Identifying and supporting children with working memory problems

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Working memory: key features

- Capacity to hold material in mind and manipulate as necessary for brief period
- Mental workspace
- Limited in capacity
- Catastrophic loss

Characteristics of children with poor working memory

- Poor academic progress, particularly in reading and maths
- Normal social integration
- Reserved in groups
- Difficulties in following instructions
- Problems combining processing with storage
- Place-keeping difficulties
- Short attention span and distractibility

Why do these children struggle to learn?

- Learning is a step-by-step process, based on successes in individual learning activities.
- Children with working memory impairments often fail in the classroom because the working memory loads are excessive for them.
- Working memory failure leads to inattentive behaviour, simply because the child forgets what s/he is doing.

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Activity 1:
Identifying children with working memory problems

For each case, decide:

- what (if any) do you consider to be the possible major underlying problems faced by this child?
- whether this child show any of the warning signs associated with working memory impairments? If so, which ones?

Adam

Adam is a 10-year old boy. He is viewed by his teacher as experiencing many problems within the classroom, and on occasions can be a disruptive influence due to his high level of distractibility. He often appears restless and fidgety, and on several occasions has broken classroom equipment. His work is of a low average standard, with its quality varying considerably from day to day. His teacher is as yet unsure whether he will attain Level 4 in Key Stage 2 National Curriculum assessments in English, maths and science, although she feels sure that he has the abilities to do so.

Andrew

Andrew is a 6-year old boy with a pleasant and cheery personality. He is well-behaved and popular in his class. Andrew’s IQ is within the normal range, with a higher Performance IQ (105) than Verbal IQ (95). His academic performance is poor in both numeracy and literacy, and is in the lowest ability group in literacy. He frequently becomes frustrated by the difficulties that he experiences, particularly in writing. Andrew does not often participate in class discussions, and often seems to be unable to respond even after he has raised his hand in response to a question by the teacher at ‘carpet time’.
Olivia

Olivia is a 7-year old child with an outgoing personality who is well-liked by her classmates. Her IQ is in the high average range (113). She has a mature and responsible attitude and is often chosen by her teacher to run errands. She has been placed in high-ability groups in both literacy and numeracy, and often helps out less able children within the group, occasionally misguiding them. At times she is forgetful, and can appear to be distracted from work by her own thoughts. The teacher often enlists her help in organizing classroom activities such as putting out art materials.

Alice

Alice is aged 9 years. She is a timid girl with a close friendship with one other child. She was identified by her school as having special educational needs (School Action stage) one year ago due to her difficulties in developing literacy skills. Despite good comprehension of language, her word recognition skills are very poor and she struggles to extract meaning from text. Her hand-writing is messy, and her spelling is very inaccurate. Alice has made reasonable progress in maths where she copes with the demands of a mid-range ability group.

Jonathon

At 8 years, Jonathon struggles to meet the language demands of the classroom despite appearing to be a bright and focused child. His spoken language is not markedly impaired, but is characterized by some degree of phonological immaturity. His progress in reading is very poor and he has struggled with many aspects of maths. In both areas, he receives twice-weekly support from a special needs assistant in school. The severity of his learning difficulties is reflected by his School Action Plus special needs status.

Charlotte

Charlotte is a 6-year old girl who has established a small and supportive group of friends in her two years at school. In class activities, however, she often appears withdrawn, and frequently drifts away from activities without completing them. Her teacher says that she often seems to be in a world of her own. She is working in low ability groups in the classroom.
Classroom-based support for children with poor working memory

Children with poor working memory struggle to learn because of memory overload in activities designed to promote learning.

The main purpose of the intervention is to: minimise learning difficulties by preventing working memory overload.

Principles of the intervention outlined in the booklet: Understanding Working Memory: A Classroom Guide

Classroom support: The principles

- Be aware of the warning signs of working memory failure

Warning signs of working memory failure

- Incomplete recall
- Failing to follow instructions
- Losing track of place
- Abandoning the task

Classroom support: The principles

- Be aware of the warning signs of working memory failure
- Monitor the child
Identifying and supporting children with working memory problems
Prof. Susan Gathercole

Classroom support: The principles
- Be aware of the warning signs of working memory failure
- Monitor the child
- Reduce amount of information to be stored

High working memory loads
- Remembering such sequences as
  - Three or more numbers (e.g., 5, 9, 2, 6)
  - Three or more unrelated words (e.g., cat, lion, kangaroo)
- Writing lengthy sentences containing some arbitrary content
  - (e.g., To blow up parliament, Guy Fawkes had 36 barrels of gunpowder)
- Following lengthy instructions
  - (e.g., Put your sheets on the green table, arrow cards in the packet, put your pencil away, and come and sit on the carpet)
- Keeping track of the place reached in the course of multi-level tasks
  - (e.g., writing a sentence either from memory or copying from the board)

Classroom support: The principles
- Be aware of the warning signs of working memory failure
- Monitor the child
- Reduce amount of information to be stored
- Reduce difficulty of processing
- Repeat important information
Some examples

Teacher spends time individually prompting pupil and keeping him on task:
- e.g. What is the next word?
  Think of a sentence using this word.
  What is the spelling pattern?

