



COGNITIVE LOAD THEORY EFFECTS



AN INFOGRAPHIC SUMMARY OF THE BOOK **COGNITIVE LOAD THEORY** BY JOHN SWELLER, PAUL AYRES, SLAVA KALYUGA [2011]

EFFECT 01

THE GOAL-FREE EFFECT

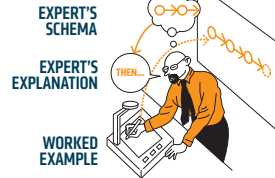


When novices solve a conventional problem, they will frequently work backwards from the goal to the givens using a means-end strategy.

Learners are more likely to acquire schemas under goal-free than conventional goal conditions.

EFFECT 02

THE WORKED EXAMPLE EFFECT



Studying worked examples provides one of the best, possibly the best, means of learning how to solve problems in a novel domain.

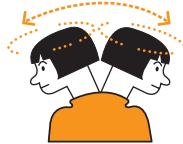
Worked examples can effectively provide us with problem solving schemas that need to be stored in long-term memory.

THE SPLIT-ATTENTION EFFECT

EFFECT 03

Split-attention occurs when learners are required to split their attention between at least two sources of information that have been separated either spatially or temporally.

Worked examples had no advantage over conventional problem solving when they were constructed in a split-source presentation.



THE MODALITY EFFECT

EFFECT 04

The amount of information that can be processed using both auditory and visual channels should exceed the processing capacity of a single channel.

The modality effect is usually stronger for measures of transfer rather than retention.



EFFECT 05

THE REDUNDANCY EFFECT



The redundancy effect occurs when information that includes redundant material results in less learning than the same information minus the redundant material.

Redundant information should be omitted to preclude an increase in extraneous cognitive load.

EFFECT 06

THE EXPERTISE REVERSAL EFFECT



The need for experts to establish connections between elements of presented information and their existing knowledge base can interfere with learning.

...to unnecessarily process the same information that is redundant for more knowledgeable learners.

THE GUIDANCE FADING EFFECT

EFFECT 07

The gradual reduction of instructional guidance as levels of learner expertise increase has proven to be a more effective instructional procedure than abrupt switches from worked examples to problems.

One possible means of a smooth transition from worked examples to problem solving practice is the use of completion tasks.



THE IMAGINATION & SELF-EXPLANATION EFFECT

EFFECT 08

Imagining or self-explaining a procedure can be regarded as a form of deliberate practice that requires intentional processing of information in working memory to strengthen schemas held in long-term memory.

The imagining technique was beneficial only for more knowledgeable learners.



EFFECT 09 A

THE TRANSIENT INFORMATION EFFECT

AUDITORY



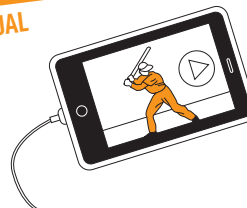
We define the transient information effect as a loss of learning due to information disappearing before the learner has time to adequately process it.

Whenever a teacher orally explains something to a class a pupil... the information presented is transient.

EFFECT 09 B

THE TRANSIENT INFORMATION EFFECT

VISUAL



Whether viewed on a computer or a television screen, as frames roll from one to another, visual information disappears from sight.

Static diagrams could lead to more active learning. In a sequence of static diagrams, learners are required to mentally integrate the static diagrams.

THE ELEMENT INTERACTIVITY EFFECT

EFFECT 10

The fact that cognitive load effects tend to be obtainable only if intrinsic cognitive load is high, is referred to as the element interactivity effect.

Element interactivity due to intrinsic cognitive load can be manipulated by changing the nature of a task.



THE COLLECTIVE WORKING MEMORY EFFECT

EFFECT 11

Such sharing will not be beneficial if the transaction costs exceed the advantages gained by off-loading some of the elements to other people.

Under appropriate conditions collaboration can enhance learning.

