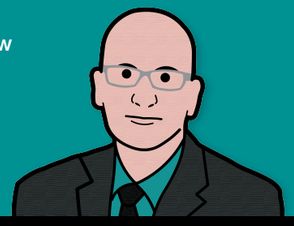
Willingham explores how students' minds work and clarifies how to use that knowledge to be a better teacher.



DANIEL T. WILLINGHAM

WHY DON'T STUDENTS LIKE SCHOOL?

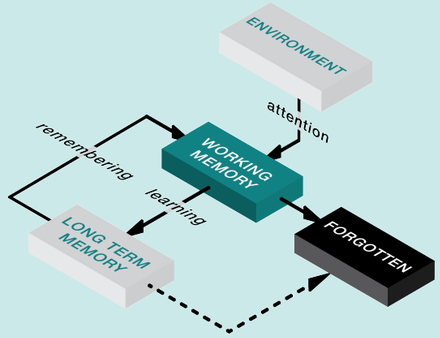
UNDERSTANDING HOW STUDENTS' MINDS WORK

THINKING

HOW THE HUMAN MIND WORKS

Willingham says, ***unless the cognitive conditions are right, we avoid thinking***. Thinking only occurs when you combine information from the environment and long-term memory in new ways - this combining of information happens in your working memory. Working memory has limited space which means thinking becomes increasingly difficult as it gets crowded. To ensure students experience the rush of problem solving, we should look at our practice from a cognitive perspective. Willingham suggests teachers should promote challenging ***cognitive work by reviewing each lesson in terms of what the student is likely to think about*** and use memory aids such as diagrams, checklists, etc to support working memory.

SIMPLE DIAGRAM OF THE MIND



E — **ENVIRONMENT**
Information in the environment surrounding us that we are both aware and unaware of.

WM — **WORKING MEMORY**
The site of awareness and information you're consciously thinking about in your mind.

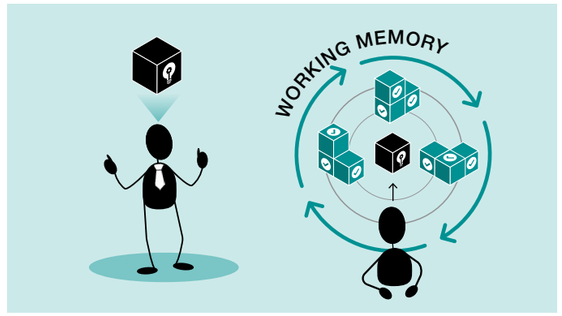
LTM — **LONG TERM MEMORY**
The storehouse of factual and procedural knowledge which exists outside of our awareness.

F — **FORGOTTEN**
Information that is lost and not transferred to long term memory.

KNOWLEDGE

THINKING DEPENDS ON BACKGROUND KNOWLEDGE

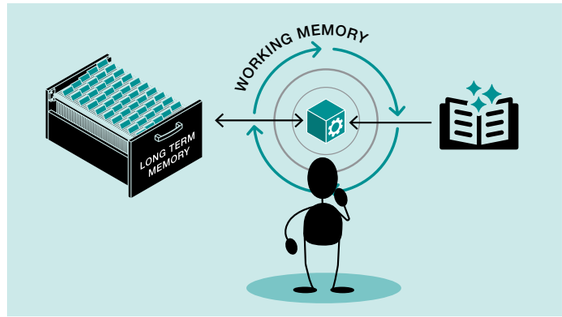
We want students to think critically not simply memorise information. Willingham says this cannot be achieved without background knowledge: ***background knowledge from our long term memory helps us to make sense of new information***. The factual knowledge stored in our long term memory allows chunking, and chunking increases space in working memory which makes it easier to tie ideas together. This means that teaching factual information makes the cognitive process work better. A practical way to do this is to get students to learn the concepts that come up again and again - the unifying ideas of each discipline. Knowledge is best learned when it is conceptual and facts are interrelated.



MEMORY

THE IMPORTANCE OF MEMORY & THINKING ABOUT MEANING

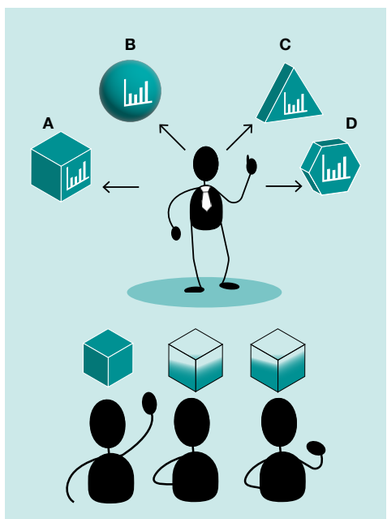
Students remember what they think about. Information can not get into long term memory unless it has first been in working memory. In other words, if you don't pay attention to something, you can't learn it: ***memory is the residue of thought***. Thinking about meaning helps memory and so teachers must design assignments so students think about the meaning of content. Willingham says effective teachers are able to connect personally with students and organise material in a way that makes it interesting and easy to understand: ***The human mind seems exquisitely tuned to understand and remember stories***. Stories have a familiar structure and contain the four Cs: causality, conflict, complications and character.



UNDERSTANDING

SHALLOW & DEEP KNOWLEDGE

We understand things we don't know by relating them to prior knowledge. This is why analogies work effectively when teaching students a new concept as they provide concrete examples. Willingham says: ***understanding is disguised remembering*** because every new idea we have is built on existing ideas. Our understanding of new information is initially shallow knowledge. To develop deep knowledge, we must work with the same idea in a number of ways which can take time. To support transfer, you can provide multiple examples and ask students to compare them. Explicitly and implicitly allude to the deep structure of material when asking questions, and setting assessments.



PRACTICE

DRILLING & EXTENDED PRACTICE

To increase competency and improve, we must practise. In fact, Willingham says: ***it is virtually impossible to become proficient at a mental task without extended practice.*** Practice can make the mental process automatic and therefore require little working memory capacity. This helps to extend thinking as more space in working memory can be used to further learning. Spacing practice over time is also useful as it leads to long-lasting memory. What's more, practising lots of problems of a particular type makes it likely you will recognise the underlying structure of them problem - in other words, ***practice helps transfer because it makes deep structure more obvious.*** Teachers should prioritise practising with knowledge students need to become automatic; space practice over time and fold practice into more advanced skills to add depth.

EXPERTS

KNOWLEDGE & EXPERIENCE

Experts are better equipped than novices to identify details, and transfer knowledge quicker to similar situations. Information in an expert's long term memory is organised differently as they can see deep structures of concepts much more easily. This is why expert teachers are often better at dealing with behaviour management - instead of trying to solve an issue, they first assess the situation and recall different types of problems the have experienced before. This experience only comes with extended practice - As Willingham says, ***practice makes progress.***

Why Don't Students Like School?
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