Starter activity (‘Do Now’)

Read this passage of text.

Write a summary of your understanding in 2-3 sentences. You have 3 minutes.

Discuss your response with a partner

Harbhajan starts with one that maintains its line, just beating McMillan''s outside edge. The sweep works that time and earns McMillan a single. Astle is deceived by the next one, on his leg-stump. A neat back-foot square drive into the gap gets him two to end the over.

Kumble again. McMillan''s just got a warning for running on the wicket. Which is hara-kiri. Kumble''s attacking but isn''t getting his line right yet. Too much to leg. A good quick single on the offside.

Harbhajan''s tasted blood here. McMillan sweeps for a single. So does Astle. Now, will one of them try to sweep a top-spinner and top-edge it? But no, the sweep works, and earns a single.

Pity there''s just 10 minutes to go for lunch. The pressure will be eased off. Another wicket, of course, will change things.

Kumble almost yorks McMillan there. They''re really piling on the pressure, and the batter has no clue where the ball is. He manages to edge that on the onside for a single. Mustn''t give Astle any breadth.

Now Harbhajan''s attacking McMillan hard. He gets a single, though, to get away from the firing line. Bhajji makes the netx one come in sharply and Astle is foxed. This is getting to be fun now.

Teaching that aligns with how students learn

Nuella Flynn – Principal Policy Analyst

Australian Education Research Organisation

Acknowledgement of Country

AERO acknowledges the Traditional Owners and Custodians of the lands, waterways, skies, islands and sea Country across Australia. We pay our deepest respects to First Nations cultures and Elders past and present. We endeavour to continually value and learn from First Nations knowledges and educational practices.

Artwork: Shaun Edwards, Wildbarra Co.
www.wildbarra.com.au | Twitter @wildbarraco | Instagram @wildbarra

Introduction

What is AERO, and why we focus on teacher practice

AERO is
Australia's independent education evidence body, established and funded by Commonwealth, state and territory governments.

Our vision

AERO's vision is for excellence and equity in educational outcomes for all children and young people through effective use of evidence.

In support of this vision, we:

Generate high-quality evidence

Present high-quality evidence that is relevant and accessible

Encourage adoption and effective implementation of evidence in practice and policy

Gap between knowing and doing

There is a well-documented gap between research and practice: a lag of approximately 17 years between what we “know” and what we “do” (Robinson et al., 2020).

Evidence-based practices work across contexts

Formative assessment

- has a positive impact on student achievement in mathematics, reading, writing, social science and foreign languages
- works for primary and secondary students
- benefits students with and without additional learning needs.

Explicit instruction

- has a positive impact on student achievement in mathematics, reading, spelling, problem solving and science
- works for primary and secondary students
- benefits students with and without additional learning needs.

Mastery learning

- has a positive impact on achievement in mathematics, sciences, social studies and English and foreign languages
- works for primary and secondary students
- is effective particularly for lower-achieving students, with higher-achieving students also benefitting.

Why are some teaching practices consistently effective at improving learning outcomes?

Teaching that aligns with how students learn

“

Without an understanding of human cognitive architecture, instruction is blind.

John Sweller (2017)

”

Today's session

Australian Education Research Organisation

1. Working memory has limits
2. Higher order competencies rely on knowledge in long-term memory
3. Teaching that aligns with how students learn can improve learning outcomes
4. AERO's resources and advice can help provide consistent and coherent support

