’88]

In-class Exercise: Classifying dimensions

- Example:
  Rising level = “more”, falling level = “less”
- Natural for all additive dimensions, e.g., amount (water level), heat (thermometer), volume, line thickness, brightness, weight,…
- But: not for substitutive dimensions, e.g., color, audio pitch(!), taste, location,…
Natural Mappings: Biological/Cultural Analogies

- Another natural analogy:
  Order from top to bottom
- How about from left to right?
Constraints

- Constraints are the “inverse” of affordances, and can augment them
- They limit the way an object can be used
- Goals:
  - Avoid usage errors
  - Minimize the information to be remembered
- Types of Constraints:
  - Physical, semantic, logical, cultural
Physical Constraints

- Limit number of possible physical operations
- Limiting is done by physical shape
  - Example: Traditional key does not fit into security lock
- More efficient and useful if constraint is visible ahead of time!
  - Example: Car key should fit both ways, but should then also work both ways

Semantic Constraints

- Use our common knowledge about the world and particularly the meaning of the current situation
- Example: Driver’s figurine in a model plane construction kit has to sit facing forward to “make sense”
- Powerful means to improve intuitiveness
- But: Only use rules that are valid throughout your user population!

Logical Constraints

- Use logical conclusions to exclude certain solutions
  - Example: All parts of a model plane construction kit are to be used
- Natural mappings often use logical constraints, and are hard to distinguish
  - Example: left switch = left lamp is natural/logical

Cultural Constraints

- Rely on generally accepted cultural conventions
  - Example: Labels are to be read, so are expected not to be upside down — implies which side is up on a closed package
  - Example: Red = Stop
- But: Only applies to specific cultural group!
  - Chinese labeling does not give most Westerners an idea where “up” is
  - Pointing with index finger is inappropriate in some middle and far east cultures
In-Class Exercise: Constraints

- Think about three examples for objects where constraints help us use them correctly
- Try to find examples for the different types of constraints
  - Physical, semantic, logical, cultural
- Sample areas: kitchen appliances, security devices, vending machines, ...

Conceptual Models

- We are surrounded by innumerable objects (20,000 everyday things)
- How do we cope?
  - Mind aims to make sense of things
  - Affordances support using objects easily
  - Designers can provide a good image of how a system works
- Humans form a conceptual model of how something works when they encounter it

Providing Good Conceptual Models

- Principle of good design
- Allows to predict effects of our actions, and cope with problems
- Conceptual models are mental models of things
  - Other mental models: Of ourselves, others, the environment, ...
  - Formed through experience, training, instruction

Design Model, System Image, and User’s Model

- By carefully crafting the system image, designers can provide a good idea of how a system works
- Problems arise when the designer’s conceptual model is different from what emerges as the user’s mental model
- Important concept to remember when designing UIs!
Assignment: Revisiting the Remote Control

- Reflect on your remote control design in your idea log
- How did you map your controls to the system?
- Are the mappings natural? How?
- What are alternative mappings? What are their pros and cons?
- What were constraints you used in your design?
- How does the system image of your remote control communicate the conceptual model to the user?
Learning About Users

• Providing useful functions is not enough
• Functions also need to fit seamlessly into users’ task environment, otherwise it won’t be used (cost/benefit)
• So: Know The User!
• Find real people interested in your planned system (otherwise there’s a problem—example: CBT authoring system)

Finding Users

• “No time”: Will likely have no time to use final product either
• So: motivate them, explaining why system will be useful
• Geeks are often more willing
• Bribery helps (gummi bears, t-shirts, coffee mugs—usually better than money)

Lame Excuses by Designers
Avoiding to Find Users

• “My system is useful for everyone.”
  • If true, finding users should be easy
  • If not, “everyone” really means “no one”
• “I am a typical user myself.”
  • Would you really use it daily?
  • Also: usefulness that designer appreciates after long thought process may not be obvious to the user

Observing Users

• Setting goals
  • How will you analyze the data from the observation?
• Identifying users
  • Who will you observe?
• Triangulation
  • Use multiple evidences to confirm your observations
• Pilot observation
  • Do a small-scale observation to debug the process
Simple Observation Framework

- **People:** Who is using the technology at any particular time?
- **Places:** Where are they using it?
- **Things:** What are they doing with it?


Detailed Observation Framework

- **Space:** What is the physical space like and how is it laid out?
- **Actors:** What are the names and relevant details of the people involved?
- **Activities:** What are the actors doing and why?
- **Objects:** What physical objects are present, such as furniture?
- **Acts:** What are specific individual actions?
- **Events:** Is what you observe part of a special event?
- **Time:** What is the sequence of the event?
- **Goals:** What are the actors trying to accomplish?
- **Feelings:** What is the mood of the group and of individuals?


Summary

- Natural mappings connect system state to the real world
- Constraints limits the way an object can be used
  - Avoid errors
  - Reduce information to be remembered
- Usable objects use the system image to convey the right conceptual model to the user
- Knowing your real users is the key to usable design
- User observation is one method to learn about users

Video: http://www.youtube.com/watch?v=_Mlk-QSCFnU