Human Computer Interactions

Ms. Momna Zaneb

Reading Material

- **Text Books:**
- Human-Computer Interaction (3rd ed.) by Dix, Finlay, Abowd, and Beale (2004)
- The Usability Engineering Lifecycle by Deborah J Mayhew (1999)
- **Reference Books:**
- The Design of Everyday Things, by Donald Norman. Currency/Doubleday, 1990
- Interaction Design: Beyond Human - Computer Interaction (3rd ed.), by Yvonne Rogers, Helen Sharp, Jenny Preece. Wiley, 2011
- About FACE 3.0 – The Essential of Interaction Design by Alan Cooper & Robert Reimann (2007)
- Designing the User Interface: Strategies for Effective Human-Computer Interaction, Ben Shneiderman and Catherine Plaisant, 4th Edition, Addison-Wesley, 2005.

Did You Ever Hate Your Computer?

Facts

- 1 in every 4 computers has been physically attacked by its owner - Novatech (British PC Manufacturer)
- Almost ⅓ of people have physically attacked a computer – National Opinion Poll/Symantec
- 67% experienced frustration and anger – National Opinion Poll

Introduction

- **HCI** (human-computer interaction) is the study of how people interact with computers. and to what extent computers are or are not developed for successful interaction with human beings.
- Human–computer interaction is what happens when a human user and a computer system, in the broadest sense, get together to accomplish something.
- **Definition:** ***Human-Computer Interaction*** (HCI) is a discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them.

INTRODUCTION

- The study of interaction between people, computers and tasks.
- Combination of cognitive psychology and computer science
- **Cognitive Psychology** is a sub discipline of psychology exploring internal mental processes
- It is the study of how people perceive, remember, think, speak and solve problems

Introduction

- How many interactive products are there in everyday use?
- How many are actually easy, effortless, and enjoyable to use?
- Interactive design is about developing interactive products that are easy, effective, and enjoyable to use-from the users' perspective.

Interactive Products

Following must all be true for a product to be successful.

Useful: accomplish what is required: play music, cook dinner, format a document;

Usable: do it easily and naturally, without danger of error, etc.

Used: make people want to use it, be attractive,

engaging, fun, etc.

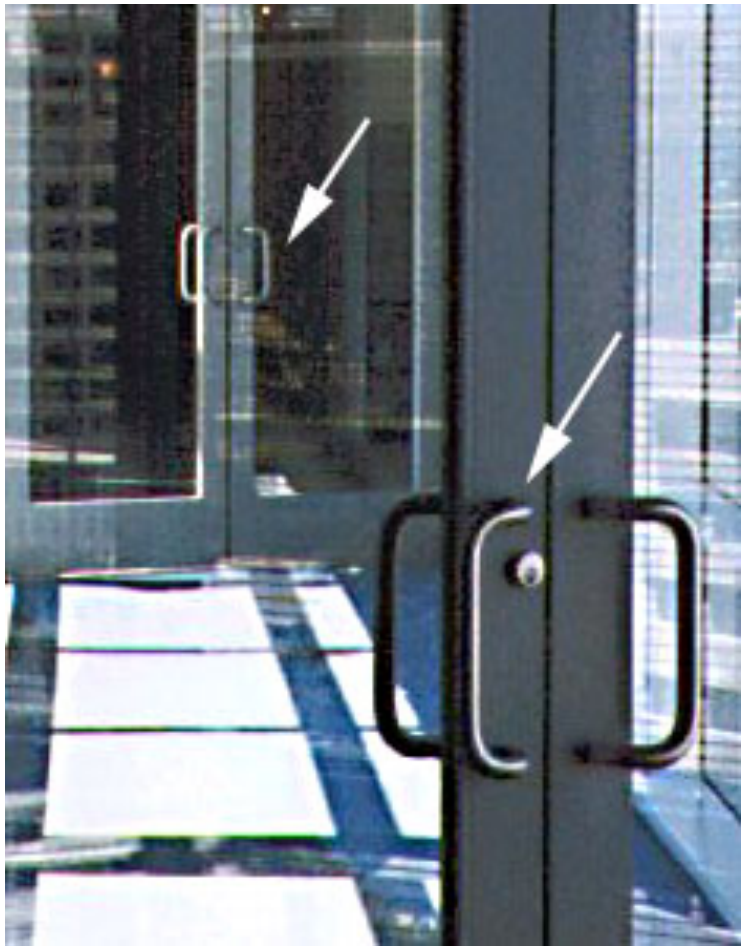
Good and Bad Interfaces!

