EBU5305

Interactive Media Design and Production

Design & Human Cognition

Today's main points

- Design is about aesthetic value and communication.
- The human user is an important element in design.
- We can't redesign people, so we need to understand them.
- Cognitive psychology can help designers.
- Perception is active. It blends knowledge and sensations.
- Carefully design grouping into the interface.
- Perceptions do not automatically become memories.
- Working memory is transient in nature.
- Chunking information increases working memory capacity.
- Recognition is easier than recall.
- Consistency allows the user to make valid generalisations.

The Media Designer Task

- An interactive media designer is concerned with:
  - Aesthetic value
  - Planning the creation of a new thing
- Often, this new thing is a communication
  - *The designer is using audio-visual elements to make something that can convey an idea to other people*
- Design can be looked at as:
  - A working progress
  - Solving a problem to meet a need

3

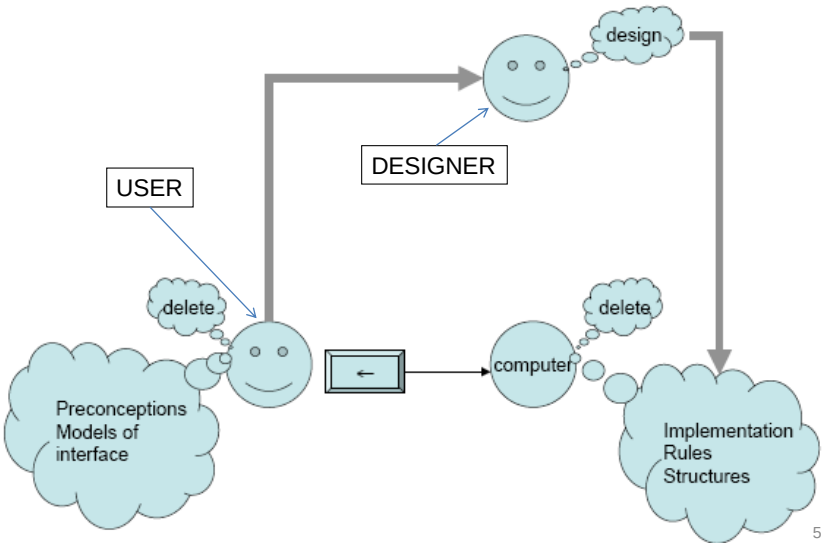
The Human Factor

- Interactive media is not just the technology used to deliver the communication.
- It is about what sort of experiences the media can provide and what a person can do with it.
- Interactivity is the ability of the user to influence communication.
  - E.g. ability for the communication to change on the basis of direct input from the user (e.g. video game).
  - Ability to create or alter the content of the presentation for oneself and for others (e.g. online bulletin board).

→ **The human user is an important element in design !**

4

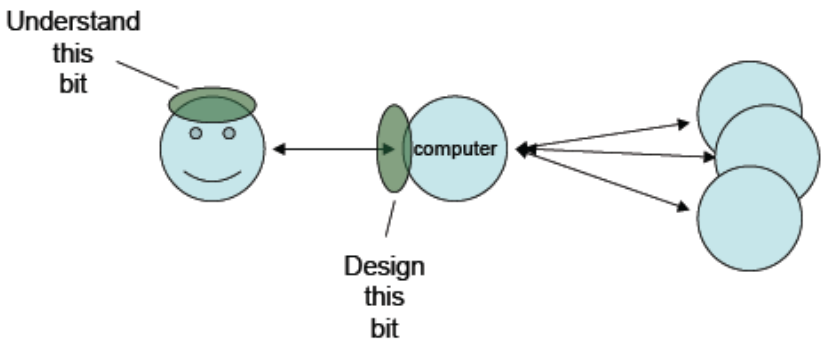
The design problem



5

Human cognition and relation to design

We can't redesign people … so we need to understand their limits.



