Education and Social Care

WORKING MEMORY IN THE CLASSROOM

Memory and Learning

Memory and learning are inseparable. The importance of memory in learning can not be underestimated.

Learning is dependent on our experiences and involves us acquiring new knowledge and skills. However remembering and retaining what has been learned is vital if we are to use it again in the future. Memory is the process by which this is achieved.

Memory is the process by which we store, activate and retain knowledge and skills, to be recalled and put to use at a later date.

Different Types of Memory

There are two different types of memory:

1. **Working Memory : -** is a fluid cognitive skill that refers to the ability to store and manipulate information (verbal, visual and spatial) in the mind for short periods.
   (*such as remembering telephone numbers, following directions and instructions, and keeping track of shopping list items in the supermarket*).

2. **Long-Term Memory :-** involves remembering significant personal events, storing skills that have been mastered and can be used automatically (*such as driving car, playing guitar*) and also storing facts, word meanings and general knowledge.

Why is Working Memory Important in Learning?

Children often are required to hold information in mind whilst engaged in other activities. The capacity to store this information is vital to many learning activities in the classroom.

However information held in working memory can easily be lost through distraction or overload. The size of each child's working memory capacity can vary greatly.

Children with poor working memory often struggle to meet the heavy demands of many everyday classroom activities, simply because they are unable to hold sufficient information in mind to allow them to complete the task (*often forgetting information/ instructions, and being forced to guess – a strategy which often leads to errors, or abandoning tasks before their completion*)

Working Memory and Learning Outcomes

There is now an increasing body of evidence which suggests that working memory is linked to key learning outcomes.

Research has found evidence of working memory problems in individuals with reading and mathematical difficulties, language impairments, developmental co-ordination disorder and attention problems.

There is also strong support for the view that working memory represents an important factor in determining a child's success in learning outcomes (*for example, a study of typically developing 5 year olds found that working memory to be best predictor of scores in standardised measures of reading, spelling and maths six years later*).

Working memory is crucial not only in early education, but can have an impact on future learning. It appears that children with working memory deficits are not able to catch up with their peers, and they can continue to struggle throughout their academic careers.

As the amount of information given to children increases in class as they progress through school, the demands placed on their working memory increase, and this can cause overload.

How can we recognise poor working memory in the classroom?

Children who have significant working memory difficulties often have the following profile:

- Normal social relationships with peers
- Reserved in group activities
- Poor academic progress in reading and maths
- Difficulties in following instructions
- Struggle to cope with learning activities that require both storage and processing demands (*frequently imposed in structured learning activities*)
- Place-keeping difficulties (*errors such as missing out letters/ words in sentences*)
- Appears to have short attention span/ daydreaming/ lacking motivation/ distractible.
- Difficulty copying from the board

Children with poor working memory are rarely described by their teachers as having memory problems. Typically they present as children who have attentional difficulties (who 'zone out') or behavioural difficulties.

How can we help support child with working memory difficulties?

Once we know that a child has poor working memory and when we have identified their working memory profile, it is vital that the school works with the child to find ways to overcome these difficulties, in order to ensure that their learning can be maximised.

Below is a <u>classroom-based working memory approach</u> which is designed to avoid working memory overload in structured learning activities:-

Principles	Further Information
Recognise working memory failures	Warning signs include incomplete recall, failure to follow instructions, place-keeping errors and task abandonment
Monitor the child	Look out for warning signs and ask the child about difficulties
Evaluate working memory loads	Remain vigilant to heavy loads caused by: - lengthy sequences of instructions - unfamiliar content - demanding mental processing activities
Reduce working memory loads	Reduce the amount of material to be remembered, increase the familiarity and meaningfulness of material, simplify mental processing and restructure complex tasks
Repeat important information	Repetition can be supplied by teachers or fellow pupils nominated as memory guides
Encourage use of memory aids	Can include wall charts/ posters, useful spellings, cubes, counters, number lines, calculators, memory cards, personalised dictionaries, audio recorders and computer software
Develop the child's own strategies	These include asking for help, rehearsal, note-taking, use of long-term memory, place-keeping and organisational strategies.

Further Information and Useful Resources

- **www.sagepub.co.uk/dittrich** - offers downloadable and photocopiable PDFs on strategies for helping memory.

Information for this booklet was compiled using a variety of different sources/ resources including:

Gathercole, S.E. (2008) Working Memory in the Classroom *The Psychologist, 21, 5, 382-28.*

Alloway, T.P (2011), The benefits of computerised working memory assessment, *Educational & Child Psychology, 28 (2), 8-17.*