# CHAPTER – IV : METHODOLOGY

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4.1 Introduction

Methodology is the science of methods or principles of procedure (Good, 1945). It includes the description of the methods, tools and techniques the researcher has used for collecting, organizing and analyzing data.

In order to attack any problem, suitable method should be adopted in relation to the objectives of the study. The decision about the method or methods to be employed, however, always depends upon the nature of the problem selected and the kinds of data necessary for its solution. The method selected should always be appropriate for the problem under investigation, feasible, pre-planned and well understood.

This chapter deals with the methodology used, the procedures followed to identify the students with learning difficulties, construction of research tools with their validity and reliability, details of the standardized tool adopted, sampling, data collection and statistical technique used in the study.
4.2 Construction of Research Tools

Any scientific investigation requires data gathering tools or techniques which may vary in their complexity, design, administration and interpretation. Each tool is selected to be appropriate for the collection of certain type of evidence or information. There are many tools used to collect data for a research work. John, W. Best (1989) says “Like the tools in the carpenter’s chest, each tool is appropriate in a given situation”. Selection of the tool is an important ingredient of a successful research study. Depending upon the purpose of the study the investigator has to use appropriate tools. In this research the investigator selected the following tools for investigation.

1. Reading Difficulties Diagnostic Test
2. Writing Difficulties Diagnostic Test
3. Spelling Difficulties Diagnostic Test
4. Arithmetic Difficulties Diagnostic Test
5. Achievement Motivation Scale
6. The Self Concept Scale
7. Personal Adjustment Inventory for Upper Primary School Children
8. Social Adjustment Inventory for Upper Primary School Children
9. Home Environment Inventory
10. Raven’s Coloured Progressive Matrices Test

4.2.1 Construction of Reading Difficulties Diagnostic Test

Reading is an integral part of the language system and is closely linked to oral language and writing. Reading is a two way process involving both recognition of a word and understanding its meaning. If children do not learn to read, they cannot succeed in life. Without the ability to read, the
opportunities for academic and occupational success is limited. Because reading is the basic skill for all academic subjects, failure in school can be traced to inadequate reading skills. Difficulties in reading skills hinder the academic growth of the student. Hence it is critical to identify children with reading problems and provide them with appropriate early interventions.

In order to diagnose the reading difficulties of students, the investigator planned to construct a diagnostic test. For this purpose, the investigator referred the available literature and studies on reading difficulties.

The National Reading Panel (2000) selected several elements of reading for its intensive study. They reached conclusions on the essential components of reading. They are,

a) **Phonic awareness:** It is the ability to notice, think about and work with the individual sounds in spoken words. The term phonological awareness includes the ability to identify and manipulate larger parts of spoken language such as words, syllables, rhymes and phonemes.

b) **Phonics:** Phonics is an essential word-recognition skill that involves learning the correspondence of letters, sounds and applying that knowledge to recognizing words and reading. Phonics refers to the relationship between printed letters (graphemes) and the sounds (phonemes) in language.

c) **Fluency:** Reading fluency is the ability to read the corrected text rapidly, effortlessly and automatically. The reader must develop fluency to make the bridge from word recognition to reading comprehension.

d) **Vocabulary:** Vocabulary occupies a central position in learning to read. The student’s vocabulary has a significant effect on reading
achievement and is strongly related to reading comprehension. The reader requires the vocabulary knowledge not only to know the word but also to apply it appropriately in context.

e) Comprehension: The purpose of reading is comprehension. It is the process of gathering meaning from the printed page. All reading instruction should provide for the development of reading comprehension.

Before constructing the diagnostic test on reading difficulties, the investigator made an in-depth analysis of the above dimensions of reading and the English textbook prescribed for standard VI.

Sivakami (2000) has developed Reading, Writing and Spelling diagnostic tests to identify the reading, writing and spelling difficulties of learning disabled children. Considering the above tests, the investigator has developed the tools to diagnose the reading, writing and spelling difficulties in English. The investigator developed separate tools because the syllabi of Tamil Nadu and Kerala are different.