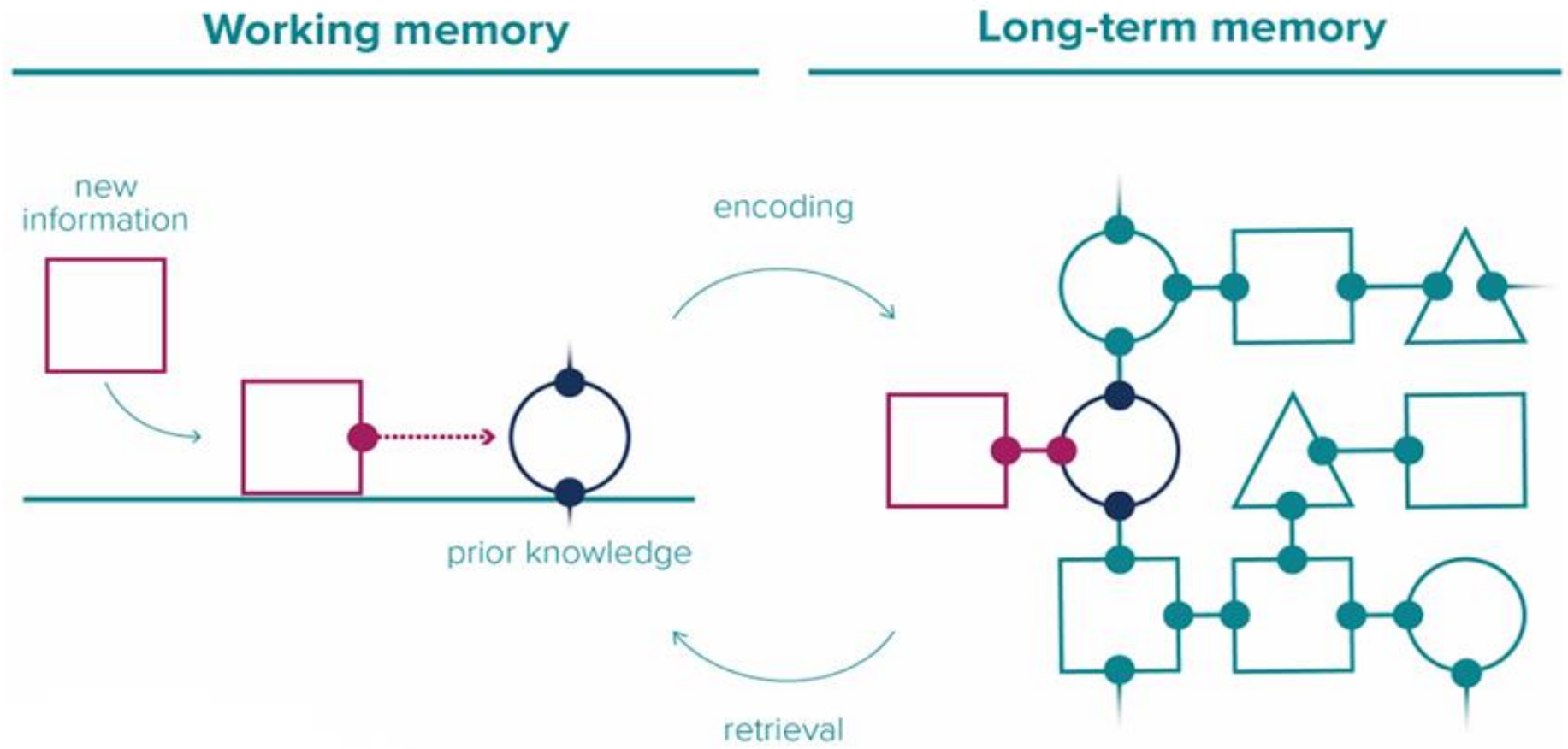
Key idea 1: working memory is limited

Image credit: AERO

What is learning?

- What shapes are covered by the Pythagoras theorem?
- When and how did you learn this?
- How do you know you have learned? Your students have learned?

A simple view of memory



TASKMASTER
TM

XFO

BIF

NNC

PDH

OGP

DCB

FOX

FBI

CNN

PHD

GPO

CBD

Based on an activity shared by Peps McRea.

What are the implications for teaching?

- Why is one set of letters easier to remember than another?
- What was the effect of repeating the word watermelon?
- What does this activity mean for teaching and learning?

List 1:	List 2:
XFO	FOX
BIF	FBI
NNC	CNN
PDH	PHD
OGP	GPO
DCB	CBD

Based on an activity shared by Peps McRea.

Cognitive load theory

> Cognitive load theory has been described by Dylan Wiliam as, “the single most important thing for teachers to know”

Paul A. Kirschner, Carl Hendrick, 2020. How Learning Happens : Seminal Works in Educational Psychology and What They Mean in Practice