Computers are every where

And

Their good design is very important

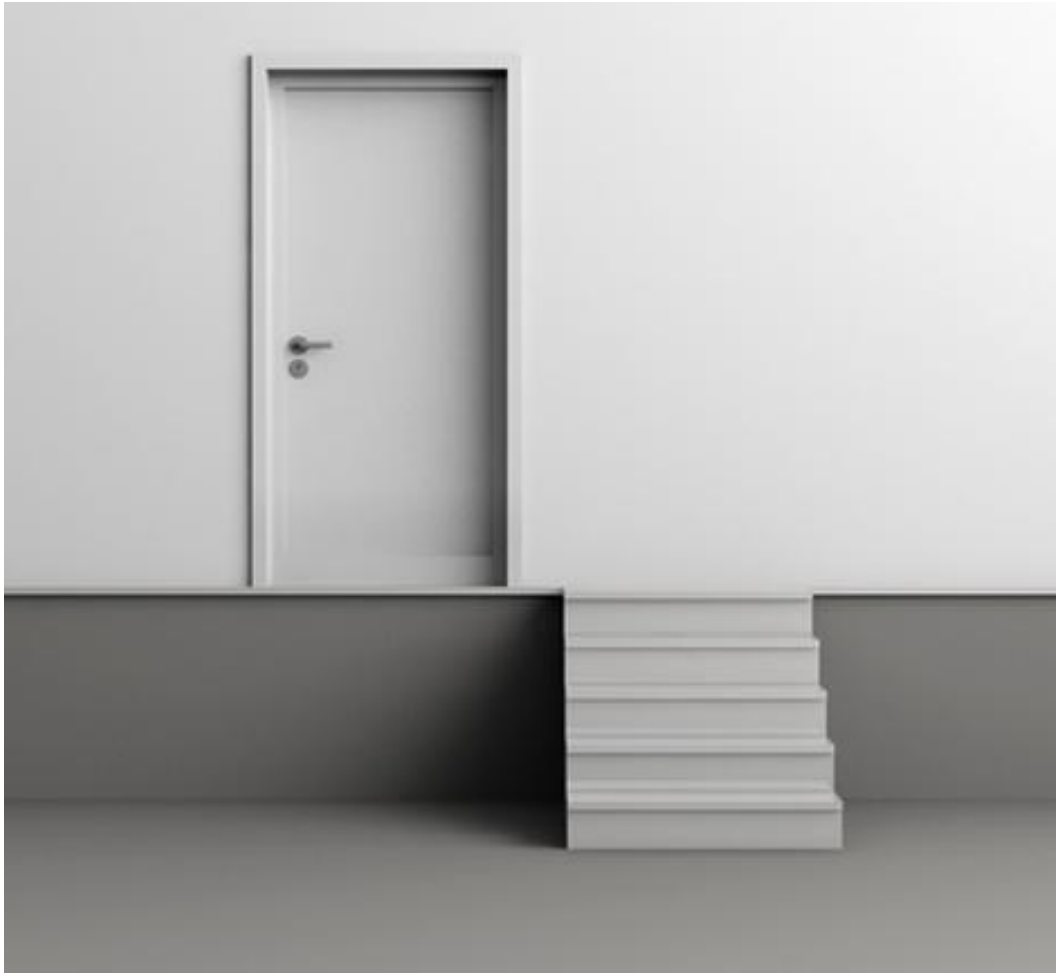
Bad Designs are Everywhere



Good or Bad ?

Good or Bad?

Good or Bad?



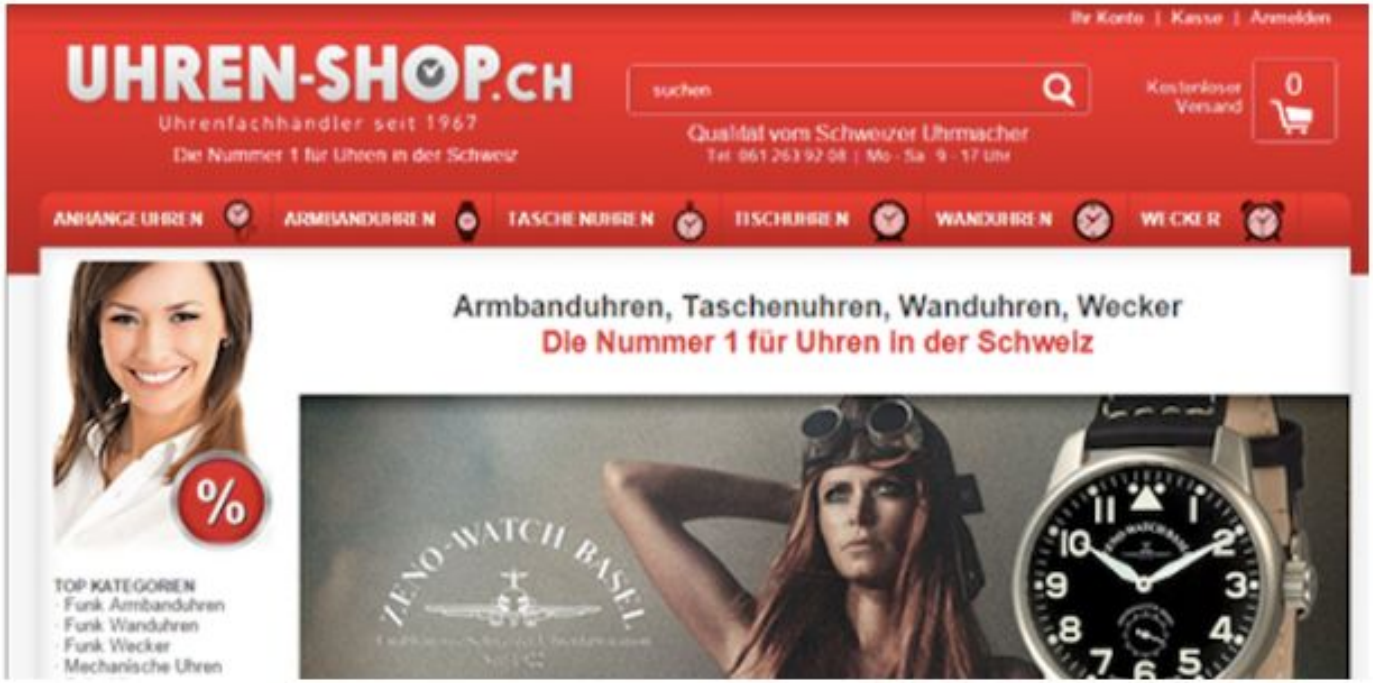
Good or Bad?

