

# **Interventional Strategies for Learning Disabilities: Evidence Based Practices**

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# Introduction:

- In India, the Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act, 1995 did not include learning disabilities as one of the categories of disability. But , the Rights Of Persons With Disabilities Bill, 2014
- (A Bill to give effect to the United Nations Convention on the Rights of Persons with
- Disabilities) has covered learning disabilities also. But this Bill is still pending.
- LD diagnosis and treatment has been one of the most-researched problems in the fields of school psychology and special education.

# Nature of Learning Disabilities:

- There is no clear and widely accepted definition of learning disabilities.
- Because of the multidisciplinary nature of the field, there is an ongoing debate on the issue of definition.
- Currently at least twelve definitions appear in the professional literature. There are several technical definitions offered by various health and education sources.

# **Nature of Learning Disabilities:**

## **contd.....**

- The Individuals with Disabilities Education Improvement Act (IDEA 2004) has not changed in its criteria and guidelines for what constitutes a learning disability.
- The definition of Learning Disabilities modified only slightly over the years, was reformatted into the following three sections in IDEA (2004):

## IDEA (2004):

- IN GENERAL: The term “specific learning disability” means a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, in which disorder may manifest itself in an imperfect ability to listen, think, speak, read, write, spell, or to do mathematical calculations.

## IDEA (2004):

- **DISORDERS INCLUDED:** Such term includes such conditions as perceptual disabilities, brain injury; minimal brain dysfunction, dyslexia, and developmental aphasia.
- **DISORDERS NOT INCLUDED:** Such term does not include a learning problem that is primarily the result of visual, hearing, or motor disabilities, of mental retardation, of emotional disturbance, or of environmental, cultural, or economic disadvantage (IDEA 2004).

# BCASP

- The British Columbia Association of School Psychologists (BCASP) attempted to develop a more specific description of the roles and the responsibilities of school psychologists in the assessment, diagnosis, and identification of students with LD.

# The current BCASP definition of LD

- *"Learning Disabilities refer to a number of disorders which may affect the acquisition, organization, retention, understanding or use of verbal or nonverbal information.*
- *These disorders affect learning in individuals who otherwise demonstrate at least average abilities essential for thinking and/or reasoning.*
- *As such, learning disabilities are distinct from global intellectual deficiency. Learning disabilities result from impairments in one or more processes related to perceiving, thinking, remembering or learning.*
- *These include, but are not limited to: language processing; phonological processing; visual spatial processing; processing speed; memory and attention; and executive functions (e.g. planning and decision-making).*



# Areas of LD

- *Learning disabilities range in severity and may interfere with the acquisition and use of one or more of the following:*
  - *Oral language (e.g. listening, speaking, understanding);*
  - *Reading (e.g. decoding, phonetic knowledge, word recognition, comprehension);*
  - *Written language (e.g. spelling and written expression); and*
  - *Mathematics (e.g. computation, problem solving).*
- *Learning disabilities may also involve difficulties with organizational skills, social perception, social interaction and perspective taking.*
- ❖ *Diagnostic Tests(Criterion Based/Curriculum Based) need to be administered.*

# Features of LD

- Learning disabilities are generally lifelong.

*The way in which they are expressed may vary over an individual's lifetime, depending on the interaction between the demands of the environment and the individual's strengths and needs.*