The Reading Difficulties Diagnostic Test is framed on the basis of following components.

i. Letter Identification (Visual Auditory Perception)

ii. Word Attack (Auditory Visual Association)

iii. Analogues (Auditory Sequential Memory)

iv. Sound Identification (Auditory Discrimination)

v. Oral Reading (Auditory Visual Difficulties)

vi. Word Recognition(Visual Motor Difficulties)

vii. Rhyming Words( Visual Verbal Difficulties)

viii. Comprehension (Perceptual Sensory Reception)
ix. Segregate the Sounds (Auditory Segmentations)

x. Cloze Test (Perceptual Sensory Information)

The developed test was given to six experts working at school and collegiate level with a request to review the items and give instructions regarding the

- relevancy of each item
- whether the item measures the concerned dimension
- specificity and clarity of each item
- suitability and accuracy of language used and
- suggestions on any other specific aspects related to the items prepared.

Based on their opinions, certain items are modified, changes are made in the form of items, some items are eliminated and some are incorporated.

The final draft of the Reading Difficulties Diagnostic Test consists of 50 objective type questions with multiple choice - fill in the blanks, choose correct answers and one word answers. The test is for 50 marks and each question carries one mark. The correct answer is given one mark and the wrong answer is given ‘zero’. The Reading Difficulties Diagnostic Test and its scoring key are given in Appendix-I and I(a).

4.2.2 Construction of Writing Difficulties Diagnostic Test

Writing is an important form of communication. Written language allows one to communicate with others, to express ideas, feelings and to share knowledge. Writing is a major means through which students demonstrate their knowledge of advanced academic subjects. Hammill and McNutt (1981) report that writing skills are among the best correlates of
reading. Such skills include competence in writing, spelling, punctuation, knowing the alphabet and distinguishing one letter from another.

Writing is both a skill and a means of self expression. It integrates visual, motor and conceptual abilities. Thus the Writing Difficulties Diagnostic Test covers the following components.

i. Letter Formation (Visual Motor Perception)
ii. Letter Slope (Visual Motor Co-ordination)
iii. Letter Size (Revisualization Difficulty)
iv. Letter Space (Visual Motor Discrimination)
v. Word Space (Visual Formation Disorder)
vi. Letter Word Alignment (Visual Motor Memory Discrimination)
vii. Letter Joins (Spatial Planning Difficulties)

The developed Writing Difficulties Diagnostic Test was given to six English teachers working at school and college levels, with a request to give their opinion on the relevance and suitability of each item in identifying the student’s writing difficulties. Based on their suggestions certain items are modified, rearranged, restructured, incorporated and deleted. The developed diagnostic test carries 50 marks in total. Each question carries one mark. For every correct answer is given a score and wrong answer is given a zero score. The Writing Difficulties Diagnostic Test and its scoring key are given in Appendix II and II(a).

4.2.3 Construction of Spelling Difficulties Diagnostic Test.

Spelling difficulties are often associated with reading difficulties. Peters (1970) states that children who have difficulty in learning to spell
tend to be low in intelligence, low in visual perception of word forms, careless and slow in hand writing.

To spell a word correctly, an individual must not only have stored the word in memory but must also be able to completely retrieve it from memory.

Poor spellers who cannot remember or visualize the letters and their order in words are found to benefit from activities that strengthen and reinforce the visual memory of the spelling of words. Some poor spellers have difficulty with auditory memory and cannot hold the sounds or syllables in their minds. These students need instruction that will help them to recognize the sounds of words and build phonological skills.

Motor memory is also a factor in spelling because the speller must remember how he ‘felt’, or recall the motor movement when the word was previously written. Students with motor memory problems need additional practice in writing the spelling of words.

Ellis (1982) has described that the difficulties in spelling are due to retardation of visual memory, visual discrimination, visual sequence, visual verbal association and auditory perception. Considering these dimensions the Spelling Difficulties Diagnostic Test has been constructed. It covers the following components

i. Circle the Correct Spelling (Visual Verbal Association)

ii. Word Recognition (Visual Discrimination)

iii. Plurals and Change the Gender (Visual Memory Motor Co-Ordination)

iv. Track the Words (Visual Sequence)

v. Prefix and Suffix to the Roots (Perceptual Discrimination)
vi. Spell and Match the Words (Auditory Perception)

vii. Finding the Words by Clues (Visual Perception)

viii. Dictation (Auditory Visual Memory)

The diagnostic test has been given to six English teachers in order to point out the appropriateness of the test to diagnose the particular aspects of spelling difficulty. Based on their judgment the items are modified, included or omitted. The Spelling Difficulties Diagnostic Test is for 50 marks. Each correct answer is given one mark and wrong answer zero. The Spelling Difficulties Diagnostic Test and its scoring key are given in Appendix-III and III (a).