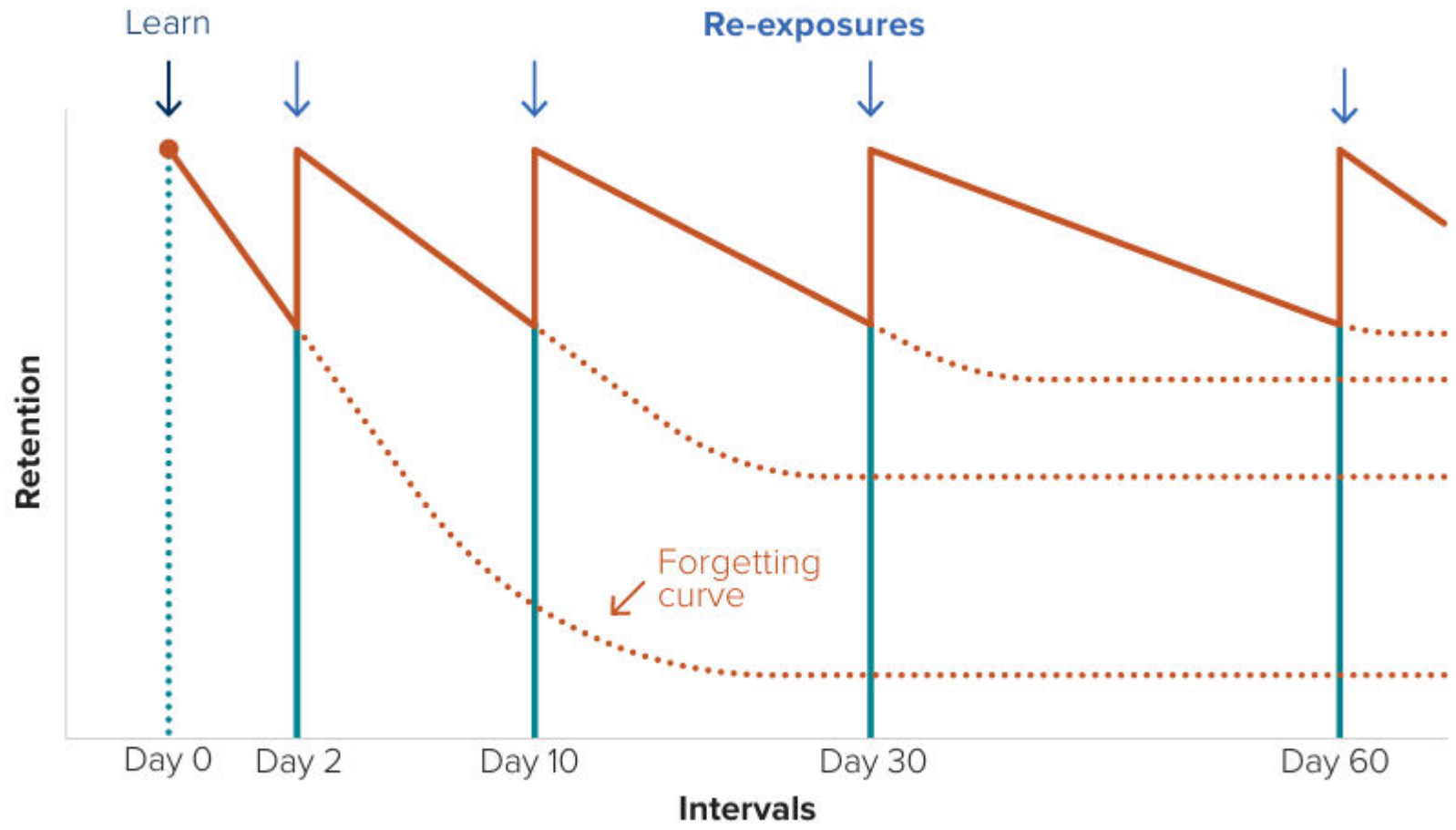
Cognitive overload

Students can experience cognitive overload when they are presented with:

- multiple new pieces of information simultaneously
- too much additional information that is not directly relevant to their learning
- too many distractions in their environment (which are common in learning environments with unclear behavioural expectations and inconsistent rules/routines)
- a task that is too conceptually difficult.

Willingham, 2021; CESE, 2017

The forgetting curve



Source: Adapted from Productive.Fish, used a CC0 licence.

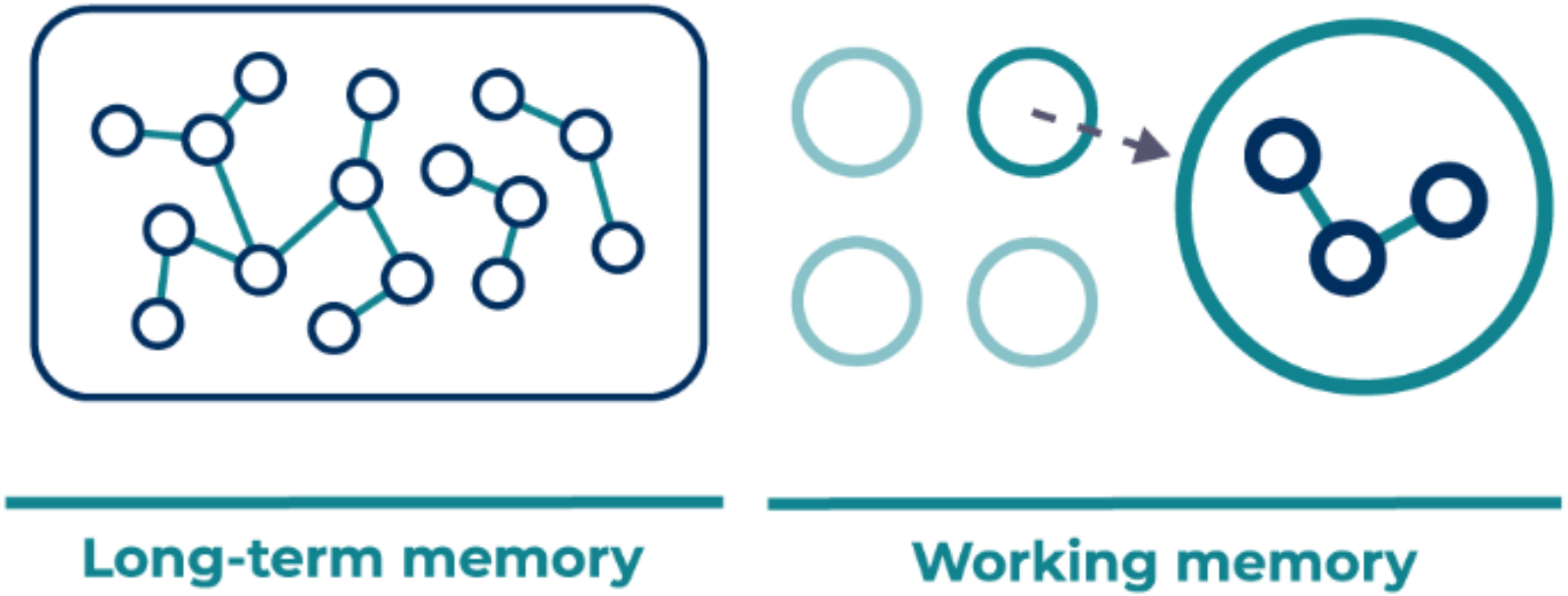
Optimising cognitive load and retention

- Break up, sequence and organise content (increasing in detail, complexity and abstraction)
- Teach explicity – explain, demonstrate and model using worked examples and other scaffolds
- Space and vary opportunities to practise
- Manage the learning environment to support focus on learning
- Gradually release responsibility from teacher to student