Good or Bad?


nicole
ti ruba il cuore...
COLLECTIONS
ACCESSORIES
BOOK AN APPOINTMENT
BOUTIQUE
NEWS AND EVENTS
nicole
2016 COLLECTION

Good or Bad ?


UHREN-SHO
Uhrenfachhandler seit 19
Die Nummer 1 für Uhren in der
ANHÄNGEUHREN
ARMBANDUHREN
%
TOP KATEGORIEN
· Funk Armbanduhren
· Funk Wanduhren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UHREN-SHOP.CH
Uhrenfachhandler seit 1967
Die Nummer 1 für Uhren in der Schweiz
suchen
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Tel: 061 263 92 08 | Mo - Sa 9 - 17 Uhr
ANHÄNGEUHREN
ARMBANDUHREN
TASCHENUHREN
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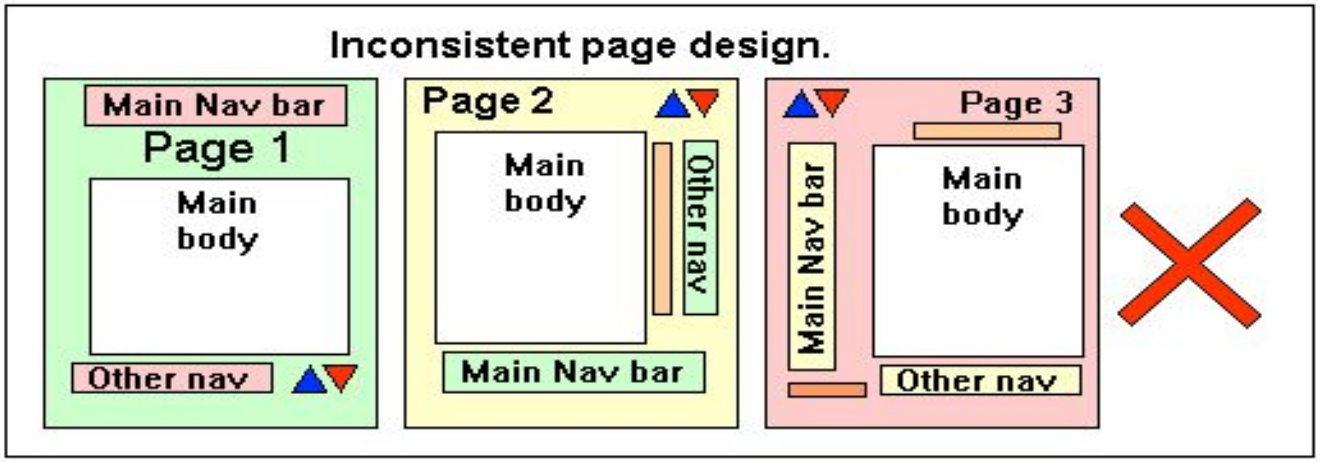
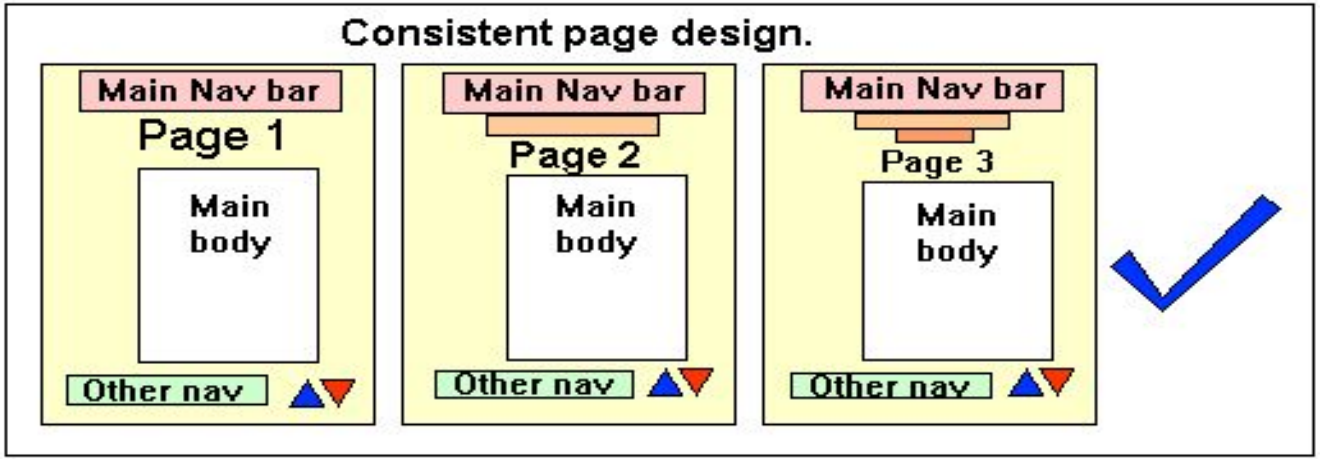
WANDUHREN
WECKER
%
TOP KATEGORIEN
· Funk Armbanduhren
· Funk Wanduhren
· Funk Wecker
· Mechanische Uhren
Armbanduhren, Taschenuhren, Wanduhren, Wecker
Die Nummer 1 für Uhren in der Schweiz
ZENO-WATCH BASEL