4.2.4 Construction of Arithmetic Difficulties Diagnostic Test

Mathematics is a symbolic language that enables the human being to think about, record and communicate ideas concerning the elements and relationships of quantity. Though it is a universal language, many students have difficulty in acquiring and using mathematic skills. About 6% to 7% of the students in general education classes show evidence of serious mathematics difficulty. Cass et al. (2003) state that mathematics difficulties that emerge in elementary school often continue through the secondary school years and impair their daily lives as adults.

Kosc (1974) classified true dyscalculia as consisting of symptoms that could be grouped into

a) Verbal dyscalculia – difficulty with verbal use of mathematical terms and symbols.

b) Practognistic dyscalculia – inability to recognize distinguishing features or to make comparisons of objects that vary in some dimensions eg: size.
c) Lexical dyscalculia – difficulty in reading digits, symbols or multidigit numbers.

d) Graphical dyscalculia – difficulty to write dictated numbers or copy symbols.

e) Ideognostical dyscalculia – difficulty to comprehend mathematical ideas and make mental calculations.

f) Operational dyscalculia – difficulty in doing the basic operations of addition, subtraction and division including confusion between the operations and the appropriate algorithm for each.

Considering these dimensions of dyscalculia the investigator has made a thorough analysis of the mathematics text book prescribed for standard VI. The Arithmetic Difficulties Diagnostic Test covers the following components.

i) Fundamental Mathematics – Basic Operation Task

ii) Task Related to Geometry

iii) Place Value Task

iv) Task Related to Mathematics Language

v) Fraction and Decimal

vi) Money Transaction

vii) Sign Task

viii) Word Problem

ix) Selection of Proper Unit

x) Conversion from One Unit to Another

xi) Task Related to Measurement

xii) Time Calculation
The developed diagnostic test was given to six mathematics teachers at school and college levels to check the relevancy, suitability and accuracy of each item. The Arithmetic Difficulties Diagnostic Test contains 50 questions and each question carries one mark. The Diagnostic Test and it’s scoring key are given in Appendix-IV and IV(a).

a) Pilot Study

The purpose of the pilot study is to administer the diagnostic test on a selected sample of pupils to understand whether the items selected are unambiguous and adequate to test the reading, writing, spelling and arithmetic difficulties. The investigator conducted a pilot study on a few students with reading, writing, spelling and arithmetic difficulties. The students were selected on the basis of teachers’ observation, terminal examination marks in English and mathematics and the RPM test scores.

i) Reliability of the Reading, Writing, Spelling and Arithmetic Difficulties Diagnostic Tests.

Reliability is one of the most essential characteristics of any data gathering tool. A test is reliable to the extent that it measures whatever it is measuring consistently. In tests that have a high coefficient of reliability, errors of measurement have been reduced to a minimum. Reliable tests are stable in whatever they measure and yield comparable scores upon repeated administration. The reliability or stability of the test is usually expressed as correlation coefficient. There are different procedures for the measurement of the reliability of a test. The commonly used methods for measuring reliability are Test-retest method, Split-half method, Alternate or Parallel test form method and Kuder-Richardson’s Estimate.

In order to find the reliability of the diagnostic tests (Reading, Writing, Spelling and Arithmetic) the investigator used test-retest method.
For this the investigator randomly selected ten students with reading difficulties, ten students with writing difficulties, ten students with spelling difficulties and ten students with arithmetic difficulties. Those students were given respective tests and the scores were collected. After a gap of 30 days the same tests were readministered to the same group of students. The data collected were analysed using Karl Pearson’s Product Moment Method of Correlation.

\[ r = \frac{\sum \sum X Y - \sum X \sum Y}{\sqrt{[\sum \sum X^2 - (\sum X)^2] \ [\sum \sum Y^2 - (\sum Y)^2]}} \]

**Reliability of Reading Difficulties Diagnostic Test**

\[ r = \frac{10 \times 1996 - 135 \times 140}{\sqrt{[10 \times 1949 - (135)^2] \ [10 \times 2070 - (140)^2]}} \]

\[ r = 0.89 \]