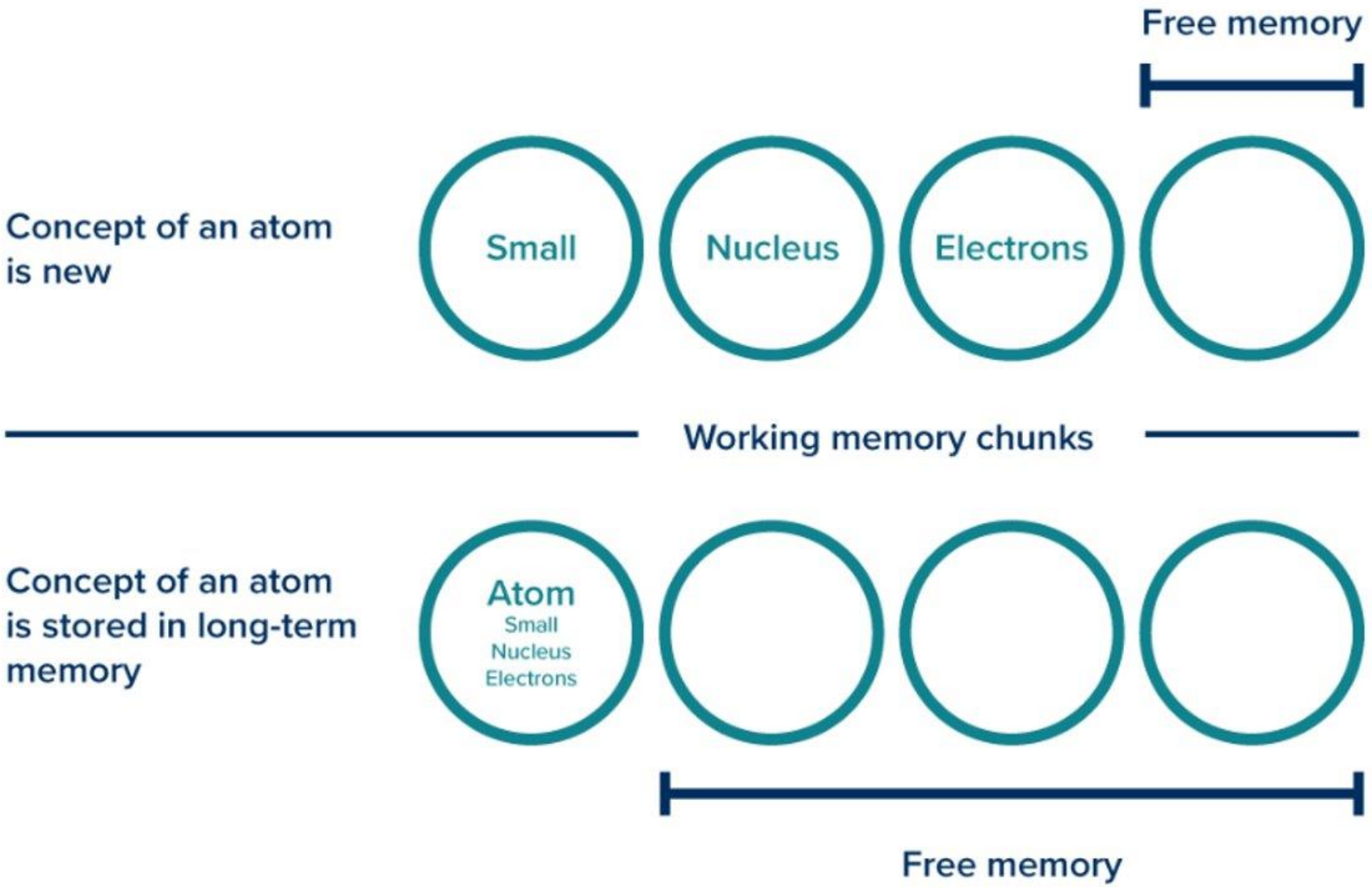
Key idea 2:
Higher order competencies rely on knowledge in long-term memory

