Methodology
The methods form the core of all the research studies. The present chapter with various methodological details of the present study entitled “Identification and Remedial Strategies for Children with Specific Learning Disabilities”.

PARTICIPANTS

The present study was conducted within the premises of Jhunjhunu district of Rajasthan (India) to ensure optimum personal contact for data collection. Since, the researcher belongs to Jhunjhunu district. The study was conducted on vulnerable group which required continuous and comprehensive monitoring and supervision. The participants (children with poor performance in academics) were randomly selected from English medium schools of the district.

Initially, 1500 children of grade II and grade III were approached. The scholastic performances of these children were assessed by using the Rutter’s (1967 Proforma- A containing questions related to academic performance (Appendix-B). On the basis of responses received, 160 children, who were found academically backward were taken. Further, these poor performers were screened to detect specific learning disabilities using Behavioural Checklist for Screening the Learning Disabled (B.C.S.L.D.) scale by Swaroop and Mehta (2011). On the basis of scores obtained (above 44) on B.C.S.L.D scale, 56 children were found specific learning disabled. These children were assessed to find out the level of intelligence using Raven’s Coloured Progressive Matrices (1995). These children were also examined for their hearing and visual capacities.

Finally, 30 children with average or above average intelligence, without any visual or hearing impairment were taken as participants. The performance of these children in reading, writing and mathematics were assessed by using Grade Level Assessment Device by Narayan (1997). The socio demographic status of the children was studied to find out the support system available for children with learning disabilities at home as well as school. Learning disability checklist for teachers by Orkids Foundation (2011) was used to elicit more information about the children.
Sample Design

Jhunjhunu (Rajasthan)  
\[ \downarrow \]  
Sample Universe (1500 Children)  
\[ \downarrow \]  
Academically backward children (160 Children)  
\[ \downarrow \]  
Children with Specific Learning Disabilities (56)  
\[ \downarrow \]  
(Average/ above average IQ)

Total Sample (n=30)  
Children with Specific Learning Disabilities  
(Without any visual /hearing impairment)

\[ \downarrow \]

Boys  
(n₁=19)  
\[ \downarrow \]  
Grade II SLD (n₁₁=9)  
\[ \downarrow \]  
Grade III SLD (n₁₂=10)

Girls  
(n₂=11)  
\[ \downarrow \]  
Grade II (n₂₁=5)  
\[ \downarrow \]  
Grade III (n₂₂=6)
MEASURES

OPERATIONAL DEFINITIONS OF THE VARIABLES

CLASSROOM PERFORMANCE

It is operationally defined as scores obtained on 15 closed ended questions of the Children’s Behaviour Questionnaire, “Proforma- A” developed by Rutter (1967). It is the performance of a child in all the subjects of his/her respective class.

SPECIFIC LEARNING DISABILITY

It refers to a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in an imperfect ability to listen, think, speak, read, write, spell or to do mathematical calculations, including conditions such as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia and developmental aphasia. It is operational defined as scores obtained on 30 items Behavioural Checklist for Screening Learning Disabilities developed by Swarup and Mehta (2011) and percentage scores of marks obtained on 38 worksheets (English-13, Hindi-15 and Maths-15) for class II and 28 worksheets (English-9, Hindi-9 and Maths-10) for class III of Grade Level Assessment Device developed by Narayan (1997) for the present study.

INTELLIGENCE

It is operationally defined as scores obtained on 36 items (A, Ab and B, 12 items in each) Coloured Progressive Matrices (Appendix E) developed by Raven (1995).

REMEDIAL STRATEGIES

These are operationally defined as remedial measures planned by the researcher on the basis of eight areas of difficulty i.e. memory, comprehension, thinking, psychomotor skills, self-image and motivation for mainstream education classroom teachers to meet the needs of students who are having difficulties in their classrooms. Remedial strategies include Individual Education Plan that specifies achievable goals.
Methodology

The following measurement devices were used.

BASE LINE PROFORMA

A self made base line proforma, containing background information about the participants like class, age, gender, parental education, family income, parental and teacher’s awareness related to specific learning disabilities etc. was framed and used for the present study (Appendix-A).

ACADEMIC PERFORMANCE

Poor academic performance is the foremost requisite for the diagnosis of specific learning disabilities. Therefore, first of all the global impression by the teacher about a particular child on scholastic backwardness based on the Rutter’s Proforma A (Appendix-B) was obtained. The Children's Behaviour Questionnaire (Rutter, 1967) or CBQ is primarily designed to be used as a screening instrument responded by teachers for purposes of screening the academically poor performers. This proforma has 15 close ended questions to be answered either yes or no. Academic records of previous examinations (any two) of children were taken to decide the performance of children. Children with academic grades C or C+ in any two tests (as per test norms) were considered scholastically backward. The decision of selecting grade C or C+ was taken as per discussion with school authorities in consistent with education policy of Rajasthan.

