

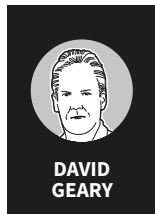
We are loopy creatures.



ANDY CLARK
Philosopher & cognitive scientist

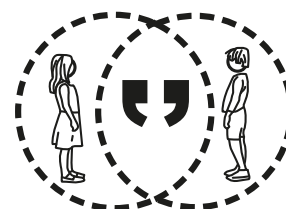
LOOPY CREATURES

These one-pagers capture the essence of The Extended Mind In Action, written by Emma Turner, David Goodwin and Oliver Caviglioli and based on Annie Murphy-Paul's best-seller, The Extended Mind.



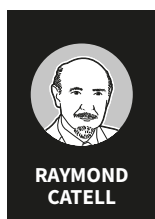
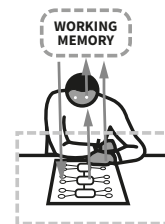
BIOLOGICALLY
PRIMARY &
SECONDARY
LEARNING

Biologically primary learning is natural, automatic, spontaneous and doesn't have any cognitive demands. We learn to speak, relate to one another, and so on, without tuition or strain. Biologically secondary learning, by contrast, is unnatural, difficult and places enormous strain on our cognitive resources. This describes the learning that predominates in schools. Cognitive load theory shows how the former can be used to support the latter for more effective learning.



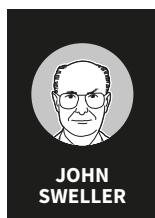
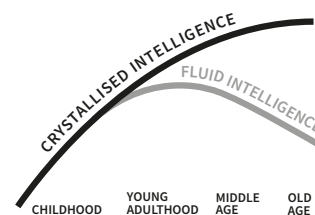
THE MAKING
OF THE
MODERN
MIND

Donald's theory, explaining the power of the modern mind, is based on three stages of development across the ages. Pre-language, we mimed our intended meaning: the Mimetic Age. Spoken language allowed us to transcend the here and now: the Mythic Age. With written language, we were able to put down our thoughts which allowed us to dramatically transcend the limits of our working memories and extend our capacity to think: the Theoretic Age.



TWO
TYPES OF
INTELLIGENCE

Raymond Cattell distinguished two types of intelligence. One was termed fluid intelligence: the raw processing power we inherit from our parents. The other, crystallised intelligence, is the sum of the skills and knowledge we learn during our lifetime. Both intelligences are not static. Fluid intelligence rises then declines with age, while crystallised continues to rise as a result of our endeavours in encountering and learning about the world. This growth is in our hands.



COGNITIVE
LOAD
THEORY

Some 20 years ago, this central pillar of current educational policy included in its repertoire: *New instructional effects with direct practical implications for instruction have been formulated... collective working memory effect, the human movement effect, and the physical environment as a distinct factor.* (SWELLER). This is a clear indication of the impact of evolutionary psychology in directing research related to this theory. It also resonates with Cattell's notions of the two types of intelligence. So, if *The power of the unaided mind is highly overrated. Without external aids, memory, thought and reasoning are all constrained* (NORMAN), let's help students exploit their other cognitive loops.

Cognitive Load Theory offers a novel, evolutionary-based perspective on the cognitive architecture that informs instructional design...regarding the functions of long-term and working memory.

COGNITIVE LOAD THEORY, SWELLER, AYRES & KALYUGA, [BACK COVER] SPRINGER, 2011



JOHN SWELLER

MEMORY LOOP



Thinking with your memory

Gestures can support WM processing by temporarily off-loading WM resources normally devoted to internal maintenance of information, with the gesture physically maintaining the info.

AN EVOLUTIONARY UPGRADE TO COGNITIVE LOAD THEORY, PAAS, F. & SWELLER, J., 2012



FRED PAAS

EMBODIED LOOP



Thinking with your body

The physical learning environment is considered as a distinct causal factor of cognitive load by redefining the term 'environment'.

EFFECTS OF THE PHYSICAL ENVIRONMENT ON COGNITIVE LOAD AND LEARNING: TOWARDS A NEW MODEL OF COGNITIVE LOAD, CHOI, H.H., van MERRIENBOER & PAAS, F., 2014



JEROEN VAN MERRIËNBOER

SITUATED LOOP



Thinking with objects

The collective working memory concept has an important focus on the learning of individuals in the group.

FROM COGNITIVE LOAD THEORY TO COLLABORATIVE COGNITIVE LOAD THEORY, KIRSCHNER, P., SWELLER, J., KIRSCHNER, F. & ZAMBRANO, J., 2018



PAUL KIRSCHNER

DISTRIBUTED LOOP



Thinking with people