Image credit: AERO

Knowledge in long-term memory overcomes the limits of working memory

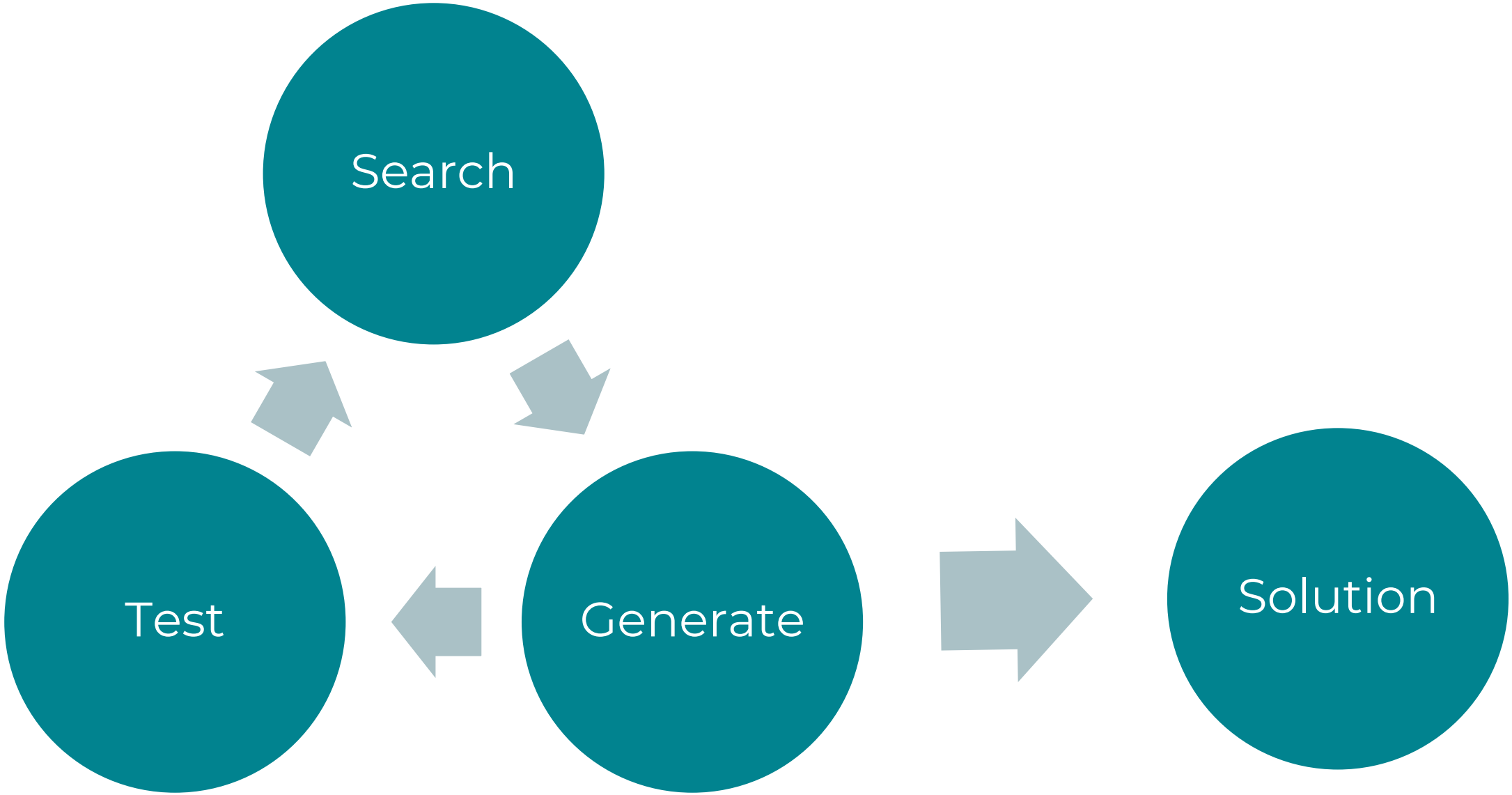


Knowledge in long-term memory overcomes the limits of working memory



“Data from the last 40 years lead to a conclusion that is not scientifically challengeable: thinking well requires knowing facts, and that's true not simply because you need something to think about. The very processes that teachers care about most – critical thinking processes such as reasoning and problem solving – are intimately intertwined with factual knowledge that is stored in long-term memory (not just found in the environment).”

