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Introduction

Making It Stick: teaching for long-term memory professional development pack comprises:

- This presenter's handbook.
- A CD containing Microsoft PowerPoint and Apple Keynote presentations, which includes slides, videos and animations; a staff room poster to display the key techniques.

It is based on educational research from a variety of authors. References are provided throughout and a bibliography provides further reading.

The pack is intended to help teachers to understand some of the main findings from cognitive science and the implications for curriculum design and implementation.

Why doesn't learning stick?



Background

Why is it that students seem to forget?

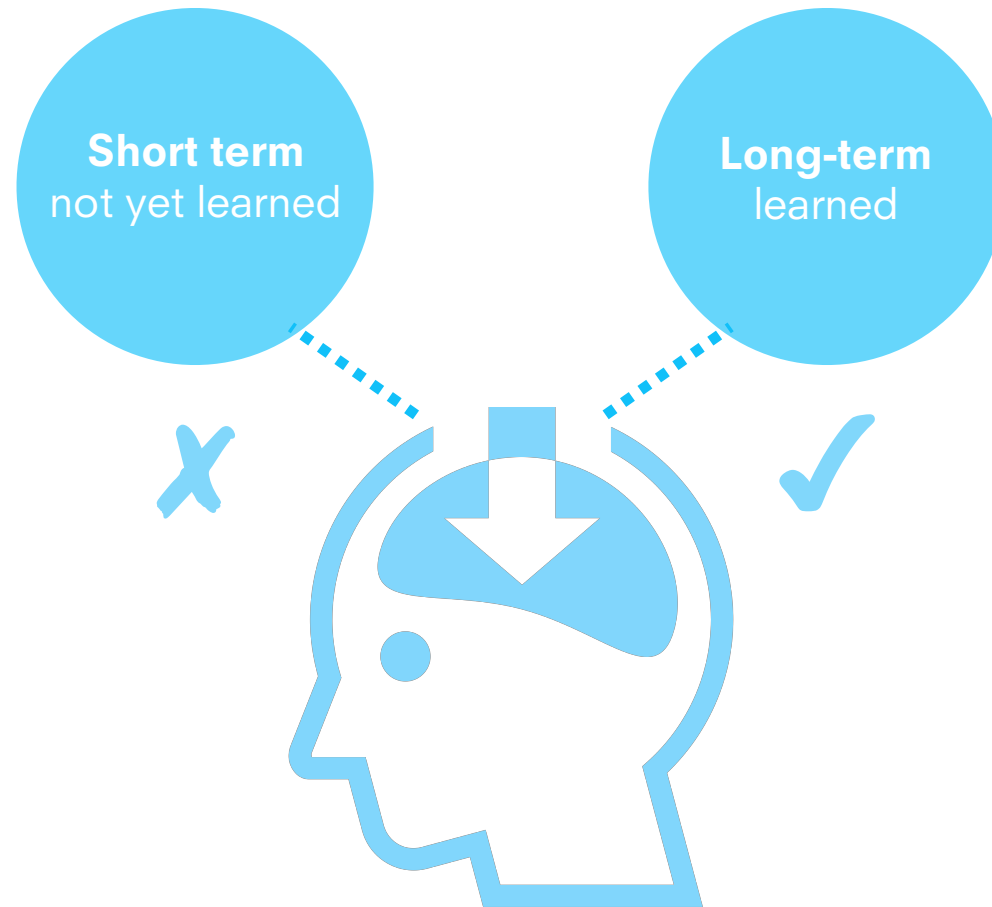
Despite our best efforts to engage them, stimulate their interest and motivate them, students don't seem to retain things for long. Teachers often feel they have had a good day in teaching new content, thought students had understood the new content and prepared follow on lessons for the next day. However, what teachers actually find is that students have little knowledge or recollection of the content covered in the previous lesson.

Instead of moving on, teachers go back and become stressed that they are running out of time.

Presenter's tip:

Use a story from your own practice that shows your own frustration with this phenomenon we call forgetting.

Learning is a change in long-term memory



Background

The answer to the question. 'Why is it that students seem to forget?' is actually quite simple: it is because students haven't actually learned what we think they have; they have encountered aspects of the curriculum, but not learned them.

