

LEARNING DISABILITY

Topics included in this **Section** are as follows-

A Conceptual Framework of Development and Learning

Students with Learning Problems

Some Key Definitions

Characteristics of a Learning Disability: Pre-school and Early Primary School Students

Characteristics of a Learning Disability: Primary School Students

Characteristics of a Learning Disability: Secondary School Students

Characteristics of a Learning Disability: Literacy Learning Signs

Characteristics of a Learning Disability: Numeracy Learning Signs

Assessing Students with a Learning Disability

Learning Disability and the Concept of Directionality

- Directionality in Basic Skills
- Aspects of Directionality in Early Academic Learning
- Learning Disabilities: A Conceptual Framework of Directional Factors
- General Instructional Guidelines
- Some Specific Instructional Guidelines

Basic Skills

- Auditory Processing Skills
- Phonological Skills
- Visual Processing Skills

Basic Academic Skills

- Reading
- Spelling
- Spelling and Written Expression
- Handwriting
- Mathematics
- General

A CONCEPTUAL FRAMEWORK OF DEVELOPMENT AND LEARNING

The acquisition and development of basic abilities, academic skills and appropriate behaviour are determined by internal and external factors.

The following chart lists factors that can arrest, delay or enhance the development of basic abilities and lead to developmental and learning differences in students.

INTERNAL FACTORS	BASIC ABILITIES	ACADEMIC AREAS
Genetic	Sensory	Handwriting
Physiological	Gross Motor	Reading
Neurological	Fine Motor	Spelling
Biochemical	Visual Perception	Written Expression
EXTERNAL FACTORS	Auditory Perception	Mathematics
Infection	Language	Science
Physical trauma	Thinking	Technology
Psychological	LEARNING DIFFERENCES	SOSE
Socio-cultural	Pace of Learning	Arts
Educational	Styles of Learning	LOTE
BASIC CHARACTERISTICS	<ul style="list-style-type: none"> • Sensing/Intuitive • Visile/Audile • Analytic/Holistic • Reflective/Impulsive • Passive/Active • Individual/Group • Independent/Dependent 	
Temperament		
Personality		
Behaviour		
Motivation		
Attentional Skills		

SOSE (Studies of Society and Environment), LOTE (Languages Other Than English)

This conceptual framework includes the factors considered important in understanding development and learning.

The dimensions of internal and external factors refer to the major variables that contribute to human development. The internal or constitutional factors include fundamental developmental components that are neurological, physiological or biochemical in nature. The external, environmental factors cover the experiential influences that shape development. For teachers, the critical variables over which they have some control relate to educational aspects which include teacher knowledge and skills, teaching style and quality of instruction and the nature of the curriculum.

The dimensions of basic abilities, learning styles and basic characteristics refer to the attributes and competencies that result from the combined contribution and interaction of internal and external influences.

The final dimension relates to the main academic areas and details the key learning or curriculum areas. An individual's ability to master one or more of the key learning areas depends on the integrity of the internal factors and facilitating external factors and the resultant development of appropriate attributes and competencies.

From an educational perspective, the key aspects of the conceptual framework over which teachers have some influence include the following-

External Factors	Basic Abilities	Academic Areas
Educational	Learning Essentials	Knowledge of Curriculum
	Learning Styles	
	Teaching Styles	

The important variables highlighted refer to the teacher, the student and the curriculum. Specifically, issues include the quality of the educational environment, teaching competence and style, quality and appropriateness of instruction, appropriateness of the curriculum and the student's attributes and competencies.

STUDENTS WITH LEARNING PROBLEMS

In every classroom, some students will experience learning problems. The cause(s) of these problems will vary, however several major categories of students with special needs have been recognised for funding and educational purposes.

The Victorian Department of Education and Early Childhood Development (DEECD) currently identifies the following six categories of students in its Program for Students with Disabilities (2008):

Problem	Estimated Expectancy Rate (%)
Physical Disability	0.5
Visual Impairment	0.1
Severe Behaviour Disorder	3
Hearing Impairment	0.5
Intellectual Disability	2.3
Autism Spectrum Disorder	0.1
In addition, the Department of Education and Early Childhood Development has implemented a Language Disorder Program which will support schools in providing resources and services to the following group of students -	
Language Disorder	5

These categories represent only a relatively small percentage of students with special needs - those deemed to have severe disabilities and who may attend special schools. They do not include other important groups of students with problems in learning. These additional two categories include the much larger percentage of students who attend regular schools and can be classified as having either-

- **a Learning Difficulty, or**
- **a Learning Disability**

The problems experienced by many of the students in these last two groups are obvious and frustrating to themselves, their parents and their teachers. In some of these students, however, the problems are more subtle, being partially obscured by other strengths, or frequently attributed to laziness, lack of attention or concentration or low motivation.

This classification identifies three groups of students with learning problems.

Group 1. Students with Severe Disabilities/Disorders

This group comprises those students with severe, low incidence disabilities that are identified as requiring special education in either a segregated or integrated educational setting. Typically, the definition and identification of these students have wide acceptance. In Victoria, six categories of students are identified and represent those students eligible for inclusion in the Victorian Department of Education and Early Childhood Development's Program for Students with Disabilities and one group is included in their Language Disorder Program.

Considerable controversy surrounds the next two groups of students with learning problems-those with learning difficulties and those with learning disabilities. Consistency in terminology, definitions and characteristics has not been universally adopted and controversy abounds. For the purposes of this material, the terms can be defined as follows:

Group 2. Students with Learning Difficulties

Learning Difficulties is a generic term which refers to approximately 15-20% of students who exhibit problems in learning that are not as severe as those experienced by the students in Group 1. These students attend regular schools and are usually not eligible for special school enrolment or integration resources. The learning difficulties result from one or more of the following factors; below average general ability, physical and sensory defects, attentional and motivational problems, emotional difficulties, inadequate environmental experiences, lack of appropriate educational opportunities.

For these students, the cause of their learning difficulties is usually known and their problems in learning are not unexpected. These students generally demonstrate low achievement in most academic areas.

Group 3. Students with Learning Disabilities

This term refers specifically to the much smaller proportion (3-5%) of students who experience significant and unexpected learning problems despite at least average intellectual ability, unimpaired vision and hearing and no evidence of major primary emotional or behavioural problems. While the cause of the learning problems is unknown, it is presumed to have a neurological basis with strong evidence of a genetic origin. There is an uneven gender incidence with males outnumbering females by about 5 to 1. The learning problems are associated with severe and prolonged difficulties processing sequential and orientational / positional information.

During the early primary school years, developmental delays in the processing of directional information including sequential and orientational / positional information are prominent. However, such problems gradually diminish in intensity with age and experience and the most obvious "tell-tale" feature is continuing academic underachievement, which can range from mild to severe.

Learning disabled students usually demonstrate uneven academic progress which is characterised more by underachievement than low achievement. Problems are usually experienced in one or more of the following areas of literacy and numeracy learning including handwriting, reading, spelling, written expression and some areas of maths.

These students also attend regular school and, while not eligible for integration resources under the DEECD's Program for Students with Disabilities or the Language Disorder Program, may be considered eligible for Special Examination Arrangements in their VCE examinations.

A broad range of factors can contribute to academic learning problems. One factor common to many students with learning difficulties and a defining problem for students with a learning disability is persistent directional confusion which can result in uncertainty regarding:

- orientation-physical or positional location in space
- sequencing-successive arrangement of motor, visual or auditory information

Such uncertainty can be demonstrated in-

- slowly developing lateral awareness
- uncertain lateral awareness
- directional learning difficulties
- serial learning problems
- difficulties with short-term retention of sequential information
- slow rate of processing sequences of information (motor, visual and auditory)
- underdeveloped sense of time and order
- organisation and planning difficulties (spatial and temporal)
- time management problems

Students experiencing such directional confusion can present a real challenge to the classroom teacher, especially in the areas of literacy and numeracy instruction.

