User Interaction: The Human

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INF 133 Fall 2010
Learning Objective:
To appreciate the limitations of the human and implications for U/I design
Memory

- Three types of memory which build on each other
  - Sensory Memory
  - Short-Term or Working Memory
  - Long-Term Memory
Sensory Memory

- Buffers for stimuli received through senses
  - iconic memory: visual stimuli
  - echoic memory: aural stimuli
  - haptic memory: tactile stimuli
- Examples
  - non cognitive recall
  - Continuously overwritten
Short-Term Memory

- Scratch-pad for temporary recall
  - rapid access ~ 70ms
  - rapid decay ~ 200ms
  - limited capacity - 7± 2 chunks
Long-Term Memory

- Repository for all our knowledge
  - slow access ~ 1/10 second
  - slow decay, if any
  - huge or unlimited capacity
- Two types
  - episodic – serial memory of events
  - semantic – structured memory of facts, concepts, skills
  - semantic LTM derived from episodic LTM
Thinking

- Reasoning
  - Deduction
  - Induction
  - Abduction
- Problem Solving
Thinking

- **Reasoning**
  - **Deduction**
    - derive logically necessary conclusion from given premises.
  - **Induction**
    - generalize from cases seen to cases unseen
  - **Abduction**
    - reasoning from event to cause
      - Sam drives fast when drunk.
      - If I see Sam driving fast, assume drunk.
Thinking

- Problem Solving
  - Process of finding solution to unfamiliar task using knowledge.
  - Many theories of this process
Individuals vary in their abilities

- long term
  - gender, physical and intellectual abilities
- short term
  - effect of stress or fatigue
- changing
  - age
Will a particular design decision exclude a section of your user population?
Will a particular design decision exclude a section of your user population?

Font Size
Will a particular design decision exclude a section of your user population?

Screen Real Estate
Will a particular design decision exclude a section of your user population?

Color Choice
Will a particular design decision exclude a section of your user population?

Embedded Video
What are strategies for including more users?
Addressing different skills and environments

• “Plasticity”

• Adapting to different environments easily.

• What environments?
Movement

- Time taken to respond to stimulus
  - reaction time + movement time
- Reaction time depends on stimulus
  - visual: ~200ms
  - auditory ~150ms
  - pain ~700ms
- Movement time depends on physiology
\[ M_t = a + b \cdot \log_2 \left( \frac{\text{distance}}{\text{size}} + 1 \right) \]

Movement - Fitts’ Law

- Implications
  -
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Movement - Fitts’ Law

- Implications
  - Putting frequently used items at the top of a list
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- Implications
  - Putting frequently used items at the top of a list
  - Pie menus are better than drop down menus

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- Implications
  - Putting frequently used items at the top of a list
  - Pie menus are better than drop down menus
  - Exposé style interfaces are very efficient
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Movement - Fitts’ Law

- Implications
  - Putting frequently used items at the top of a list
  - Pie menus are better than drop down menus
  - Exposé style interfaces are very efficient
  - Bubble Cursors are more efficient
    - Also help with dexterity issues