**Reliability of Writing Difficulties Diagnostic Test**

\[ r = \frac{10 \times 1669 - 121 \times 134}{\sqrt{[10 \times 1533 - (121)^2] \ [10 \times 1844 - (134)^2]}} \]

\[ r = 0.82 \]

**Reliability of Spelling Difficulties Diagnostic Test**

\[ r = \frac{\sum \sum X Y - \sum X \sum Y}{\sqrt{[\sum \sum X^2 - (\sum X)^2] \ [\sum \sum Y^2 - (\sum Y)^2]}} \]
The calculated $r$-values with respect to Reading Difficulties Diagnostic Test (0.89) Writing Difficulties Diagnostic Test (0.82) Spelling Difficulties Diagnostic Test (0.89), Arithmetic Difficulties Diagnostic Test (0.87) are high and hence the diagnostic tests used in the study are reliable.

**ii) Validity of the Reading, Writing, Spelling and Arithmetic Difficulties Diagnostic Tests.**

Validity of a test refers to the degree to which the test items actually measure, or are specifically related to, the traits for which the test was designed and is to be used (Best & Kahn, 1995).

There are different sources of validity evidence. The diagnostic tests constructed for this research study possess mainly three kinds of validity ie, content validity, face validity and intrinsic validity.

**a) Content validity:** Content validity is also named as rational or logical validity. It is estimated by evaluating the relevance of the test items in relation to instructional objectives and actual subject matter. Content validity of the constructed tools were examined by a panel of experts in the
field concerned. The panel included one professor of education, Mahatma Gandhi University and five English and Mathematics teachers working at school and collegiate levels. Based on their opinion, the content and quality of the items were improved. Thus the investigator assured the content validity of Reading, Writing, Spelling and Arithmetic Difficulties Diagnostic Tests.

b) Face validity: Face validity is the way the test appears superficially to assess what it is supposed to test (Donald H and Mc Burrey, 2003). It refers to the way the tool looks to the examiners, educationists and test administrators. If the content of the test appears irrelevant or absurd, the examiners as well as examinees may lack proper motivation. From the opinion of experts it can be said that the aforesaid tools have face validity.

c) Intrinsic validity: Intrinsic validity is estimated by considering how well the obtained scores measure true score. It is given by the intrinsic validity coefficient which is the square root of the reliability coefficient. Square root of reliability coefficient of diagnostic tests is the intrinsic validity. Thus the intrinsic validity of the diagnostic tests are high (reading 0.947; writing 0.907; spelling 0.944; arithmetic 0.933) indicating the suitability of the test used in the study.

4.2.5 Construction of Achievement Motivation Scale

Motivation is a personal, internal process, a state of arousal, a striving which determines the strength and direction of a person’s behaviour. It is something within the individual that not only arouses but also directs and sustains the line of action. It empowers a person to achieve a specific goal and make efforts to realize it. “A motivated person strives to accomplish something, to do his best, to excel others in performance” (Kundu, 1989).
Achievement motivation is an important determinant of aspiration, efforts and persistence when an individual expects that his personality and his achievements in life will be evaluated in relation to some standard of excellence. Achievement motivation refers to a pattern of actions and feelings connected with strivings to achieve some internalized standard of excellence in performance (Vider, 1977).

For analyzing the achievement motivation of students with learning difficulties, the investigator has constructed the tool ‘Achievement Motivation Scale’. The different dimensions selected for Achievement Motivation Scale are

- Academic motivation
- Pursuit of excellence
- Status aspiration
- Acquisitiveness
- Need for achievement

The developed scale was given to teacher educators teaching in various B.Ed. colleges with a request to review the test items and their suitability to identify the home environment of students. Based on their opinion, certain items were revised and certain items were incorporated or deleted.

**Scoring**

The scale consists of sixty items both positive and negative. It is a 3 point scale following a response pattern of ‘Yes’, ‘Undecided’ and ‘No’. The respondents were required to indicate their response in the form of symbol ‘X’ against any of the alternatives. The score for each positive item will be in a sequence of 2, 1, 0 and negative items in 0, 1, 2.
Achievement Motivation Scale and answer sheet are given in Appendix V and V(a).

4.2.6 Construction of Home Environment Inventory

All the important personalities, especially psychologists, emphasise the need for bringing up children in their own home. The family is considered to be the cradle of personality. Home is the only place where all the needs of a growing child can best be met.