Good or Bad?



The Bad: Inconsistent Page Design

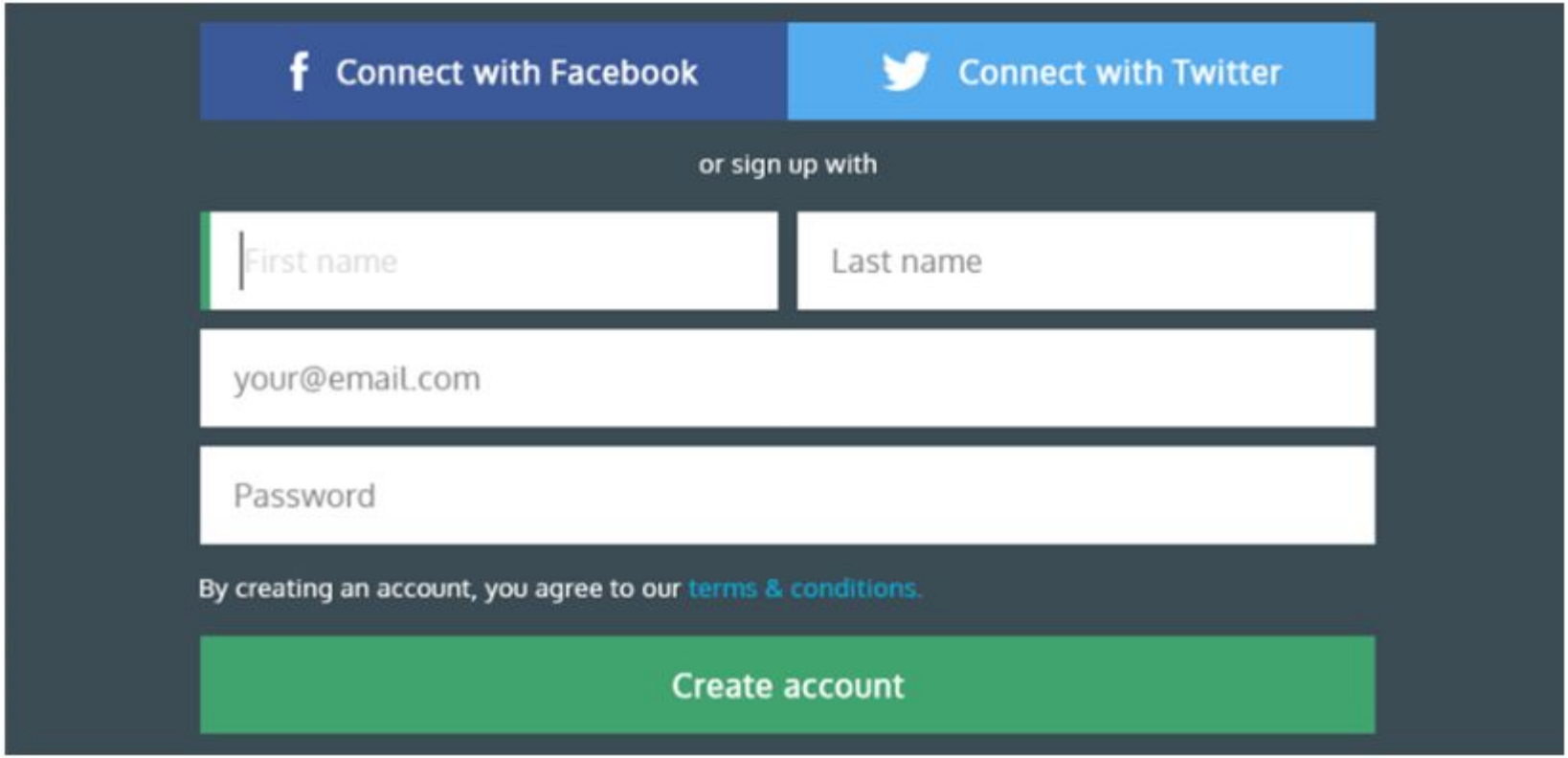


Good Design


AT&T
12:51 AM
Account
facebook
Search
News Feed
Profile
Friends
19
Inbox
Places
Groups
Chat
Events
31
Photos
Notifications
12:52
facebook
News Feed
Profile
Friends
Photos
Events
31
Messages
Requests
Notifications


Search
Safari
Messages
Contacts
OCT
20
Calendar
Reminders
FaceTime
iTunes
App Store
Game Center
