CHAPTER IV
METHODS AND PROCEDURE

The present study aims at testing the impact of various remedial strategies on reducing the reading disability of primary school children studying in various English medium schools of Chandigarh.

STATEMENT OF THE PROBLEM

The problem under investigation can be stated as:
"Differential impact of various remedial strategies on reducing reading disability of dyslexic primary school children."

OPERATIONAL DEFINITIONS

For the realization of the objectives laid out, the following definitions have been made operational:

Various Remedial Strategies: In the present study, Multisensory Structured Linguistic method, Alphabetic-Phonic method, Behaviour Modification method and Eclectic method (combination of all methods) would be used as remedial strategies for the elimination or reducing the reading disability of the second and third graders going to English medium schools.

Reading Disabled Dyslexic Children: Normal in sensory - visual or auditory functioning, visual retracking without any serious emotional disturbance, normal in auditory reception, normal in intelligence (IQ 90 and above), at least one year and above retarded in reading.
Primary School Children: At or above 7 years of age, studying in second and third grade in English medium schools of Chandigarh.

DESIGN OF THE STUDY

To achieve the stated goals, control group experimental design on the lines of Craighead et al. (1976) was employed. The control group experimental design includes at least two groups, whose subjects have been randomly assigned. In the present study there were five groups (four experimental and one control group). Subjects were randomly assigned to various treatment groups and control group. All the five groups were assessed before and after treatment on the criterion measure of reading disability and other related problems like spelling and free writing and few neuropsychological processes which are essential to learn reading, although there are many other processes.

Pictorial form of the design of the present study is represented in figure 4.1.
### FIGURE 4.1: DESIGN OF THE INVESTIGATION

<table>
<thead>
<tr>
<th>Treatment Groups</th>
<th>Experimental Groups</th>
<th>Control Group</th>
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<tbody>
<tr>
<td></td>
<td>EG₁, EG₂, EG₃, EG₄</td>
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<tr>
<td></td>
<td>MSLm, APm, Bm, ECm</td>
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**Pre-test (Base-line)**

A) Identification of Reading Disability
   1) Teacher’s Referral Form
   2) Aston Index
   3) Brigance Diagnostic Comprehensive Inventory of Basic Skills.

B) Measurement of Intelligence
   1) Indian Adaptation of Wechsler Intelligence Scale for Children (Primary) by Malin

C) Assessment of Socio-Economic Status
   1) SES Scale by Srivastava

**Intervention:** Daily 35-40 minutes treatment to each of the four EGs (20 weeks)

**Post-Test:** On A (2), (3) B (1), for recording changes in scores

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No Treatment
In the present study, different strategies i.e., Multisensory Structured Linguistic method, Alphabetic Phonic method, Behaviour Modification method and Eclectic method (combination of all methods) served as independent (manipulated) variables and their effectiveness was studied on the criterion variable of reducing or eliminating reading disability of primary school children. Variables of intelligence, age and socio-economic status were taken as controls. All the experimental conditions were carried out in an informal atmosphere and good rapport was established with the subjects.

**SAMPLE**

Multistaged randomized sampling technique was used in the present study.

The list of existing English medium schools in Chandigarh, U.T., was collected from the Director of Public Instructions (Schools). There are 109 English medium schools in Chandigarh. The Principals of various schools were contacted. Out of these 109 schools, 10 schools were randomly selected for the purpose of the data collection.

**Stage II**

**Initial Sample**

During the second stage, teachers were made aware of the specific learning disabilities of the children.
After that Teacher’s Referral Forms were given to teachers to assess the children’s specific learning disabilities from each of ten schools randomly selected. Children who scored 65% and above on teacher’s referral form were included in initial sample.

Children fulfilling the following criteria were included in the initial sample:

1. Children between the age range of seven to ten years and belonging to grade second and third.
2. Children having specific reading disabilities.
3. Children who scored sixty five percent and above on teacher’s referral form.
4. Children not been absent from school frequently.
5. Children without any apparent emotional disturbances.