Scoring

Each negative response carrying zero mark and for positive response one mark, which combine to give an index of scholastic backwardness of the child.

BEHAVIOURAL CHECKLIST FOR SCREENING SPECIFIC LEARNING DISABILITIES

A standardized Behavioural Checklist for Screening the Learning Disabled (Appendix-C) developed by Swarup and Mehta (2011) was used to assess the children with specific learning disabilities. It has been specially designed to test 8 to 11 years old
Methodology

children studying in English medium private schools. The checklist attempts to integrate all the aspects of learning, i.e. the ability to process visual and auditory information, memory, comprehension, thinking, psychomotor skills, self-image and motivation. The interplay of these factors ultimately results in child’s scholastic performance. The checklist consists of 30 items positive and negative to be filled by the teacher. The B.C.S.L.D covers eight areas of difficulty which are as follows:

### Table 3.1 Areas of difficulty (B.C.S.L.D)

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Areas of Difficulty</th>
<th>Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Deficits in Visual Processing</td>
<td>9,11,12,16 &amp; 17</td>
</tr>
<tr>
<td>2</td>
<td>Deficits in Auditory Processing</td>
<td>15,19, 25,26,27 &amp; 28</td>
</tr>
<tr>
<td>3</td>
<td>Deficits in Motor Co-ordination</td>
<td>3,6,11,16,18,22 &amp;24</td>
</tr>
<tr>
<td>4</td>
<td>Deficits in the Cognitive Domain</td>
<td>17,19, 21 &amp;30</td>
</tr>
<tr>
<td>5</td>
<td>Deficits in Language</td>
<td>2 &amp; 20</td>
</tr>
<tr>
<td>6</td>
<td>Deficits in Memory</td>
<td>13 &amp; 29</td>
</tr>
<tr>
<td>7</td>
<td>Preservation tendencies</td>
<td>6 &amp; 22</td>
</tr>
<tr>
<td>8</td>
<td>Disorders in the Affective Domain</td>
<td>4,7,8,10,14 &amp; 23</td>
</tr>
</tbody>
</table>

### Visual Processing

Visual processing includes seeing differences between things, remembering visual details, visualization and imagination, and artistic abilities. Children with a difficulty here often experience problems in mathematics and spelling because they have trouble in visualizing words, letters and symbols. They would have difficulty in visualizing mathematics problems and would present a cluttered worksheet. They often also have poor handwriting skills. Reading today has become a very dominant tool for learning – any deficit in this area will negatively affect the child’s ability to read and create problem in the classroom. Any child deficit in this area has to be trained to strengthen his visual perceptual ability through a host of activities and tasks to enable him to cope better with his academic work.
Auditory Processing

Auditory processing includes hearing differences between sounds and voices, remembering specific words or numbers, remembering general sound patterns, understanding even when some sounds are missed out, and musical sensitivity. Children with a difficulty in auditory processing usually have problems with general reading, writing and language. They would be poor at decoding new words, poor at comprehension, spelling and sentence structure and would have a difficulty with expression. They would also find it difficult to follow oral directions and learn by oral instruction. Represents child’s difficulties in processing of auditory stimuli and thus create problems in classroom performance. A programme to develop and improve his/her auditory perception would go a long way in making the child a better learner.

Motor Coordination

Motor skills disorder, also called motor coordination disorder or motor dyspraxia. Writing and performing (diagrams, experiments or any practical work) occupy significant place in today’s academic domain. Any difficulty in this area hinders child’s scholastic performance.

Cognitive Domain

Difficulty in this area would indicate the child’s difficulties with the process of thinking, reasoning and comprehension- all of which are important for any higher level learning.

Language

Language is an important tool for communication- academic or social. The child’s performance in this area would help us to know whether the unfamiliarity with the language is the cause of learning problem, so as, to plan remediation accordingly.
Methodology

Memory

Memory deficits often noted in students with a learning disability: Often does not remember what was seen, heard or shown. Has difficulty in remembering facts. Memory forms the base for most learning.

Preservation Tendencies

This could sap the child’s energy uselessly and grossly limit his scope for learning any new task-material. The reason could be neurological or psychological-the later being more responsive to treatment. These tendencies inhibit the child’s world of experience; make him very narrow and rigid in his approach to problem and thus unable to learn.

Affective Domain

Self image, confidence, motivation, desire to take challenges and learn from it, etc. are very crucial to the child’s learning ability and performance. Remediation would help the child develop appositive approach to learning and improve his academic performance.