SOME KEY ISSUES

- Distinguishing between students with a Learning Difficulty and students with a Learning Disability
- Learning Disability and the concept of directionality

SOME KEY DEFINITIONS

The following definitions draw heavily on the contributions of previous researchers and organisations including Kirk (1963), NACEHC (1968), Hammill, et al., (1981) and Sykes (1982). The definitions were modified and finally adopted by the National Health and Medical Research Council (1990).

LEARNING DIFFICULTIES is a generic term which refers to the substantial proportion of children and adolescents who exhibit problems in developmental and academic skills. These difficulties are considered to result from one or more of the following factors; intellectual disability, physical and sensory defects, emotional difficulties, inadequate environmental experiences, lack of appropriate educational opportunities.

LEARNING DISABILITIES refers to the much smaller proportion (3 to 5%) of children and adolescents who exhibit problems in developmental and academic skills which are significantly below expectation for their age, grade and general ability. The disabilities, which often include severe and prolonged directional confusion, sequencing and short-term retention difficulties, are presumed to be intrinsic to the individual, but they are not considered to be the direct result of intellectual disability, physical or sensory defects or emotional experiences or lack of appropriate educational experiences.

More recently, the DSM-1V (1995) and the DSM-1V-TR (2005) preferred the term Learning Disorders and offered the following operational definition-

LEARNING DISORDERS

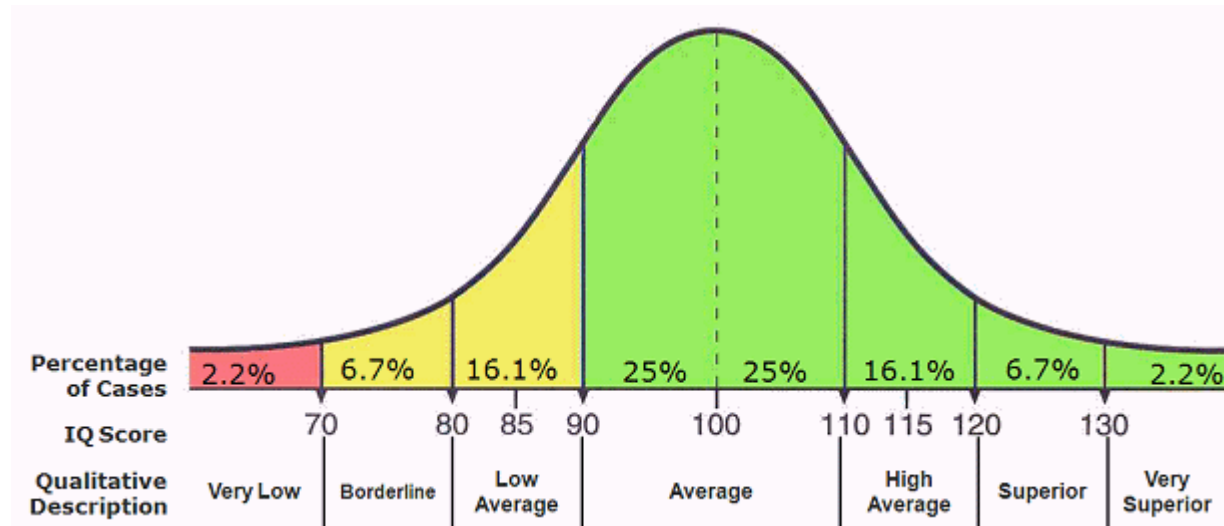
"Learning disorders are diagnosed when the individual's achievement on individually administered, standardized tests in reading, mathematics, or written expression is substantially below that expected for age, schooling, and level of intelligence. The learning problems significantly interfere with academic achievement or activities of daily living that require reading, mathematical, or writing skills. A variety of statistical approaches can be used to establish that a discrepancy is significant. *Substantially below* is usually defined as a discrepancy of more than 2 standard deviations between achievement and IQ. A smaller discrepancy between achievement and IQ (i.e., between 1 and 2 standard deviations) is sometimes used..." (1995, p. 46).

The Victorian Curriculum and Assessment Authority (VCAA) defines a Learning Disability as follows-

"Students must be of an average or above average IQ, whose developmental and academic skills are significantly below expectation for their present grade level. The disabilities are presumed to be intrinsic to the individual and long term, but they are not considered to be the direct result of intellectual disability, physical and sensory impairments or emotional difficulties. Neither do they appear to derive directly from inadequate environmental experiences, or lack of appropriate educational experiences".

(VCE and VCAL Administrative Handbook, 2008, p.130).

The Normal Curve shown below provides a diagrammatic representation of IQ levels, percentile rankings and standard deviation levels. The area in green represents average IQ and above - a defining characteristic of a learning disability.



SOME KEY ISSUES

- the notion of a conceptual, theoretical definition compared to a functional, operational definition
- the exclusionary nature of most definitions of a Learning Disability
- clarification of the words-“significantly below expectations” and “discrepancy”
- what variable(s) should be chosen to establish the presence of a “significant discrepancy”- Age?, IQ?, Year Level?
- need for a checklist of behavioural characteristics of a Learning Disability

Most definitions of a learning disability can be described as being basically theoretical or conceptual in nature. While helpful for a general understanding of key components, they do not provide sufficient detail to enable teachers, psychologists and other professionals to readily and accurately identify students with a learning disability.

Operational or functional definitions that describe actual behavioural features associated with a learning disability have greater practical utility. In addition, checklists that outline the relevant diagnostic criteria are considered essential for the purposes of making a positive diagnosis and for providing educationally relevant information.

Unfortunately, few such checklists are available that provide a concise listing of relevant behavioural characteristics of a learning disability at key stages of academic learning.

The following checklists provide information about important characteristics that are frequently associated with a learning disability.

In using these checklists the following points should be considered-

- The emphasis is clearly placed on what the author considers to be important “tell-tale” signs of a learning disability. Such signs or characteristics have been gleaned from practical experience as a teacher and psychologist over some forty years. It should be stressed that most of these signs can be readily identified by the classroom teacher through direct observations or a careful examination of a student’s workbooks.
- Students with a learning disability, while frequently sharing common characteristics, represent a heterogeneous group, and hence, each student will display a unique profile of strengths and weaknesses.
- Most young students experience problems processing directional information including sequential and orientational/positional information. Hence, caution should be taken in not over interpreting such early difficulties and prematurely classifying a student as having a learning disability. It is the persistence and severity of such problems that enables a positive identification to be made beyond the early school years.
- The checklists reflect the gradual changing nature of the important characteristics of a learning disability from the pre-school and early primary school levels through to the senior secondary school level.
- The checklists can be used to support a positive diagnosis and to provide teachers with direct and explicit educational guidelines and specific instructional strategies.

CHARACTERISTIC SIGNS OF A LEARNING DISABILITY: SOME GENERAL DEVELOPMENTAL SIGNS

PRE-SCHOOL AND EARLY PRIMARY SCHOOL STUDENTS

The importance of directionality, including sequencing and orientation, in the development of basic academic abilities, is paramount. Students with a learning disability typically demonstrate underdeveloped directional concepts and processing skills including serial learning, identifying, retaining and producing sequential information and processing orientational/positional information.