A functionally adequate home encourages growth, achievement, learning, confidence, respect for personality and ability to face reality. In short, a functionally adequate home is an emotionally healthy home that provides love, affection, care, sympathy and emotional security for the growing child, which are as important as food, clothing and shelter.

Defective parent-child relationship is a great handicap for the growing child. A child is the future leader of the community and true welfare of the community depends upon the health and welfare of the child. A feeling of belonging to the family is vital to the healthy development of the child. So the investigator decided to evaluate the extent of relationship between home environment and learning difficulties.

The different dimensions selected for Home Environment Inventory are

- Learning facilities at home
- Parental acceptance
- Cultural level of the family
- Parent-child interactions

The developed inventory was given to teacher educators teaching in various B.Ed colleges with a request to review the test items and their
suitability to identify the home environment of students. Based on their opinion, certain items were revised and certain items were incorporated or deleted.

The final Home Environment Inventory consists of fifty items in all. The respondents were required to indicate their responses in the form of symbol ‘X’ against the box ‘Y’ if the answer is ‘Yes’ and ‘N’ if the answer is ‘No’. One mark is assigned to each correct answer of the question. The Home Environment Inventory and answer sheet are given in Appendix IX and IX(a).

a) **Pilot Study**

To find out the appropriateness and practicability of the constructed Achievement Motivation Scale and Home Environment Inventory the investigator conducted a pilot study on a few LD students. While administering the tests, the investigator found that the selected items have clarity and appropriateness. The result on analysis revealed that the constructed Achievement Motivation Scale and Home Environment Inventory were adequate to assess the achievement motivation and home environment of LD students.

i) **Reliability of the Achievement Motivation Scale and Home Environment Inventory**

Reliability is the degree of consistency that the instrument or the procedure demonstrates. The reliability of Achievement Motivation Scale and Home Environment Inventory were established by test-retest method. For this, 10 students with learning difficulties were selected and the same tools were administered twice with a gap of 25 days. The correlation coefficient was calculated using Karl Pearson’s Product Moment method.
Reliability of Achievement Motivation Scale

\[ r = \frac{N \Sigma XY - \Sigma X \Sigma Y}{\sqrt{(N \Sigma X^2 - (\Sigma X)^2)(N \Sigma Y^2 - (\Sigma Y)^2)}} \]

\[ r = \frac{10 \times 46777 - 665 \times 685}{\sqrt{(10 \times 45395 - (665)^2)(10 \times 48579 - (685)^2)}} \]

\[ r = 0.87 \]

Reliability of the Home Environment Inventory

\[ r = \frac{N \Sigma XY - \Sigma X \Sigma Y}{\sqrt{(N \Sigma X^2 - (\Sigma X)^2)(N \Sigma Y^2 - (\Sigma Y)^2)}} \]

\[ r = \frac{10 \times 9277 - 301 \times 307}{\sqrt{(10 \times 9109 - (301)^2)(10 \times 9465 - (307)^2)}} \]

\[ r = 0.82 \]

The obtained r-values of Achievement Motivation Scale (.87) and Home Environment Inventory (0.82) are high and hence the tools used for the study are reliable.

ii) Validity of the Achievement Motivation Scale and Home Environment Inventory

Validity is that quality of a data gathering instrument or procedure that enables it to measure what it is supposed to measure. (Best and Kahn, 1995). Content validity is estimated by evaluating the relevance of the test item individually and as a whole. The content validity of the Achievement Motivation Scale and Home Environment Inventory are assessed by a panel of experts in the field who judge its adequacy. In order to validate the content of the test items, the tests were given to five teacher educators working in various B.Ed. and M.Ed. departments. Based on their comments, the content and quality of the statements are improved. Face validity refers to the way the test appears to those it is meant for and to experts and
educationists. The experts’ opinion of the Achievement Motivation Scale and Home Environment Inventory is taken as face validity. The intrinsic validity which is the square root of reliability is also established. The intrinsic validity of the Achievement Motivation Scale (.93) and Home Environment inventory (0.91) are high and hence the tools used are valid.

### 4.2.7 Self Concept Scale

Self concept or perceived self is the summation of the ways by which one evaluates one’s own characteristics and behaviour. Each individual has a concept of self, made up of his thoughts and feelings about himself.