Scoring

It is a 30 items checklist, under three categories ‘Yes’ or ‘No’ and ‘?’(doubtful). A behaviour is put under ‘doubtful’ when the occurrence of this behaviour in the child was neither so frequent that it could be put under ‘Yes’, nor was it all together non-existent. The scoring of the checklist is done on the basis of arbitrary decided weightages provided to different categories. All items are negative, except items 19, 26, 27 and 29. The weightage of items is given below:

<table>
<thead>
<tr>
<th>For negative items</th>
<th>For positive items</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>YES</strong></td>
<td>2</td>
</tr>
<tr>
<td><strong>NO</strong></td>
<td>0</td>
</tr>
<tr>
<td><strong>?</strong></td>
<td>1</td>
</tr>
</tbody>
</table>
Methodology

The sum of the scores on all the items of the checklist gives as a child’s total scores on the checklist. The maximum obtainable score is 60. Considering the top 27 percent of the scores, all those scoring within this range were treated as suspected cases of learning disability.

Reliability and Validity

The split-half reliability for the full test is 0.76 and for the half test is 0.61. Content validity of the test is established regarding the coverage of characteristics, number of items and the item construction.

COLOURED PROGRESSIVE MATRICES

Raven’s Progressive Matrices test is used to measure general intelligence. Designed for children of 5 to 11 years of age, the elderly and mentally as well as physically impaired individuals. The 36 items are presented in three sets (12 each) in increasing order of difficulty within each set. The three sets provide respondents with the opportunity to become familiar with the type of problem-solving (thought processes) that successful completion of the test involves. This test contains sets A and B from the standard matrices, with a further set of 12 items inserted between the two, as set Ab (Appendix-D). Most of the items are presented on a coloured background to make the test visually stimulating for participants.

Scoring

Book form of the test is administered individually, the piece a person points to as his or her final choice counts as “right” or “wrong”. The discrepancies in a person’s score composition can be assessed by subtracting person’s score on each set score normally expected for the same total score. Expected total score is 35 (A (12), Ab (12) and B (11)).

The following variables were scored:

- Total of correct responses
- Expected values of all sets compared to the raw scores for the entire test,
- Error distribution.
Results were reported in the form of raw scores and percentile ranks.

Table 3.2 Classification of Children according to scores obtained normative data

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
<th>Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade I</td>
<td>Intellectually superior</td>
<td>Scores lies at or above the 95(^{th}) percentile</td>
</tr>
<tr>
<td>Grade II</td>
<td>Definitely above the average in intellectual capacity</td>
<td>Scores at or above the 75(^{th}) percentile</td>
</tr>
<tr>
<td>Grade III</td>
<td>Intellectually average</td>
<td>Scores lies between the 25(^{th}) and 75(^{th}) percentile</td>
</tr>
<tr>
<td>Grade IV</td>
<td>Definitely below average in intellectual capacity</td>
<td>Scores lies at or below the 25(^{th}) percentile</td>
</tr>
<tr>
<td>Grade V</td>
<td>Intellectually impaired</td>
<td>Scores lies at or below the 5(^{th}) percentile</td>
</tr>
</tbody>
</table>

Reliability and Validity

The majority of the internal consistencies lie between \(r=0.80\) and \(r=0.90\); in Indian studies retest reliability is above 0.86. Raven Matrices Test is a good indicator for Spearman’s g-factor, although there are differences depending on the composition of the test battery. Correlations with school performance are usually lower than those between school performance and knowledge tests. Coloured progressive matrices have established good validity.

GRADE LEVEL ASSESSMENT DEVICE (GLAD)

GLAD by Narayan (1997) was used to find out the processing problems in child’s academic performance. It is useful for children who are scholastically backward to find out ‘why’ they fail. The tool is easy to administer and useful to refer child for remedial teaching.

Scoring

The worksheets were used and child’s responses were recorded on scoring sheet (Appendix-E). Testing was done in three sessions, one sitting for each Hindi, English and Maths.

Comprehensive summary report was prepared in the end of the test. The scores in a given class level when converted to percentage are grouped as follows:
Children's level of Functioning

<table>
<thead>
<tr>
<th>Percentage Range</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over 70%</td>
<td>Independent</td>
</tr>
<tr>
<td>40% to 69%</td>
<td>Instructional</td>
</tr>
<tr>
<td>Below 40%</td>
<td>Frustration</td>
</tr>
</tbody>
</table>

Reliability and Validity

Test- retest reliability coefficient of the test for class II is 0.98 and for class III 0.99. Criterion group validity correlation scores for class II is 0.86 and for class III 0.76. Content validity also shows that contents of GLAD are valid.

DEMOGRAPHIC PROFILE SCHEDULE AND INTERVIEW SCHEDULE FOR PARENTS AND TEACHERS

Self-prepared demographic profile schedule (Appendix-G) and interview schedule (Appendix-H) for parents and teachers were also used. Demographic details of the children were collected to study the support system available for these children. To find out knowledge and awareness among parents and teachers about learning disabilities interview schedule was used.

Along with above mentioned measures, Learning disability checklist for teachers (Appendix-F) by Orkids Foundation (2011) was also used by the investigator to elicit more information about symptoms of learning disabilities which to plan effective remedial strategies.