**Stage III**

**Final Sample**

In the third and final stage children between the age range of seven to nine years who were identified as having reading, writing and comprehension problems constituted the initial sample. These children were administered Indian adaptation of Wechsler Intelligence Scale for Children (primary) by Malin (1969), Socio Economic Status (SES) by Srivastava (1978), Aston Index by Newton and Thomson (revised 1976) and Brigance Diagnostic Comprehensive Inventory of Basic Skills by Brigance (1982).
On the basis of these tests, children who fulfilled the following criteria besides the above mentioned criteria for the initial sample, were included in the final sample.

1. Average or above average intellectual ability (Full Scale IQ 90 or above)
2. All children were from middle class families.
3. At least one year and above retarded in word reading.

On the basis of above mentioned criteria, out of 209 (referred cases) second and third grade children only thirty were selected for the final sample. Out of these thirty children, six children were randomly assigned to each of the five groups that is, four experimental groups and one control group.

HYPOTHESES

1. Various remedial strategies would be helpful in reducing reading difficulties of dyslexic children.
2. There would be differential impact of various remedial strategies in reducing reading difficulties of dyslexic children.
3. There would be improvement in neuropsychological abilities due to reduction in reading problems of dyslexic children.
4. Reduction in reading problems would improve spelling and writing expression of dyslexic children.
5. Reduction in reading problems would result in IQ gain of dyslexic children.

6. Reduction in reading difficulties would enhance the academic achievement of dyslexic children.

TOOLS USED

For the purpose of the proposed study and to test the above mentioned hypotheses, the following tools were used:

1. Indian adaptation of Wechsler Intelligence Scale for Children (Primary) by Malin (1969).


3. Brigance Diagnostic Comprehensive Inventory of Basic Skills (Brigance, 1982).


5. Teacher’s Referral Form prepared by investigator.

6. Academic achievement scores taken from school records.

DESCRIPTION OF TOOLS

Indian Adaptation of Wechsler Intelligence Scale for Children (Primary) by Malin

The most common IQ test for assessing possible dyslexics is known as the Wechsler Intelligence Scale for Children (WISC). This was originally developed in the United States, but is now used around the world. In the present study Indian adaptation of WISC by Malin is used. It is ideally suited to Indian children with reading and spelling...
difficulties because it involves no reading and writing at all.

Like most intelligence tests, it is split into two halves. One aims to assess child’s intellect by what he can say about things and the other to test what he can do in visual and manual tasks that requires no speaking. The test is divided in this way because verbal skill is generally governed by the left half of the brain, and visual and manual performance by the right half. Most people score equally well or equally badly in both sets of tests. So if there is a big difference between child’s verbal and non-verbal ability, this will show that one half of his brain is working much better than the other. This kind of imbalance will throw the learning process out of true and can result in learning difficulties such as dyslexia (Hornsby, 1984).

WISC is an individual intelligence scale for children from the age of 5 years to 15.11 years. The Indian adaptation covers only ten years from 6 to 15.11 years. The original scale comprises twelve sub-tests but Indian adaptation omits the picture arrangements (8) of the performance scale as it proved too culturally biased both as to content as well as to form.

The points or raw scores of each test are totalled and then converted on the principle of the ‘deviation IQ’ into derived scores. In the original WISC these derived scores are standard scores called ‘scaled scores’ which in
turn must be converted into IQ’s by means of a table each for Verbal, Performance and total Full Scale IQ’s. The adapted test avoids the use of ‘scaled scores’ and by means of tables converts the raw scores directly into ‘Test Quotient’ which are actually IQ’s. The sub test IQs are then added and group averaged (verbal, performance) and the total or Full Scale of both groups is similarly obtained without the use of a table.