Breaks down multi-step instructions into separate steps, giving pupils time to perform each stage.
- e.g. 'Stop what you are doing…..First job is tidy your tables…..Second job is to stand behind your chair.'

Provides clear, simple instructions and demonstrates when possible. E.g. 'I am going to give you two books. Your literacy and your buff developing writing book. (Teacher points to them). Your plan is in this literacy book…..You will write the story in your developing writing book.'

Repeating important information

Asks questions directly to the pupil as prompts to support retention of information, e.g.
- 'Who did I say you will be working with?'

Repeats classroom management instructions, e.g. 'Take your reading journal then pass the pile along.'

Repeats key information and asks pupils target questions to remind them of crucial steps.
- E.g. 'Why are you going to be given two writing books?'
  - 'Which book do you write the story in?'

Classroom support: The principles

- Be aware of the warning signs of working memory failure
- Monitor the child
- Reduce amount of information to be stored
- Reduce difficulty of processing
- Repeat important information
- Encourage the use of memory aids

Memory aids

Key information remains displayed visually, e.g. lesson learning objective and success criteria, class and group writing targets.

Pupils work with practical resources when calculating additions, e.g. counting the total number of cubes/stamps made. A simple key is used on the worksheet for the pupil’s independent task to act as a reminder, e.g.
- Colour rectangles red

Often refers to displayed posters of key information as memory aids during teaching, e.g. 'Phoneme of the week, Days of the week, We are learning about…. Class target, We know what a sentence needs.'

Refers to displayed picture cards when discussing the work to be completed that day, e.g. 'First we are doing literacy' (teacher points to the card symbolizing this subject).
More memory aids

- Demonstrates use and makes regular reference to individual target cards, reading journals and spelling journals.
- Number line (0-100) stuck to table surface
- Memory keyring: important information available at all times, personalized for child’s needs.
- Flash cards, letter/word strips and word blocks
- Topic memory cards: e.g., card for ‘area’ concept includes:
  - Definition
  - Diagram and formula
- Dictaphones

Classroom support: The principles

- Be aware of the warning signs of working memory failure
- Monitor the child
- Reduce amount of information to be stored
- Reduce difficulty of processing
- Repeat important information
- Encourage the use of memory aids
- Help the child to use strategies

Strategies

- Encourages pupils to list new words in their spelling journals and note their own strategies for remembering them.
- Helps children to develop use of acronyms as easy method of remembering key information, e.g., CFSS – ‘always check for capital letters, full stops, spellings and sense in sentences’.
- Encourages pupils to ask for help when they are stuck or for information to be repeated when required. E.g., Ross attempted to develop this strategy at one point during the numeracy lesson when he voluntarily asked the teacher to explain the independent task to him again as he had forgotten the verbal instructions. Ross was praised for seeking help in this way.

More strategies

- Encourages pupils to jot down important information to be remembered on their individual whiteboards when performing mental calculations.
- Encourages pupils to touch their chin as they count each finger so they remember which ones have been counted. Similarly, asks pupils to cross off the fingers on each picture as they count them.
- Identified pupil is frequently praised when responding well to strategies, e.g., making good use of memory aids etc.
What teachers say about the intervention ....

- “Their self-esteem has improved as well because they’re not failing anymore. They are now actually succeeding so self-confidence has largely improved.”
- “I find, especially with the ones that struggle more, that they’re quite excited when they remember what they’ve got to do and when they’re working they seem to be enjoying it a lot more.”
- “I am now aware of working memory as a special need and feel increasingly aware of these pupils and the strategies needed to support them. I can now identify pupils with working memory problems myself.”
- “I understand how important it is to repeat information and explain things again and again to these pupils to support them. You can’t simply provide information once and move straight on or expect children to have taken it on board.”
- “We have been discussing whether we need to consider more widely all the other children in the school as well. It’s become a way of teaching for us now more than anything, and we now need to disseminate it to all the other staff so it becomes part of their teaching. We’re hoping to make this quality teaching and a school strategy.”

