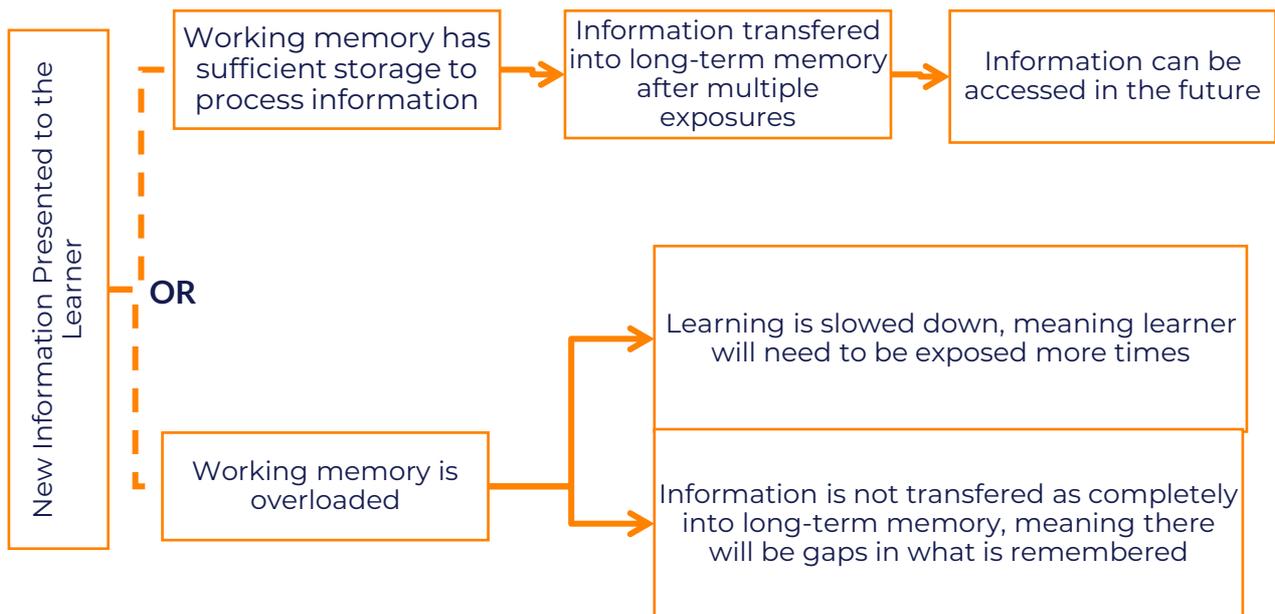# LANGUAGE DISORDER AUSTRALIA

Long-term Retention and Learning

A student's knowledge is stored in their memory. At any given moment, students are being exposed to a large number of stimuli in the environment, but only a small portion of this makes it into the brief memory storage area known as short-term or working memory. To be retained or learned, that information must also then be transferred into long-term memory. This transfer of information from short-term to long-term memory can be facilitated through frequent practice that incorporates certain teaching strategies, including managing the load on working memory.

Keywords: *long-term memory, working memory, retention, cognitive load*

Considering Cognitive Load and its Impact on Learning

Cognitive Load Theory is a theory of how the brain learns and stores information that has relevance for teaching. This theory emphasises the importance of optimising the load placed on a student's working memory by a learning activity. The human brain can only process a small amount of new information at once. This is because of limits to our short-term or working memory system. The average person can only hold between 4 and 7 'chunks' of information in their working memory at one time. In comparison, long-term memory is able to hold large amounts of information. These two facts about have important implications for the learning process, as shown in the diagram below.

New Information Presented to the Learner

Working memory has sufficient storage to process information → Information transfered into long-term memory after multiple exposures → Information can be accessed in the future

OR

Working memory is overloaded → Learning is slowed down, meaning learner will need to be exposed more times

Information is not transfered as completely into long-term memory, meaning there will be gaps in what is remembered

Ways to Address Cognitive Load

Managing the load on learners' working memory is an important implication of cognitive load theory. There are two general approaches that can be used:

1. When information is complex or new, reduce working memory load as much as possible. For more information see LD *Working Memory* handout.
2. Use teaching strategies that support the transfer of information into long-term memory. For more information, see the strategies in this handout below.

Teaching Strategies to Support Long-Term Retention

The recommendations below are evidence-based strategies for organising both instruction and students' studying of material to facilitate the learning and remembering of curriculum content.

Frequent Practice	Deliberate practice of skills is a key aspect of transferring information into long-term memory. Daily review of skills can help strengthen connections and increase our ability to recall concepts automatically when we need that material. Examples may include: • Daily review of key term vocabulary • Beginning each class period with a brief five to ten-minute review of previously covered material • Daily review of maths facts at the start of small group math intervention
Space Learning Over Time	Research has shown that re-exposure to course material after a delay can significantly increase the amount of information that students remember in the long-term. Even though students may not be able to recall the previously learnt material, the re-learning will be easier, and the final retention will be stronger. Consider spacing out practice by: • Arranging term teaching plans to review key elements of course content on at least two separate occasions, after a delay of several weeks to several months. • Spacing intervention or support sessions across the week. Consider more frequent, shorter sessions. • Including a few items covering previous content in homework assignments • Helping secondary students to space their studying over time instead of "cramming"
Active Rehearsal	Learners require additional time rephrasing, elaborating, and summarising new material in order to store new information in their long-term memory. This active recall or rehearsal of information is more helpful for learning than passive review. Examples include: • Encouraging students to actively answer questions through practice quizzes. Consider using items that require active recall (e.g. short answer or fill in the blank) and be sure to provide feedback about correct answers.

	• Starting a class session with a 'quick write' or 'quick draw' where students record what they can remember from previous lessons. • Providing opportunities for both guided and independent practice following the introduction of material through lecture or independent reading, in other words, I do, We do, You do. • Providing frequent opportunities to respond to questions and to discuss information with peers such as the Think-Pair-Share strategy.
Link to Previous Learning	When students are able to form a connection with class content and can relate this to prior knowledge, the meaningfulness of content is increased. Examples include: • Using a mind map to allow students to tangibly link previous knowledge to a new class topic. • Having the class share their own experiences related to the new topic

Want to learn more?

To learn more about Language Disorder and how to support children and young people for whom language is their primary disorder, please **contact us**. Language Disorder Australia provides holistic, innovative and effective therapy, education and support services and has a transdisciplinary team of speech pathologists, occupational therapists, educators, psychologists and physiotherapists.

Contact: 1300 881 763 or **hello@languagedisorder.org.au**

Website: **languagedisorder.org.au**

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Version 1.01