The subtests in the scale are grouped as follows:

1. **Verbal Subtests**
   i) Information
   ii) Comprehension
   iii) Arithmetic
   iv) Similarities
   v) Vocabulary
   vi) Digit span

2. **Performance Subtests**
   i) Picture Completion
   ii) Block Design
   iii) Object Assembly
   iv) Coding
   v) Mazes

1. **Verbal Sub Tests**
   i) **Information**: This is aimed to assess child’s range of general information and knowledge of the world around him/her, as well as his/her memory for facts which he/she may have learned at school. Each item is scored one or zero. Maximum points are 30.
   ii) **Comprehension**: This tests the subject’s practical judgement, common sense and awareness of why things are...
done as they are. Each item is scored 2, 1 or 0. Maximum points are 28 points. It is discontinued after three consecutive failures.

iii) Arithmetic: Here the child is given mental arithmetic problems to test her/his arithmetic ability, concentration and memory. All the questions can be worked out by common sense, without any specialised knowledge of mathematics. Each item is scored one or zero. Maximum points are 16 points. The test is discontinued after three consecutive failures.

iv) Similarities: To check his/her abstract reasoning, he/she is asked in what way pairs of things are alike. To begin with, the similarities should be obvious and simple and the questions then get progressively harder. Each item is scored 2, 1 or 0. Maximum points are 28 points. Test is discontinued after 3 consecutive failures.

v) Vocabulary: This test normally gives the best points to child's intelligence. He/she is asked to define a number of words, the questions ranging in difficulty. Each item is scored 2, 1 or 0. Maximum scores are 80 points. It is discontinued after 5 consecutive failures.

vi) Digit Span: The examiner says out loud a random sequence of numbers and asks the child to repeat them both forward and backward. Although his/her score on
this test is not used to calculate his IQ, it provides useful information about his or her attention and memory for numbers - lack of which is a possible pointer to dyslexia. Total score is 17 points.

2. Performance Sub Tests

i) Picture Completion: All the performance tests are timed. The first is designed to find out how good child is at distinguishing the essential details of a picture. He/she is asked to say what is missing from a series of drawings. Each item is scored one. Maximum exposure 15 seconds. This subtest is discontinued after 4 consecutive failures. Maximum scores are 20 points.

ii) Block Design: To test the child's spatial coordination he/she is asked to make patterns with blocks to match patterns shown in a booklet. Scoring is done through manual. Maximum scores are 57 points.

iii) Object Assembly: This is for assessing similar skills to the previous test. The subject is asked to assemble parts of an object - a face, perhaps into a whole. He/she is told what the object is supposed to be in the first two items but has to guess for himself in the last two. Scoring is done through manual. Maximum points are 34 points.

iv) Coding: This is a speed test of child's fine muscular co-ordination and his/her ability to learn a new task and to translate numbers into symbols. Timing is 120
seconds. Scoring is done through manual, maximum scores are 50 points.

v) Mazes: This is a speed test of child’s fine motor control and his/her ability to learn a new task. Time is printed beside each maze. Scoring is done through manual. Maximum scores are 20 points.

Reliability - The reliability of the original WISC was calculated by the split half method with appropriate correction for full length of the test by the Spearman-Brown formula and yeilded a total co-efficient of 91.

Indian adaptation established its reliability with the test-retest method and yeilded a Pearson’s Product moment correlation co-efficient of 0.91 for the full scale IQ results. It has also established concurrent as well as congruent validity. The former was obtained from school ranking and came to be 0.61 whereas congruent validity was obtained from an adapted version of the California Short Form Test of Mental Maturity for the upper age levels and from the Good Enough Draw-a-man test for the lower age level. Both yeilded a co-efficient of ’63.

SOCIO-ECONOMIC STATUS SCALE

This scale was developed by Srivastava in 1978. The importance of this scale has been realised by the research workers in the field of Psychology, Education, Sociology, Social Work and other applied disciplines. Researchers have
shown socio-economic status to be related to values, attitudes, child rearing practices, school achievements, emotional stability, aggression, dominance, verbal behaviour and many other phenomena.

The final form of the scale was developed after item analysis of the responses of 370 students on the preliminary form for recording responses of the scale. This form of the scale seeks information about education, occupation, income, cultural living or cultural standard and social participation of the subject under study. This scale claims a very high reliability, co-efficient of stability which was calculated by administering the test on 100 students at two different times with an interval of 4 weeks. It was found to be 0.94.