Key signs of a learning disability can be identified during the pre-school and early school years. However, it is stressed that caution should be taken about prematurely identifying the presence of a learning disability as many young students experience significant problems processing directional information. Some key signs include the following-

ACTIVITY	DIFFICULTY CONFUSION
MOTOR SEQUENCING	
Tying shoe laces	
Putting shoes on correct feet	
Using crayons, pencils	
Using scissors	
Skipping, hopping	
DIRECTIONALITY	
Understanding directional concepts and words	
Left-right awareness/understanding	
Lateral preference (handedness) slow development/mixed	
Dressing-back to front, inside-out	
Setting table-knives and forks	
Letter, numeral reversals	
Placement of items in order (left to right placement)	
Spatial awareness-"lost" in familiar building	
Telling time, judging passage of time	
SERIAL (ROTE) LEARNING	
Birthday	
Address	
Phone Number	
Days in the week, months, seasons	
Alphabet	
REMEMBERING VERBAL SEQUENTIAL INFORMATION	
Instructions	
Commands	

**CHARACTERISTICS OF A LEARNING DISABILITY
SOME GENERAL EDUCATIONAL SIGNS**

PRIMARY SCHOOL STUDENTS

While signs of a developmental delay in the processing of directional information continue to be observable, with age and experience, they tend to diminish in intensity and the most prominent characteristic of a learning disability is academic underachievement.

Important signs of a learning disability are readily identifiable during the primary school years and include the following-

ACTIVITY	DIFFICULTY CONFUSION
MOTOR SEQUENCING	
Tying shoe laces	
Handwriting-	
• Printing	
• Cursive	
DIRECTIONALITY	
Understanding directional concepts and words	
Left-right awareness/understanding	
Writing letters and numerals-reversals	
Spatial awareness-“lost” in familiar buildings	
Telling time-analogue	
Maths- concepts, common fractions	
Map reading	
SERIAL (ROTE) LEARNING	
Birthday, address	
Phone number	
Days in the week, order of months, seasons	
Alphabet	
Number facts, maths tables	
Rules	
SEQUENTIAL RETENTION AND PROCESSING	
Reading-phonological skills, recognising words, comprehension	
Spelling-retaining and recalling words	
Writing-planning and structuring essays	
Maths-place value, number sequences, equations, algorithms	
Retaining, recalling spoken commands and instructions	

**CHARACTERISTICS OF A LEARNING DISABILITY:
SOME GENERAL ACADEMIC SIGNS**

SECONDARY SCHOOL STUDENTS

Again, while signs of a developmental delay in the processing of directional information continue to be observable, with age and experience, they tend to greatly diminish in both severity and intensity. The prominent sign continues to be academic underachievement, usually in one or more of the literacy skills including handwriting, reading, spelling and written expression and in some areas of maths and it can range in intensity from mild to severe.

Important signs of a learning disability can be identified during the secondary school years and include the following-

ACTIVITY	DIFFICULTY CONFUSION
MOTOR SEQUENCING	
Handwriting-	
• Printing-often a preference, faulty letter formation & spacing	
• Cursive-often messy, poor fluency/speed, rapid fatigue	
DIRECTIONALITY	
Understanding directional concepts and words	
Understanding some maths concepts, terms and signs, basic algorithms, fractions, algebra, areas of geometry	
Map reading and some geographical terms and concepts	
SERIAL (ROTE) LEARNING	
Rules	
Dates in history, literature, music	
Retaining and recalling poems, selections from plays, novels	
READING	
Underdeveloped word recognition and word-attack skills	
Slow reading rate	
Slow reading comprehension, retaining sequential information	
SPELLING	
Basic spelling errors, especially common “irregular” words	
WRITTEN EXPRESSION	
Faulty planning and structuring essays	
Faulty organisation, coherence and unity- “a word salad”	
Basic grammatical and punctuation errors	
Limited written output	
Slow productivity rate- “converting thoughts to print”	
STUDYING AND INDEPENDENT LEARNING	
Problems planning and organising study	
Faulty time management skills	
Slow reading rate, very reluctant readers, very limited reading	

SOME KEY ISSUES

- nature and type of underlying developmental difficulties
- the unifying concept of directional processing difficulties
- positional/orientational processing difficulties
- sequential processing difficulties
- associated educational difficulties
- changing nature of symptoms with age
- diminution of many signs at the senior secondary school level
- prominence of essay writing problems at the senior secondary level
- notions of discrepancy and severity

CHARACTERISTICS OF A LEARNING DISABILITY: LITERACY LEARNING SIGNS

Students with a learning disability in primary and secondary schools experience problems in academic learning arising from difficulties processing directional information.

In literacy learning, these problems are often demonstrated in the following areas:

Handwriting

- slow development of a preferred “hand”
- left/right confusion
- faulty pencil grip
- incorrect letter formation
- letter/numeral reversals
- usual preference for a printing style of writing
- inappropriate use of upper-case letters
- awkward and immature style
- inappropriate spacing
- slow writing rate
- prone to writing fatigue

Phonological Awareness

- difficulty with the perception, retention and manipulation of words in sentences, syllables in words and phonemes in words
- difficulty with the auditory and kinaesthetic sequencing of sounds in words

Reading

- letter reversals
- left/right confusions
- limited knowledge of the alphabet
- underdeveloped sight vocabulary and word-attack skills
- comprehension difficulties-retaining the sequence of information
- slow reading rate and/or difficulty modifying rate
- easily fatigued
- negative attitude to reading
- low level of confidence in reading
- limited recreational reading

Spelling

- letter-sound confusions
- letter reversals
- sequencing errors (both auditory and visual)
- underdeveloped visual memory for words, especially common, phonetically irregular words
- limited knowledge of spelling patterns and rules
- inappropriate phonetic spelling
- avoidance of difficult or unfamiliar words in written expression

Written Expression

- handwriting problems (often a preference for a printing style, inappropriate use of upper-case letters)
- basic, elementary spelling errors-especially under exam conditions
- slow rate of productivity-"converting thoughts to print"
- problems with sentence and paragraph structure, word arrangement and coherence (writing has a "word salad" appearance- basic sequencing problems)
- imprecise, unclear expression
- immature syntax and sentence formation
- apparent lack of planning, organisation and coherence
- disregard for writing conventions including incorrect use of punctuation
- use of restricted vocabulary

For learning disabled students, written expression presents significant challenges and great difficulties. To gain some appreciation of the problems confronting such students, the following points may be helpful-

- an obvious self-awareness of the discrepancy (and hence, substantial frustration) between their knowledge, thoughts and ideas and the "quality" of their written responses
- their generally underdeveloped early literacy skills and the cumulative impact this has on the final domain of written expression
- their very low confidence as a writer stemming from years of underachievement, constant criticism and obvious incompetence
- the generally slow, difficult, frustrating task of converting their thoughts to print
- a fundamental inability to maintain the sequence of thoughts in a coherent and fluent fashion throughout the essay, and
- a difficulty editing essays- identifying and correcting errors

A QUICK CHECKLIST OF USUAL CHARACTERISTICS IN WRITTEN EXPRESSION

APPEARANCE

- messy handwriting
- a print script rather than a cursive script
- inappropriate use of upper-case letters

SPELLING

- basic errors, especially the misspelling of common, phonetically irregular words. Frequent errors include- homonyms (there-their-they're, hear-here, which-witch, write-right), rule based errors (tense, plurals, adding suffixes), confusions (its-it's, of-off), some common errors (they-thay, their-thier, with-whith, which-wich, friend-freind, who-how, know-now, coming-comming, father-farther, dining-dinning, beginning-begginning, hoped-hopped, does-dose)

WRITTEN EXPRESSION

- faulty sentence structure and unity-"a word salad"
- faulty paragraph structure and lack of coherence/unity
- limit output