REMEDIAL STRATEGIES

PHASE I- SAMPLING AND PRETESTING

- The sample for the present study was taken with the help of different measures as described a head (under the head participants). It took approximately 6 months to finally select a sample of 30 children with specific learning disabilities.
- Pre-testing of children was done with the help of percentage scores of marks obtained on worksheets for English, Hindi and Mathematics of Grade Level Assessment Device developed by Narayan (1997). It took approximately 6 months. Parents and teachers level of awareness about learning disabilities was also pretested with the help of interview schedule.
PHASE II - DEVELOPMENT AND IMPLEMENTATION OF REMEDIAL STRATEGIES

Remedial strategies are the administrative methods for imparting knowledge and training to the individuals to improve their existing knowledge, capacity and efficiency regarding any skill. In present study, remedial strategies were planned and implemented to scaffold academic skills of children with specific learning disabilities. Teachers dealing with these children were also given demonstration on remedial strategies. Interactive sessions with parents were organised to improve their knowledge and awareness about specific learning disabilities.

Development of Remedial Strategies

Development of the remedial strategies includes following steps:

- Identification and collection of items: Items were identifies on the basis of available literature and were collected on a rational theoretical basis. During item selection, children’s developmental level was kept in mind and most relevant items were selected to improve hidden potentialities of children with learning disabilities. The following remedial strategies were planned to scaffold skills of children:

  - **Reinforcement:** Reinforcement strategy was to enhance academic skills of children as:
    - Encourage children to complete their work accurately by clapping for them in class
    - Avoid unnecessary comparison between children
    - Materialistic reinforcement should be avoided
    - Both parents as well as teachers should use reinforcement approach
    - Initially extrinsic but gradually moving towards intrinsic reinforcement

  - **Spelling practice:** Spelling practice strategy was included to improve reading and writing accuracy of children, with the following procedure:
    - Error correction procedure with modeling and feedback
    - Self-directed study of children
    - Encourage self-monitoring in children
    - Combination of visual and phonological approaches
Methodology

- Repetition, repetition and repetition
- Associating similar irregular spellings. Example: too, true, shoe, flew, through; sleeve, leave, even, seize, siege; stole, coal, bowl, roll etc.
- Encourage children to remember distinctive phonological spellings (e.g., yacht is said /yot/ but is spelled /ya/ /ch/ /t/)
- Copy spellings repeatedly by rote learning and writing
- Encourage children to use spell check and adaptive technology to ensure accuracy
- Parents as well as teachers should use correct spellings and pronunciations
- Encourage children to remember spelling in chunks
- Emphasizing prefixes, roots and suffixes, beginning with inflections that change the spelling of a base word (fine, finest; begin, beginning; study, studied) e.g. words designate; signal and assignment share a root
- Encourage children to link meaning and spelling
- Encourage children to identify spelling patterns and learn to use them as a tool to read and write new words
- Ask children to build –a-word
- Give exercises to erase a word
- Teach synonyms or antonyms with the help of matching cards

Memory strategies: To scaffold children’s memory skills through various strategic plans:

- Keep rules and directions short, simple and clear
- Give instructions one at a time and repeat, if necessary
- Maintain eye contact while giving instructions
- Ask the children to repeat the instructions
- Offer information in small chunks
- Encourage children to memorize a list of information
- Teach children to design mnemonics or memorization aids, Cap-Copy and paste
- Help them to find and make lists of crucial information
• Apply mnemonic strategies such as creating acronyms/abbreviations, e.g. VIBGYOR- Violet Indigo Blue Green Yellow Orange Red
• Make information meaningful and simple
• Show children what to do more than once
• Break tasks into individual steps

Word Identification Strategy: To enhance reading skills of children word identification strategy was planned with the help of following procedure:
• Teach children problem-solving procedure
• Make sure children should learn and repeat unknown words of a passage
• Encourage children to learn the meaning of unknown words
• Motivate children to comprehend and use these words at proper place
• Develop a reading habit in children

Paraphrasing Strategy: To enhance children’s comprehension skills paraphrasing strategy was included as:
• Motivate children to read a limited section of paragraph
• Encourage children to identify the main theme/idea of a paragraph
• Encourage children to learn and understand the details of the paragraph
• Assist children to learn and write in their own words
• Focus attention of children on the important points of a passage
• Stimulate children for active participation

Self-Questioning Strategy: To enhance curiosity among children for better understanding of the subject matter self-question strategy was planned which included:
• Motivate children to ask questions from a passage
• Encourage children to find out the answers for these questions
• Encourage children to ask themselves questions about various aspects of the story or passage
Visual Imagery /Mental Imagery Strategy: To improve memory and comprehension skills of children mental imagery strategy was included as:

- Encourage children to read short passage and visualize the scene that is described incorporating actors, action and details
- Teach children to create pictures in their mind that represent the text they have read

Paired Associate Strategy: To enhance memory and language skills of children paired associate strategy was planned as:

- Encourage children in memorizing pairs or small groups of information:
  - By using visual imagery
  - Matching pertinent information with familiar objects
  - Coding important dates
  - Using a first-syllable technique

Vocabulary Strategy: The strategy was used as a powerful memory-enhancement technique to help children to learn the meaning of new vocabulary words:

- Cues to focus on the critical elements of the concept
- Use of visual imagery
- Make associations with prior knowledge and key-word mnemonic devices
- Create a study card to enhance comprehension and recall the concept

Error Monitoring Strategy and Errors Correction Strategy: To improve reading and writing accuracy of children error monitoring strategy was included as:

- Encourage children to locate errors related to:
  - Paragraph organization
  - Sentence structure
  - Capitalization
  - Overall editing and appearance
  - Punctuation and spelling by asking themselves a series of questions
Methodology

- Correct grammatical errors of children
- Restate the learning material using correct structures
- For children having problems in orientation need to develop right-left and up-down orientation, e.g. Put semicircle on the down and right side of a standing line it is ‘b’ while a semicircle on down and left side would be ‘d’. On the same line semicircles on up and right side and up and left side would respectively be ‘p’ and ‘q’. Thus the child would learn to differentiate commonly mistaken letters ‘b’, ‘d’, ‘p’ and ‘q’
- Motivate children to correct their errors and rewrite a neater passage before submitting to their teachers

Motivation Strategy/ Self-Advocacy Strategy: To enhance confidence level of children self-advocacy strategy as:
- Encourage children to prepare and participate in extracurricular activities or activity of his/her interest.

Metacognitive Strategy: To improve memory and reading skills of children metacognitive strategy was planned as:
- Teach children to coordinate the processes and strategies involved in learning
- Help to enhance self-awareness of one’s own internal thought processes:
  - Self-questioning
  - thinking aloud while performing a task
  - making graphical representations of thoughts and knowledge

Question Answering Strategy: To enhance reading and comprehension skills of children question answer strategy was planned as:
- Encourage children to answer questions posed by the teacher
- Give immediate positive feedback

High frequency words Strategy: To enhance word power of children, the most commonly used words in printed text were included:
Methodology

- Teach words that are often confusing, e.g. were /where; was/saw; from/for
- Provide practice of reading high-frequency words
- Ask the children to read continuously and record the number of words pronounced incorrect.
- Repeat the activity every day to extend this practice of recognizing the correct words. A simple way to do this is to create a matrix of five rows. Each row contains lists of the same words in different order. Students review the words and are then timed for 1 minute as they read the words in each list. After each session, record the number of words read correctly. Help to identify one-letter, two-letter and other small words that cannot be visualized mentally. Assist children in understanding the definitions and functions in a phrase, until the children know the words and is comfortable with the ways the words are used.

Read aloud /choral reading Strategy: To improve reading skills of children read aloud technique was included as
- The teacher or peer reads aloud with the child for 10 to 15 minutes daily. The helper takes a position beside and slightly behind the student and points to each word, reading at a slightly faster pace than the child
- Encourage children to practice phrasing and intonation
- Choral reading should be done with a large copy of text and the whole class or with a peer or older student mentor/buddy

Reciprocal Teaching Strategy: To enhance comprehension skills and to encourage children to take initiatives reciprocal teaching was planned:
- Ask children to share the role of teacher
- Break the classroom into mixed ability small groups
- Designate one child as the "teacher" within each small group
- The child will help keep the small group on task and ensure they move through each of the four steps as follows:
Clarify- Teach children specific steps that help them in decoding (letter sound correspondence, chunking, spelling etc.). Also, make them understand difficult vocabulary and lapses in concentration.

Predict- Encourage children in the activities combining their background knowledge with what they have gathered from the text. Children imagine what might happen next. Pre-teach new vocabulary. Link new content to prior knowledge. Children should be taught to relate the content of the text to their personal lives and attempt to make predictions based on their knowledge.

Question- Help the children in monitoring their own understanding of the text by self-questioning.

Summarize- Help the children in discriminating between important and less important in the text and organize in a coherent whole. In Summarization motivate children to find the main ideas.