This scale was standardized on 1000 school and college students. The variable of socio-economic status was divided into five categories taking two units together. The total possible scores are 44 and the following five categories are obtained for the purpose of classifying students.

<table>
<thead>
<tr>
<th>Scores</th>
<th>Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>34 and above</td>
<td>upper class</td>
</tr>
<tr>
<td>25-33</td>
<td>upper middle class</td>
</tr>
<tr>
<td>16-24</td>
<td>lower middle class</td>
</tr>
<tr>
<td>8 and below</td>
<td>lower, lower class,</td>
</tr>
</tbody>
</table>
ASTON INDEX

Aston Index (Newton and Thomson, 1982) is widely used by teachers. It helps them in the early recognition of educationally 'at-risk' children. It enables teachers to assess the various learning skills needed for success in acquiring literacy and to predict possible 'barriers to learning' in the individual child. The Index comprises 17 sets the use of which, as its name implies will indicate the nature of an individual child's learning potential for literacy. This Index is divided into two areas, each of which provides different sorts of information concerning the child.

1. General Underlying Ability and Attainment (Mental age)

1. Picture recognition Level 1 only
2. Vocabulary scale Level 1 and 2
3. 'Goodenough draw-a-man test' Level 1 and 2
4. Copying geometric designs Level 1 and 2
5. Grapheme/phoneme correspondence Level 1 and 2
6. Schonell reading test Level 2 only
7. Spelling test Level 2 only

These tests except for picture recognition, copying geometric designs and grapheme/pheneme correspondence result in a Mental Age or Attainment Age score which can be
Level 2: The total administration time at level 2 is approximately 60 minutes. It has been prepared for use with any child over the age of 7 years who does not seem to be as successful at reading, spelling and writing as one might expect. The Aston Index can be used to indicate the particular learning patterns of the child and identify specific types of learning patterns.

For the purpose of the present study, these tests were selected.

1. Schonell Reading test
2. Spelling test
3. Visual discrimination
4. Sound discrimination
5. Free writing
6. Auditory sequential memory
7. Visual sequential memory
8. Sound blending

1. Schonell Reading Test

The Child is required to read out aloud a series of graded words to obtain a reading age. The test should be given in a friendly atmosphere in which the child is thoroughly at ease. It should not take place within the hearing of other children. Younger children or weaker readers should start the test at the beginning. Better readers can start at a later group of 10 words. If any word
is failed, however, the preceding group of 10 words is given until all 10 are read correctly. Credit is then given for all words preceding this point. Testing is discontinued when 10 consecutive words are failed. The tester records a tick on the score sheet for each successful response, as the child is reading. The score is the total number of words correctly read. Norms are provided to drive the reading age.

2. **Schonell : Graded Spelling Test**

The child is required to spell a number of graded words. Words from the Schonell spelling Test are said aloud, followed by the word said in a sentence, followed by the word said on its own once more. The child is then required to write the word down on the paper. Testing is discontinued when 10 consecutive words are incorrect. It is not necessary to start at the first group of 10 words. If however a child fails a word in any group of 10, the previous 10 words must be given and so on until 10 consecutive words are correct. The spelling age can be obtained by the following formula.

\[
\text{Spelling Age (SA)} = \frac{\text{Number of words correctly spelt}}{10} + 5
\]

The scores should be noted on score sheet.

3. **Visual Discrimination Test**

One of the sub-skills necessary for precise recognition of letters (graphemes) of the alphabetic script is that of visual discrimination. The child needs to
distinguish between very similar 'line-drawings' such as t, k, h, f, m, w, c, a, b, d, etc., in order to associate them with the appropriate lexical meaning. They are in fact the very basic elements of written language and must be perceived in exact form. This test has not been standardised to give 'norms' as such, but a threshold score of 7 out of 10 will provide a base-line of ability.

