REPUBLIC POLYTECHNIC

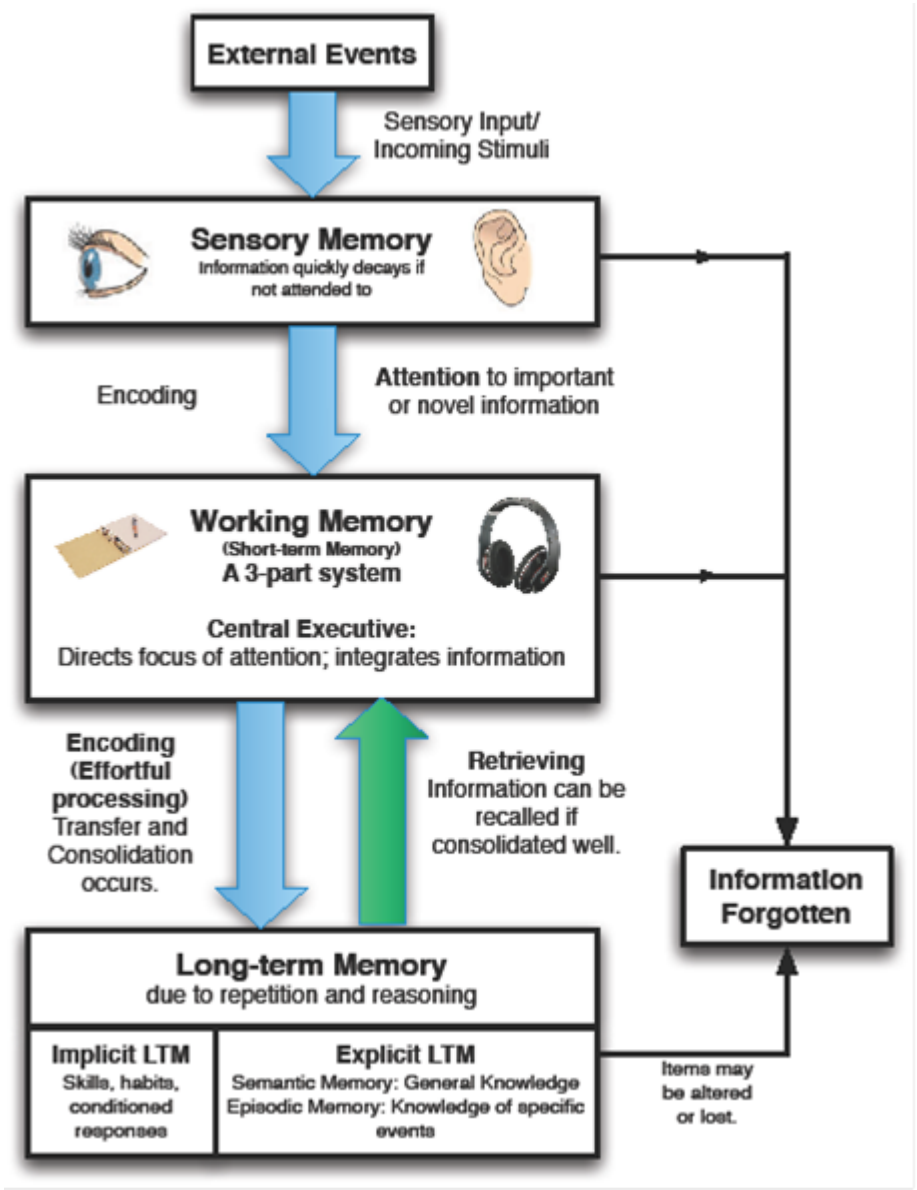
P05

A Bottomless Pit

E365 – Aviation Human Factors

SCHOOL OF ENGINEERING

Memory process



Memory systems

	Sensory Memory	Working Memory	Explicit LTM
Subsystems	Iconic, Echoic	Auditory, Visual-spatial	Semantic, Episodic
Duration	Iconic – 0.5s Echoic – 2.0s	15 – 30s	Lifetime
Capacity	Unlimited	7 ± 2 chunks	Unlimited

Sensory memory

- Echoic memory
  - auditory sensory memory
  - retained for up to two seconds.
- Iconic memory
  - visual sensory memory,
  - retained only for about 0.25 second.
- The sensory memory for other senses, such as smell and touch, has received little attention in research studies.

Working memory

- Functions
  - To retain information for long enough such that it can be used – e.g. remembering a telephone number long enough to be able to dial it.
  - To allow for rehearsal, needed for encoding info into LTM.
  - To allow information to be retrieved from LTM, so that the info can be used or manipulated.
  - Allows new information to be linked to old information.
- Auditory subsystem
  - process words, such as when we talk, or write, or repeat items to ourselves in order to memorize them.
- Visual-spatial subsystem
  - process images, such as when we mentally picture someone's face, or imagine a scene in our heads, or look for an item in our surroundings.

Long-term memory

- Implicit LTM
  - Processes close to automatism
    - Skills, motor programmes
- Explicit LTM
  - Episodic memory
    - Retention of information about the where, when, and what of life's happenings—that is, how individuals remember life's episodes
  - Semantic memory
    - A person's knowledge about the world, including his or her areas of expertise, general knowledge, such as of things learned in school, and everyday knowledge
- The capacity of long-term memory appears to be unlimited

Encoding to LTM

- Effortful processing is needed
- Rehearsal
  - Even with rehearsal information in working memory can decay over time.
  - Decay occurs more rapidly with more items in working memory.
- Increased semantic (meaning) encoding
  - need to understand the content and context well, and link new information to old information already stored in the LTM.
- Chunking
- Spacing effect
- Use of imagery – mental pictures
- Use of mnemonics
- Self-reference effect

Retrieval of LTM

- Retrieval cues are
  - bits of related information which we encode while processing a target piece of information.
  - linked in some way to the context of the target, and they become a part of a web of stored associations.
- When one of these associated bits catches our attention, it helps to lead us back to the target information, drawing it into our conscious awareness.

Forgetting

- Encoding failure
  - Failed to encode, info is not in LTM, cannot be retrieved.
- Storage decay
  - Even items that have been encoded well can later be forgotten – one explanation is the gradual fading of the physical memory trace in the brain.
- Retrieval failure
  - Lack of retrieval cues
  - Proactive interference: something learnt earlier interferes with recall of something learnt later
  - Retroactive interference: something learnt later interferes with recall of something learnt earlier

Attention

- Types of attention
  - Selective
  - Divided
  - Focused
  - Sustained
- Inattentional blindness
  - failure to notice an object because attention was not focused on it.

Learning Objectives

- Human memory systems
  - Sensory memory
  - Working memory
  - Long-term memory
- Encoding and retrieval of memory
- Types of attention