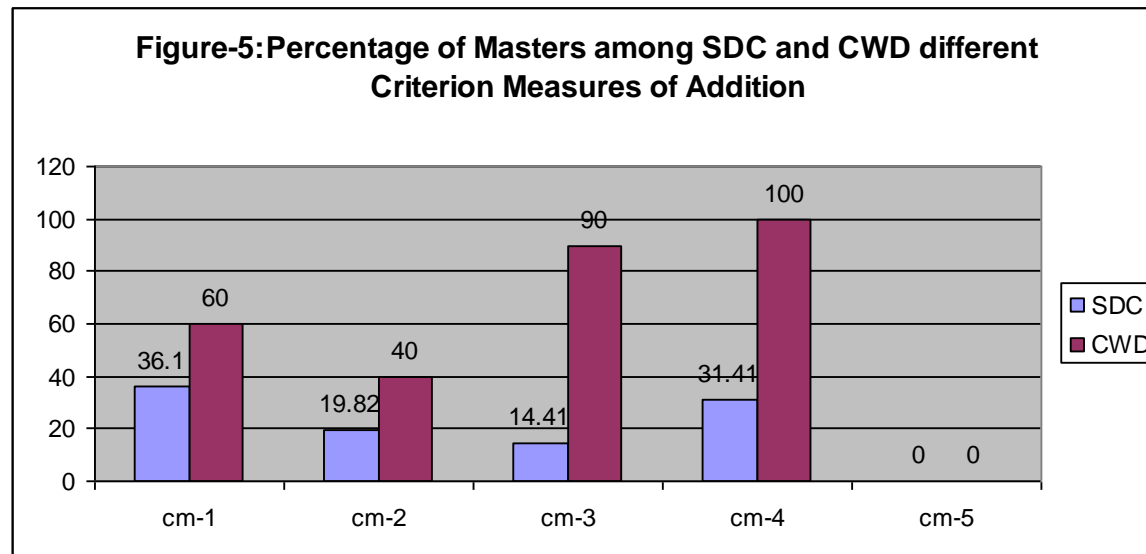
# Features of LD

- *Learning disabilities are due to genetic and/or neurobiological factors or injury that alters brain functioning in a manner which affects one or more processes related to learning.*
- *Learning disabilities may co-exist with various conditions including attention, behaviour and emotional disorders, sensory impairments or other medical conditions.*

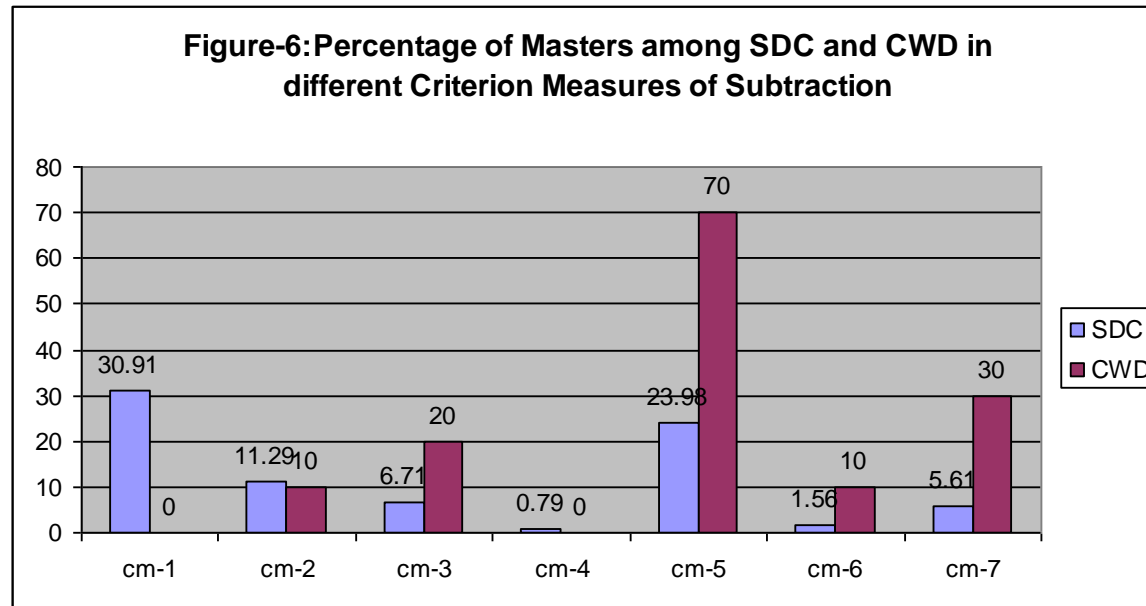
## Criticism of Discrepancy

- In the area of learning disabilities (LD), IQ achievement discrepancy criteria have been questioned on the basis of poor **discriminant validity** (few differences between students identified with LD and low-achieving students, for example); lack of **consequential validity** (outcomes are not enhanced by diagnosis and services in special education); and **social inequity** (disproportionality and growing incidence of LD).