The child was required to match together pairs to letters and words. The exercise presents the child with a list of 10 letters and short words down the left hand side of the page. Opposite each letter or word is a list of visually similar items only one of which is exactly the same as the original in the margin. The child must find the letter of word which exactly matches the original. One point should be scored for each correct answer, including the first (example) item, giving a maximum of 10 and entered in the score sheet.

4. Sound Discrimination

The child is required to repeat and to distinguish between similar words. The tester says two similar sounding words and the child is asked to indicate whether the words are the same or different. Attention should be paid by the tester to clear enunciation of the word, and the tester should be aware of possible dialectic differences. The child should be facing away from the tester so as to be given only sound cues.
Scoring: Twenty items give a maximum score of 20. While scoring, one should subtract a point off for each item incorrect and divide by two to obtain score out of 10. One should write down any errors made, note any particular confusion and enter the scores on scoring sheet.

5. Free Writing

The child is required to write a piece of prose or a story without help or correction from any source on a unlined paper. The writing should not be hurried, with no correction of spelling or grammar, i.e., completely free, unaided writing. The passage can be inspected for types of (i) spelling error (omissions, substitutions, additions, reversals, bizarre spelling etc.) (ii) syntactics structure (grammar, use of clauses or not, punctuation, use of capitals) (iii) fluency, (iv) originality of content, (v) general level as compared with peer group performance. Brief notes should be made under these five headings. A quantitative score may be obtained by giving a maximum of 10 points.

6. Auditory Sequential Memory

Child is required to repeat a series of digits from memory. The tester recites a series of digits aloud at the rate of one digit per second. The child is required to repeat these digits either as spoken (forward) or in reverse order. It is important for the child to be facing
away from the tester so that no visual clues are picked up. If the child gets a digit wrong or the sequence wrong then that item is marked incorrect. The score is made by adding all correct responses giving a total out of 20. This figure is divided by two to give the score out of 10.

7. Visual Sequential Memory

The child is required to arrange a series of symbols in the correct order to match a series which has been presented by the tester. Test cards and appropriate symbol cards are provided. The test cards show the sequence of symbols to be remembered. The symbol cards are used by the child to match the test cards from memory. Place the four symbol cards in front of the child as indicated on the back of the test card. Show the child the practice test card with the symbol cards in view. Ask the child to choose and arrange the correct symbols to match the test cards. Proceed to the test properly if the child is correct. These are 10 items, one point for each incorrect item is subtracted and a score out of 10 is obtained.

8. Sound Blending

The child is required to blend orally, sets of sounds presented by the tester. The tester presented a series of sounds at a rate of one sound per second. The child is then asked to say the word that these sounds made. The sounds should be presented in as 'pure' a manner as possible e.g./t/not 'tu'. /b/ not/bee/. This is facilitated
if the sounds are unvoiced or whispered. It is of course important for the child to be attending very closely. Young children, particularly if phonic reading method has not been taught may be unable to do this task at all. The tester should then discontinue testing, otherwise continue with all items. The child should be facing away from or sitting beside (not opposite) the tester so that only sound cues are given.

**Scoring:** These are 20 items. One point for each incorrect item is subtracted and the score is divided by two to give maximum of 10 scores.

**BRIGANCE DIAGNOSTIC COMPREHENSIVE INVENTORY OF BASIC SKILLS**

A number of reading tests are available e.g., Schonell Graded Reading Test, Neale Analysis of Reading Ability, the BAS Reading Test, The MacMillan Reading Test. For the present study oral reading test and reading comprehension were taken from Brigance Diagnostic Comprehensive Inventory of Basic Skills by Brigance (1982) to assess the reading skills among dyslexic children.

Brigance Inventory is widely used by psychologists to diagnose the reading problems. It is suggested that reading test is also given to obtain more detailed information about the child’s reading strategies e.g. use of context cues, fluency, comprehension etc. The nature of a child’s reading error is of importance also. In reading
items pertaining to dyslexic difficulties include the following disordered word patterns e.g., desert/derest, place/palace, reversals of letters and words e.g., on/no, was/saw as well as other more common errors as omissions, substitutions etc. Reading will tend to be non fluent with regressive eye movement or losing of place.