SOME KEY ISSUES

- the hierarchical nature of the acquisition and development of literacy skills
- the critical role of early identification and intervention
- the need for continuing intervention throughout secondary school
- the emphasis on literacy skills required in the VCE Examination
- the prominence of essay writing difficulties
- remediation versus "special arrangements"

CHARACTERISTICS OF A LEARNING DISABILITY: NUMERACY LEARNING SIGNS

Students with learning disabilities in primary and secondary schools experience problems in academic learning. The major causal factor is a consistently occurring directional confusion or uncertainty regarding the orientation and sequencing of information, for example;

- positional learning difficulties
- serial learning problems
- difficulties with short-term retention of sequential information
- slow rate of processing information (perception, organisation, integration, storage and retrieval)
- underdeveloped sense of time and order
- organisation and planning difficulties

In numeracy learning and mathematical understanding, these problems are often demonstrated in the following areas:

Basic Skills

- slow development of number concepts and processes
- number sequencing- counting, place value
- seriation and ordering
- incorrect formation of numerals
- reversal of numerals and transposition of digits
- reading and writing number words
- confusion of basic mathematical terms and symbols, e.g., algebraic symbols
- limited or incomplete knowledge of basic number facts including multiplication tables

Conceptual Understanding and Application

Temporal Concepts (e.g., before, after)

- telling time (digital and analogue, using clocks and calendar)

Spatial Concepts (e.g., under, below, beside)

- place value and its written representation
- fractions-numerator/denominator confusion
- geometry (2 and 3 dimensional)
- location in space (copying, recitation and processing)

Limited insight into interrelationship of basic maths processes

Terminology- "the language of maths"

- confusion concerning general and specific terms used in maths

Algorithms

- confusion regarding starting position of operation (directional confusion)
- difficulties with the alignment of numerals
- setting out and location in space of written work
- difficulties with notation
- perception and understanding of the four operational signs
- difficulty with the sequencing of required steps-the order of processes

Mental Computation

- retention of oral information
- computation (given limited knowledge of basic number facts)
- rate of calculation

Word Problems

- reading and understanding of problems
- determining relevant information
- appropriate sequencing of information

General

- copying from the white- board or a book
- remembering oral instructions
- reading written instructions and information
- spelling number words

Unlike Literacy Learning problems, students with Maths Learning problems have not been explored beyond the early Secondary School level in this **Section**.

ASSESSMENT OF STUDENTS WITH A LEARNING DISABILITY

During the primary school years, the classroom teacher is usually the first person to be concerned about a student's academic progress. Problems are generally most apparent in handwriting, reading and spelling and areas of maths. While many students experience problems with the acquisition and development of literacy skills, to be correctly diagnosed as having a Learning Disability, the following three criteria should be established-

- average or above IQ
- significant underachievement in terms of measured literacy skills and current grade placement
- no obvious causal factor(s) of underachievement can be established

Traditionally, learning disabilities in the literacy skills of reading, spelling, handwriting and written expression have been studied far more extensively than learning disabilities in maths. Hence, the focus in this section is on the identification of learning disabilities in literacy learning.

INFORMAL ASSESSMENT

Initially, the classroom teacher, through direct observations and informal assessment, determines significant academic underachievement in literacy learning. Usually, the early concerns lead to formal assessment, often conducted by the special education teacher.

Together, the educational information gleaned from such assessments provides valuable directions for appropriate instruction.

FORMAL ASSESSMENT

Through formal literacy testing, a teacher can gain a more accurate measure of the student's actual underachievement and areas of need. Tests assess ability at different levels and can provide details on the following skills-

Reading

- phonological and phonic skills
- word recognition
- word-attack skills
- prose reading accuracy
- reading comprehension
- reading rate

Spelling

- accuracy

PROFESSIONAL REPORTS

Where concerns persist, the student is frequently referred to outside specialists including a psychologist, audiologist, optometrist, occupational therapist and/or speech and language therapist. The purposes of such referrals are to gain information that can lead to a differential diagnosis and to provide further information for remediation of the literacy learning problems. Most of the recommendations from the specialists focus on strengthening relevant underdeveloped basic abilities considered to be essential pre-requisites for literacy skill development.

PSYCHOLOGICAL REPORTS

A psychologist will usually assess the general cognitive abilities of a student referred by teachers or parents. While several relevant tests are available, most psychologists choose to administer the appropriate "WISC" or "WAIS" test, depending on the age of the student.

WISC/WISC-R/WISC-111, WAIS-R PROFILES AND REPORTS

Many psychologists have inferred the presence of a Learning Disability following the administration of one of the "WISC" or "WAIS" tests.

The following profile characteristics are often used to infer a differential diagnosis of a Learning Disability-

- ACID (Arithmetic, Coding, Information, Digit Span)
- SCAD (Symbol Search, Coding, Arithmetic, Digit Span)
- Verbal Scale Scores v Performance Scale Scores
- Subtest Spread/Scatter
- Processing Speed Index Score (Coding, Symbol Search)

WISC-1V, WAIS-111 PROFILES AND REPORTS

With the recent introduction of the latest WISC test, the WISC-1V, and the WAIS test, the WAIS-111, the following Index Scores have been used to infer a positive diagnosis of a Learning Disability.

- Working Memory (Digit Span, Letter-Number Sequencing, Arithmetic)
- Processing Speed (Coding, Symbol Search, Cancellation)

USEFULNESS OF WISC/WAIS REPORTS

A WISC profile analysis has some positive benefits, especially for pre-school and primary school students. Such possible benefits include the following-

- as an initial guide to the possible presence of a Learning Disability (average IQ or above)
- it can identify cognitive competencies and hence indicate that the student is not intellectually disabled or a "slow learner" and this usually has the very positive benefit of informing a student that he/she is "not dumb"
- through direct observations, it is possible to identify verbal and non-verbal processing difficulties (e.g., Information (serial learning), Arithmetic (retaining verbal sequential instructions), Digit Span (auditory short-term sequential memory), Block Design (directional uncertainty), Picture Arrangement (processing sequential pictorial information))
- it can identify preferred cognitive and learning styles (the influence of Howard Gardner, 1993)
- it can identify subgroups (to demonstrate that students with a Learning Disability are not a homogeneous group, Sykes, 1976)

Caution, however, must be taken, not to over-interpret the educational significance of a Profile Analysis. The WISC/WAIS tests were not developed to provide educational/instructional guidelines.

There is not a direct, obvious link between profile analyses and instructions in literacy learning and numeracy learning or with the Victorian Essential Learning Standards, VELs, (VCAA).

For senior secondary school students, the usefulness of the WISC/WAIS tests in providing educational guidelines is greatly diminished. Some valuable information can be gleaned to assist in choosing subjects and possible tertiary courses. A specific underdeveloped ability, such as vocabulary knowledge, can also be a useful finding and have important, direct educational implications. However, it is generally too late to use the WISC/WAIS scores to derive instructional guidelines for "remedial" reading, spelling and written expression. At Years 11 and 12, the emphasis should be mainly on determining eligibility for the classification of Learning Disability and the possibility of Special Examination Arrangements (i.e., "an average or above IQ").

SOME PROBLEMS INTERPRETING WISC/WAIS PROFILES AND REPORTS

The presentation of symptoms frequently associated with a Learning Disability varies according to the developmental level of the child/adolescent. Some symptoms (or precursors) of Learning Disability may be present in the pre-school age range, but typically a Learning Disability diagnosis is not made during the pre-school years. Identification is clearly best made early in the student's primary school years to derive the most useful educational information and to minimise learning frustration.