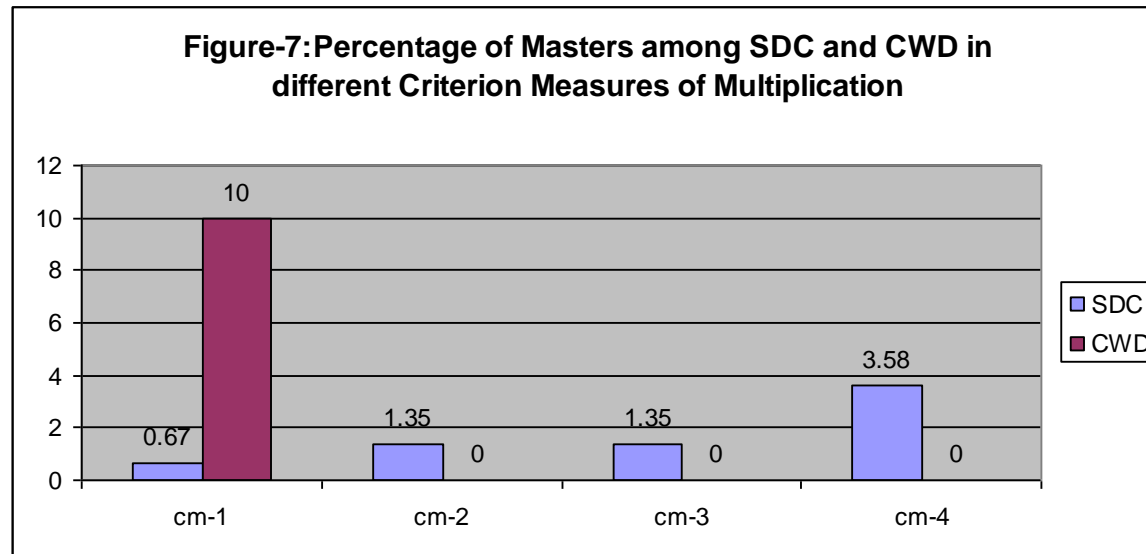
## Comparison between the Percent of Masters in Arithmetic Performance among Socially Disadvantaged Children and Children with Dyscalculia



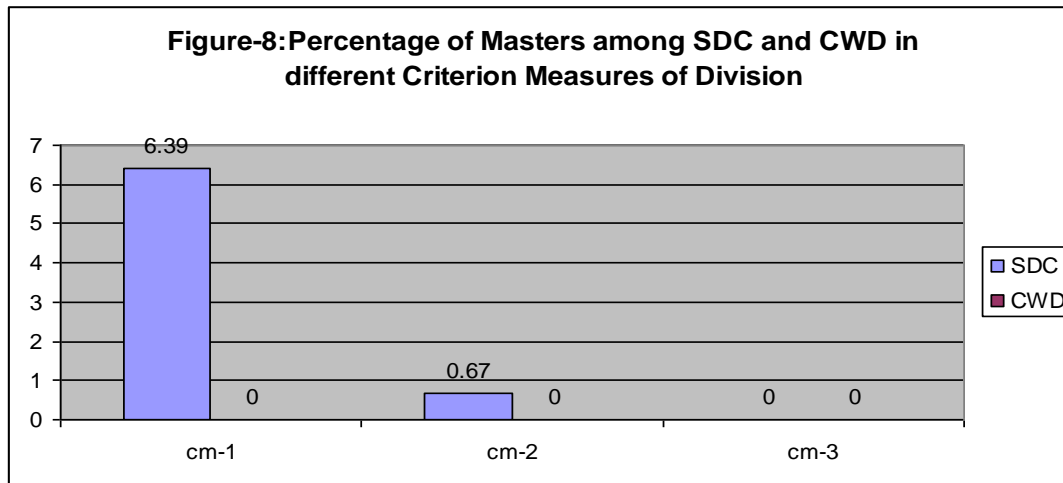
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# The revised LD definition in DSM-5

- Changed the term from “Learning Disorders” to “Learning Disabilities.”
- This includes general categorical label of LD with subtypes, although it requires some expansion of the subtypes is supported by current research.
- To further improve the definition of LD in the DSM-5, it is suggested by the experts that three areas needed revision:
  - (1) The use of intellectual disability as a rule-out criterion for diagnosis (as
  - opposed to inclusion of average intelligence as a rule-in criterion);

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# The revised LD definition in DSM-5

- (2) The inclusion of more specific markers of LD as rule-in criteria for diagnosis, including lack of **response to scientifically-based intervention (RTI)**, direct measurement of the effect of interventions on performance, and/or use of universal screening data to verify that the instructional environment is generally adequate; and,
- (3) Expansion of the definition to include additional subtypes supported by research.

