

# 5: COGNITIVE LOAD THEORY

How we learn is constrained by our biology. Knowing what this entails is an enormous help in designing effective teaching. Cognitive load theory spills the beans on what our limits are and how teachers can reduce their impact. Here is my pick of the most important ideas.

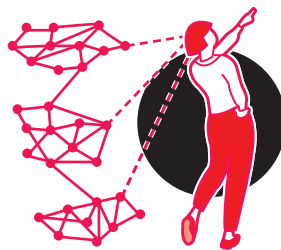
## 1 WORKING MEMORY LIMITS

Our working memory comprises the attention we use to think. It is very limited and gets jammed as we attempt to get new information organised and into long-term memory.



## 2 NOVICES AND EXPERTS

Novices and experts think in different ways. Experts easily and fluidly use elaborate schema in their long-term memory to overcome the limits of working memory. Novices, alas, can't.



## 3 BORROWED KNOWLEDGE

Borrowed knowledge refers to already existing organisation of information held by experts. There is little sense in hoping that novices can succeed in duplicating this achievement.



## 4 INTRINSIC V EXTRINSIC LOAD

Learning new content is hard enough without overloading novices with extra demands unrelated to the task of learning. This is not a case of making learning easy.



## 5 TRANSIENT INFORMATION EFFECT

When teachers talk, their words disappear — they are transient. Students have to continually store spoken information in order to relate it to the current stream. This easily overloads.



## 6 SPLIT ATTENTION

Labels and notes about a diagram placed at a distance from it, causes extraneous load. Scarce working memory is wasted in moving from one to the other in making connections.



## 7 MODALITY EFFECT

A cognitive hack that reduces the impact of working memory limits, is to use dual coding. Visual and auditory channels are separate and double the amount of information being absorbed.



## 8 WORKED EXAMPLE

Worked examples are nothing less than experts' problem-solving schemas made visible. Rather like the slo-mo camera, worked examples show the step-by-step path to success.



## 9 GUIDANCE FADING EFFECT

The gradual withdrawal of worked examples by completing a partially-worked one is the way to build towards independent problem-solving — synched with a decrease in intrinsic load.

