Activating prior knowledge

Overview

Students learn more effectively when new information is connected to prior knowledge (AERO 2024).

A student's prior knowledge sits in their long-term memory as 'schema' of interconnected ideas.

Teachers can activate this prior knowledge by prompting retrieval. This brings the schema into a student's working memory.

Retrieving prior learning just before new learning is introduced brings students' existing schemas into their working memory, ready to make the new connections (start with what they know) (AERO 2023a).

To support students to retrieve this learning over time, teachers can provide opportunities this learning.

Retrieving learning over time strengthens the connections in the brain, enhancing the fluency of future retrieval (spaced retrieval).

A schema occupies only one space, even though it may be very complex

New information   New information   'Free' space

Available 'spaces' in working memory
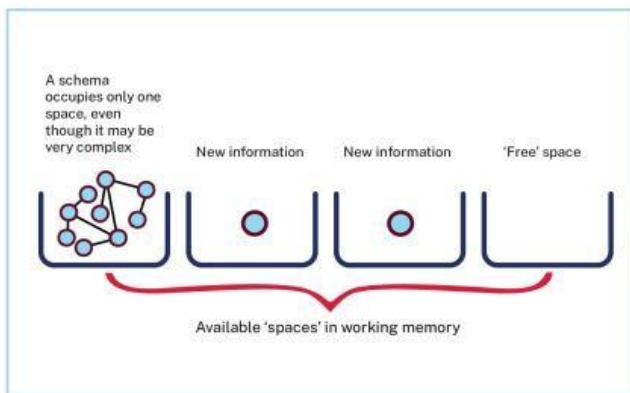
Key Considerations

- Not all students have the same prior knowledge. Teachers carefully select key pieces of prior knowledge they know all students in the class can retrieve.
- Prompt students to retrieve information from their long-term memory (See 1 on the diagram). Ensure all students have retrieved the information intended to avoid creating misconceptions.
- Introduce the new information. Only add a small number of new pieces at a time (See 2). Explain the connection between new information and prior knowledge.
- Plan activities for students to process the prior knowledge in combination with the new knowledge to make meaningful connections between them (See 3). This supports the transfer of this knowledge to long term memory in a process called encoding (See 4).
- Any activity you use to prompt retrieval will use up some working memory. Creating routines to reduce this cognitive load will support learning.

What it isn't

- Starting new learning with a prompt that is unrelated to the new learning.
- A pre-test – the purpose is not to discover what they already know.
- Saying 'Remember when we did "photosynthesis" last lesson' without students actively retrieving the specific piece of information needed for next steps.
- Telling students what they should remember. Students need to be prompted to actively retrieve the information from their long-term memory.
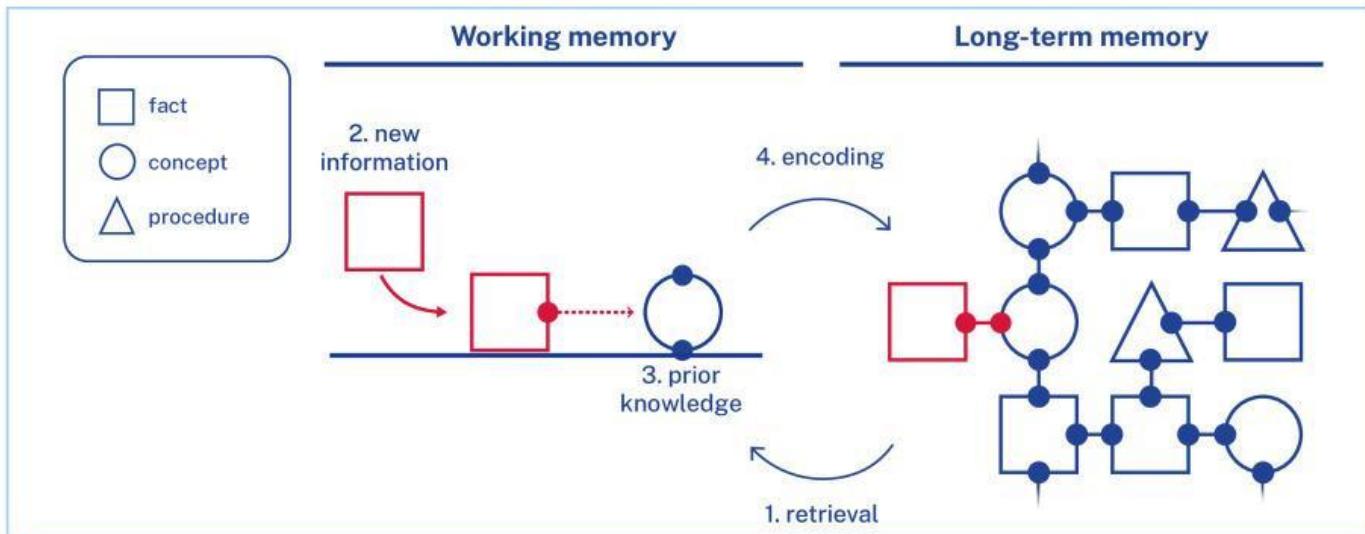
Working memory   **Long-term memory**

