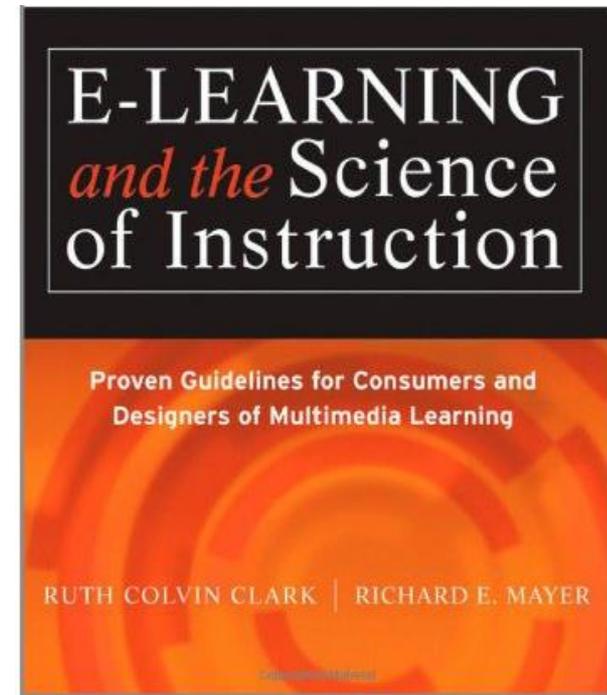


Cognitive Theory of Multimedia Learning

Bruno Zuga

How Do People Learn From e-Courses? Chapter 2

Based on slides from
Ruth Clark



A technology-centered vs. learner-centered approach to e-learning

Are hot technologies the central focus of e-learning design?

- No, meeting learners' needs should be

Should these be avoided?

- No. These technologies may help & are worth consideration, but should be evaluated

Three learning principles

- Limited capacity
- Dual channels
- Active processing

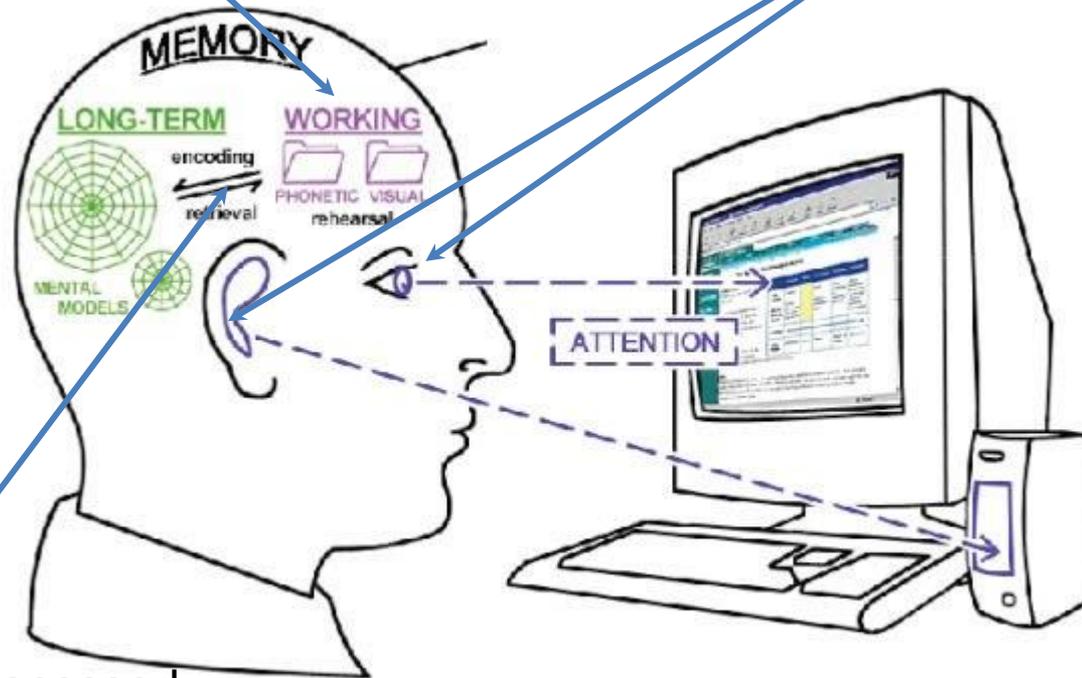


Cognitive Theory of Multimedia Learning

Memory has

- Limited capacity
- Location of learning

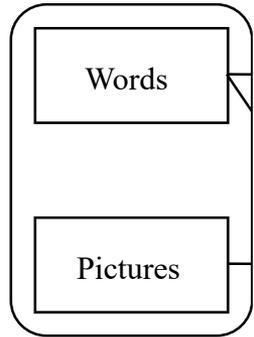
Dual channels
(auditory and
visual)