As there is no one, "tell-tale" sign of a Learning Disability, including a subtest score or an Index Score, it is not possible to accurately identify the presence of a Learning Disability from WISC/WAIS scores.

Several major authorities in the field of Learning Disabilities have consistently stressed this point. Some relevant quotations are provided below.

Sattler, J. M., (1990). Assessment of Children. Third Edition.

"The failure to find a unique WISC-R profile pattern for learning-disabled children is not surprising. Learning-disabled children represent a group that is too heterogeneous for one type of WISC-R profile to be typical of all or even most of its members....These results strongly suggest that a child's WISC-R profile should not be used to establish a diagnosis of learning disability.....At present, there is no unique WISC-R profile that is reliably diagnostic of learning disability." (p. 610).

Diagnostic and Statistical Manual of Mental Disorders. Fourth Edition (DSM-IV TM). (1994).

"There may be underlying abnormalities in cognitive processing (e.g., deficits in visual perception, linguistic processes, attention, or memory, or a combination of these) that often precede or are associated with Learning Disorders....the presence of such conditions does not invariably predict an eventual Learning Disorder, and there are many individuals with Learning Disorders who have no such history." (p.47).

Kaufman, A.S. and Lichtenberger, E.O. (2000). WISC-III and WPPSI-R Assessment.

"In summary, although some patterns on the WISCs are reported fairly consistently for children with learning disabilities, these patterns do not have adequate power on which to base differential diagnosis. The ACID and SCAD profiles may provide useful information about a child's cognitive abilities on a case-by-case basis, but the presence or absence of these profiles cannot justify making a diagnosis of LD. Likewise, the V-P or P-V profiles do not provide evidence in and of themselves of a learning disability. Many variables-including performances on standardized measures of achievement, academic history, developmental history, medical history, family history and behavioral observations-must be combined to properly evaluate a child with a potential learning disability. Although it seems as though a cut-and-dry cognitive profile of a typical learning disabled child would ease the process of diagnosis, characterizing a child by means of a single score or combination of scores can never provide adequate information about his or her abilities." (pp. 205-206).

Sattler, J.M. (2002). Assessment of Children. Fourth Edition.

"The attempts to find a unique WISC-III test pattern among children with learning disabilities have not been successful.... There is no evidence that Verbal-Performance discrepancies can identify learning disabilities. Similarly, there is no evidence that a cluster of low scores on a subtest profile-such as (a) ACID (Arithmetic, Coding, Information and Digit Span or (b) SCAD (Symbol Search, Coding, Arithmetic and Digit Span) or.... can reliably distinguish children with learning disabilities from those who do not have learning disabilities." (p. 303).

Flanagan, D.P. and Kaufman, A.S. (2004). Essentials in WISC-IV Assessment.

"Children with Reading Disorders displayed a relative deficit in Working Memory. Their mean Working Memory Index was 6 points lower than their average Index on VCI, PRI and PSI. This pattern is consistent with other evidence that children with reading disorders often have working memory problems. It is by no means clear, though, whether this pattern is due to problems with mental sequencing, auditory processing, mental manipulation, or some other factor." (p.198).

Sattler, J.M. and Dumont, R. (2004). Assessment of Children. WISC-1V and WPPSI-111 Supplement.

“...*profile analysis with the WISC-1V cannot be used to arrive at a diagnostic label.*” (p.114).

“There are no WISC-1V profiles that are known to reliably distinguish clinical groups from normal groups.” (p.141).

“Intelligence test scores, in and of themselves, should never be used as a basis for establishing a learning disability diagnosis. No pattern of Index scores or subtest scores necessarily indicates a learning disability. Also, accurate documentation of academic achievement, among other things, is necessary for a diagnosis of learning disabilities.” (p.142).

Sattler, J.M. and Hoge, R.D. (2006). Assessment of Children: Behavioral, Social and Clinical Foundations. Fifth Edition.

“Although the definition of learning disability continues to be elusive and children with this label represent an extraordinarily heterogeneous population, *the common characteristic usually shared by children with learning disabilities is academic underachievement.*” (p.393).

“We strongly recommend never diagnose a learning disability on the basis of a discrepancy between any two WISC-1V indexes, such as Verbal Comprehension and Perceptual Reasoning, or between any two Indexes or other individually administered intelligence tests. .. It is extremely poor practice to rely *exclusively* on patterns of scores on an intelligence test to arrive at a diagnosis of learning disability.” (p.414).

Despite these clear warnings, I continue to read reports from psychologists who diagnose a learning disability, usually, dyslexia, solely on the basis of a cluster score and even on a single subtest score. In one recent case, a student was diagnosed with dyslexia on the basis of a Coding percentile ranking of 63, (ie., a score within the average range) as this was the lowest score on the test profile.

REPORTS FROM OTHER PROFESSIONALS

Teachers and/or parents frequently refer students to one or more of the following professionals-

- audiologists
- optometrists
- speech and language therapists
- occupational therapists
- medical practitioners

Reports from specialists can obviously be extremely valuable for pre-school and primary school students who are experiencing early learning difficulties. These reports can provide teachers with highly useful information to better understanding the possible nature and cause(s) of learning problems and to provide directions for appropriate educational and instructional strategies.

Generally speaking, the relevance of such reports diminishes as students reach the senior secondary school level.

AUDIOLOGIST REPORTS

Information is provided in areas such as the following-

- Basic hearing
- Auditory processing
 - auditory figure-ground
 - dichotic listening
 - short-term auditory memory (STAM)
 - digit span
 - phonemic discrimination and synthesis
 - sentences

OPTOMETRIC REPORTS

Typical information provided includes the following-

- Vision and eye structure
- Eye alignment
- Focus ability
- Eye movements
- Colour vision
- Perceptual abilities
 - visual-motor
 - figure-ground
 - visual analysis
 - visual memory
 - laterality/directionality
 - auditory analysis
- Eye tracking

SPEECH AND LANGUAGE REPORTS

Information is usually provided in some of the following areas-

- Articulation and speech
- Phonological skills
- Oral language
 - word knowledge
 - syntax
 - semantics
- Written language
 - reading
 - written expression

OCCUPATIONAL THERAPY REPORTS

Typically, details are provided on the following-

- Gross and fine-motor skills
- Visual-motor integration
- Handwriting legibility
- Handwriting speed (“The quick brown fox jumped over the lazy dog”)
- Typing speed test
- Fine-motor observations

MEDICAL PRACTITIONERS

Reports from GPs, paediatricians, neurologists and other medical specialists whilst not providing the necessary, relevant, primary evidence to identify a Learning Disability, do provide very helpful information about developmental and health issues.

LEARNING DISABILITY AND THE CONCEPT OF DIRECTIONALITY

A broad range of factors can contribute to academic learning problems. One factor common to many students with learning difficulties and a defining problem for students with a learning disability is persistent directional confusion which can result in uncertainty regarding:

- orientation-physical or positional location in space of visual-spatial information
- sequencing-successive arrangement of motor, visual or auditory information

Such uncertainty can be demonstrated in-

- slowly developing lateral awareness
- uncertain lateral awareness
- directional learning difficulties
- serial learning problems
- difficulties with short-term retention of sequential information
- slow rate of processing sequences of information (motor, visual and auditory)
- underdeveloped sense of time and order
- organisation and planning difficulties (spatial and temporal)
- time management problems

Students experiencing such directional confusion can present a real challenge to the classroom teacher, especially in the areas of early literacy and numeracy instruction. See [Early Learning Essentials-Directionality](#).

The information below attempts to provide teachers, psychologists and other professionals with an insight into the concept of directionality and its relevance to the teaching of students with a learning disability.

