

### THE TRANSIENT INFORMATION EFFECT

When content disappears — speech or frames of a video — trying to remember them overloads your working memory, hindering any further thinking.

### THE WORKED EXAMPLE EFFECT

If every step of a process disappears under the next step, you have trouble keeping all the steps in mind, limiting your mastery of the process.

### THE SPLIT-ATTENTION EFFECT

When you look away from the diagram to the labels situated elsewhere, the diagram becomes, in effect, transient. You have trouble remembering what you saw.

### THE ELEMENT INTERACTIVITY EFFECT

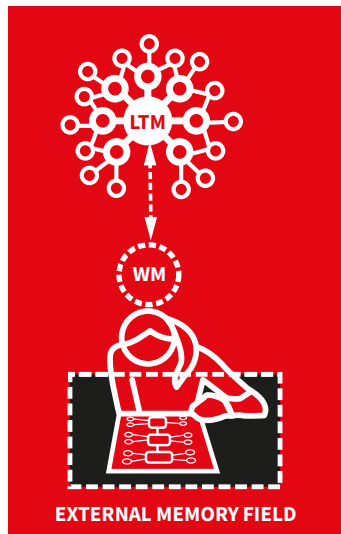
Keeping in mind, and thinking about, several elements of a topic easily overloads you. Especially if they are transient speech and not permanent marks.

### THE COLLECTIVE MEMORY EFFECT

Sharing ideas in a group is difficult if the ideas are transient — that's to say, only spoken. Capturing them visually makes them, in effect, permanent.

### THE MODALITY EFFECT

Your auditory loop soon gets overwhelmed by the transience of speech. Enriching the information by permanent visuals is an easy solution.



## TRANSIENCE AND COGNITIVE LOAD

The Transient Information Effect is just one in a long list within cognitive load theory. But when considered in the context of a theory from evolutionary psychology, its significance emerges. Cognitive scientist, Merlin Donald, concluded that finding solutions to the limits of speech-based transient information was the basis of the making of the modern mind.

#### 1 MIMETIC STAGE

NO SPEECH

- Representational acts
- Conscious, self-initiated
- Public communication

#### 2 MYTHIC STAGE

SPEECH

- Gestures
- Language
- Reconstruct the past

#### 3 THEORETIC STAGE

WRITING

- External storage of info
- External memory field
- Iteration & reflection

**Merlin Donald** theorised that the modern mind developed through three stages. The last is the shortest and also the most powerful. By capturing our ideas we overcame the transience of speech, allowing for dialogue to last more than one lifetime, thus building on previous knowledge, piece by piece.

### THE EXTERNAL MEMORY FIELD

The breakthrough that Merlin Donald described revolved around what he termed the External Memory Field. The space just in front of your eyes — your desk — is, in effect, your mental workspace. It's your working memory's visuospatial sketchpad externalised and, consequently, with a far greater capacity that allows you to think deeper about more things.

### THE UNAIDED MIND

Don Norman, designer and professor of cognitive science had this to say about the unaided mind: *The power of the unaided mind is highly overrated. Without external aids, memory, thought and reasoning are all constrained.* THINGS THAT MAKE US SMART, 1993  
Such aids help us avoid the cognitive burden of transience.

### COGNITIVE OFF-LOADING

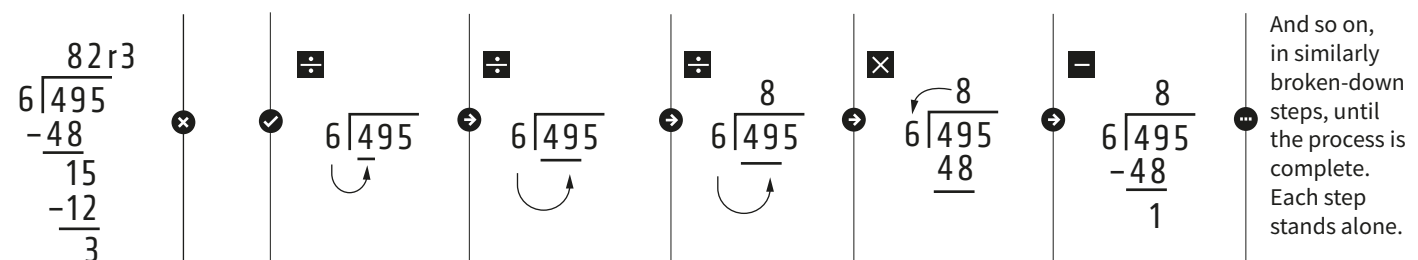
So what does this mean for classrooms? Well, continue to strengthen the unaided mind through retrieval practice in all its formulas. But, also, recognise that performance significantly improves with the cognitive off-loading that comes about by using text and diagrams to help students hold and think about more information than with speech alone.

### AVOIDING TRANSIENCE IN WORKED EXAMPLES



One step at a time. A picture for every step.

Fred Jones reveals how to avoid obscuring steps when adding the next one on top. Redraw to show each separate step. This avoids it disappearing, becoming transient.



And so on, in similarly broken-down steps, until the process is complete. Each step stands alone.

Watch Fred here: <https://www.youtube.com/watch?v=MInPwzg6TiQ>