User Interaction: The Human

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"...in an information-rich world, the wealth of information means a dearth of something else: a scarcity of whatever it is that information consumes. What information consumes is rather obvious: it consumes the attention of its recipients. Hence a wealth of information creates a poverty of attention and a need to allocate that attention efficiently among the overabundance of information sources that might consume it" (Simon 1971, p. 40-41).
Augmented (hyper) reality

http://vimeo.com/8569187
“Designing an object to be simple and clear takes at least twice as long as the usual way. It requires concentration at the outset on how a clear and simple system would work, followed by the steps required to make it come out that way -- steps which are often much harder and more complex than the ordinary ones. It also requires relentless pursuit of that simplicity even when obstacles appear which would seem to stand in the way of that simplicity.”

T.H. Nelson, 1977
Humans are limited in their capacity to process information. This has important implications for design.
Human Computer Interaction is a misnomer. Rarely do people want to interact with a computer. They want to interact with people, data, media. Even gaming isn’t about the computer as much as it is about having fun through a computer.
The Human

The Model Human Processor

Long-Term Memory

Working Memory

Visual Image Store

Auditory Image Store

Perceptual Processor

Motor Processor

Cognitive Processor

Ears

Eyes

Muscles

Card, Moran, Newell (1983)

Monday, September 26, 11
- Information Input/Output
  - visual, auditory, haptic, movement
- Information stored in memory
  - sensory, short-term, long-term
- Information processed and applied
  - reasoning, problem solving, skill, error
- Emotion influences human capabilities
- Each person is different
The Eye - Physical Reception

- mechanism for receiving light and transforming it into electrical energy
- light reflects from objects
- images are focused upside-down on retina
- retina contains rods for low light vision and cones for color vision
- ganglion cells (brain!) detect pattern and movement
The Eye - Interpreting the signal

- **Brightness**
  - subjective reaction to levels of light
  - affected by luminance of object
  - measured by just noticeable difference
  - visual acuity increases with luminance as does flicker

- **Color**
  - made up of hue, intensity, saturation
  - cones sensitive to color wavelengths
  - blue acuity is lowest
  - 8% males and 1% females color blind
DISTRIBUTION OF RETINAL PHOTORECEPTORS

TEMPORAL

Foveola, ~1/3 mm (1°)

MACULA

~ 4.5 mm (15°)

FOVEA, ~1.3 mm (4.5°)

~140°

FIELD OF VIEW

200,000/mm²

100,000/mm²

20°

TEMPORAL

30°

40°

50°

60°

70°

80°

90°

10°

Blind spot ~1 mm

40°

30°

20°

10°

NASAL

EYE SPECTRAL RESPONSE

CONES

RODS

0 10 20 30 40

AVG. RELATIVE SENSITIVITY

400 320 240 160 80

wavelength (nm)

F 500 550 600 650 700

PHOTOPIC

SCOTOPIC

MESOPIC (approx.)

0.8 0.6 0.4 0.2

log intensity (μTrolands)

minutes in dark

rods break

rgb notation

http://www.telescope-optics.net/eye_spectral_response.htm