6

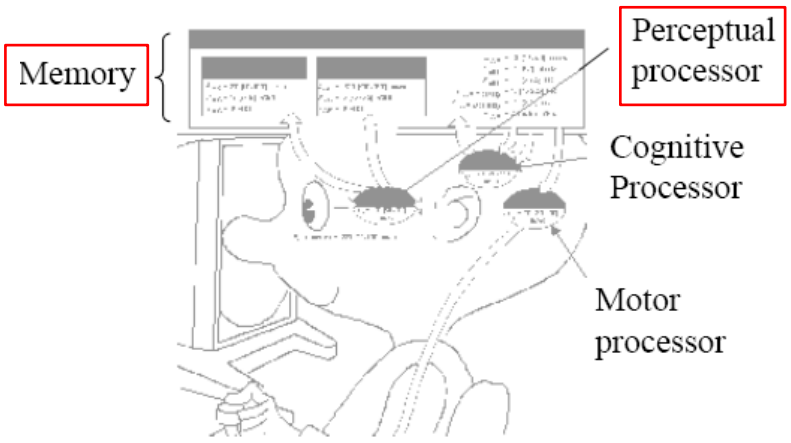
Cognitive psychology

- Can help us understand the capabilities and limitations of the human
- Will tell us if there are things that people will find difficult or, even, which they will not be able to do at all.
- Will help us to know what people find easy ...

- e.g. Cognitive psychology can help us understand: how humans perceive the world around them, how they store and process information and solve problems, and how they physically manipulate objects.

7

Model Human Processor



The model human processor (from Card, Moran and Newell, 1983)

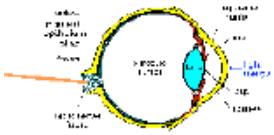
8

Perceptual Processor

- Information is received and responses given via a number of input and output channels.
  - **visual channel**
  - auditory channel
  - haptic channel
  - movement

9

Visual perception



- Human vision is a highly complex activity with a range of physical and perceptual limitations.
- Physical properties of the eye mean there are certain things that cannot be seen by the human
- Interpretative capabilities of visual processing allow images to be constructed from incomplete information.
- (Visual) perception is active: it blends knowledge and sensation.

10

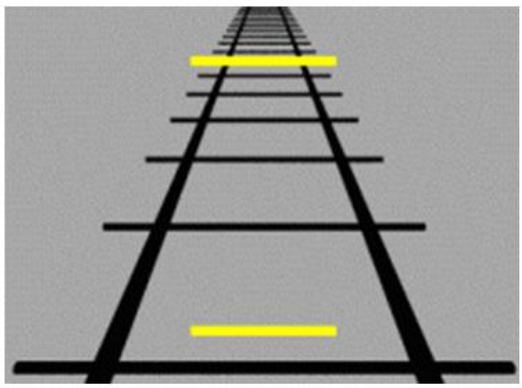
Perception

- The perception of ambiguous figures depends on what the viewer knows, and what they expect to see.
- Our expectations affect the way an image is perceived.
- The context in which an object appears allows our expectations to clearly disambiguate the interpretation of the object.
- However … it can also create optical illusions.

11

The Ponzo illusion

Which of the two yellow lines is the longest?



12

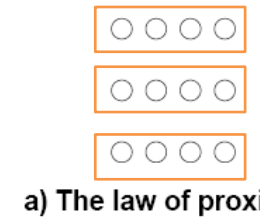
The proof reading illusion

Is there anything wrong with the following text?

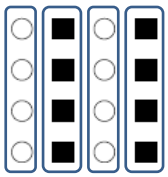
The quick brown fox jumps over the the lazy dog.

13

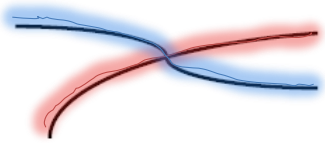
The Gestaltists laws of perceptual organisation



a) The law of proximity



b) The law of similarity



c) The law of good continuation

d) The law of closure

14

Grouping

- If you don't try to design grouping into the interface, the user's perceptual processes will still try to impose a structure on the display

… and it might not be the structure you want!