**Oral Reading Test**

Oral Reading test requires the child to read out the graded stories to obtain oral reading grade level. Oral reading level is assessed by using a selection of one grade level below the student’s oral reading level. The subject is asked to read the story aloud. The assessment is continued at pre-primer, primer to higher grade levels at which the students could read with 97% accuracy.

**Composition and Design of Assessment** - The assessments for the pre-primer, primer, lower first grade and upper first-grade levels consists of stories of approximately 33 words. The assessment for the lower and upper levels of grades two and three and for the fourth, fifth and six grade levels consists of stories of approximately 67 words.

**Two Forms** - Form A and Form B- for each reading level either form can be used if only one assessment is to be made. If pre-test and post-testing is planned, one form can be used for the pre-test and the alternate form for the post-test.

**Method of Assessment** - This oral reading assessment is made by asking the student to read aloud a selection at the grade
level one considers to be the most appropriate. If the student has difficulty with more than 3% of the words, he or she should be asked to read aloud a selection at the next lower level. If the student reads a selection with 97% accuracy, he or she should be asked to read about a selection at the next higher level unit with 97% accuracy.

Accuracy - Any word the student does not pronounce is counted as an error. If the student needs a word to be pronounced a second time, count as an error. Count any word that the student mispronounces as an error. Do not count substitutions, self-corrected words, insertions, omissions and repetitions as error.

Reading Comprehension

Various psychological processes are involved in comprehension, like auditory reception, auditory memory, auditory discrimination and auditory association. Sometimes children read well but don’t know the meaning and sometimes they have difficulties in understanding and remembering sounds.

The purpose of the reading comprehension is to determine the highest grade level at which the student can read and comprehend vocabulary words and reading selections. The assessment for the primer and lower and upper first-grade levels consists of stories of approximately thirty three words. The assessment for the lower and upper levels
of grade two and three and for the fourth, fifth and sixth-grade levels consists of stories of approximately sixty-seven words. Each story is followed by five multiple-choice questions. The five questions are designed to assess the student’s comprehension skills at the literal level, such as understanding clearly stated facts or details sequence, cause and effect vocabulary, and main idea.

Two form A and B have been included for each assessment in the reading comprehension. Either form can be used if only one assessment is to be made. One form can be used for the pretest and alternate form for the post test. 

**Assessment Method** - The primer and lower and upper first grade comprehension assessment must be administered individually. The assessment is made by asking the student to read the story silently, listen to the questions read aloud, and tell the best answer to each question. For lower second grade through ninth grade level, one can use individual assessment or group assessment.

**Teacher’s Referral Form**

Teacher’s referral form was developed by the investigator under the guidance of her research guide. This form is designed to obtain teacher’s perception of the native of various learning difficulties experienced by the students in the primary classes. It is most important of all the tools used in the present study because this form contains the items related to various specific learning
difficulties experienced by the students in primary classes. This referral form contains the items related to various specific learning difficulties like reading, writing, spelling, vocabulary, comprehension and various other problems related to attention, memory, motor coordination language, social adjustment motivation, emotions and work habits/study skills.

**Scoring** - The scoring of this form is very simple. Each positive score is given one score and each negative score is given zero score. Total scores are seventy two.

**PROCEDURE OF DATA COLLECTION**

The data of the present study was collected in the following four phases.

**Phase I**

In the first phase of data collection principals of English medium schools were contacted and permission was sought for data collection. Class teachers of second and third grade children of 10 randomly selected English medium schools of Chandigarh were contacted and made aware of various specific learning difficulties of school children. Teacher's referral forms were distributed to all these class teachers of second and third grade students.