DIRECTIONALITY IN BASIC ABILITIES

The importance of directionality as both a concept and an ability, including orientation and sequence, in the development of the following basic abilities is evident. These abilities are observable in very young children and form the basis for academic learning.

MOTOR ABILITIES

Gross motor patterns:

- balancing, climbing
- walking, hopping, skipping
- throwing, catching

Fine motor fluency and co-ordination:

- articulation, pronunciation
- scribbling, cutting, drawing, colouring, copying, writing, tying

PERCEPTUAL ABILITIES

Visual:

- discrimination of orientation of objects, shapes
- discrimination of sequence of objects, shapes

Auditory:

- discrimination of sequence of sentences, words and phonemes

MEMORY ABILITIES

Motor:

- retention of sequence of motor patterns

Visual:

- retention of orientation of objects, shapes
- retention of sequence of objects, shapes

Auditory:

- retention of sequence of sentences, words, phonemes

LANGUAGE ABILITIES

Articulation

- production of sequences of speech sounds

Grammar

- awareness and production of grammatical sequencing of words

Semantics

- awareness and production of meaningful sequences

CONCEPT FORMATION

- directional, positional, temporal concepts

ASPECTS OF DIRECTIONALITY IN EARLY ACADEMIC LEARNING

The role of directionality including orientation and sequence is most evident in the following areas of early academic learning.

MOTOR SKILLS

- **Cutting:** fine motor sequencing
- **Drawing:** awareness of orientation and fine motor control
- **Writing:** letter and numeral formation requires fine motor sequencing; fluent, sequential fine motor skills required for cursive script

ORAL LANGUAGE SKILLS

- **Listening:** understanding sequential aural information; auditory discrimination, identification and retention of speech sounds
- **Speaking:** auditory sequential retention and manipulation of speech sound units; production of sequences of oral information

WRITTEN LANGUAGE SKILLS

- **Reading and Spelling:** all oral skills outlined above; visual discrimination of orientation of graphemes; visual sequencing of graphemes within words and words within sentences; sequential matching of graphemes and phonemes; visual memory of orientation and sequencing of letters in words
- **Handwriting:** awareness of orientation of graphemes; sequencing of fine motor movement
- **Written Expression:** sequencing of thoughts and their written representation

SERIAL LEARNING

- Such learning requires retention of sequential information (alphabet, counting, days in the week, months of the year, multiplication tables)

(In my practice it is so apparent that students are very aware of their problems in this area and frequently declare, during assessment that they are “no good at days and months, date of birth etc.”).

NUMERACY SKILLS

- **Counting:** sequential activity
- **Numeration and Notation:** recognition of orientation of numerals, sequencing of fine motor movements in formation of numerals, sequencing of graphemes in number words
- **Place Value:** positioning and sequencing of numerals
- **Basic Number Facts:** retention of sequences of information
- **Mental Computation:** application of sequences of information
- **Basic Algorithms:** sequential processing of information
- **Time:** spatial and temporal awareness
- **Measurement and Spatial Relationships:** positional and spatial concepts

Teachers at the pre-school or early primary school level, should play a significant role in developing directional skills in young children. By being aware of the central role of sequencing and orientational skills in early academic learning, teachers can emphasis these aspects in their instruction and identify and address any developmental delays in a child's directional skills.

While many aspects of directionality, as indicated above, are apparent through direct observation, some aspects will require specific assessment.

LEARNING DISABILITIES: A CONCEPTUAL FRAMEWORK OF DIRECTIONAL FACTORS

This framework attempts to indicate the pervasiveness of directional processing skills in learning. While many other factors contribute to successful learning outcomes as indicated in the table headed "A Conceptual Framework of Development and Learning", under the topics of Basic Abilities, Learning Differences and Basic Characteristics, in the Section, the processing of directional information plays a very significant role for learning disabled students.

The framework shows the subskills under the different academic domains and indicates whether Sequencing (S) or Orientation (O) skills are implicated. In addition, the model also shows three levels of functioning-

- Educational
- Psychological; and
- Neurological

Possible causal factors are also provided.

THE EDUCATIONAL LEVEL

LITERACY LEARNING

HANDWRITING

Letter formation (O)

Word formation (O/S)

Printing (O/S)

Cursive (O/S)

READING

Alphabet (S)

Letter recognition (O)

Word recognition (O/S)

Prose reading (S)

Comprehension (S)

Reading rate (S)

SPELLING

Retention of words (S)

Recalling words (S)

WRITTEN EXPRESSION

Planning (S)

Sentence structure (S)

Paragraph structure (S)

Coherence/Unity (S)

Spelling (S)

Punctuation (S)

GENERAL LEARNING

SERIAL LEARNING

Days in week (S)
Months in Year, Seasons (S)
Recalling birth date (S)
Recalling address (S)
Recalling telephone number (S)
Reciting alphabet (S)
Reciting poems (S)
Reciting sequential information (S)

MATHS

Rote counting (S)
Writing numerals-reversals (O)
Numeration and notation (S)
Number bonds (S)
Number facts-"tables" (S)
Number sequences (S)
Number sentences-equations (S)
Basic algorithms-steps (S)
Common fraction (O)
Decimal fractions (S)
Telling the time-analogue (O)
Telling the time-digital (S)
Reading maths words/problems (S)
Spelling number words (O/S)

GENERAL SKILLS

Retaining spoken instructions (S)
Retaining written instructions (S)

STUDYING/INDEPENDENT LEARNING

Planning and organisation (S)
Time management (S)

Attempts to explain the cause of a learning disability usually focus on problems/dysfunctions/differences at one or more of the following levels-

THE PSYCHOLOGICAL LEVEL

THE SKILLS INVOLVED IN PROCESSING, RETAINING AND REPRODUCING
SEQUENTIAL AND ORIENTATIONAL INFORMATION

THE NEUROLOGICAL LEVEL

THE INTEGRITY OF THE DIRECTIONAL FUNCTION
LOCATED WITHIN THE PARIETAL AND OCCIPITAL LOBES

POSSIBLE AETIOLOGY

GENETIC/FAMILIAL PREDISPOSITION

MATURATIONAL DELAY/DIFFERENCE

Irrespective of causation or assumed neurological or psychological deficits, the challenge for the teacher is the selection of the most appropriate instructional method(s)/strategies to give the student the best chance to acquire and develop the basic general, literacy and numeracy skills essential to be successful learners.

GENERAL INSTRUCTIONAL GUIDELINES

Teachers need to be aware that directional confusion affects the academic learning and organisational skills of many students. The following guidelines should assist in the instruction of many students who experience particular difficulty with the processing of sequences of information, with the orientation of symbolic information or with spatial awareness generally.