15

When the laws of grouping are in conflict

How would you group the following figures?

a) ○ ○ ○ □ □ □ □ □

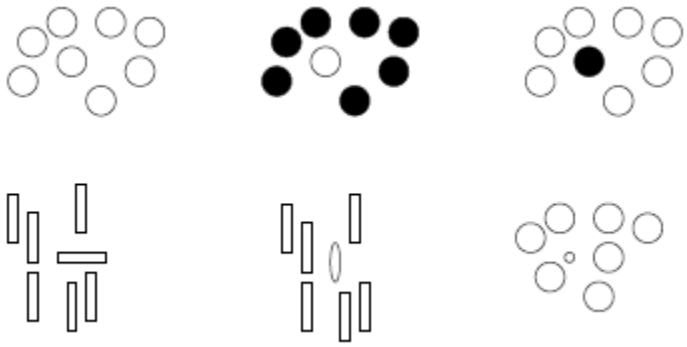
b) ○ ○ ○ □ ■ ■ ■

c) ■ ■ ■ □ ○ ○ ○

16

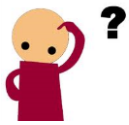
Pop-out

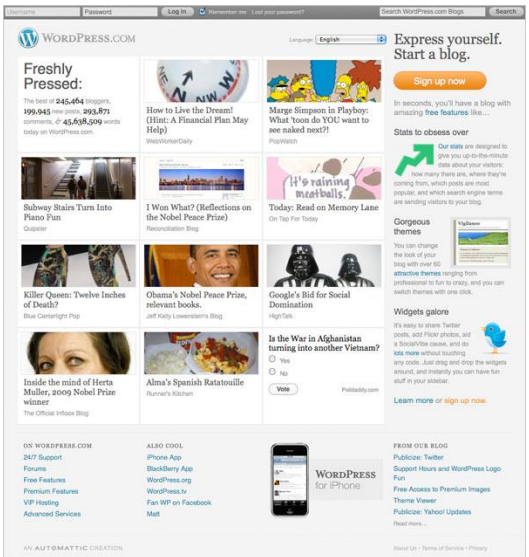
- Objects that are spatially close to a group, but not part of it, seem to pop-out



17

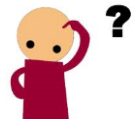
Example of bad grouping design?





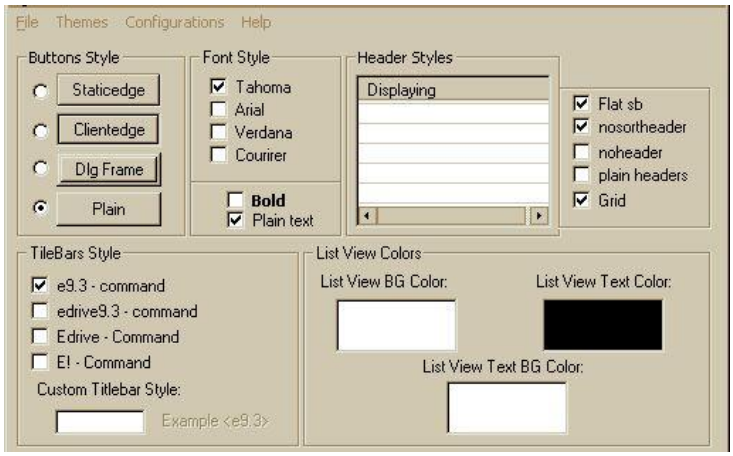
18

Better design?



Question

- What is wrong with this dialog window?
- Redesign it with good grouping in mind.



Summary so far…

- Design is about aesthetic value and communication.
- The human user is an important element in design.
- We can't redesign people, so we need to understand them.
- Cognitive psychology can help designers.

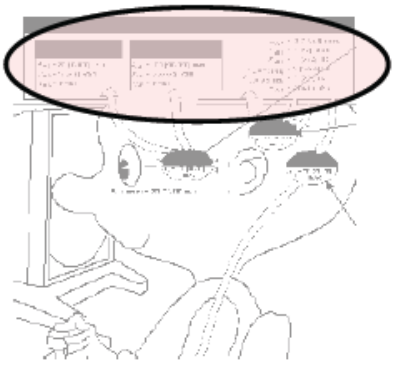
- Perception is active. It blends knowledge and sensations.
- Carefully design grouping into the interface.