**Reading Recovery Strategy:** To improve performance of children in academic reading recovery strategy was used as:

- To encourage children to reach up to the level of their peers
- To assist to develop independent reading and writing skills

**Word Hunts Strategy:** To enhance visual and verbal memory of children word hunts strategy was planned as:

- Focus on the structure and meaning of words by turning children’s attention to spelling patterns and root word
- Motivate children to learn how words are used in different contexts
- Introduce the book or topic to be read along with the specific word patterns of study; onsets and rimes also known as “word families.” e.g. -ack; -ock, etc. words that are similar in sound, especially with respect to the last syllable; "hat and cat rhyme"
- Provide children with written material (i.e., newspapers, magazines, dictionaries, novels, and/or news articles on the internet)
Methodology

- Model word hunting by using a portion of text copied onto chart paper, overhead transparencies, or a familiar book
- Demonstrate how to locate words that fit the patterns under study and how to record those words into categories
- Motivate children to read and reread a text to find words that fit in a particular pattern
- Ask children to form small groups and read the words they found aloud
- Ask children to find words that they can group together in categories
- Record the words on chart paper for a whole-class display

Graphic Representation: To improve understanding and comprehension skills of children graphical representation was used as:
- Teach how to make graphic representations of the reading material

Role plays and drama Strategy: To enhance higher order thinking (explain, describe, evaluate, compare) of children role play and drama strategy was used:
- Read a paragraph
- Make the children to listen it carefully
- Stimulate the children to perform the role of the characters in the paragraph
- Engage children in storytelling

Multi-sensory approach: To scaffold scholastic skills of children multisensory approach was used:
- Teach children by using graphic organizers, pictures, movies, demonstrations and modeling
- Use more senses to learn, understand and retain the knowledge (visual, auditory, kinesthetic or tactile input together should be used for children)
- Gradually increase multi-step directions
- Involve the children in simulations (the act of imitating the behaviour of some situation or some process by means of something suitably similar)
Phonological processing approach: Phonological Processing approach was planned to improve knowledge and skills of children related to phoneme and letter sound correspondence as:

- Teach children to develop sound symbol correspondence (getting to grips with sounds) which is considered as the sheet anchor in remediation. For example, child is taught that the letters ‘a’ and ‘r’ are needed to make the sound /ar/, and that the sound of the letter ‘t’ can be joined to produce the sound /tar/.

- Use phonologic processing to increase orthographic (visual symbol) processing.

- Teach children to differentiate between the letter names from letter sound, e.g. in a word ‘car’ it is ‘c + ar’ which is pronounced as ‘k’+ ‘ar’. Thus, here the letter name for symbol ‘c’ is ‘see’ but letter sound is ‘k’.

Use phonemic games:

- Teach children phoneme segmentation, e.g. what sounds do you hear in the word *pot*? What’s the last sound in the word *tap*? Ask children to move a token for each sound segment in a word.

- Reverse-a-Word (Say “cat”, then say it with the first sound last and the last sound first – e.g. “tac”).

- Phoneme deletion, e.g. what word would be left if the /m/ sound were taken away from *mat*? Remove-a-part (Say “cat”, then say it without the beginning sound – e.g. “at”)

- Circle all the pictures that end in /ch/.

- Add a beginning sound to make phoneme blends. (Say “cat”, then says it again, adding the “s” sound at the beginning – e.g. “scat”)

- Blending, e.g. what word would you have if you put these sounds together? /f/ /a/ /t/.

- Encourage the children to blend a segmented word to make a complete word and mark the matching picture. Ex. Put 1 by /c/a/r/t/.


Methodology

- Phoneme matching, e.g. Do pen and pipe start with the same sound?
- Phoneme counting, e.g. How many sounds do you hear in the word take?
- Phoneme Substitution, e.g. What word would you have if you changed the /p/ in pot to /h/?
- Rhyming, e.g. Tell me as many words as you can that rhyme with the word eat

Phoneme Manipulating/Phoneme position sort
- Motivate children to sort cards showing change of the initial, middle or final phoneme under part of a segmented picture.

Letter Sound correspondence:
- Matching a picture with the letter that creates the initial sound.
- Identifying beginning, middle and end sounds of words
- Morpheme Structure: Compound word concentration- Matching simple words to form compound word with cards. Ex. Moon Light - Moonlight
- Use charts and visuals to improve phonics skills throughout the class
- Word- walls to illustrate a phonetic component.
- Provide direct instruction involving: rhyming words, breaking compound words into individual words and words into syllables, pass word, chunked text and connected text.
- Teach the tapping technique to identify speech sounds before they spell words by touching the thumb to successive fingers as they segment and pronounce the speech sounds

Word Reading Strategy: To enhance word power of children, word reading strategy was planned as:
- Encourage children read words as a whole like we read symbols and not as made up of few letters, e.g. the symbol ‘₹’ is read as rupee and symbol ‘%’ is read as percent
- Enhance word reading
Methodology

- Make labels and put them on common objects in the surrounding, e.g. ‘notebook’ ‘classroom’ ‘desk’ ‘clock’ ‘reading room’ ‘indoor activity’ ‘library’ ‘stairs’ etc.
- Help children to learn and read these words as a whole by repeated looking at them rather than as a group of letters in the word

Paragraph Reading Strategy: To improve comprehension skills of children paragraph reading was included as;

- Help children to learn story or the concepts discussed in the chapter orally before they read it so that they have at least some idea of what they are going to read
- Summarizing the essential points needed to understand in a given reading material, e.g.
- The Magic Garden