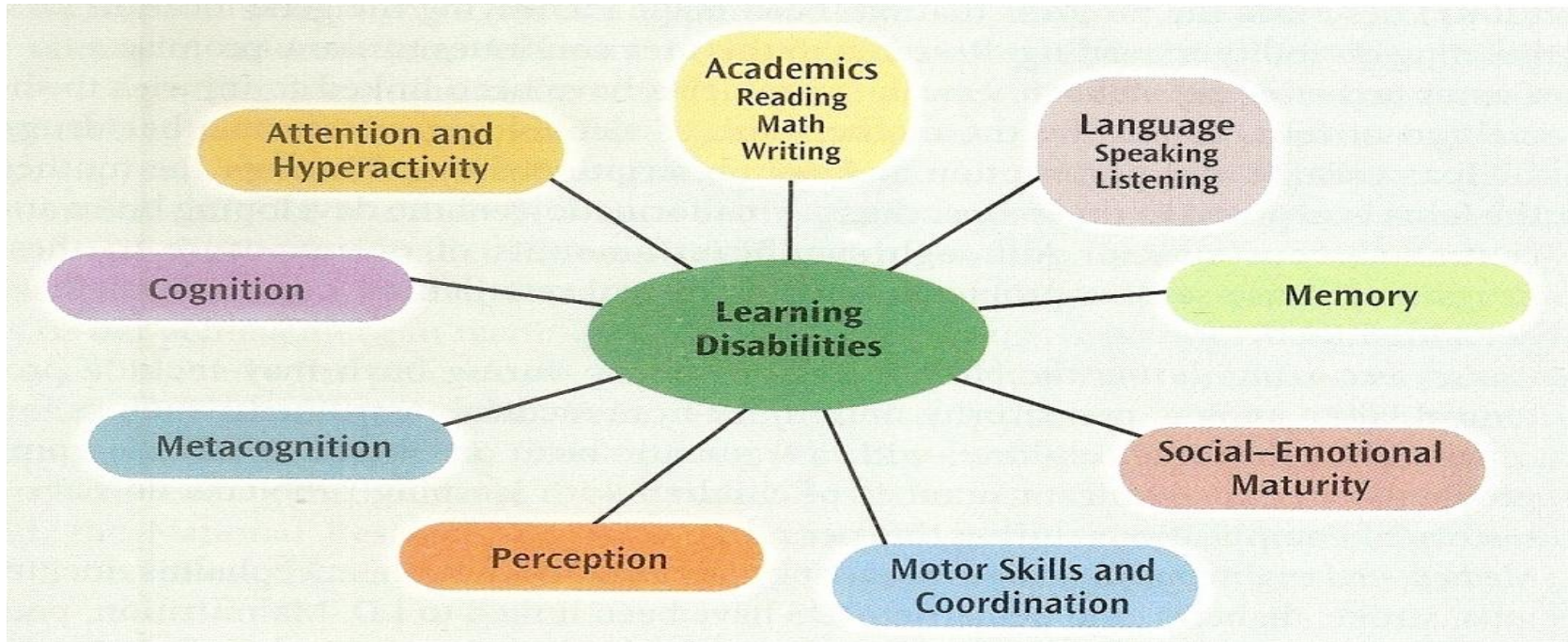
# Suggested Criteria for Learning Disability Diagnosis in DSM-5

- Learning Disabilities are a group of disorders characterized by sustained difficulties learning academic skills (currently or by history), that are not consistent with the person's chronological age and educational opportunities, and that cannot be explained by an **intellectual disability**, sensory impairment, emotional disorder, or lack of adequate instruction.
- Academic skills refer to reading accuracy, reading fluency, reading comprehension, written expression, mathematics calculations, and mathematics problem solving.
- Multiple sources of information are to be used to assess academic skills, one of which must be an individually administered, culturally appropriate, psychometrically sound, norm-referenced measure of academic achievement.

## Suggested Criteria for Learning Disability Diagnosis in DSM-5

- The use of intelligence tests, tests of cognitive ability, and/or neuropsychological tests may also be indicated in order to provide more information regarding an individual's learning disability or disabilities and to inform interventions.
- The adequacy of instruction and the client's response to evidence-based interventions are to be considered in making the diagnosis.
- Accurate LD diagnosis can only be made through a series of rule-out judgments using measurement procedures of adequate diagnostic accuracy and concluding with an individual comprehensive psychological evaluation that includes measurement of IQ to rule out intellectual disability where it is suspected.

# Areas of possible strengths and deficits of students with learning disabilities



# Academic Deficits

- : The academic problems that identify a learning disability fall into the areas of read-ing, math, and written expression. The most prevalent type of academic difficulty for students with LD is reading.
- Another major academic problem area is mathematics. Students with LD may have problems in math calculations or math reasoning. It is hoped that math disabilities will soon be stud-ied as intensely as reading disabilities.
- A disability in math may be called dyscalculia. Learning disabilities in the area of written expression are beginning to receive more recognition as a potentially serious problem.