21

Model Human Procesor

- Information is stored in *memory*

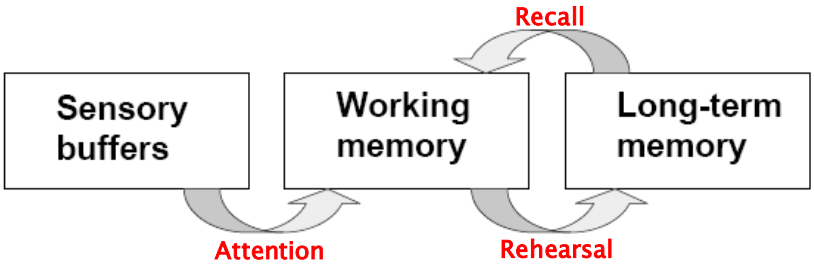
- **sensory** memory
- short-term (**working**) memory
- **long-term** memory



22

Memory

- It is generally agreed that there are three types of memory function:
  - sensory buffers
  - short-term memory or working memory
  - long-term-memory



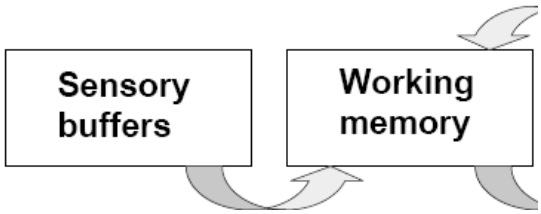
23

Sensory memory

- The sensory memories act as buffers for stimuli received through the senses:
  - iconic memory for visual stimuli
  - echoic memory for aural stimuli
  - haptic memory for touch
- These memories are constantly overwritten by new information
  - e.g. information remains in iconic memory very briefly, in the order of 0.5 sec.
- ***Information received by sensory memory is quickly passed into a more permanent memory store or overwritten and lost.***

24

From sensory buffers to working memory



Attention !!

25

25

Working memory

- The working memory acts as a “scratch-pad”.
- In working memory, information is temporarily placed in an *active state so that other cognitive* processes can be brought into operation.
- Working memory can be accessed rapidly (in the order of 70 ms).
- It is transient in nature.
- It has a limited capacity of 7 +/- 2 chunks of information.
- Information is subject to interference.
- Items are lost from memory if not rehearsed.

26

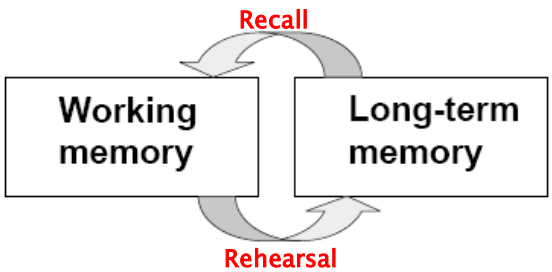
Chunking

- Short-term memory is constrained by number of chunks, not basic elements (e.g. digits)
- Patterns can be useful as aids to memory.

27

Long-term memory

- We store meaning or knowledge in Long-term memory.
- When people are recalling units of meaningful information they are placing items from long-term memory in an active state (working memory).



28

Recall versus recognition

- Recall is where we have remembered something
  - e.g. your login name and password
- Recognition occurs when you are presented with the item you are trying to remember
  - e.g. when you list all the files in your directory to help you remember
- It is much easier for people to recall the meaning of something than the exact words or sentence.
- Recognition is easier than recall

29

Question

Can you improve the design of this menu to relieve the load on user's memory?

Style
Plain text
Bold
Italic
Underline
Shadow
Left justify
Center
Right
Single space
1 - 1/2
Double

30

Consistency in layout

- An important part of effective layout is to use a design that appear consistent from one section of the project to another.
- A consistent layout allows users to know what to expect. They will already know:
  - where the navigation is located,
  - where the content is,
  - how to find what they are looking for.

31

Today's main points

- Design is about aesthetic value and communication.
- The human user is an important element in design.
- We can't redesign people, so we need to understand them.
- Cognitive psychology can help designers.
- Perception is active. It blends knowledge and sensations.
- Carefully design grouping into the interface.
- Perceptions do not automatically become memories.
- Working memory is transient in nature.
- Chunking information increases working memory capacity.
- Recognition is easier than recall.
- Consistency allows the user to make valid generalisations.

32