

Human Cognitive Architecture - definition:

- deals with cognitive (thinking) structure of brain; the manner in which cognitive structures and functions required for thinking are organised
- relationship btw sensory memory, working memory and long term memory (most modern treatments of HCA use Atkinson/Shiffrin, 1968 model as their base; for current research on working memory see Baddely/Hitch, 1974, 2000, 2007)

Sensory Memory

- very limited retention of sensory stimuli
- must attend in order to move info from sensory memory into working memory where it is consciously processed
- must help kids code by activating LTM schema in relation to new schema

working memory (WM)

- all conscious processing occurs here
- 3-4 things can be processed in WM at one time (Cowan, 2001); applies to new yet to be learned information
- 15 - 30 second retention if not reshearsed (Peterson, 1959/Driscoll, 2005)
- when LTM schema is activated for use during conscious processing, processing capacity is increased
- visual and auditory info is processed within own systems (Baddeley/Hitch, 1998); presenting info in both modes increases WM capacity

Long Term Memory (LTM)

- stores schema (mental representations)
- if WM can draw on schema from LTM then limitations are lessened
- huge stores of information (schema) in LTM allow us to quickly recognise a situation, and then, often unconsciously we are internally guided in our response
- automation increases cognitive capacity
- if schema is not in LTM then learners have nothing to connect new learning to

Learning

- information comes into sensory register; learner must attend in order for information to be passed into WM
- information is *consciously processed* in WM; related schema in LTM must be activated to aid processing and meaning making in working memory; schema is constructed and encoded (organisation, inference, elaboration Mayer /Moreno, 2003) ; if relevant and meaningful, schema is tagged 'important'; then it is stored in LTM during REM sleep (Sousa, 2006)
- problem solving (a main aspect of inquiry based learning) places a huge burden on WM (Sweller, 1988); if instruction overloads the learner's WM capacity, (cognitive load) then processing is inhibited; this results in limited learning