## **Language Deficits:**

- They are found in the areas of oral expression (expressive language) and listening comprehension (receptive language). Since these two areas control our ability to communicate with others, a deficit can have a major impact on quality of life-including life in a general education classroom.
- A new area of concern and research for children with language-learning disabilities is the area of pragmatics, or use of language in social situations.

# Social-Emotional Problems

- Some children with LD have a real strength in the area of social skills; they are well-liked by peers and teachers.
- However, several characteristics of learning disabilities, like those noted in the area of language, can create difficulties in social and emotional life.
- Social skills deficits of children with LD include resolving conflict, managing frustrations, initiating or joining a conversation or play activities, listening, demonstrating empathy, maintaining a friendship, and working in groups.

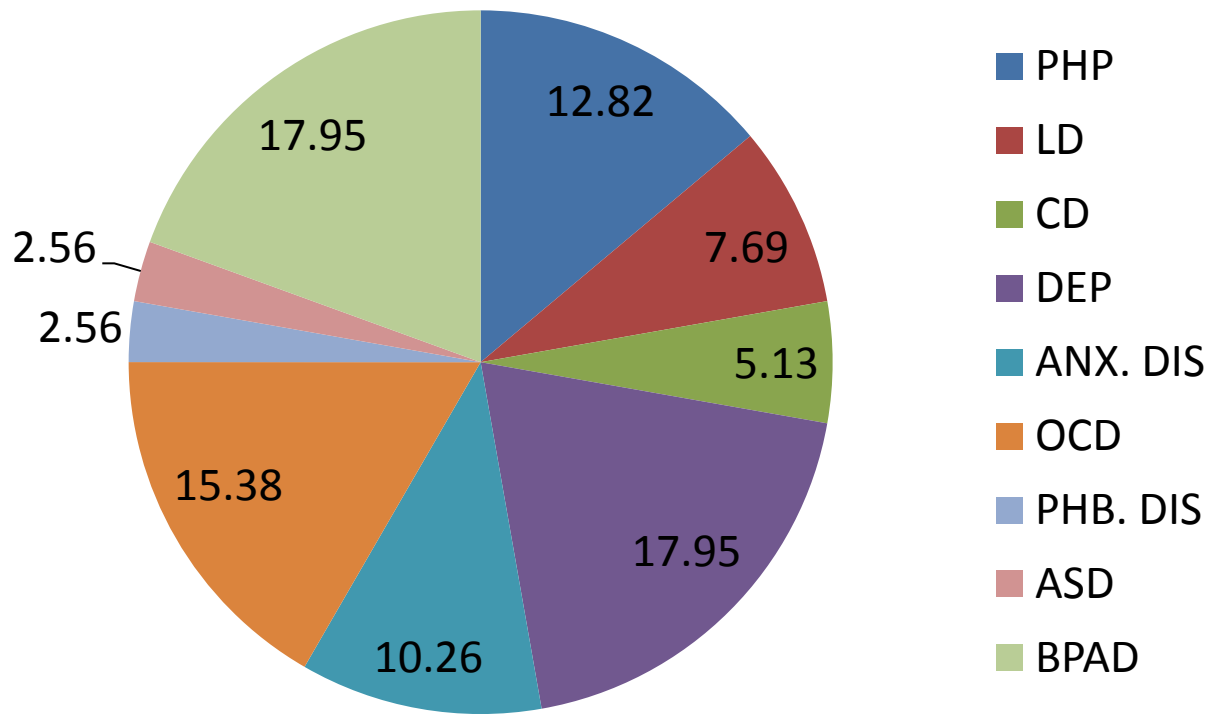


## ADHD and Memory Deficits

- Attention Deficits and Hyperactivity: Approximately 51 percent of students with LD are also reported to have attention problems, and it is estimated that 3.7 percent of school-aged children have both LD and ADHD. The co-morbid occurrence of these two disabilities has also been found to create an increase in the need for special education service.
- Memory Deficits: Students with LD have deficits in short-term memory, working memory, and long-term memory.

# Cognition and Metacognition Deficits:

- Cognition Deficits: Cognition refers to the ability to reason or think. Students with problems in this area may make poor decisions or frequent errors.
- Metacognition Deficits: Metacognition refers to “thinking about thinking”. Students with problems in this area might have difficulty focusing on listening, purposefully remembering important information, connecting that information to prior knowledge, making sense out of the new information, and using what they know to solve a problem.