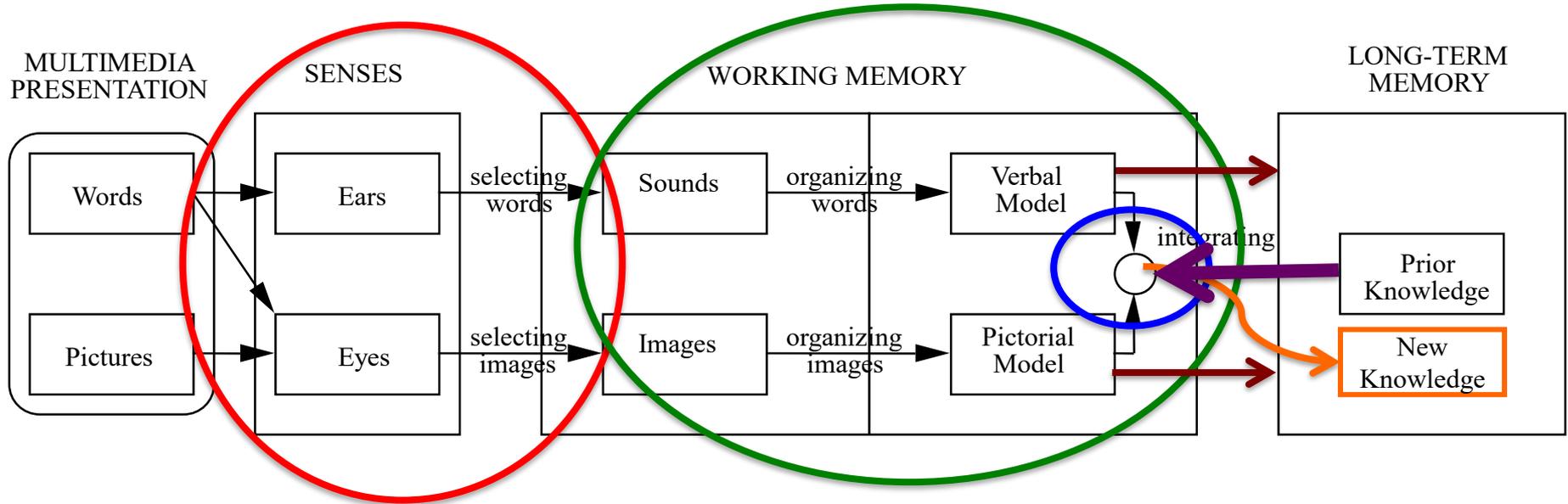
Encoding
Once actively processed
Retrieval
Transfer of learning

Cognitive theory of multimedia learning

MULTIMEDIA
PRESENTATION



Key learning processes



- Selection
- Retrieval
- Integration
- Load management

What's missing in this diagram?

Cues to retrieve

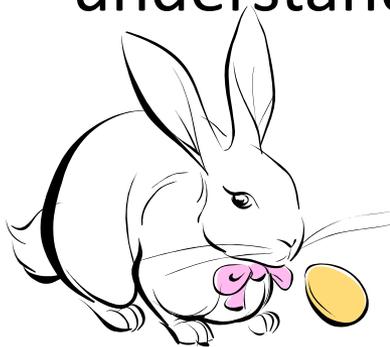
Update to long-term memory

12 Practical Principles

- Coherence Principle
- Signaling Principle
- Redundancy Principle
- Spatial Contiguity Principle
- Temporal Contiguity Principle
- Segmenting Principle
- Pre-training Principle
- Modality Principle
- Multimedia Principle
- Personalization Principle
- Voice Principle
- Image Principle

The Spatial Contiguity Principle

- Place corresponding words and graphics near each other
- Why?
 - The learner does not need to search for the relevant words and can therefore focus on understanding



A rabbit

The Temporal Contiguity Principle

- The sequencing of words and pictures
- Words and pictures should be presented simultaneously
- Why?
 - The simultaneous presentation of the two stimuli helps to form an association in the mind of the learner



A tiger

The Coherence Principle

- People learn better when extraneous material is excluded rather than included
- Adding interesting material can hurt learning
- Why?
 - Distraction: it guides attention away from the relevant material
 - Disruption: it prevents the learner building links between relevant material (due to the presence of irrelevant material)
 - Seduction: it can raise inappropriate prior knowledge



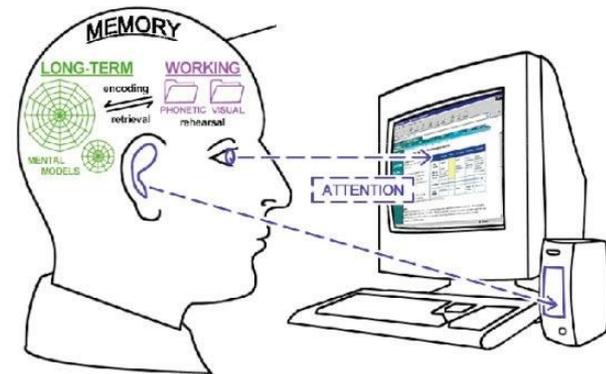
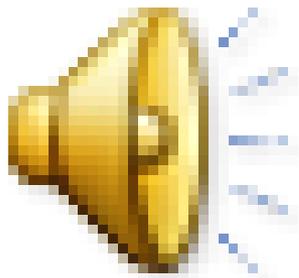
The Coherence Principle

- Visual coherence
 - Remove unnecessary words and pictures, however interesting you or the learner deems them to be
- Sound coherence
 - Remove unnecessary sounds from a presentation, however interesting you or the learner deems them to be
- Word coherence
 - Eliminate unnecessary words
- Be wary of cognitive overload!



The Modality Principle

- Present words as audio narration rather than onscreen text
- Images/video with audio narration is better for learning than images/video with text
- Why?
 - It splits the information across two cognitive channels (auditory and visual) rather than all through a single channel (visual)



The Personalization Principle

- Use conversational style and virtual coaches
- Why?
- Allows the learner to engage with the learning as a social conversation

Other Principles

- Signaling Principle – People learn better when cues that highlight the organization of the essential material are added.
- Segmenting Principle – People learn better when a multimedia lesson is presented in user-paced segments rather than as a continuous unit.

Other Principles

- Pre-training Principle – People learn more deeply from a multimedia message when they receive pre-training in the names and characteristics of key components.
- Voice Principle – People learn better when the words in a multimedia message are spoken by a friendly human voice rather than a machine voice.