The magic garden was in a school playground. It was very pretty. Sunflowers and roses stood high against the wall. There were also marigolds, poppies and pansies. The sunshine fell on this garden more than on any other and the flowers danced and sang happily. They said to one another, “We have hundreds of little gardeners.” One sunny morning the flowers were talking to the birds. “I love all the children, but I love the dear little ones most of all,” said a poppy. “I like them to bring their watering cans and water my thirsty roots.” “Yes”, said the marigolds, “the boys are good to us too. “We love the little children,” said a tiny bird. They are kind and they bring bread for us.” All the flowers said, “We must work hard to make our dresses very pretty, for the children will be here soon.” The sun said, “I will help you also, for nothing pleases me better than to see the children running about in the golden sunshine.” Suddenly, the children came out laughing and singing and the flowers stopped their songs to listen to them. “Oh, look at the tall sunflower!” said one child, and the sunflower lifted its head very proudly. Another child said, “I love the marigold in its golden dress.” The marigold smiled happily. “They dig the ground so well!” It was indeed a magic garden because it had fairies too.
Methodology

- Read out the chapter to children
- Explain using gestures and examples
- Ask them to form a mental image of the matter read.
- Use of audio cassettes whenever required
- Make scrapbooks of flowers, favorite things or collections (discuss with child)
- Use word building technique like writing two words on each petal of flower
- Substitute the difficult words in the paragraph or text with simpler words
- Similarly, change the compound and complex sentences to short and simpler sentences which are easy to read and understand
- Illustrate the matter with pictures, diagrams, flow-charts, tables etc
- Use headings and sub-headings of the reading material
- Appreciate, praise, encourage and reward efforts of children
- Avoid humiliation and criticism

The Inference Strategy

To improve children’s abilities to comprehend passages and to improve their ability to respond to inferential questions (based on interpretation) as required in most of their subject-matter classes as well as on state assessments was planned.

Strategies Related to Mathematics: To improve arithmetical skills of children with following procedures:
- Develop positive beliefs and attitudes towards mathematics in children
- Help children to develop curiosity, creativity, enjoyment and flexibility
- Make children understand with the help plays
- Encourage children to solve problems by creating models

Numeracy
- Teach children concept and problem solving strategies with the help of concrete materials such as buttons, straws, seeds, pebbles and beads to teach children how to count. Hands on activities using concrete materials: a basic
set of math materials, such as Multi-base Arithmetic Blocks (MAB), 3-D shapes, scale and other measurement instrument provided in each classroom, e.g. instead of what is 7x2 show them how many students would be able to sit in a class if we put 7 students per row in 2 rows?

- Link concept such as time and money to day to day events
- Demonstrate with actual money transaction. E.g. Take 12 coins of Rs.1 each. Ask him to give 5 coins (Rs.5) for buying a pen. Ask him ‘how many are remaining?’
- Teach concept of ‘<’ ‘=’ ‘>’ by showing illustrations like 5>4, 4=4, etc.
- Combine the numeral or symbol with the word (+, plus) and (5, five)
- Use a highlighter or colour code to identify key words, symbols and operations
- Encourage children talk to know the process before completing a task
- Reduce copying errors by reducing copying of work (provide work already copied with space for calculations)
- Use real life problem solving approach that involve estimating and reasoning
- Use tactile materials such as embossed numerals and symbols to daily events
- Use blocks, puzzles and word games
- Teach the relationship between addition, subtraction, multiplication and division.
- Develop concept of estimate, distance, shapes, weights and sizes

**Visual-motor Processing Strategies:** To scaffold children’s eye-hand coordination activities were planned as:

- Provide copies of notes from a classmate or the teacher
- Allow children to trace rather than draw freehand
- Provide templates for children to fill in
- Use graph paper so that children keep columns orderly
- Provide practical assistance to development motor skills, coordination, handwriting and organization
Methodology

- Offer a variety of writing tools (pens/pencils) to allow students to find one that feels comfortable for them
- Set appropriate expectations about the volume of writing required
- Use blank graphic organizers for writing and encourage children to draw patterns
- Use angle board which raises the writing surfaces an angle of 15-25 degree
- Use soft or shaped grip pen or pencil
- Encourage children to use right body posture and right position of paper
- Use coloured cues in writing such as blue signs and orange dots
  - **Arrangement of items:** The items were arranged in the order of increasing difficulty keeping in mind the developmental level of children.
  - **Experts’ opinion:** The developed package of remedial strategies was given to a panel of seven experts from the field of child development and psychiatry for evaluation. Their suggestions were incorporated and after consultation with experts, the remedial package was finalized for pretesting.
  - **Pretesting:** The remedial strategies were pretested on 10 children from Jaipur (Rajasthan). The sample was different from those children on which the final package was implemented. While pre-testing all the precautions regarding implementation were taken into consideration. The strategies were found suitable and finally the target group was exposed to remedial strategies. Finally, a manual was developed by the investigator in both English and Hindi.