Daniel Willingham

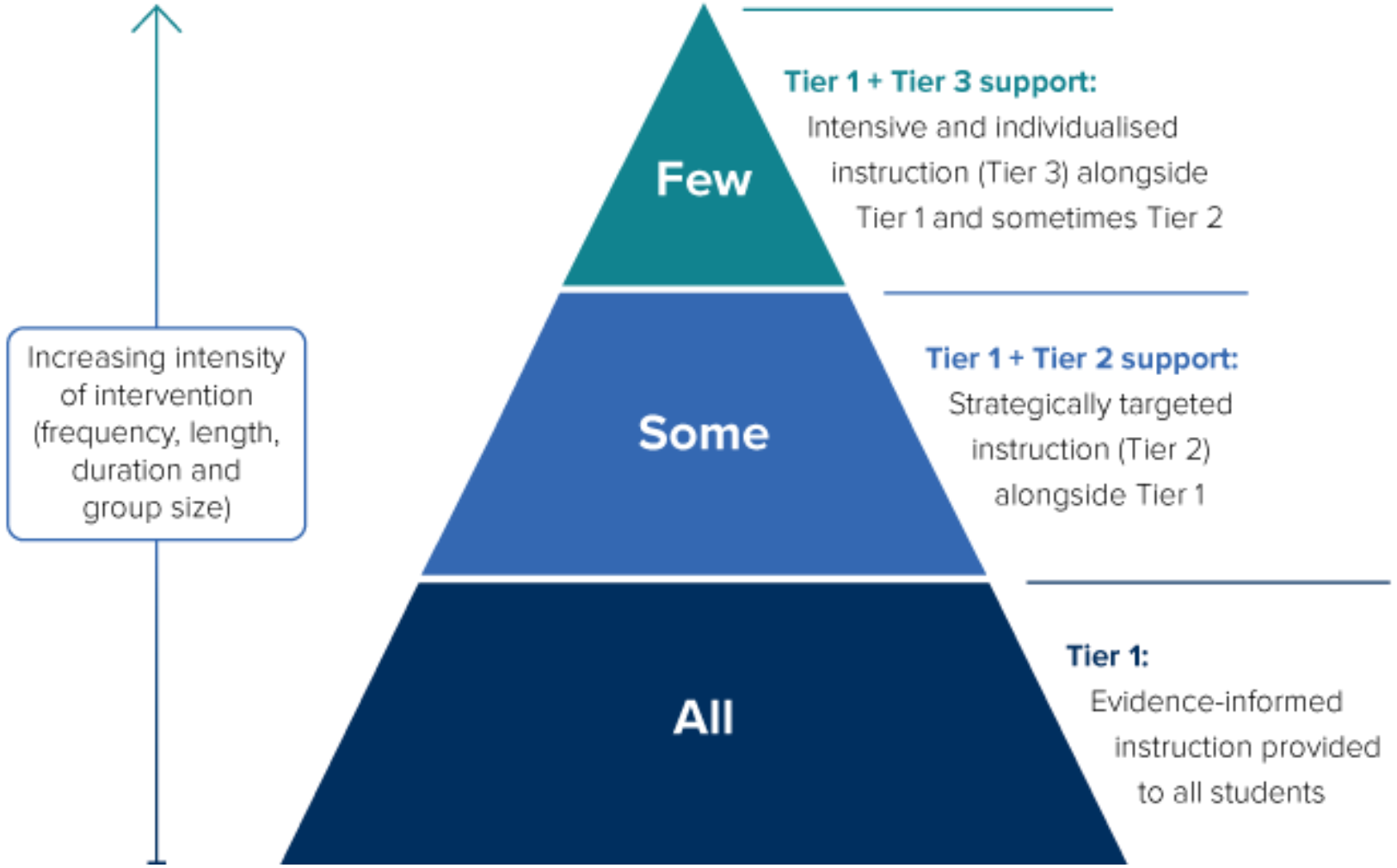

Search
Test
Generate
Solution

Guiding students towards mastery

Effective teaching gradually releases responsibility as students gain mastery. This involves:

- Scaffolding and guiding student practice when content is new
- Frequently monitoring and responding to student learning progress
- Revisiting prior learning to review and consolidate
- Spacing and varying opportunities for retrieval practice
- Providing more open, complex and independent tasks once students have consolidated knowledge to draw from.

Tiered intervention within a multi-tiered system of supports (MTSS)



Conclusions of research into support for struggling students

- Sound evidence to support the use of a MTSS in Australian schools
- Consistent use of effective instruction at Tier 1 made a difference
- Team-based, problem-solving approach to selecting interventions, and implementing with fidelity at Tier 2
- 95% of students could meet academic benchmarks

Intro to MTSS (Leaders)

Support tiered interventions (Teachers)

Key idea 3:

Teaching that aligns with how students learn can improve learning outcomes

Image credit: AERO

A model of learning and teaching: aligning teaching with how students learn

How students learn

Attention and focus

Students are actively engaged when learning

- Sensing, thinking and memory
- Readiness for learning
- Self-regulation
- Safety and belonging

Knowledge and memory

Learning is a change in long-term memory

- Novice learners
- The developing brain
- Working and long-term memory
- Consolidation

Retention and recall

Students process limited amounts of new information

- Cognitive load
- Recall and retention
- Additional learning needs

Mastery and application

Students develop and demonstrate mastery of their learning

- Application of knowledge
- Mental models
- Problem solving, critical and creative thinking
- Generative learning

Teaching that aligns with how students learn

Enabling

Foster the conditions of a learning-focused environment

- Rules and routines
- Respectful interactions
- Self-regulated learning
- Cultural safety
- Family engagement

Planning

Develop a teaching and learning plan for the knowledge students will acquire

- Define knowledge
- Chunk content
- Sequence instruction
- Plan to assess

Instruction

Manage the cognitive load of learning tasks

- Explain learning objectives
- Teach explicitly
- Scaffold practice
- Monitor progress
- Support tiered interventions

Gradual release

Maximise retention, consolidation and application of learning

- Revisit and review
- Vary practice
- Organise knowledge
- Extend and challenge

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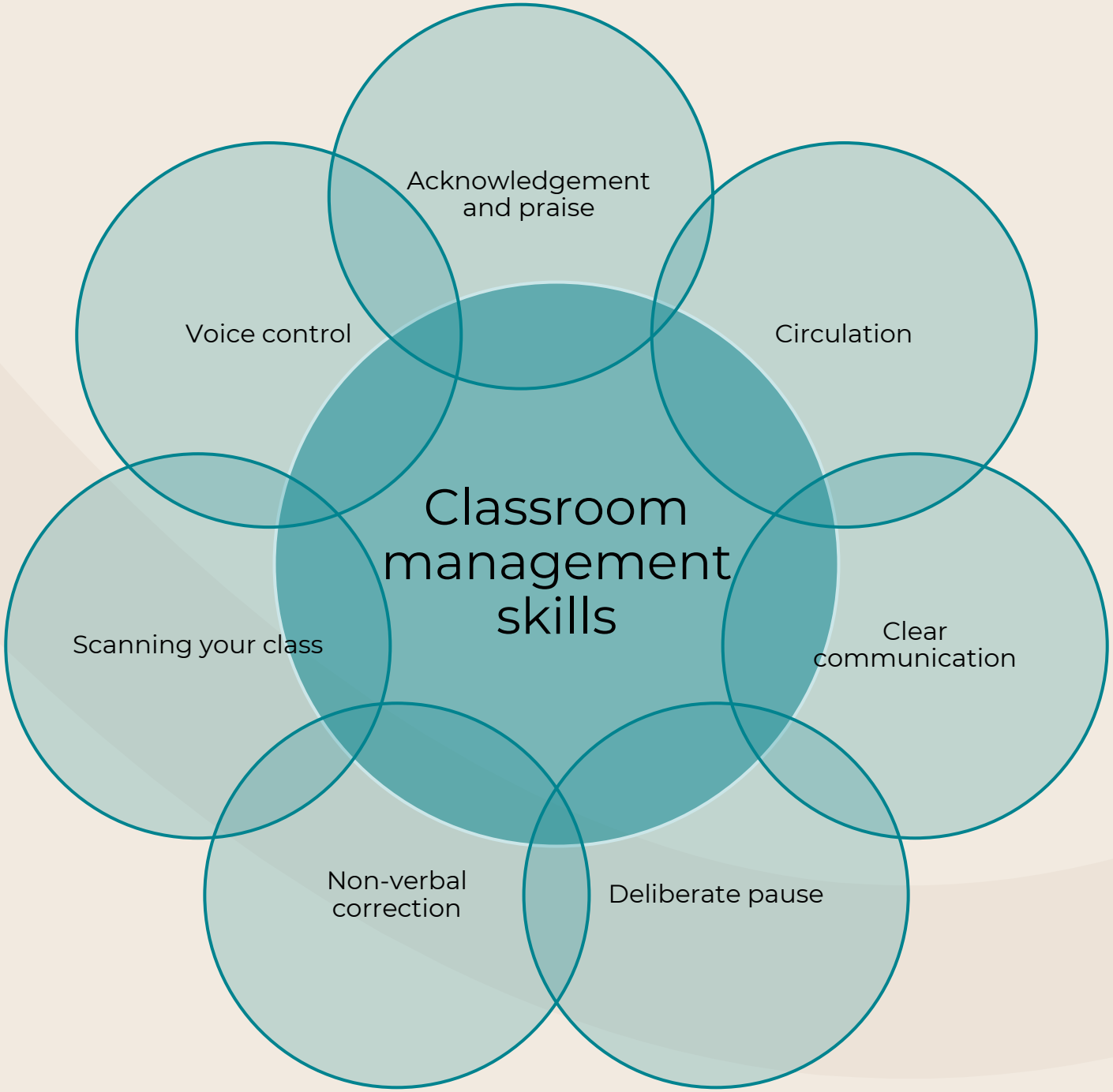
Scan to read AEROs model and overview of How Students Learn