Notes
Launchpad
280
3D
Maps
Time Machine
iBooks
System Preferences

Good Design


Connect with Facebook
Connect with Twitter
or sign up with
First name
Last name
your@email.com
Password
By creating an account, you agree to our terms & conditions.
Create account

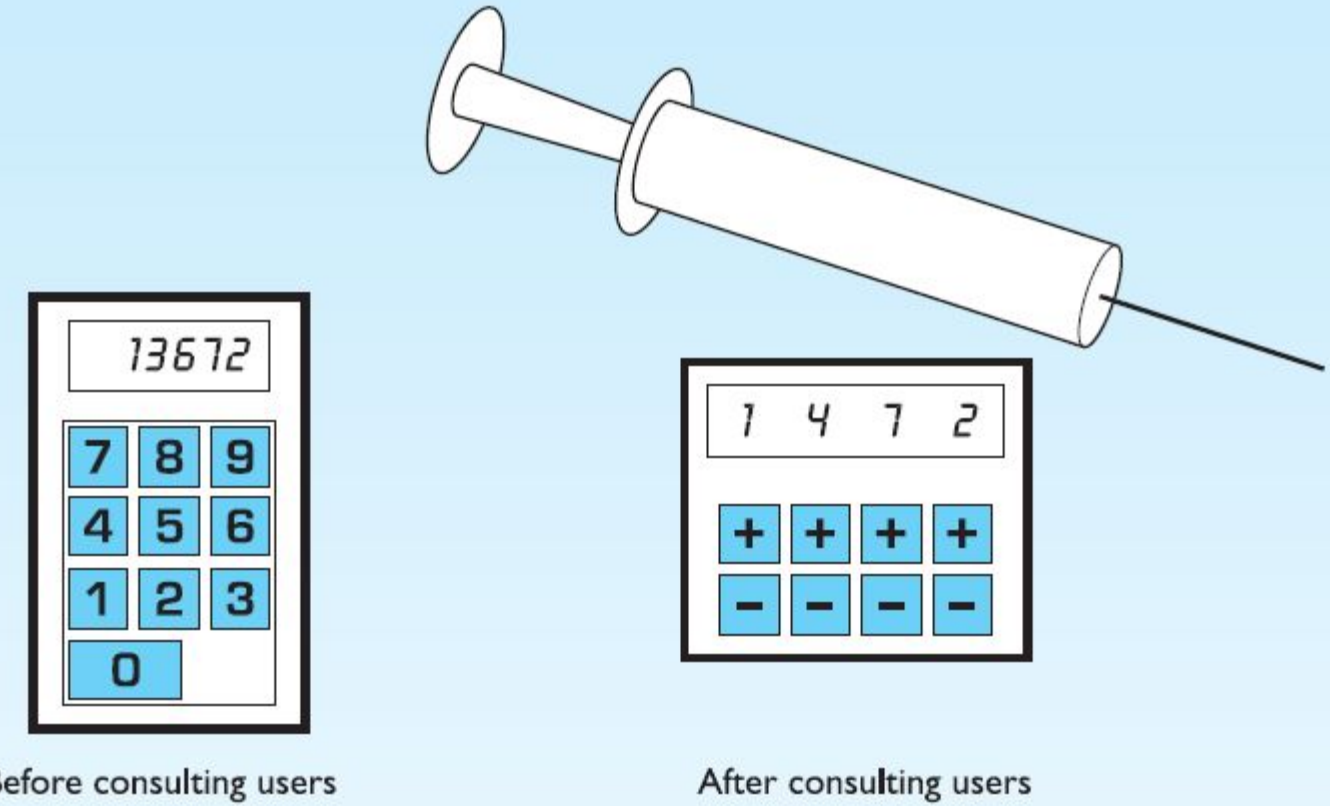


Figure 0.1 Automatic syringe: setting the dose to 1372. The effect of one key slip before and after user involvement