Wellington et al. (1965) points out some major problems of children with poor self concept. They are feelings of personal inadequacy, uncertainty, general lack of confidence, anxiety related to the feeling of inadequacy and inability to cope with problems. They are also likely to have negative attitude towards school, little interest in reading and a tendency to procrastinate. So the investigator is keenly interested in taking up a systematic investigation in these grounds.

**Description of the Self Concept Scale**

In the present study the researcher adopted ‘The Self Concept Scale’ developed by Dr.(Sr). Therese Koottiyaniyil (1994). It is designed to measure the perception of the scholastic ideal, perception of acceptance by others, self acceptance, self esteem and self worth of school students. Self Concept is the evaluation of an individual about what he is, what he has and what he thinks he can be. A few items in the original inventory have been restated to make the inventory adapted to the requirement of studying the self concept of learning disabled children. The modified Self Concept Scale was given to four teachers teaching in various B.Ed. colleges with a request to give their
opinion on relevance and suitability of each item. Based on their suggestions the tool is reconstructed.

**Scoring**

The final draft of the scale contains 50 items. This tool is in the form of a four point scale, the students are expected to indicate their degree of consent by marking any of the alternatives A, B, C, D (Always, Often, Sometimes, Never). ‘A’ is given a weightage of 3, ‘B’ is given a weightage of 2, ‘C’ is given a weightage of 1 and D of 0 in case of positive items. For the negative statements correct answers are given a weightage like 3 to ‘D’, 2 to ‘C’, 1 to ‘B’ and 0 to ‘A’. The total score for each individual was obtained by adding up the scores obtained on each item.

The Self Concept Scale and answer sheet are given in Appendix VI and VI(a).

**4.2.8 Personal Adjustment Inventory for Upper Primary School Children**

The capacity of adaptation and adjustment is most important for successful living. According to Carr (1955) it is a balance between a person and his environmental situations. Personal adjustment is defined as a state of being in which the individual is in harmonious relationship with a given social situation. It is also defined as the process of attaining such a state (Fairchild, 1944). A variety of techniques are at present employed to appraise personal and social adjustment. The following are some of the techniques.

a) self-descriptive inventories or personal reports
b) rating scales of personal and social conduct
c) observational and anecdotal records
d) free association and projective methods
e) autobiographies  
f) interviews  
g) sociometric techniques and  
h) situational tests.

For measuring the personal adjustment of students with learning difficulties, the investigator used a scale which was constructed and used by Dr.P.J.Poulose and Minimol Antu Srambickal (1999). The original form of this scale was prepared and standardized by Nair (1976) modelled after the well known California Personality Inventory.

**Description of the Personal Adjustment Inventory for Upper Primary School Children**

The different dimensions of the tool are self reliance, sense of personal worth, withdrawing tendencies (freedom from) and nervous symptoms (freedom from). The investigator made a few changes in the original tool so as to make the tool adapted to the requirement of studying the personal adjustment of learning disabled students. The modified Personal Adjustment Scale was given to three teachers teaching in various B.Ed colleges to check the relevancy, suitability and accuracy of each item. Based on their suggestions certain modifications were made.

**Scoring**

The present inventory consists of 24 items. The respondents are required to indicate their response in the form of symbol ‘X’ in the box ‘Y’ if the answer is ‘Yes’ and ‘N’ if the answer is ‘No’. Since all the questions are asked in a negative form the answer ‘No’ is given one score and ‘Yes’ zero score.
Personal Adjustment Inventory for Upper Primary School Children and answer sheet are given in Appendix VII and VII(a).

4.2.9 Social Adjustment Inventory for Upper Primary School Children

Social adjustment is the process whereby the individual attempts to maintain his security, comfort states or creative inclinations in the face of the ever changing conditions and pressures of his social environment or the state or conditions attained through such efforts (Thompson and Gardener, 1959).

The term is very close to Personal Adjustment and very often they are defined and measured together.

