Understanding the user
IN THIS WEEK’S WALLY REPORT, I’LL DISCUSS A SERIOUS THREAT TO MY PRODUCTIVITY.

BY TUESDAY MY BRAIN WAS SO FULL THAT I HAD TO FORGET THINGS TO MAKE ROOM FOR NEW THINGS.

WALLY, I HAVE SOME INFORMATION FOR YOU.

GREAT. I’LL JUST FORGET THE FIFTH GRADE.
Human Capabilities

- Why do we care? (better design!)
- Want to improve user performance and preferences

- Knowing the user informs the design
  1. Senses
  2. Information processing systems
  3. Physical responding
  4. Motivations
  5. Social Attachments
Overview

I. Senses
   A. Vision
   B. Hearing
   C. Touch
   D. Smell?

II. Information processing
   A. Perceptual
   B. Cognitive
      1. Memory
         a. Short term
         b. Medium term
         c. Long term
      2. Processes
         a. Selective attention
         b. Learning
         c. Problem solving
         d. Language
   C. Motor system

III. Motor system

IV. Motivations

V. Social Attachments
I. Senses

➢ Sight, hearing, touch important for current HCI
  ❖ smell, taste ???

➢ Abilities and limitations affect design
Vision

➢ Visual System
  ❖ Eye
  ❖ Retina
  ❖ Neural pathway

~ 80% of brain’s operation
Visual Abilities

- **Sensitivity**
  - luminance: $10^{-6}$~$10^7$ mL (see notes)

- **Acuity**
  - detection, alignment, recognition (visual angle)
  - retinal position: fovea has best acuity

- **Movement**
  - tracking, reading, vibrations

- **Note:** Vision decreases with age

- **Implications (??)**
  - Font size & location depends on task
  - Much done by context & grouping
Color Vision

- **Color & the retina**
  - 380 (blue) ~ 770nm (red)
  - Problems with cones or ganglion cells causes problems with color perception
  - (not really “color blindness”)
  - 8% males, 0.5% females

- **Implications (??)**
  - avoid saturated colors
  - color coding should be redundant when possible
Perception Matters in Usability

**Read-flow principle:**

- Action items (buttons, links) should support the flow of the user in the same way as reading occurs.
- The last action should be the most-likely action to avoid backtracking.
- Left = back, stop, quit, cancel, previous
- Right = next, continue, submit
Read flow…

FLOWS

DOES NOT FLOW
Hearing

- **Capabilities** (best-case scenario)
  - pitch - frequency (20 - 20,000 Hz)
  - loudness - amplitude (30 - 100dB)
  - location (5° source & stream separation)
  - timbre - type of sound (lots of instruments)

- **Implications** (??)
Three main sensations handled by different types of receptors:
- Pressure (normal)
- Intense pressure (heat/pain)
- Temperature (hot/cold)

Sensitivity, Dexterity, Flexibility, Speed

Where important?
- Mouse, Other I/O, VR, surgery
Overview

I. Senses
   A. Vision
   B. Hearing
   C. Touch
   D. Smell?

II. Information processing
   A. Perceptual
   B. Cognitive
      1. Memory
         a. Short term
         b. Medium term
         c. Long term
      2. Processes
         a. Selective attention
         b. Learning
         c. Problem solving
         d. Language
   C. Motor system

III. Motor system

IV. Motivations

V. Social Attachments
III. Motor System

- **Capabilities**
  - Range of movement, reach, speed, strength, dexterity, accuracy

- **Often cause of errors**
  - Wrong button
  - Double-click vs. single click

- **Principles**
  - Feedback is important
  - Minimize eye movement
Part 1 - Understanding the problem

- Discovery process
- In UCD terms, determine **Context, Domain, Users, Needs/Wants, Tasks**, and their design implications

- *Who is it, what do they need to do, and where?*
  - Interpretive evaluation of current interface, if it exists
  - Establish objectives, requirements for (re)design

- Set up project Web space
Reminder: UCD 9 Steps

1. Define the Context
2. Describe the User
3. Needs & Task Analysis
4. Function Allocation & Information Architecture
5. System Layout / Basic Design
6. Mockups & Prototypes
7. Usability Testing
8. Iterative Test & Redesign
9. Updates & Maintenance
1. Define the Context

- Context: the “type” of uses, applications
  - Life critical systems, applications
  - Industrial, commercial, military, scientific, consumer
  - Office, home, entertainment
  - Exploratory, creative, cooperative

- Market

- Customer (not the same as the User)
  ...Design Impacts?...
2. Describe the User (!!)

- **Physical attributes**
  - (age, gender, size, reach, visual angles, etc...)

- **Physical work places**
  - (table height, sound levels, lighting, software version...)

- **Perceptual abilities**
  - (hearing, vision, heat sensitivity)

- **Cognitive abilities**
  - (memory span, reading level, musical training, math...)

- **Personality and social traits**
  - (likes, dislikes, preferences, patience...)

- **Cultural and international diversity**
  - (languages, dialog box flow, symbols...)

- **Special populations, (dis)abilities**
3. Task & Needs Analysis

- Talk to and observe users doing what they do; find out what they want/need to do
- Needs/wants, surveys, focus groups
- Explore the **PROBLEM SPACE**
- List each and every TASK

★ ABSTRACT into standard tasks
Upcoming

- More on human abilities (cognition, social aspects)
- Brainstorming methods