

# Learning Differences

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## Definition

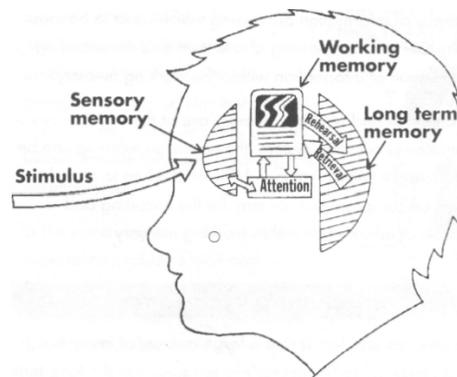
The brain's information processing system can be likened to the operation of a computer. Memory is said to be made up of three information stores; sensory, working and long-term.

For information to be processed, the child must be focusing attention on the subject. If attention is not focused, the information will not reach the memory stores. Material which has been focused on can be held in the sensory memory for a brief time.

The stored information is passed to the working memory, the so called computer screen, where it is interpreted and organised. It is then passed on to the long-term memory store where it can be retained and retrieved in the future. Long-term memory holds an unlimited amount of information for an indefinite period of time.

A separate system known as the central executive system regulates these processes. The more efficient the memory storage process, the easier it is to retrieve information.

Progress may be compromised and the effects on learning can be quite significant if students have differences in their ability to attend to stimuli, encoding and manipulate information within working memory so that it can be successfully encoded into the long-term memory store.



**The information processing system**

Differences may be evident at any of the four stages of learning:

- Input – information is entered into the brain via the senses
- Integration – information has to be understood prior to being remembered and used
- Memory – information must be stored and retrieved when required
- Output – as proof that we have learned , learning must be expressed in some way

# LEARNING DIFFERENCES



Learning Stage	Differences	Implications for classroom Impacts on .....	Adjustments
<p><b>1. INPUT STAGE</b> Information is entered into the brain via the senses</p>	<p><b>Sensory Systems:</b> visual, auditory, tactile, vestibular, proprioception, kinaesthetic, olfactory &amp; gustatory</p> <p><b>Visual Perception / Visuospatial:</b> organizing the shape and position of what is seen</p> <p><b>Scotopic Sensitivity Syndrome:</b> excess sensitivity of the retina to light frequencies</p> <p><b>Auditory Perception:</b></p> <p><b>Auditory Discrimination:</b> difficulty distinguishing differences between sounds</p> <p><b>Phonological Awareness:</b> perception of sounds within words</p> <p><b>Social Perception:</b></p> <p><b>Non-verbal Learning Disorder:</b></p> <p><b>Asperger Syndrome:</b> misperceive social cues, body language, gestures, facial expressions, voice tones</p> <p><b>Sensory Impairments:</b> HI,VI,PI</p> <p><b>Attention, arousal, self-regulation</b></p>	<p>Writing- tendency to reverse or rotate letters, words, numbers, shapes (<i>b, d was, saw</i>)</p> <p>Effects copying and transferring information</p> <p>Reading –skip words, lines,diff tracking Left-Right</p> <p>Loses place, distorted print, convergence insufficiency- blurs print, words swim, background interference leads to decoding strain, stress, mental fatigue</p> <p>Organising own position in space – clumsy, confuse right and left, misjudge distances, depth in space, page layout, map work, handwriting, visual motor difficulties, fatigue with writing tasks</p> <p>Spelling – sounds within words, saying vowel sounds correctly (<i>ball, bell</i>) (<i>17, 70</i>)</p> <p>Distinguishing noise and sounds from background impacts on understanding, following instructions, mishearing questions</p> <p>Peer interaction / social misunderstandings</p> <p>Confusion, anxiety and frustration with learning can lead to self-doubt, reluctance to take risks, avoidance, masking difficulties. Concentration level</p>	<p>Avoid lengthy copying- provide photocopies, USB to student computer</p> <p>Use technology – NeoSmart, AlphaSmart, laptop</p> <p>Proximity seating to minimize distractions</p> <p>Reduce glare, use fresh W Board markers, different colours, consider lighting</p> <p>Provide clear, legible, uncluttered handouts</p> <p>Gain attention prior to giving instructions, use names</p> <p>Give short, clear directions and requests</p> <p>Simple specific instructions in sequence – 1-2 steps</p> <p>Clarify / confirm understanding of task expectations, repeat back, rephrase</p> <p>Use visual aids to accompany verbal instructions</p> <p>Avoid asking st to listen and write at same time</p> <p>Additional time, build in breaks, chance to move around</p> <p>Enhance attention – use highlighter pens, heavy lines around pertinent items, colour coding, notemaking frameworks to extract main ideas, emphasise key words</p> <p>Ensure work is interesting and relevant</p> <p>Buddy support</p> <p>Self-regulation strategies, 'sensory diet' – maximize learning</p>
<p><b>2. INTEGRATION STAGE</b> Information has to be understood before it can be remembered and used – processing</p>	<p><b>Visual / Auditory Sequencing:</b> organising information heard and seen into an order that makes sense</p> <p><b>Abstraction:</b> inferring meaning from the words and symbols</p> <p><b>Comprehension:</b> understanding</p> <p><b>Organisation:</b> information must be integrated with new incoming information and connected to previously learned information</p> <p><b>Central Auditory Processing:</b> Brain does not process what ear hears</p> <p><b>Sensory Integration</b> – processes that organize sensations form own body and environment to function effectively</p>	<p>Spelling – letters in incorrect order, alphabet order, tables, time concepts and mathematical processes (<i>see 23 write 32</i>) Print Blind</p> <p>Retelling events, following sequence of instructions</p> <p>Literal interpretation, misunderstanding jokes, humour, idioms, puns, sayings</p> <p>Difficulty pulling newly learned information and pre-existing information together to make a whole concept</p> <p>Difficulty interpreting symbolic and abstract concepts</p> <p>Auditory lag – stall for time to think -respond</p> <p>Processing sounds at a slower speed</p> <p>Difficulty hearing in background noise</p>	<p>Multi sensory instruction – reading, spelling</p> <p>Visual, Auditory, Kinesthetic modes</p> <p>Use of separate answer sheets – a problem</p> <p>Verbal, gestural prompts, model, reinforce</p> <p>Provide frequent specific feedback</p> <p>Clarify words and phrases that have double meaning</p> <p>Teach st strategies to clarify understanding to avoid misunderstanding or misinterpretation</p> <p>Wait time to process, organise and respond</p> <p>Teach simple tasks before complex ones</p> <p>Teach key words</p> <p>Teach / model organisation strategies – planners, folders</p> <p>Use hands-on, concrete manipulative objects</p> <p>Relate learning to real life examples / situations</p> <p>Reduce visual, auditory distractions; consider lighting</p>

