

How to Support Students with Working Memory Difficulties

What is working memory?

Working memory is the ability to hold information in your head and mentally manipulate it over short periods of time. It is a mental workspace that we can use to store information in the course of our mental activities. Difficulties with working memory make it hard to hold information in 'temporary storage' or work with it - for example, difficulty in remembering and following instructions, or forgetting what has recently been said. Poor working memory is characteristic of children with many kinds of learning difficulties. These include individuals with language impairments, with difficulties in reading and mathematics (including dyslexia), with some forms of ADHD and with developmental coordination disorder.

Why is working memory crucial for learning?

Working memory provides a mental workspace in which to hold information in mind whilst engaged in other relevant activities. Students need this memory on a daily basis at school for a variety of tasks, such as following teachers' instructions or remembering sentences they have been asked to write down. Students with a difficulty in working memory can often expend more effort than other children in completing a task.

Characteristics of students with poor working memory:

- have difficulty staying engaged in class.
- need more time and repetition.
- often give an inconsistent performance.
- have difficulty following instructions or directions.
- make poor academic progress, especially in reading and maths.
- lose their place in complicated tasks that they may eventually abandon.
- need to constantly read and re-read text
- behave as though they have not paid attention, for example forgetting part or all of instructions or messages, or not seeing tasks through to completion.
- are considered by their teachers to have short attention spans and also to be easily distracted.

How to support students with working memory problems:

- **Recognise working memory failures** - if a student displays any of the characteristics above it may be necessary to try and reduce working memory demands and loads (see below) for those specific students. For example:
 - avoid activities that require the student to remember lengthy instructions, number sequences, lengthy sentences etc.
- **Reduce working memory loads if necessary** - to limit working-memory-related failures, working memory loads in structured activities should be decreased. For example:
 - reduce the amount of material to be stored (shorter sentences to be written or items to be remembered).
 - encourage memory aids - lists of key words available, provide printed notes/handouts prior to or during lessons.
 - give information or instructions in verbal and visual formats.
- **Frequently repeat important information** - it is good practice to repeat information during classroom tasks or activities. For example:
 - break down whole activities into simple steps
 - encourage students to have the confidence to ask for instructions to be repeated or to clarify activities.
- **Encourage the use of memory aids** - a variety of tools to support working memory are already available in schools. For example:
 - memory cards, Dictaphones, personalised dictionaries, teacher notes, wall charts etc.
- **Develop the child's use of memory-relieving (or enhancing) strategies** - the student should be encouraged to take responsibility for developing and using strategies for overcoming memory problems. For example:
 - using memory aids
 - breaking tasks down into manageable chunks.
 - students should be encouraged to build confidence in asking for help and asking staff to go over important information when it has been forgotten.
 - It may be necessary to teach students to over-learn material: students should be taught the necessity of "over-learning" new information (new vocabulary/terminology, symbols, etc).
 - students should be encouraged to be active readers: highlighting words, underlining, jotting down key words in margins enhance working memory. Re-reading highlighted words, underlinings etc will consolidate information in the long-term memory.
 - encourage students to organise their ideas graphically (using flow charts, wheels, venn diagrams, Some good examples can be found on www.eduplace.com/graphicorganizer).

- practice the retrieval of information by setting tests - these tests can be answered individually, in pairs, small groups, etc. Students can be involved in setting each other tests.
- encourage students to use cues to retrieve information. For example, mnemonics or acronyms act as a cue for learning and recalling information.

Praise and motivation:

- Praise can be a natural motivator as long as the student feels the praise is genuine and deserved. It is important to let him/her know why he/she is being praised rather than just provide praise.
- It can be easy for the student with working memory difficulties to be discouraged. It is crucial that motivation is maintained. One of the best motivators is success. If steps are small enough and targets are realistic, then students will achieve some success and this will provide motivation.

Further information:

Mind Mapping[®] is usually an effective way to remember items visually, and this technique also helps to organise items. The Mind Map[®] Book by Tony Buzan (BBC Books) provides good examples of the use of this strategy.

The book by Agnew, Barlow, Pascal and Skidmore, *Get Better Grades - Cool Study Skills for Red Hot Results* (Piccadilly Press), also offers a range of interesting and unusual strategies for developing memory skills, as do the books by Jonathan O'Brien such as *Brain Trainer* (Longman).

Memory Trainers: techniques, games and systems to teach and improve memory skills (2001) - available from Learning Works, 9 Barrow Close, Marlborough, Wiltshire SN8 2YY; email: info@learning-works.org.uk; website: www.learning-works.org.uk