Activity 2: Modifying classroom activities for low memory children

The following classroom situations may place excess working memory loads on a child with poor working memory. Imagine that you have such a child in a class that you are teaching. Discuss how to avoid exceeding the child’s working memory capacity to the point that activity failure results.

1. It’s close to the end of the lesson and many of the children still have not completed a maths worksheet activity that has involved manipulating coloured counters. The materials have to be collected together and put away and the worksheets must be returned to each child’s maths folder (in their drawer). How would you organise the class (including the child with a working memory problem) in such a way as to achieve this?

2. The purpose of today’s literacy lesson is to develop the children’s skills in writing sentences that they have generated for themselves. The sentences should be related to the child’s family. What sort of guidance would you offer the child with an impairment of working memory?
3

As part of the phonics programme in Year 1, the class are engaged in an activity that involves clapping to each syllable in a nursery rhyme and counting the number of claps. Each child takes a turn in clapping along to one rhyme. How would you support the child with a working memory problem when her turn comes?

4

Another part of the phonics programme involves listening to new rhymes, and remembering the words that rhyme. What sort of rhyme would you choose for a child with a working memory problem?

5

You are a teacher of a Year 5 class. Some shared classroom materials held currently by Mrs Taylor, a teacher in an adjoining building, are needed urgently in your own classroom. How would you go about giving the responsibility for this errand to a child with a working memory problem?

Discussion points

- Memory awareness in the average classroom: what's important?
- What should we do if we suspect a child has poor working memory?
- Beyond the classroom: can we involve the family?
To find out more ....


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Described as 'a practical manual for assessing individual needs' Baroness Mary Warnock goes further in her foreword and suggests that 'CAP It All' is a tool kit 'that all teachers can use'. It is certainly all of these things and much more besides!

The introduction recognises that busy teachers need to identify problems before they begin to interfere with a student's learning. Not all teachers have specialist training in SEN, but they are required to cater for all students in their classes. This book will enable ANY teacher to work through a process of assessment efficiently and professionally.

Those who are familiar with Gavin Reid's work will recognise the sound research on which it is based, and those who have worked with Fil Came will rejoice to see so much that is practical and instantly usable!

Clearly organised into 10 separate areas, any teacher can go straight to the section they require by consulting the detailed table of contents.

Specialist teachers will find much within these pages to interest them and support them in their quest to develop excellent specialist practice. There is a superb glossary of assessment terms which is a helpful reminder to us all and a really useful tool when delivering INSET to colleagues. The, resources section also holds a wealth of information particularly for those involved in outreach to parents and carers. The pupil self-assessment section is interesting – exploring ways of encouraging students to take responsibility for their own learning.

CAP It All is excellent. Clear, accessible and so useful. It may perhaps appeal more to those in the primary sector where initial concerns and accurate assessments as early as possible are so vital. However, it will also prove invaluable to those of us who work with older students, enabling us all to keep clear, concise records of student development and progress.

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Fil Came is leading consultant for Learning Works®, having previously been a teacher, Research Fellow at Bristol University and later an SEN adviser. Dr. Gavin Reid is an experienced teacher, author and international speaker. This book aims to be a practical manual for assessing individual needs and can be used as a resource bank for busy teachers, learning support staff and SEN co-ordinators who work with pupils who have learning difficulties. Its purpose is to assist the process of identification and assessment of pupils who are beginning to cause concern, due to their lack of progress in learning so that remediatory strategies can be applied to help reduce the problems.

Ten sections in the book explore the following:

- **Initial Concern**, outlines initial assessment and where to find information and evidence. Useful proforma are included.
- **Formal Assessment** examines standardised tests and advises which ones to use.
- **Informal Assessment** helps to gather information about/from the pupil. Helpful tick sheets and checklists are included.
- **Assessing Literacy Skills** advises on checks to make such as, pre-reading skill, phonological awareness, vocabulary, reading strategies used, spelling and writing.
- **Assessing Maths Skills** helps to identify concepts where difficulties are common, such as the counting system, vocabulary, syntax and the four rules.
- **Monitoring Behaviour** has checklists and assessment sheets to help record behaviour patterns over time.
- **Pupil Self-assessment sheets** help pupils to realise what type of learner they are and how they feel about their own learning.
- **Planning to make a Difference** advises on targets and Individual Educational Plans.

The book concludes with useful websites, lists of resources and support groups.

All resource material is written in accessible language, ensuring qualifications in SEN are not required to fully access this solution-focused manual. Those working with pupils with SEN in all phases will find this a brilliant resource.

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