<p><b>3. MEMORY STAGE</b> Remembering what we have learned. The information must be stored and retrieved when required</p>	<p><b>Short Term / Working Memory:</b> <b>Executive Functioning:</b> involves retaining information for a short time while focusing on it -attending to organising for storage or discarding and connecting to pre-existing info anywhere from a few minutes to twenty-four hours for 5 to 9 items <b>Auditory Sequential Memory:</b> Remember and correctly repeat a sequence <b>Visual Memory:</b> registering info correctly, coding, storing, retrieving it. remembering shapes or patterns <b>Long Term Memory:</b> very large capacity and duration Components of long term memory Episodic- personal memories Semantic-meaningful Procedural- how to do things <b>Kinesthetic memory:</b> muscles</p>	<p>Remembering the homework that was set, forgetting what happened in class that day Remembering while copying from the board Remembering spelling, times tables Remembering directions, instructions Retrieval of information is draining, time consuming - fatigue Ability to use visualization Working memory is disrupted by high levels of social/emotional stimulus Negative self-concept OR High anxiety = reduced working memory span Positive associations / pleasant memories of school – increases success</p> <p>Need to unlearn mistakes – eg spelling errors as they become automatic</p>	<p>Activate prior knowledge, provide field / background information and vocabulary – to ensure st has meaningful networks of info into which to link new incoming info for storage and retrieval Repetition / rehearsal x10 – to keep info in working memory longer so that it will be transferred into long term memory. St to repeat task instructions. Rehearse out loud, then covertly. Visual-spatial sketchpad – teach st visualization, imagery techniques for representation of information in the mind's eye Use of checklists, visual prompts, charts Chunk information into meaningful categories Break tasks down into small achievable steps Simplify complex tasks – task analysis Overlearning and opportunity to practice Vertical presentation of math rather than horizontal – easier to solve problems Mnemonic techniques, acronyms Organisation strategies – term planners, separate folders, task analysis sheets for assignments</p>
<p><b>4. OUTPUT STAGE</b> Express in some way what has been learned (proof that we have learned something)</p>	<p><b>Language Disorders:</b> <b>Motor Planning Difficulties:</b> <b>Dyspraxia:</b> Developmental Co-ordination Difficulty (DCD) <b>Visuomotor:</b> Hand-eye coordination <b>Gross Motor:</b> large muscles <b>Fine Motor:</b> small muscles <b>Generalization:</b> transferring /applying a learned skill to a new situation <b>Behavioural characteristics:</b> associated with the downward spiral of failure, reluctance to take a risk</p> <p><b>Attention Deficit Disorders</b></p>	<p>Language output – Word finding diff Spontaneous- student initiated time to think Demand- responding to questions, reading around class cf. pressure cooker Social- Pragmatic Language -Social diff – peer interactions and conversations Motor output Coordination of vision with movement Clumsy handwriting, ball skills, balance, HPE Awkward pen grip – fatigue with writing Difficulty getting thoughts onto paper for extended writing tasks – despite having creative, detailed ideas and thoughts Frustrated – head works faster than the hand Impulsivity, Inattention, distractibility, perseveration, inflexibility, hyperactivity</p>	<p>Present orally, dictate answers to a scribe Scaffolding of written tasks Checklists, cue cards Negotiate task adjustments – show evidence of understanding Model, prompt appropriate responses in social interactions, requesting assistance Debrief social misunderstandings Role play social conversations Prepare st by alerting them / saying name before asking a question Ask non-threatening questions Use of laptop , Alpha Smart notetaker Encourage cursive writing – easier to keep ideas flowing and pen doesn't have to be lifted Limit copying, Maths – graph paper or turn lined paper to the side – neater Raise expectations based on strengths and use adaptive compensatory strategies Avoid confrontations</p>