Description of the Social Adjustment Inventory

A mentally healthy person is able to get along with others. For measuring the social adjustment of students with learning difficulties, the investigator adopted the ‘Social Adjustment Inventory for Upper Primary School Children’ prepared by Dr.P.J.Poulose and Minimol Antu Srambickal (1999). This inventory is modelled on the Social Adjustment Category of California Personality Inventory. The different dimensions of the tool are family adjustment, school adjustment, interpersonal relationship and social competence. The investigator made a few changes in the original tool so as to make the tool adapted for the requirement of studying the social adjustment of learning disabled students. The modified Social Adjustment Inventory was given to three B.Ed. teachers to check the relevancy and accuracy of each item. Based on their suggestions, certain items were modified.
Scoring

The test contains 24 items. The respondents were required to indicate their response in the form of symbol ‘X’ in the box ‘Y’ if the answer is ‘Yes’ and ‘N’ if the answer is ‘No’. As all the questions are asked in a negative form the answer ‘No’ is given one score and ‘Yes’ is given zero score.

Social Adjustment Inventory for Upper Primary School Children and answer sheet are given in the Appendix VIII and VIII(a).

a) Pilot study

In order to find out the feasibility and adaptability of the tools to measure the self concept, personal adjustment and social adjustment of learning disabled children, the investigator conducted a pilot study. The tools namely Self Concept Scale, Personal Adjustment Inventory and Social Adjustment Inventory were administered to ten LD students. The results on analysis revealed that all the above tools are adequate to assess the psychosocial variables of LD students. The investigator found out the reliability and the validity of the tools. The reliability of the tool is calculated by Test-Retest method.

The reliability coefficient is calculated by using Karl Pearson’s Product Moment Method of Correlation.

i) Reliability of the above tools

Reliability of Self Concept Scale

\[
r = \frac{N\Sigma XY - \Sigma X \Sigma Y}{\sqrt{(N\Sigma X^2 - (\Sigma X)^2) \cdot (N\Sigma Y^2 - (\Sigma Y)^2)}}
\]
Reliability of Personal Adjustment Inventory

\[
r = \frac{\sum X \sum Y - \sum X \sum Y}{\sqrt{[\sum X^2 - (\sum X)^2][\sum Y^2 - (\sum Y)^2]}}
\]

\[
r = \frac{10 \times 47341 - 675 \times 684}{\sqrt{[10 \times 47105 - (675)^2][10 \times 47938 - (684)^2]}}
\]

\[
r = 0.87
\]

Reliability of Social Adjustment Inventory

\[
r = \frac{\sum X \sum Y - \sum X \sum Y}{\sqrt{[\sum X^2 - (\sum X)^2][\sum Y^2 - (\sum Y)^2]}}
\]

\[
r = \frac{10 \times 1620 - 112 \times 129}{\sqrt{[10 \times 1400 - (112)^2][10 \times 1935 - (129)^2]}}
\]

\[
r = 0.88
\]

The obtained r-values of Self Concept Scale (0.87), Personal Adjustment Inventory (0.88) and Social Adjustment Inventory (0.86) are high and hence the tools used for the study are highly reliable.

**ii) Validity of the above tools**

Validity is the quality of the research tool or procedure that measures what it purports to measure. According to John W. Best (1989), “Validity is the quality of a data gathering instrument or procedure that enables it to measure what it is supposed to measure”. The index of reliability is sometimes taken as a measure of validity (Garrett et al., 1981). Several kinds of validity are ascertained. They are:
a) **Content Validity:** Content validity indicates how adequate is the content of a test about which inferences are to be made. Content validity of the tools namely Self Concept Scale, Personal Adjustment Inventory for Upper Primary School Children and Social Adjustment Inventory for Upper Primary School Children was examined by five experts. They included three special school teachers, and two teacher educators working in B.Ed. colleges. Content validity was estimated by evaluating the relevance of the test item individually and as a whole. The panel of experts opined that all the tests were having content validity.

b) **Face Validity:** This is the term used to characterise test materials that appear to measure what the test author desires to measure. The test contains items that seem to be related to the variable being measured. In the opinion of the experts the investigator assured that the tools, namely Self Concept Scale, Personal Adjustment Inventory for Upper Primary School Children and Social Adjustment Inventory for Upper Primary School Children had face validity.

c) **Intrinsic Validity:** Intrinsic Validity is stated as how well the obtained scores measure the test’s true score. The intrinsic validity which is the square root of reliability also was established. The intrinsic validity of the test were, Self Concept Scale (.94) Personal Adjustment Inventory for Upper Primary School Children (.94) and Social Adjustment Inventory for Upper Primary School Children (.93).