# Perceptual Differences and Motor Skill & Coordination Problems :

- Perceptual disorders affect the ability to recognize stimuli being received through sight, hearing, or touch, and to discriminate between and interpret the sensations appropriately. A child with a learning disability might not have any problems in these areas, or he or she might have deficits in any or all of them.
- **Motor Skill and Coordination Problems:** This area has also been de-emphasized in the identification of an intervention for children with learning disabilities because it is not directly related to academics. However, it is common for children with LD to display problems in gross and fine motor areas.

# Prevalence of Learning Disabilities

- The true prevalence of learning disabilities is subject to much dispute because of the lack of a standard definition of LD and the absence of objective diagnostic criteria.
- Research efforts to identify objective early indicators of LD in basic reading skills have concluded that virtually all children scoring below the 25th percentile on standardized reading tests can meet the criteria for having a reading disorder.
- While less is known about LD in written expression, researchers estimate its true prevalence at between 8% and 15% of the school population. Research also indicates that approximately 6% of the school population has dyscalculia.
- Indian studies indicates 3% of dyslexia, 5.8 to 6.0% of dyscalculia, 6.84% of with oral language disabilities in Kannada and 7.46 percent of writing disabilities in English.
- Among Dyscalculia with or without reading and writing disabilities the following prevalence were noticed:
  - Dyscalculia without reading and writing problems - 24 out of 78 - 30.77 %;
  - Dyscalculia without writing problem - 14 out of 78 - 17.95 %;
  - Dyscalculia with reading and writing problems - 40 out of 78 - 51.28 %.
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# Interventional Strategies:

- Treatment procedures for individuals with learning disabilities have been controversial over the years.
- During 1970s, there was an emphasis on perceptual training of auditory and visual processes.
- This was debated by those who advocated direct instruction in the deficit academic area(s).
- There has been a move toward a skills approach, in which direct instruction is implemented in the areas of academic deficit.
- More recently, language, social-emotional, and cognitive-meta-cognitive areas have received positive attention.
- Many approaches have gained acceptance as research-based methods for improving the skills and developing the abilities of children and adults with learning disabilities.

## Conceptual Models of Intervention

- The medical model is based on the idea that the problem is physiological and the solution is a medical treatment, such as medication. **A newer medical model** sees medical interventions as supplementary to, not a substitute for, instructional programs. A primary implication for teachers is that teachers must collaborate with physicians to address learning disabilities.

## Conceptual Models of Intervention

- The **diagnostic-remedial model** is based on the idea that certain psychological processes or areas of learning have gone awry, that testing will reveal which processes or areas of academic performance are faulty, and remedial programs will address the faulty processes or learning.



## Conceptual Models of Intervention

- The **behavioral model** is based on the idea that behavior, including academic behavior (responses to academic tasks), is influenced by consequences. Applied Behavior Analysis, Task Analysis, and Direct Instruction are all part of a behavioral model. Direct Instruction refers to a scripted, tested program of instruction.

## Conceptual Models of Intervention

- The **cognitive model** is based on the idea that we must understand how people learn and remember. A cognitive model includes information processing, metacognition, cognitive-behavior modification, and mnemonic strategies. They stress the importance of teaching students learn self-awareness, self-talk and self-control.

# Conceptual Models of Intervention

**Educational models** differ in their emphasis on several points.

- Despite these differences, contemporary models share an emphasis on
  - Direct assessment- evaluating students' performances' frequently, on actual tasks, under varying conditions, and linking assessment directly to instruction.
  - Strategies- understanding how students solve problems and teaching them to approach tasks systematically.

- The **developmental model** stresses provision of an enriched environment.
- The **constructionist model** is based on Piaget's work. Stimulating the child's cognitive or thinking abilities is the primary focus. Activities are designed to improve memory, discrimination, language, concept formation, self-evaluation, problem solving, and comprehension. This new area of research is experiencing great success.

# Conceptual Models of Intervention

- **Syntheses of research findings** reveal that among the instructional procedures with the largest effect sizes (indicating substantial power in instruction of students with learning disabilities) are formative evaluation, direct instruction, behavior modification (when social behaviors are the target), instruction in reading comprehension, academic behavior modification (when academic skills are the target), and learning & mnemonic (memory) strategies.

# **Principles and strategies Underlying Direct Instruction for Individuals with LD:**

- Various principles recommended by the experts for implementing Direct Instruction to students with LD were incorporated in the remedial reading programme in kannada developed by Ramaa (1985,1993). They are as follows. However, these principles are useful in providing remedial instruction in teaching- writing, spelling, maths, oral language-reception, expression, comprehension, automaticity. They were supported by research and practice.

