Episode 37: The Steering Wheel

99% Invisible
A Tiny Radio Show About Design
With Roman Mars
Due Last Monday: IPA I

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

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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! It’s not a lesson!
It’s hard not designing on the fly

Topics

Personas
Affordances
Conceptual Models
Design Principles
The Action Cycle
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

I'M JULIE, AN ACCOUNT MANAGER. I'M RESPONSIBLE FOR THE PURCHASES FOR MY DIVISION.

YO, I'M MIKE, I WORK OUT IN THE FIELD, AND I NEED DURABLE TOOLS I CAN THROW IN MY TRUCK.

HI I'M JOHN, I'M AN ENGINEER, AND I SUGGEST WHAT PRODUCTS MIGHT WORK BEST

Why Personas?

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

General users have too many conflicting goals
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
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

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The Design of Everyday Things.
Don Norman
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

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

\[ 1 + 1 \times 7 = \]
\[ 1 + 17 = \]

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

<table>
<thead>
<tr>
<th>Setting</th>
<th>Freezer</th>
<th>Fresh Food</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal Settings</td>
<td>C and 4</td>
<td>0</td>
</tr>
<tr>
<td>Colder Fresh Food</td>
<td>C and 5-6</td>
<td>0</td>
</tr>
<tr>
<td>Coldest Fresh Food</td>
<td>B and 7</td>
<td>0</td>
</tr>
<tr>
<td>Colder Freezer</td>
<td>D and 6-7</td>
<td>0</td>
</tr>
<tr>
<td>Warmer Fresh Food</td>
<td>C and 3-1</td>
<td>0</td>
</tr>
<tr>
<td>OFF (both)</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

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
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.
Preconceived Models Often Wrong!

Extracted from fragmentary evidence

People find ways to explain things
Certain you’re driving on the correct road
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?