The doses were entered via a numeric keypad: an accidental keypress and the dose could be out by a factor of 10! The production version had individual increment/decrement buttons for each digit (more

THE HUMAN

- Information i/o

  - visual, auditory, haptic and movement
- Information stored In memory
  - Sensory, short-term and long-term
- Information processed and applied
  - Reasoning, problem solving, skill, error
- Emotion influences human capabilities
- Each person is different

THE HUMAN

- In 1983, Card, Moran and Newell described the *Model Human Processor,* which is a simplified view of the human processing involved in interacting with computer systems.
- **Perceptual system**: handling sensory stimulus from the outside world
- **Motor system:** which controls actions
- **Cognitive system:** which provides the processing needed to connect the two.

THE HUMAN

- Information comes in, is stored and processed, and information is passed out
- Intelligent information processing system
- Processing(problem solving, learning, making mistakes)
- Influences(social and organizational environment)

INPUT/OUTPUT CHANNELS

- User output becomes computer input and vice versa
- For example, sight may be used primarily in receiving information from the computer, but it can also be used to provide information to the computer, for example by fixating on a particular screen point when using an eye gaze system.

INPUT/OUTPUT CHANNELS

- Input through senses: sight, hearing, touch, taste and smell
- Output: motor control of the effectors
- vision, hearing and touch are central.
- Effectors such as limbs, fingers, eyes, head and vocal system. In the interaction with the computer, the fingers play the primary role, through typing or mouse control, with some use of voice, and eye, head and body position

INPUT/OUTPUT CHANNELS

- Sight(appears on the screen)
- Hear(‘beep’ at you if you make a mistake or to draw attention to something)
- Touch(feel the keys moving “click”)
- Taste
- Smell

VISION

- Two stages in Vision
- physical reception of stimulus
- processing and interpretation of stimulus (interpretative capabilities of visual processing allow images to be constructed from incomplete information)

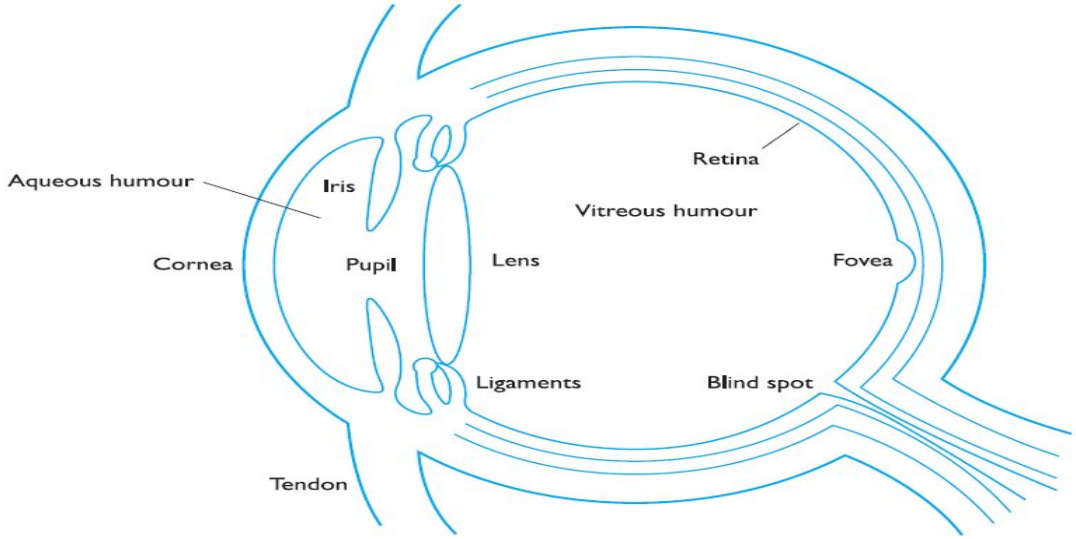
VISION

- Eye is a mechanism for receiving light and transforming it into electrical energy.
- Light is reflected from objects in the world and their image is focused upside down on the back of the eye.
- Receptors transform light into electrical signals which are passed to the brain.

VISION

- *cornea and lens at the front of the eye focus the light into* a sharp image on the back of the eye, the *retina.*
- retina is light sensitive and contains two types of *photoreceptor: rods and cones.*
- *Rods: light sensitive,120 million, on edges of retina, cannot create details, subject to light saturation*
- Cones :more tolerance towards light, three types of cones, 6 million located on fovea(on it image is fixated).

VISION



Although the retina is mainly covered with photoreceptors there is one *blind spot* where the optic nerve enters the eye. The blind spot has no rods or cones, yet our visual system compensates for this so that in normal circumstances we are unaware of it.