# Direct Instruction: Principles and strategies

- (1) Dyslexic children need to over-learn information so that it is not forgotten. Therefore, considerable time should be devoted to revision of earlier work.
- (2) Because the dyslexic child forgets quickly new material should be presented frequently and in a number of ways. Thus:

- Learning appears to be optimal after the following stages have been followed: recognition, recall, relearning, recall.
- Learning material should be presented in a variety of situations so that the child can generalize his knowledge (Ex. Use of family of words, using small words like it, at, ate etc.,). Substitution method can be used at the word and sentence levels.
- Ex. wind – wing, feather-weather; feet-sweet-sheet;
- I am drinking water/milk; I am filling water.
- I am going to the school; I am going to the market.
- Which of the following is an exception (odd man out)?:
- But, cut, put, nut, shut, hut

## Direct Instruction: Principles and strategies

- (3) Remedial help should refer to the precise skill to be learned rather than to an assumed gross deficit. Thus it should be content specific. For example, b/d confusions may well be a product of directional confusion, but it is more productive if the child is trained specifically on b/d discriminations, rather than on general directions.
- (4) In selecting the child's beginning reading vocabulary (sight words) , it should be made sure that the words are within the student's range of experience and different with reference to sound and visual configuration ( Ex.bag rather than bad).



## Direct Instruction: Principles and strategies

(5) Learning must be guided, controlled and made explicit in the early stages. This implies that training may be needed to clarify sensory experiences. Drawing attention to the differences is necessary.

- Ex. p/b/d, sequence of letters in 'saw' and 'was'.

(6) Treatment must be consistent and regular.

# Direct Instruction: Principles and strategies

(7) The child must be actively involved in the learning process, rather than passively assimilating. The child should be allowed to discover the rule if possible and then define it.

Ex.(a) Change in the vowel `a' in a word depending upon the presence or absence of final `e'- hat/hate, fat/fate; city/cycle/cite/center as against cut/car/core/chorus as against chair/ church/churn; top/tap/tape; ball/call/stall

(b)Write/writing, drive/driving; care/caring; shop/shopping; sit/sitting etc.,

(c)Identify small words within long words- Teacher = Tea-c-her; Card=car-d; weather = w-eat-her; mango=man-go.

## Direct Instruction: Principles and strategies

(d) Mental maths is difficult for children with dyscalculia. For addition, subtraction they may continue to represent the numbers as dots, lines or use fingers which consume time. To facilitate the process they may be allowed to keep a number chart with numbers from 0 to 55. They should understand addition means moving forward and subtraction is moving backward from a given number. This is represented below.

# Direct Instruction: Principles and strategies

- Add the following:

111

4567

7654

1234

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13455

0 1 2 3 **4** 5 6 7 **8** 9 10 11 12 13 14 **15**

16 17 18 19 20 21 22 23 24 25 ...

..... 55.

subtract the following

7654

4321

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3333

0 1 2 **3** **4** 5 6 7 8 9 10 11 12 13 14 15 16 17 18

## Direct Instruction: Principles and strategies

- (e) The learning of multiplication Table should be made meaningful and simple than expecting rote learning.
- The most difficult tasks in arithmetic are ascending and descending order, multiplication, division, identification of the factors as they are dependent on multiplication tables and estimation. Children with dyscalculia cannot recall the tables accurately and automatically. It is better to make them write the particular multiplication table and do the operation instead of doing entire process at the mental level. The simplification of the task depends on the meaningfulness and pattern.
-

# Direct Instruction: Principles and strategies

								5 +	1	06
1	1	2		1	2	3		10+	2	12
2	3	4		4	5	6		15+	3	18
3	5	6		7	8	9		20+	4	24
4	7	8		10	11	12		25+	5	30
5	9	10		13	14	15		30+	6	36
6	11	12		16	17	18		35+	7	42
7	13	14		19	20	21		40+	8	48
8	15	16		22	23	24		45+	9	54
9	17	18		25	26	27		50+	10	60
10	19	20		28	29	30				

# Direct Instruction: Principles and strategies

	09	<b>12</b>	08				
	18	24	16				
	27	36	24				
	36	48	32				
	45	60	40				
	54	72	48				
	63	84	56				
	72	96	64				
	81	108	72				
	90	120	80				

## Direct Instruction: Principles and strategies

- (8) The child should be continually busy at a '**meaningful**' task during the remedial session. **Immediate feedback** is essential for the child to evaluate the adequacy of his response. Also, the teacher should either prevent, or immediately correct, spelling errors to ensure continual reinforcement of correct spelling patterns and thus aid assimilation and memory.
- Better to start sentences at the earliest rather than teaching individual words for teaching spelling or meaning. The child can be asked to tell the sentences and write the same with the help of the teacher. This facilitates both comprehension and expression.