For successful learning, these students require information and committed teachers who:

- have a thorough knowledge of the process of academic skills development
- are aware and understanding of the difficulties experienced by the student
- acknowledge and respect individual differences in
 - learning styles, preferences, strengths, weaknesses and rates
 - perception, retention and use of information

- are prepared to adapt
 - teaching methods and styles
 - level of instruction
 - rate of presentation of information
 - materials
 - assessment methods

- are committed to the enhancement of the self-esteem, identity and dignity of the student

Students with learning disabilities need systematic, precise, explicit and often intensive teaching incorporating:

- use of concrete aids where necessary
- sequential presentation of material
- limited amounts of information to be processed
- reinforced repetition
- use of multisensory techniques and varied presentation
- success for the student

Some more specific aspects of the required explicit instruction include:

- establishing an individual student's knowledge/skill base
- a well organised and predictable environment
- clearly structured lessons including:
 - review of previous lesson
 - skill development
 - opportunity for both guided and independent practice

- multisensory techniques and activities
 - using apparent learning strengths
 - development of apparent difficulties
 - integration of learning
 - variety of presentation, methods, materials, and tasks (visual, auditory, kinaesthetic and tactile)
 - use of concrete materials
 - constant linking of action and language
 - teacher awareness of complexity of written material

- maximum opportunity for learning
 - maximise “on task” time
 - active involvement (attending, individual or group work)
 - minimise distractions (visual, auditory, physical, interruptions)

- clear presentation of new skills and concepts
 - at appropriate instructional level
 - sequential
 - small amounts of new information
 - new information explicitly linked to current knowledge
 - short, simple, precise explanations and instructions
 - check student understanding
 - slow, clear speech by teacher
 - pertinent information highlighted
 - use of modelling by teacher
 - avoid subtleties of language (e.g., sarcasm)

- opportunity for guided, reinforced student practice
 - application of new skills or knowledge through independent or group work
 - use of skills in a meaningful, relevant way
 - opportunity for a high success rate
 - teacher monitoring and provision of corrective feedback
 - over learning; repeated experiences

- constant review; systematic and cumulative revision of material
- development of metacognitive strategies to encourage independence in learning
- consideration of modified assignments, homework requirements and assessment procedures
 - allow for alternative presentation of material (e.g., oral, taped, diagrammatic, 3D)
 - provide models and guidelines of requirements
 - offer guidance in structuring time and organising materials
 - monitor progress allow time extensions where appropriate

- demonstration of a positive regard for the student
 - acknowledge student's, attributes and achievements
 - allow for demonstration of above
 - appropriate accommodation of difficulties
 - realistic expectations of what and how much material is to be learned
 - provision of positive feedback
 - encouragement of developing independence

INSTRUCTION

In my psycho-educational reports, specially selected instructional strategies that derive directly from the test profile and behavioural observations, are provided. It is planned that these recommendations will give teachers explicit educational and instructional guidelines and relevant activities.

AWARENESS

The first and most important recommendation is for the teachers to be **AWARE** of the nature of a learning disability.

To improve the effectiveness of instruction, it is essential that the basic characteristics of a learning disability and, consequently, the implications for teaching, are understood.

KEY KNOWLEDGE

The fundamental difficulties experienced by learning disabled students are a severe and persistent difficulty processing and retaining sequential and orientational/positional information. Such information can be visual, auditory or motoric. In most cases, all three modalities are implicated.

Typical tell-tale signs include the following-

- problems with **serial learning** (alphabet, days in week, months in year, seasons, birthday, address, telephone number)
- problems retaining and processing **sequential information**
 - visual-words (wholes and letter sequences), number patterns and order, number sentences/equations
 - auditory-listening, phonological skills-manipulating, blending, number facts and sequences
 - motoric-skipping, tying shoe-laces, handwriting

- problems processing **directional/positional information**
 - visual-letter and numeral reversals, telling the time, shape and pattern confusions, maths signs
 - motoric-handwriting-faulty letter and numeral formation, dysfluency

It is imperative that instruction in reading, spelling, handwriting, written expression and maths is planned with these “problem-areas” in mind.

SOME SPECIFIC INSTRUCTIONAL STRATEGIES

Specific recommendations are listed below starting from the **BASIC SKILLS** which are considered to be essential for later learning success. These have greatest relevance when teaching young children or older underachieving students.

Suggested activities in the basic academic areas follow.

BASIC SKILLS

It should be noted that the skills presented below are those directly relevant to the acquisition and development of the basic academic skills.

The **Early Learning Checklist** (see under the [Learning Readiness Section](#))

Also see [Early Learning Essentials-Directionality](#)

Auditory Processing Skills

Auditory Sequential Memory

Some suggested activities-

- Repeating series of digits, letters and words. Increase number of items in a series and time intervals between items.
- Immediate recall of meaningful verbal information-
- Repeating sentences
- Repeating or retelling short passages
- Paired-associate learning- learning and remembering list of word pairs
- Listening to short stories and answering questions-literal and interpretive
- Identifying missing items or rearranging sequences-e.g.,
 - 2, 6, 4, 9 2,6,?,9
 - crater, cold, window crater, window, cold
 - 1, 7, 4, 8 1, 4, 7, 8
- Remembering short instructions-e.g.,
 - Put a cross in the circle, a tick in the square and underline the triangle.
- Develop coding, chunking and rehearsal strategies.

Phonological Skills

Identification of sounds within spoken words-

- Clapping sounds in words
- Counting sounds in words-using blocks or counters if necessary

Identifying sounds within spoken words

- initial
- final
- medial

Blending sounds into words

- e.g., c-r-a-b, crab

Manipulating sounds within words

- e.g., take the "t" out of "stack" and say the word (sack)

See also the many activities provided in the Reading Section under Phonological Skills.

Phonic Skills

For example-

- Reciting the alphabet
- Letter-sound correspondence
- Spelling patterns
 - Consonantal blends
 - Vowel blends

See the many activities provided in the [Reading Section](#) under Phonic Skills and Graphophonic Skills and in the [Spelling Section](#).

Visual Processing Skills

Visual Discrimination of Shapes, Patterns, Letters and Words

Visual Memory for Shapes, Patterns, Letters and Words

- Reproducing geometric shapes from memory-show card with items, remove and have student recall items.
- Reproducing series of digits, letters, words and sentences. Expose item for approximately 5 seconds, remove/cover and have student write from memory.
- Identifying missing or changed items in a series. Two cards are shown with student required to identify difference(s).
- Develop coding, chunking and rehearsal strategies.

Reading

For younger students

- paired reading, including Books on Tape
- flashcard drill and games, especially the common "demons"
- phonological exercises-discrimination, manipulation and blending sound sequences
- phonic exercises
- visual dictation
- computer aided instruction
- reading comprehension-including cloze activities
 - sentence
 - paragraph
 - short stories

For older students

- Reading vocabulary (synonyms and antonyms). Including Flashcards with a key word on the front of the card and its synonym/antonym on the back. Student looks at the front word and "learns" the associated word on the back.
- General expansion of vocabulary, dictionary and thesaurus activities.
- Reading comprehension

Reading for understanding (sentence, paragraph and story).

pre-reading strategies
text preview
story impressions
retelling
literal
inferential
cloze
concept maps
5 Ws- who, where, why, what, when?

- Computer-aided instruction in reading

Additional activities are included in the [Reading Section](#).

Spelling

For younger students

- flashcards of basic, common words-colour coded on back. A useful activity is to have a difficult word for a student, e.g., "any" printed on the front of the card in black and on the back have the same word with the "error/problem/tricky part", in this case, usually the "a", written in red. Other basic words (e.g., from the Dolch Basic Word List or other Lists) with colour coding of the "error" on the back, form a bank of words to be used to play several games. The aim of this activity is to have the student "visualize" and remember the tricky part of the target word. The card could be placed before the student (right-side/black-side up) then asked-What is the "tricky part/the red part" in this word on the back? If unsure, the student can check and then answer. The key is the repeated exposure to the correct spelling with colour cueing. The bank of words also provides words to spell orally or in writing. These are the basic, essential words that the student must learn to spell to become a competent writer.
- mark only two or three errors per page of a student's free/creative writing. Underline the word and tick the correct letters in the word. Place these words at the bottom of the page and record in the back of the book and place on a flashcard.
- a strategy for teaching new words (limit to about four words)
 - parent/teacher SHOWS and SAYS the target word and repeats in sentence
 - student LOOKS, SAYS the word and then SAYS each letter
 - parent/teacher COVERS the word
 - student SAYS the word, WRITES the word SAYING each letter as written
 - student COMPARES word to target word
 - if correct, praise and proceed
 - if incorrect, student IDENTIFIES error and corrects-praise effort

- a strategy for testing/revising spelling (limit to about four per session)
 - teacher/parent SAYS the target word and repeats in a sentence
 - students REPEATS the word
 - student WRITES the word, SAYING aloud each letter as written
 - student COMPARES word to target word
 - if correct, praise and proceed
 - if incorrect, student IDENTIFIES error and corrects-praise effort

- when “marking” errors, provide encouragement by ticking the correct letters in a word
- visual dictation-tapping letters written on a white-board and have student “read” the target word
- dictation-short passages
- computer aided instruction

Spelling and Written Expression

For older students

- Flashcard activities-colour coding (see above details)
- Spelling patterns and rules
- Metacognitive strategies for rules
- Computer-aided instruction in spelling and essay writing (e.g., Superspell-TM and Inspiration-8)
- The use of mind maps and concept webs to assist in the planning, organisation and structuring of essays.