The retina also has specialized nerve cells called *ganglion cells*. There are two types: X-cells, which are concentrated in the fovea and are responsible for the early detection of pattern; and Y-cells which are more widely distributed in the retina and are responsible for the early detection of movement. The distribution of these cells means that, while we may not be able to detect changes in pattern in peripheral vision, we can perceive movement.

INTERPRETING THE SIGNAL

- Reflected light from the object forms an upside-down image on the retina
- The size of that image is specified as a *visual angle.*
- If we were to draw a line from the top of the object to a central point on the front of the eye and a second line from the bottom of the object to the same point, the visual angle of the object is the angle between these two lines.
- Visual angle is affected by both the size of the object and its distance from the eye. Therefore if two objects are at the same distance, the larger one will have the larger visual angle. Similarly, if two objects of the same size are placed at different distances from the eye, the furthest one will have the smaller visual angle

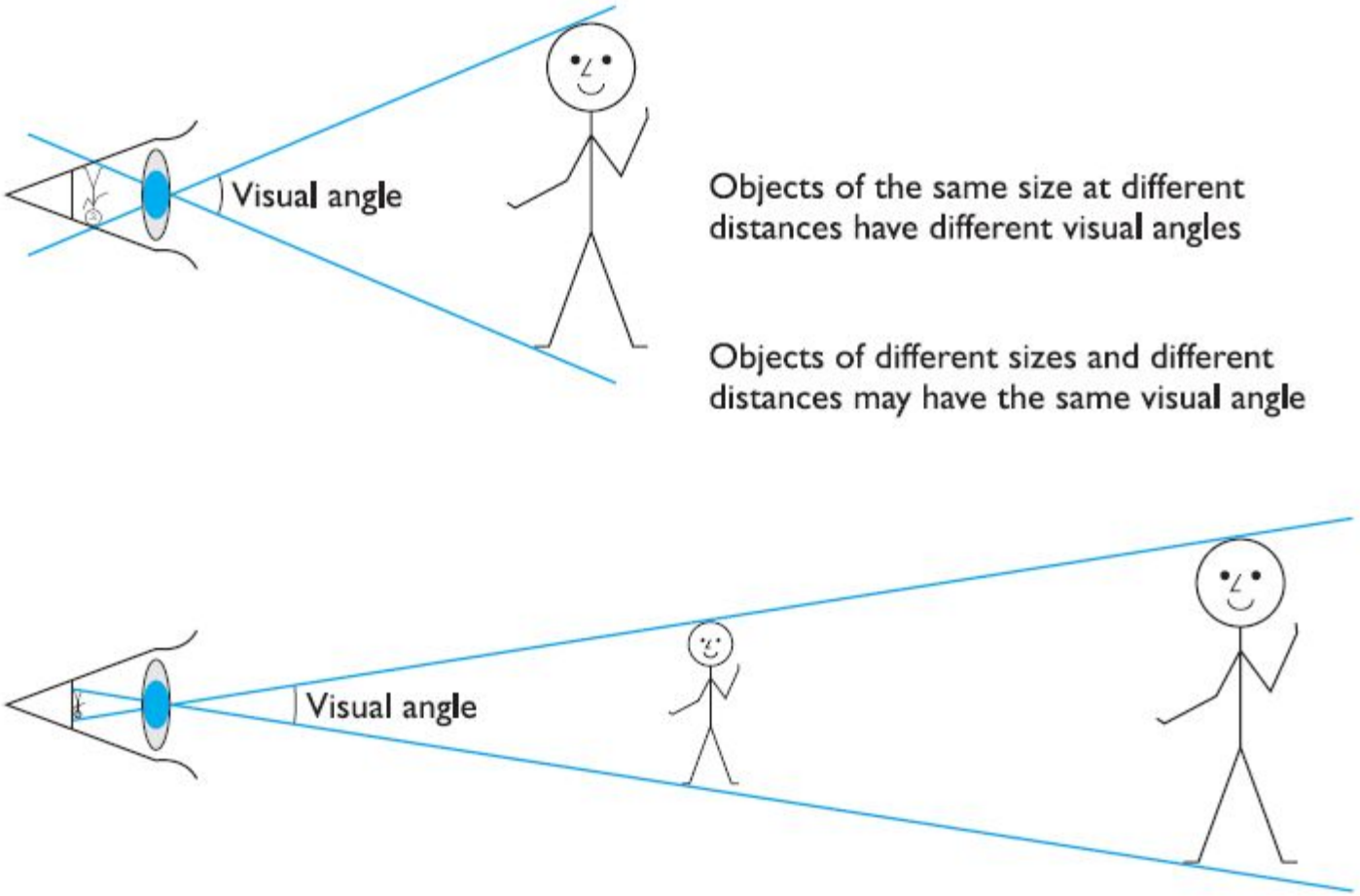


Figure 1.2 Visual angle

INTERPRETING THE SIGNAL- Perceiving size

- The visual angle indicates how much of the field of view is taken by the object.
- The visual angle measurement is given in either degrees or minutes of arc
- The visual angle measurement is given in either degrees or minutes of arc, where 1 degree is equivalent to 60 minutes of arc, and 1 minute of arc to 60 seconds of arc
- Too small visual angle leads to no perception
- Visual acuity is ability to view detail
- Familiar objects perceived as constant size