## Direct Instruction: Principles and strategies

- (9) Multisensory attack should be made using visual, auditory, tactile and kinesthetic links supported by spoken language, mnemonics and verbalizations.
- (10) Because, the child with dyslexia has had a lot of school failure, it is possible that he has become very under-motivated when he is presented with the written word. To help him become more motivated the following tactics may be helpful:

## Direct Instruction: Principles and strategies

- i) The initial part of the remedial session should involve activities on which the child should achieve success as easily as follows, since this will act as a motivator.
- ii) The learning task should be divided into sub-skills so that the child can master each of them easily and keep himself highly motivated throughout learning the task.

## Direct Instruction: Principles and strategies

(11) Integrated approach to teach different skills, (listening, speaking, reading, writing and maths) are more effective and economical.

The vocabulary/terminology of mathematics, science and mathematics also can be taught while teaching reading/writing/spelling.

# Direct Instruction: Principles and strategies

- Deliberate efforts must be made for positive transfer of learning across domains/languages. Indian languages have distinct syllables script in the script.
- The correspondence between grapheme-phoneme is fixed unlike English, which is arbitrary. They are definite graphemes for each phoneme in Indian Languages-vowels, diphthongs, basic consonants, mathras (conjunct consonants), like and unlike double/triple consonants.
- This system can be followed while teaching English also. Due to arbitrary nature, there may be variation, but still helps in writing/reading Indian Proper Nouns.
  - Ex. Ka ki ku ko –kamala, Kiran, Kusuma, Komala, Bengaluru, Gujarath etc.,
  -

## Direct Instruction: Principles and strategies

(12) A more therapeutic approach is needed, that means, teaching must inspire the non-reader to new efforts and increased confidence. The establishment of good teacher-child relationship which encourage co-operation, helpfulness, renewed interest and enthusiasm, and a will to succeed is absolutely essential. The teacher must establish a partnership with the child in teaching what is in essence a problem for both of them.

# **Intervention Related to Social Interactions and Emotional Maturity**

- Intervention related to social interactions and emotional maturity is critical for many students with LD.
- Not all students with learning disabilities have social, emotional, or behavioral problems. However, a majority of students with learning disabilities present behavior management problems for teachers.
- Problems of social competence include difficulties in using social skills effectively, avoiding maladaptive behavior, developing positive relations with others, and acquiring age-appropriate social cognition.
- Conduct problems are common among students with learning disabilities, who are overrepresented among youths detained by the juvenile justice system.
- Other emotional or behavioral problems, such as anxiety and depression, may accompany learning disabilities.

# Other Interventions

- Correcting maladaptive **attributional styles**;
- The overall goal of **social programs** is to teach socially appropriate behavior and social skills that are self-generated and self-monitored.
- **Intervention in cognitive and metacognitive skills** has only recently received support from LD professionals. Powerful techniques are being studied to improve learning. The First, and most important, attempt is to ensure that a child is paying attention to the stimulus being presented. This purpose might be achieved by dimming the lights, calling for attention, or establishing eye contact.
- **Learning strategies model**, recommends that other elements that are important to content learning include teaching critical vocabulary skills, building prior knowledge to connect to new information, and teaching an understanding of the structure of text.
- Secondary school students with LD especially need to acquire **transition skills** (e.g., abilities that will help students be successful after high school in employment and independent living).

# Adult Services:

- Many adults leave high school without the skills and confidence necessary to find employment to help them realize their maximum potential and to live independently.
- The biggest problems noted were writing skills, rate of processing information, reading comprehension, organizational skills, math computation, and time management.
- Adults with learning disabilities need to be helped through guidance and counseling.



# Controversial Approaches for Intervention:

- One controversial therapy involves the prescription of tinted glasses as a cure for dyslexia.
- Another treatment provides orthomolecular therapy, involving vitamins, minerals, and diet claiming to straighten out the biochemistry of the brain to reduce hyperactivity and to increase learning.
- Vision therapy or training is another controversial treatment for individuals with a learning disability.
- One of the latest proposals that are due to cerebella developmental delay in which the brain cannot process information quickly enough.
- Centers offer children exercises to stimulate the underdeveloped cerebellum, claiming the brain will then function faster with improved cognitive and motor skills.