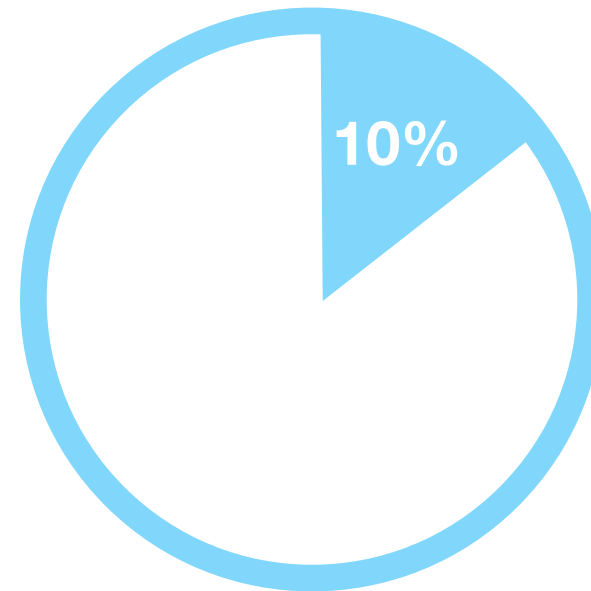
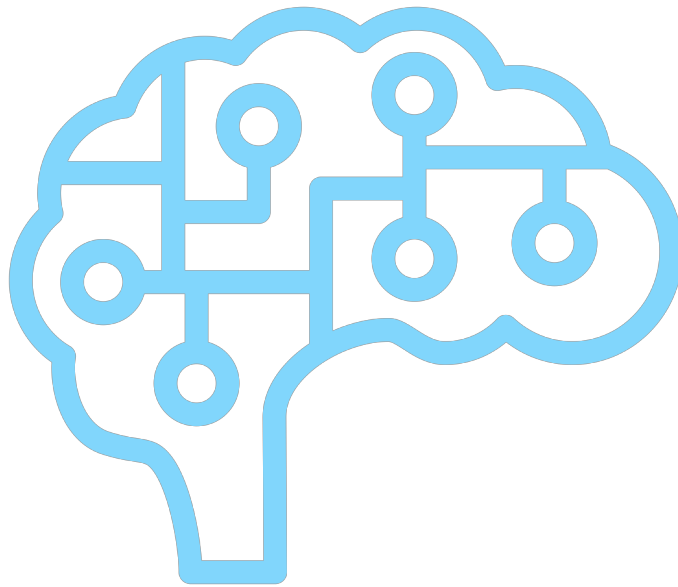
The underlying principle of this training is: nothing has been learned until it is in the long-term memory.

Presenter's tip:

Discussion ideas:

- Given that learning is a change to long-term memory, should we expect to see it in the shorter term?
- Are statements at the beginnings of our lessons such as 'Today we will learn...' useful?

True or false?



Background

A common myth is that we only use 10% of our brains. The allure of this is that if we can tap into this spare capacity we can all be geniuses.

We actually use 100% of our brains. However, the amount of brain we have available for thinking is very limited.

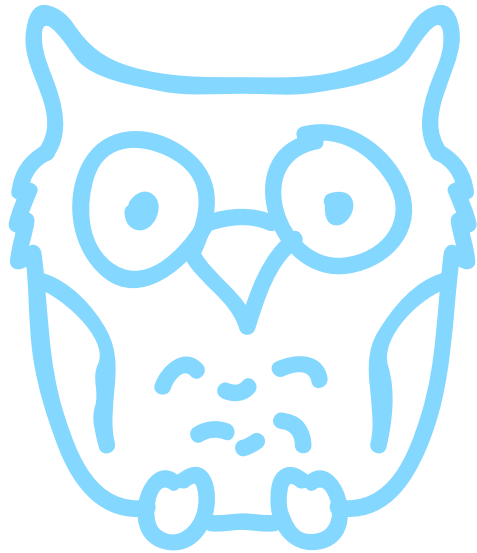
The majority of our brains are used for vision and movement - things no computers have managed to do to a fraction of the efficiency of our brains.

This is why thinking is difficult.

Presenter's tips:

- Remind the group that the cognitive principle is: People are naturally curious but we are not very good thinkers.
- Explain that most of the brain's capacity is used for vision and movement.
- Say: 'Lets move on to explore more about why thinking is difficult...'

Knowledge?

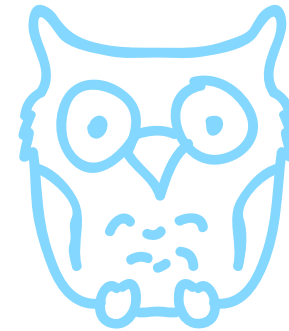


How did
King Harold
die?

An arrow hit
his eye.

How do you
know?

You told me!



Background:

On first hearing the cognitive principle, 'Knowledge must precede creativity', those teachers who strongly believe in creativity are disheartened.