INTERPRETING THE SIGNAL

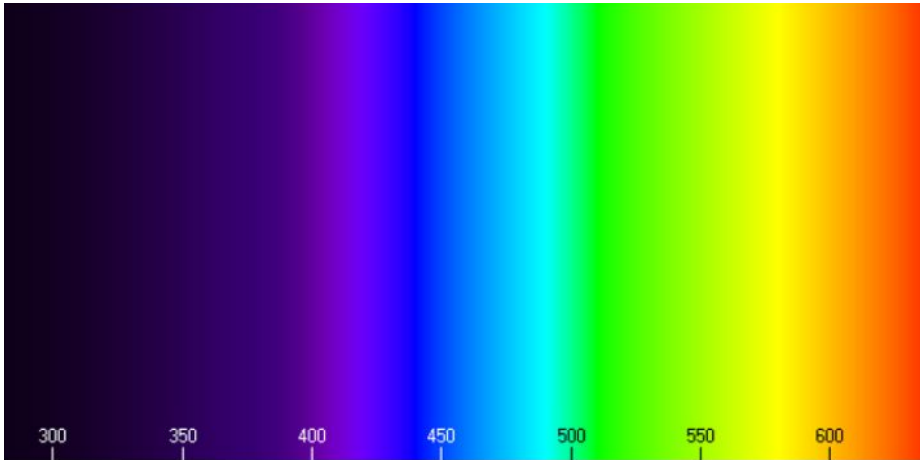
- Assuming that we can perceive the object, does its visual angle affect our perception of its size?
- Given that the visual angle of an object is reduced as it gets further away, we might expect that we would perceive the object as smaller.
- In fact, our perception of an object's size remains constant even if its visual angle changes. So a person's height is perceived as constant even if they move further from you. This is the **law of size constancy**, and it indicates that our perception of size relies on factors other than the visual angle

INTERPRETING THE SIGNAL – Perceiving Brightness

- A second aspect of visual perception is the perception of brightness.
- Brightness is in fact a subjective reaction to levels of light. It is affected by luminance which is the amount of light emitted by an object
- The luminance of an object is dependent on the amount of light falling on the object's surface and its reflective properties.
- .

INTERPRETING THE SIGNAL – Perceiving Colors

- Color is usually regarded as being made up of three components: hue, intensity and saturation
- Hue is determined by the spectral wavelength of the light. Blues have short wavelengths, greens medium and reds long.
- Approximately 150 different hues can be discriminated by the average person

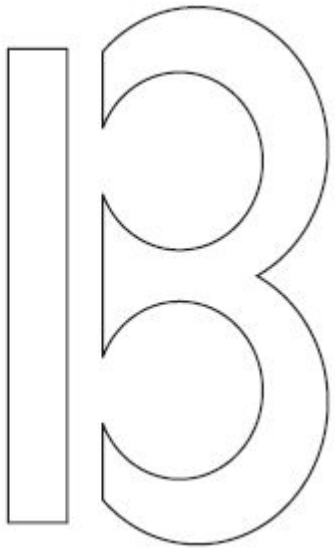


INTERPRETING THE SIGNAL– Perceiving Colors

- Intensity is the brightness of the color
- Saturation is the amount of whiteness in the color
- By varying these two, we can perceive in the region of 7 million different colors

INTERPRETING THE SIGNAL

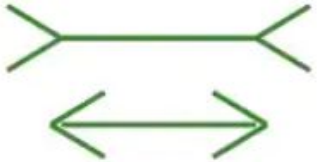
- Visual processing compensates for the movement of the image on the retina which occurs as we move around and as the object which we see moves.
- Although the retinal image is moving, the image that we perceive is stable. Our expectations affect the way an image is perceived
- Context is used to resolve ambiguity
- Optical illusions occurs due to over compensation.



OPTICAL ILLUSION

Optical Illusions

the Ponzo illusion



the Muller Lyer illusion

READING

- The visual pattern of the word on the page is perceived
- Decoded with reference to an internal representation of language
- Syntactic and semantic analysis
- During reading, the eye makes jerky movements called *saccades followed by fixations.*
- *Regressions(eye moves forward and backwards)*
- *More complex text, more regressions*

READING

- Adults read approximately 250 words a minute
- Word Shape is important to recognition.
- Font size 9 to 12 and line length 2.3 and 5.2
- Negative contrast(dark characters on a light screen) improves reading from computer screen.

LINKS

- Link: https://youtu.be/mskj1JxlzoU
- https://www.youtube.com/watch?v=J4cj6r2QrHM