Activities also included under the [Spelling Section](#) and [Written Expression Section](#) above.

Handwriting

For younger students

- white-board and bright coloured pens
- co-active patterning
- fluency patterning
- check correct pencil grip
- co-active letter formation
- check correct formation of letters and numerals (watch for reversals)
- dictation-short passages

Mathematics

Several predictable errors and error patterns are committed by young students with a learning disability. Most of the errors made by learning disabled students stem from a basic **directional** uncertainty or confusion- acquiring basic "directional" concepts, identifying, counting or retaining **sequences**, order and patterns, retaining number bonds, facts and tables, order of steps in basic algorithms, decimal fractions etc., and processing **orientational/positional** information- positional concepts (e.g., left and right) telling the time, reading maths signs, common fractions and geometric positions.

Awareness of these fundamental problems will focus teacher's attention to these areas. Appropriate instruction must be explicit, sustained, repetitive and systematic.

Key Areas of Mathematics

Number

e.g.,

- basic number concepts
- basic number facts
- basic algorithms
- common fractions
- decimal fractions

Space

Measurement

- especially time

Chance and Data

Patterns and Algebra

See other sources of information concerning instructional strategies including-

The Early Learning Checklist in the [Learning Readiness Section](#).

Activities in the [Mathematics Section](#)

General Instructional Strategies

Some general instructional strategies that should assist in improving the student's confidence as a learner are as follows-

- clear and concise instructions
- use of concrete cues, blocks, pictures, diagrams
- cueing and prompting
- use of metacognitive* strategies to assist learning (e.g., spelling rules)
- regular comments of reassurance and encouragement
- repetitive practice
- a warm, caring, encouraging learning environment

*METACOGNITION STRATEGIES

Many teachers have requested more information on metacognitive strategies mentioned above. Some of the information that I have provided includes the following.

Campione and Brown (1978) proposed an information-processing framework to develop a general theory of intelligence which was expanded by Borkowski (1985). The theory hypothesises that intelligence has two basic components: an architectural system, which represents a structural component and an executive system, which represents a control component. The executive system has several components, one of which is metacognition.

Metacognition refers to thoughts about the thoughts or awareness of one's own thinking processes and strategies. Metacognition helps to inform and regulate cognitive processes and strategies. The integration of metacognitive knowledge with strategic behaviour results in more effective problem-solving. Metacognition assists planning, self-monitoring and inventiveness and may lead to strategy selection, self-criticism and the generation of new strategies.

Examples of metacognition include knowing that a strategy that worked for one task might need to be slightly modified for a new task, knowing that some strategies will work for a variety of different tasks, knowing how to retrieve information from memory and knowing how to deal with puzzlement when a logical dilemma is encountered. Puzzlement is an experiential aspect of metacognition and may be "both a source of new metacognitive knowledge and a cue for utilizing stored knowledge about appropriate strategies to confront the problem at hand." (Borkowski, 1985, p.135).

Robert Sternberg (1986) divided human intelligence into three dimensions: componential, experiential and contextual. There are three basic types of components: metacomponents, performance and knowledge acquisition components. Metacomponents are higher-order processes used in planning, monitoring and evaluating the performance of a task. Essentially, metacomponents "tell" other components what to do and when to do it.

Many students, especially gifted students but also students with a learning disability, would benefit from problem-solving or metacognitive strategies. It needs to be stressed that gifted students and many learning disabled students have excellent higher-order thinking skills. Both categories of students are fundamentally defined by integrities in such thinking. For learning disabled students, their major deficiency is processing basic, lower-order, automatic-sequential information, involving both perceptual and memory skills.

The metacognitive strategies that could be used especially in literacy and numeracy learning but also in other areas of the school curriculum include the following:

- planning
- self-monitoring
- self-regulation
- collaboration and dialogue with students or teacher
- evaluation
- review

A general metacognitive strategy that should be useful might have the following components:

- "STOP What am I doing?"
- "THINK and DECIDE. What is the question and which is the best way to solve it?"
- "VISUALISE the plan-Can I see/draw a plan" (e.g., a mind-map, a flow diagram)
- "CHECK. Am I doing it the correct way?"
- "CONFIRM. Yes, I am doing it the correct way."
- "EVALUATE."
 - "a) If I am wrong/mistaken, next time I will do it differently/better"
 - or
 - "b) Great! I have done a good job."

These strategies can be used across the curriculum. For example-

Reading

Basic word recognition and word attack-skills

- Rules of pronunciation, orthographic patterns (including spelling patterns)
- Explanation of letter-sound correspondences, set for diversity, irregularities, etc.

Reading comprehension skills

- Higher-order reading and thinking skills
- Reading to think and solve problems
- Reading "between and beyond" the lines
- Answering set questions while reading
- Advanced organisers
- Critical reading strategies

(See [Reading](#) Section for examples)

Spelling

- Rules
- Explanation of regular and irregular spelling patterns, set for diversity, etc.

(See [Spelling](#) Section for examples)

Mathematics

- Rules and procedures
- Explanation of processes such as basic algorithms, fractions, decimals, etc.

(See [Mathematics](#) Section for examples)

Study Skills

- Planning and organisation
- Strategies and methods

(See [Study Skills](#) Section for examples)

Also see the [Giftedness](#) Section for references to Metacognitive strategies.

General References:

Borkowski, J. G. (1985). Signs of intelligence: Strategy generalization and metacognition.

In S.R. Yussen (Ed.), *The growth of reflection in children* (pp.105-144). Orlando FL: Academic Press.

Campione, J. C. and Brown, A. L. (1978). Toward a theory of intelligence: Contributions from research with retarded children. *Intelligence*, 2, 279-304.

Sternberg, R. J. (1986). *Applied intelligence: Understanding and increasing your intellectual skills*. San Diego: Harcourt Brace Jovanovich.

Educational/Instructional References:

Dominie www.dominie.com.au
Edsoft www.edsoft.com.au
Hawker-Brownlow Education www.hbe.com.au
SEMERC www.semerc.com

[Download this topic in PDF format](#)

This online resource has been prepared by Dr. [Stewart C. Sykes](#) - Psychologist. [MAPS](#).
Former Associate Professor of Psychology and Special Education and Director of the
Krongold Centre for Exceptional Children.
Monash University, Australia.

Office: 189-191 Balaclava Road Caulfield North Victoria Australia 3161
Ph: 03 9526 0017
Fax: 03 9526 0099
Email: stewart@docsykes.com

Copyright © 2009 Dr. Stewart C. Sykes. All rights reserved.
Revised: 9-February-2009