Implementation of Remedial Strategies

The main objective of administering of remedial strategies was to improve academic children with specific learning disabilities. Firstly, the teachers were exposed to remedial strategies in two groups (13 each) for eight sessions; on every Saturday of the week (For 2 months). The remedial strategies were demonstrated with the help of video recording along with oral presentation by the investigator.

In second phase of implementation, specific learning disabled children identified by the researcher were exposed to remedial strategies in 6 batches (for two weeks) each batch by investigator with the assistance of class teachers.
In third phase, parents were contacted for interactive sessions with investigator (two sessions each parent). These sessions were planned and carried out every Sunday of the week for two months (5 parents every Sunday). In this way all the parents received two interactive sessions with the investigator.

**PHASE III : IMPACT OF REMEDIAL STRATEGIES - POST TESTING**

The impact of remedial strategies on children was evaluated by using the Grade Level Assessment Device which has been used for pre-testing. The comparison between pre-test scores and post test score was done to see the impact of remedial strategies in scaffolding potentials of children with specific learning disabilities. Teachers and parents knowledge level was also compared to see the impact of remedial strategies and interactive sessions among them.

**Time Plan For Implementation Of Remedial Strategies**

<table>
<thead>
<tr>
<th>Sample selection</th>
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<tbody>
<tr>
<td>(6 months)</td>
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<tr>
<td></td>
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<tr>
<td>Pre-testing</td>
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<tr>
<td>(3 months)</td>
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<td></td>
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<tr>
<td>(After a gap of 3 months)</td>
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<td></td>
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<tr>
<td><strong>Exposure to remedial strategies</strong></td>
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<tr>
<td>(7 months)</td>
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<tr>
<td>Teachers (2 months)</td>
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<td></td>
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<tr>
<td>Children (3 months)</td>
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<tr>
<td>Parents (2 months)</td>
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<td></td>
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<tr>
<td>(After a gap of 2 months)</td>
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<td></td>
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<tr>
<td><strong>Post Testing</strong></td>
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<tr>
<td>(3 months)</td>
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</tbody>
</table>
PROCEDURE OF DATA COLLECTION:

The data was collected personally by the researcher with the help of well-structured interview schedule for parents and teachers of participants and standardized tests were used for screening children for specific learning disabilities and to measure their IQ and academic performance. Jhunjhunu district of Rajasthan was selected purposively due to easy accessibility to the researcher. A list of English medium schools was procured from the District Education Office, Jhunjhunu. Schools were selected randomly. A visit of the schools was made the investigator to explain the purpose of the present study. The consent was obtained from the principals of the schools by explaining the purpose of present investigation, with their permission same details were explained to the teachers of second and third grades to obtain their cooperation. First of all rapport was established with all the teachers. Consultation with the principals and class teachers, a visit schedule was developed according to their convenience and availability. The children were individually tested and all the standard procedures were kept in mind while administering the test. The procedure facilitated better cooperation and participation. Step by step all the tests needed to identify children with specific learning disabilities were applied and finally 30 children with specific learning disabilities were taken. Remedial strategies were given to children with the help of class teachers for a period of 3 months.

STATISTICAL ANALYSIS

The collected data were classified and tabulated to draw the meaningful inferences. The data was analysed by using the following statistical tools:

i) Frequencies and percentage scores were calculated to know demographic profile and symptoms of learning disabilities in children.

ii) Coefficient of correlation was computed to see the relationship between demographic variables and different areas of learning disabilities. Karl Pearson's coefficient of correlation (or $r^*$) =

$$
\frac{\sum(X_i - \bar{X})(Y_i - \bar{Y})}{n \cdot \sigma_x \cdot \sigma_y}
$$
where \( X_i = \text{ith value of } X \text{ variable} \)
\[
\bar{X} = \text{mean of } X
\]
\[\bar{Y} = \text{mean of } Y\]
\[Y_i = \text{ith value of } Y \text{ variable}\]
\[n = \text{number of pairs of observations of } X \text{ and } Y\]
\[\sigma_x = \text{Standard deviation of } X\]
\[\sigma_y = \text{Standard deviation of } Y\]

iii) Paired t-test was used to find out the mean scores differences between pre- and post-test scores of children with specific learning disabilities and teachers. This test is used when the samples are dependent; that is, when there is only one sample that has been tested twice (repeated measures) or when there are two samples that have been matched or "paired". Formula:
\[
t = \frac{\bar{D} - 0}{\sigma_{diff}/n} \text{ with } (n - 1) \text{ degrees of freedom}
\]

where \( \bar{D} = \text{Mean of differences} \)
\[\sigma_{diff} = \text{Standard deviation of differences}\]
\[n = \text{Number of matched pairs}\]

CONTROLS

- Only those children studying in second and third grade
- Only those children studying in English Medium private schools
- Only children from Jhunjhunu district were taken