**Phase II**

During phase II, various tests were administered to all the referral cases who were selected for the final sample under various sessions. Indian adaptation of Wechsler
Intelligence Scale for Children by Malin (1969) was administered individually on all second & third grade referral cases in session (i) and session (ii) in order to test their IQ. In the session (iii) SES scale by Srivastava (1978) was administered to all the referral cases to find out Socio-Economic Status of the families of second & third grade students. Aston index by Newton & Thomson (1982) was administered individually in the session (iv) to assess their reading age, Schonell’s graded word reading test and Schonell’s graded spelling test were administered. Then Visual discrimination test, Sound discrimination, Auditory sequential memory test, Visual sequential memory test, Sound blending test and Free writing test were administered to assess the subject’s neuropsychological abilities for reading. Brigance Diagnostic Comprehensive Inventory of Basic skills by Brigance (1982) was administered on the subjects in the session (v) in order to assess their oral reading and listening comprehension.

On the basis of these tests 30 eligible reading disabled students of II & III grade were taken for the present study. Academic achievement scores of 1st unit tests of all the subjects (EGs and CG) were obtained from class teachers.

Phase III - Intervention Period

Phase III consisted of intervention period. Intervention was provided to reading disabled subjects of
the experimental (four) groups through various remedial strategies. These strategies included Multisensory Structured Linguistic method, Alphabetic Phonic method, Behaviour Modification method and Eclectic method. Control group was not provided with any intervention.

In the Multisensory Structured Linguistic method subjects were made clear about the confusion of simple phonics and phonetics. Pupils were taught the names of letters in order to learn how ‘Chunks’ of letters sound. Subjects were taught logically step by step, beginning with single-letter sounds linked to letter names and letter shapes. This was all done through stages from simple one syllable words to complex multisyllable words. The teaching drills were based on multi-sensory technique. Students were taught how to string words, sentences and ideas together logically during reading process.

Alphabetic-phonic method is based on linking letter combinations of phonemes and digraphs to the appropriate sound. It is phonic but completely multi-sensory, using exercises to develop and reinforce auditory, visual, kinaesthetic and vocal abilities. The students start by learning the letters, taken in groups, with naming, feeling and sounding activities, practised in that sequence for each. Familiar three letter words are built up when consonants and vowels are known. Movement to more complex
words and sentences takes place gradually. The demands on the children are rigorous and exacting, yet adaptable.

In the Behaviour Modification method, subjects were taught to correct their faulty learning habits. Subjects were trained to use their capabilities in reading, writing, spelling and listening comprehension. Subjects were given social and material reinforcement whenever they did less errors while reading. Remedial activities were so loaded with effectiveness that they enhanced opportunities for the subjects and they enjoyed reading as spontaneous activity.

In Eclectic method all the three methods i.e., Multisensory Structure Linguistic method, Alphabetic Phonic method and Behaviour Modification method were combined to see their collective effectiveness. Remedial reading activities were planned and taught step by step through multi-sensory technique. Reinforcement was also provided to the subjects when they committed less errors and showed more improvement.

Phase IV - Post-Test

Phase IV consisted of re-administration of Indian adaptation of Wechsler Intelligence Scale of Children by Malin, Aston Index, Brigance Diagnostic Comprehension Inventory of Basic skills on all (EGs and CG) groups.

Intelligence test was re-administered to find out if there was any significant gain in IQ as a result of
treatment through various remedial strategies. Aston Index and Brigance Diagnostic Comprehensive Inventory were readministered to check the scores of reading disability as well as other related skills i.e., spelling and writing in order to see the effectiveness of various treatments. Academic achievement scores of 4th unit tests of all the subjects were also obtained from the class teachers to test the differential impact of various remedial strategies on the academic achievement of II & III grade students.

**Statistical Analysis**

Various statistical techniques were employed for testing research hypotheses. A brief description of these techniques is being made here as following:

- Raw scores of WISC adapted by Malin were converted into IQ according to the instructions in manual.
- Descriptive statistics namely mean and SD for all variables were obtained.
- Analysis of variance was worked out to find out variance between various treatment techniques.
- t-test was applied to different treatment groups to test the effectiveness of various remedial strategies.
- Graphic representation was done where ever necessary.