□ fact
○ concept
△ procedure

2. new information

4. encoding

3. prior knowledge

1. retrieval

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LIVEWORKSHEETS

Some activities which can be used to activate prior knowledge include:

- A short quiz. Only ask questions about information relevant to the new learning. These questions are designed so all students are successful.
- A carefully focused question which may ask students to write a sentence, or list, or draw a diagram.
- Prompts such as 'What is the name of a "doing word" ... it starts with a "v"'.
- Concept maps and mind maps can be effective but should be used with caution. A check for understanding would be required because if students create incorrect connections, they may inadvertently create or strengthen misconceptions (Caviglioli and Goodwin 2021).

Connecting learning resources

Classroom application

Stage 3 Science

In the previous lesson students were taught about vertebrates and invertebrates. At the start of the next lesson students are asked to retrieve from their memory the definitions of vertebrates and invertebrates before completing a sorting activity – each student receives a set of cards and must sort them into 'vertebrates' or 'invertebrates'. The new information comparing how vertebrates and invertebrates move differently on land can then be added.
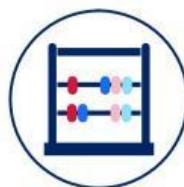
Stage 2 Mathematics

A Stage 2 class has been learning about geometric measures and mapping. Previous lessons have focused on directional language. At the start of the lesson the teacher displays a blank compass and some labels with directional language (North, East, South, West). Students use the displayed labels to label a blank compass they each have in front of them. The teacher corrects any incorrect language then explains that more complex language (North West) will be introduced so that students can complete a mapping challenge.

Stage 4 PDHPE

Students have been learning about first aid. They are given a blank piece of paper. They are asked to retrieve the emergency care acronym (DRSABC) and write the terms with their meanings on the paper (with prompting as required). Students are now ready to learn about increasingly complex situations in which to apply DRSABC using scenarios.

LIVEWORKSHEETS

More resources

AERO (2023a) – How students learn best

https://www.edresearch.edu.au/sites/default/files/2023-11/how-students-learn-best-aa_0.pdf

AERO (2023b) – Knowledge is central to learning

https://www.edresearch.edu.au/sites/default/files/2023-11/knowledge-is-central-to-learning-aa.pdf

AERO (2024) – Managing cognitive load optimises learning

https://www.edresearch.edu.au/summaries-explainers/explainers/managing-cognitive-load-optimises-learning

Explicit teaching – Checking for understanding

https://education.nsw.gov.au/teaching-and-learning/curriculum/explicit-teaching/explicit-teaching-strategies/checking-for-understanding

Explicit teaching – Using effective questioning

https://education.nsw.gov.au/teaching-and-learning/curriculum/explicit-teaching/explicit-teaching-strategies/using-effective-questioning

References

Australian Education Research Organisation (AERO) (2023a) How students learn best: an overview of the evidence, AERO. https://www.edresearch.edu.au/research/research-reports/how-students-learn-best-overview-evidence

Australian Education Research Organisation (AERO) (2023b) Mastery learning: planning and sequencing units to progress student learning, AERO. Mastery learning | Australian Education Research Organisation

Australian Education Research Organisation (2024) Managing cognitive load optimises learning.

Caviglioli O and Goodwin D (2021) Organise ideas: thinking by hand, extending the mind, John Catt Educational Limited.

Centre for Education Statistics and Evaluation (CESE) (2017) Cognitive load theory: research that teachers really need to understand, NSW Department of Education.

Cottingham S (2023) (O Caviglioli, illus) Ausubel's meaningful learning in action, John Catt Educational Ltd.

LIVEWORKSHEETS