The example in this slide shows why this might be a valid concern: just because a student knows how King Harold died in The Battle of Hastings doesn't mean that he or she understands how anyone could possibly claim to know this and whether it is a legitimate claim. However, given the distinction we have already made between information and knowledge, the fact that Harold died - whether or not he was killed by an arrow in his eye - is not knowledge: it is a piece of information. We don't want our students to spout random facts; we want them to think.

That said, information can prove useful...

Presenter's tips:

- Explain the points above, reinforcing once again the distinction between information and knowledge.
- Say: 'We shall explore creativity later in this section.'
- Say: 'For now, we shall return to knowledge. Some knowledge, although seemingly meaningless, can prove useful...'

Making learning memorable?



1:1:1:1

Background:

One of the ways we tend to think students will remember things is by 'making learning memorable'. The idea is that by making activities 'real-life' or 'hands-on', students will engage better with the content.

When I was a Year 6 teacher I thought that baking would be a good context in which to help students understand ratio. As a cake has four main ingredients: flour, sugar, eggs and butter, in equal quantities, I thought that baking a cake would be a great way for them to learn about ratio. I thought that to practise measuring would be a useful exercise and that we would also be practising some of our making skills from DT. It was a hands-on, motivating, engaging and memorable, cross-curricular task that I hoped would cement the idea of ratio in their long-term memories. The next day I thought I'd start with a re-cap on ratio and asked the students if they could explain to me what ratio was. I couldn't believe it when not one of the 36 members of the class could tell me anything about ratio. Feeling frustrated, I said: 'What did we spend all yesterday afternoon doing?' The answer: baking!

Presenter's tips:

- Share the story above or one from your own experience.
- Ask the group if they have ever experienced anything similar.
- Say: 'This takes us to cognitive principle number three...'

Make it stick by...

8. Focusing on meaning

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Thinking first

Instead of fun, put thinking first. We remember what we think about.

22



Vary contexts

How we present something affects its meaning. Vary contexts to give new meaning.

23



Concepts

Relate everything new to the Threshold Concepts.

9. Offering insight

24



Root words

Explore the Latin or Greek roots of vocabulary.

Making It Stick

25



Etymology

Embed etymology across the curriculum.

26



Mnemonics

Use mnemonics as a tool to remember lists.

27



Stories

Exploit the privileged position of stories in our memory..

Retrieval practice techniques



**No-stakes
quizzes**



Show-me boards



Exit tickets

Background:

Most teachers use retrieval practice to some extent - even if they don't call it such. Research (www.retrievalpractice.org) suggests the more we use the strategy, the greater students' storage and retrieval strength will be. Three very simple strategies:

1. No stakes quizzes. No stakes means no marking. This is important because this is not an assessment tool - it's a learning tool. If marks are given, students will focus their thinking on the test rather than the content. Remember - memory is the residue of thought. Feedback should be given, which is distinct from marking, so that students explore the content fully. Typically, lessons could start with quizzes: here's one from yesterday; one from last week; one from way, way back. Make it fun and do it often.
2. Show-me boards. Most primary school teachers use this technique and have done for years. It is a cheap and effective way to show retrieval. It involves everyone and takes no preparation.
3. Exit tickets. This works best for students who are old enough to write with ease. The idea is to write one or two key 'take-aways' from today's lesson. The tickets are anonymous. That's important (no stakes) but teachers do look through them after the lesson. This helps them to know if what they wanted students to take away has actually been taken. (Sometimes, despite our best efforts, students take away the wrong meaning!)

Actually, ideas such as a 'mental and oral starter' which was popular in the 2000's, in primary mathematics lessons, was based on the idea of retrieval practice. The technique was sometimes poorly explained as just a 'phase' of the lesson where students would do number work, rendering it ineffective. Prior to that, some publishers promoted the idea of 'simmering activities' which were a form of retrieval practice too. The idea was that initial teaching brought the concept to the boil and subsequent retrieval would keep it simmering.

Plenaries or mini-plenaries are also a form of retrieval practice. As long as they are focused on 'getting ideas OUT' rather than teachers trying to get ideas IN, then it is retrieval.

Cognitive principle #5



**Students are more alike
than different in the way
they think and learn.**

Background:

The allure of learning styles theory is that all children are different and that they therefore need different teaching styles: what is good for one may not be good for another.

However, Willingham's argument is that students are much more alike than they are different when it comes to what helps them to learn. He acknowledges different personalities and characteristics, but believes that much more subtle adaptations for differences are more important than workload heavy differentiation strategies that are not proven to work.