How students learn

practice guides and videos

Find practice guides and videos at
edresearch.edu.au/learning-teaching-model


Acknowledgement and praise
Voice control
Circulation
Classroom management skills
Scanning your class
Clear communication
Non-verbal correction
Deliberate pause

Classroom management resources

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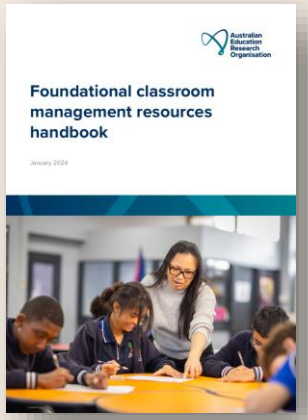
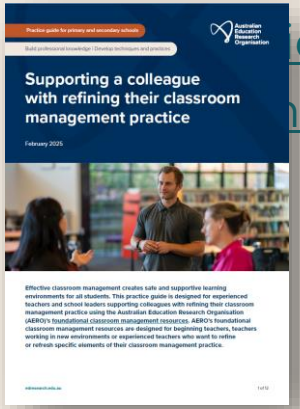
Foundational resources

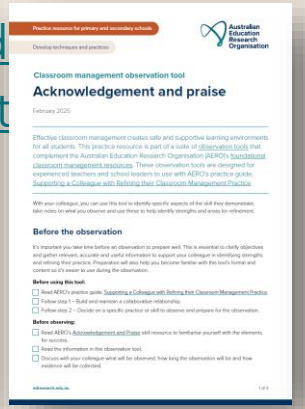


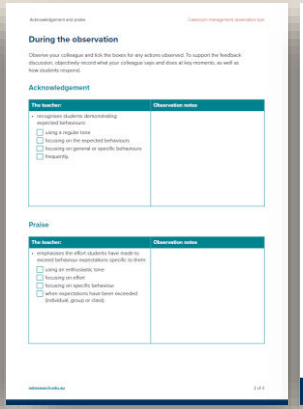
Professional learning resources

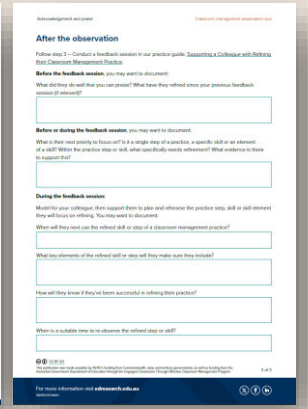
Additional support

Supporting colleagues with refining their practice







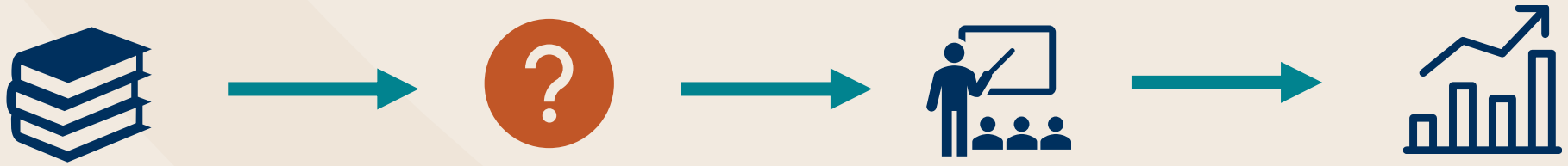


AERO guidance on classroom management

- Foundational classroom management approaches
- Supporting students' diverse needs
- A whole-school approach to classroom management
- Supporting colleagues with refining their practice

For a summary of all these resources, start with our Classroom Management User Guide.

The implementation ‘know-do’ gap



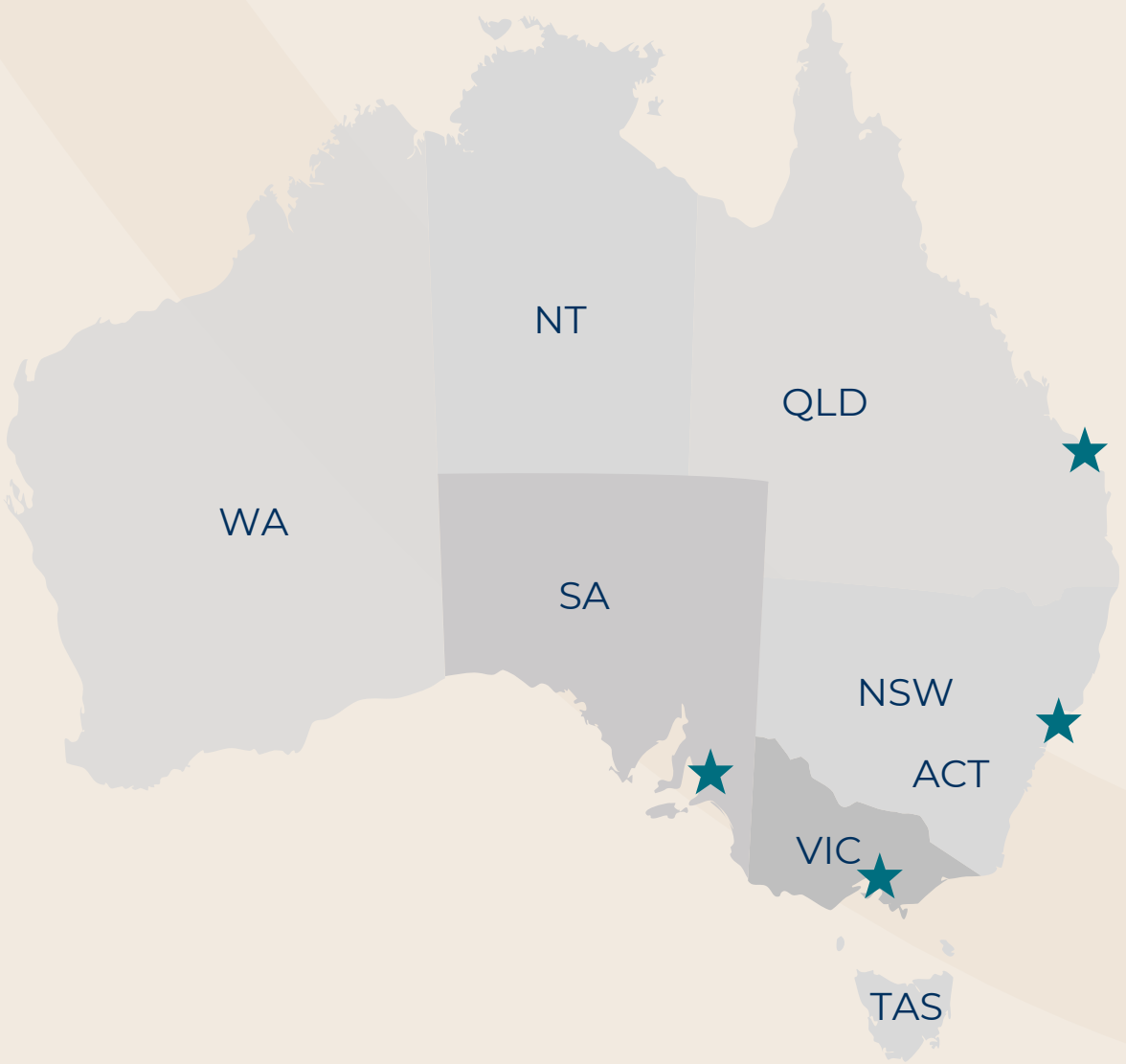
Evidence-based practice

Implementation gap

Improved teaching capability

Improved student outcomes

The Learning Partner project



2023
8 schools

2024
14 schools

2025
44 schools

Implementing evidence-based practices

- We support schools to implement **explicit instruction**, focussing on the **highlighted practices**.
- Each practice has key strategies and techniques which form the **core elements**. We work with schools to determine what these core elements will look like in their settings.
- We **chunk** some of the core elements together to help make new learning and enhancing practice manageable. These chunks help form **professional learning cycles** for teachers.

How students learn	Teaching that aligns with...
Attention and focus **Students are actively engaged when learning** • Sensing, thinking and memory • Readiness for learning • Self-regulation • Safety and belonging	**Enabling** **Foster the conditions of a learning-focused environment** • Rules and routines • Respectful interactions • Self-regulated learning • Cultural safety • Family engagement
Knowledge and memory **Learning is a change in long-term memory** • Novice learners • The developing brain • Working and long-term memory • Consolidation	**Planning** **Develop a teaching and learning plan for the knowledge students will acquire** • Define knowledge • Chunk content • Sequence instruction • Plan to assess
Retention and recall **Students process limited amounts of new information** • Cognitive load • Recall and retention • Additional learning needs	**Instruction** **Manage the cognitive load of learning tasks** • Explain learning objectives • Teach explicitly • Scaffold practice • Monitor progress • Support tiered interventions
Mastery and application **Students develop and demonstrate mastery of their learning** • Application of knowledge • Mental models • Problem solving, critical and creative thinking • Generative learning	**Gradual release** **Maximise retention, consolidation, and application of learning** • Revisit and review • Vary practice • Organise knowledge • Extend and challenge

Where to start

- Consider your school's implementation goal
- Identify what's already in place and working well, and what might need attention
- How ready are staff for change, and how are early acceptability and feasibility outcomes tracking (and how do you know)?

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Evidence and resources educators can trust

For more information, please visit:

edresearch.edu.au

Thank you!

Please reach out if you have any questions or feedback.

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