   Hence all the tools were found to be adequate for measuring the psycho-social aspects of learning disabled children.

4.2.10 **Raven’s Coloured Progressive Matrices (CPM, 1986)**

   Raven’s Coloured Progressive Matrices (CPM, 1986 edition) set A, Ab and B developed by Raven was used to measure the intelligence of
standard VI children. This test helps to make scientific confirmation to the
informally identified students with learning difficulties. This test has three
sets A, B and Ab having 12 problems in each test and accounting altogether
to 36 problems. It is a non verbal test. The problems of the three sets
proceed progressively from simple to complex.

The coloured background on which the problems are printed attract
attention and make the test spontaneously interesting. Each puzzle has a
piece missing which the person taking the test is required to find. Success in
set A depends on a person’s ability to complete continuous pattern. Success
in set Ab depends on a person’s ability to see discrete figures as spatially
related wholes and to choose figures which complete the design. Set B
contains sufficient problems involving analogies. The test was designed in
such a way that the instruction should be read aloud, especially to people
with reading and other related difficulties. In this study the RPM test was
administered to the students with learning difficulties. Students with learning
difficulties were identified based on the observation of the teacher and
academic achievement. The investigator, while administering the test, gave
the instructions very clearly. There was no specific time limit for the test.
While administering the test the investigator found that 20 to 30 minutes
were enough to complete the test. Based on the scores obtained, the students
who fall in the 5th, 25th, 25th to 75th percentile, teacher’s observation and
the marks in the quarterly examination are considered as students with
learning difficulties. Students with above 75th percentile on RPM test but
with poor performance in quarterly examinations are also considered as
students with learning difficulties.
4.3 Identification of the Students with Learning Difficulties

Identification of students with learning difficulties is done on the basis of 3 phases. The three phases are i) Identifying phase ii) Scientific confirmatory phase iii) Countercheck phase

i) Identifying Phase

It is the first stage of identifying the LD students. The teacher’s observation of the student’s curricular activities was given due consideration. In addition to this, the quarterly and half yearly examination results were analysed by the investigator. Students who got very low marks in English and Mathematics may have learning difficulties. Thus the observation of teachers and poor performance in English and Mathematics helped the investigator to identify students with LD.

ii) Scientific Confirmatory Phase

The learning disabled children identified through identification phase should be subjected to scientific confirmatory phase for better reliability and accuracy. In this process, the investigator used Raven’s Coloured Progressive Matrices (1986). The scale consists of 36 problems divided into 3 sets (A, B, Ab) of 12 each. In each set the problems progress from simple to complex. RPM helps in evaluating the intellectual capacity of the individual. Students with 5th, 25th, 25th to 75th percentile point in RPM test along with observations of teachers and poor performance in English and Mathematics in the terminal examination were considered students with LD. The students above 75th percentile point score but with poor performance in English and Mathematics were also considered students with LD at the confirmatory phase.
iii) **Countercheck Phase**

It is the formal stage of identifying students with LD. The students identified in the scientific confirmatory phase are counterchecked in this phase. For this purpose the Reading, Writing, Spelling and Arithmetic Difficulties Diagnostic Tests were administered to those students with LD on separate days. The scores were noted down. Students who got less than 35% marks in each diagnostic test were labelled as students with LD on that particular aspect. Teachers’ observation, RPM scores and scores on Reading, Writing, Spelling and Arithmetic Difficulties Diagnostic Tests were altogether considered to label students with LD. In the three phases, 224 students were identified as students with LD. These students were selected for the purpose of investigation.

### 4.4 Locale of the Study

The locale of the study is Kottayam district of Kerala State. Kottayam district consists of 5 taluks, namely Kottayam, Vaikom, Changanacherry, Meenachil and Kanjirappally. The locales of the schools are divided into two categories. Schools located in the municipal areas of Kottayam district are considered urban schools. Rural schools include the schools located in the panchayath area of Kottayam district. There are 203 upper primary schools and 241 high schools in Kottayam district.

### 4.5 Sample of the study

A sample is a finite number of observation or cases selected from all the cases in a particular universe, often assumed to be representative of all total group from a universe of which it is a part (Good, 1972). The study was confined to the five taluks of Kottayam district of Kerala State. The taluks which come under Kottayam district are Kottayam, Meenachil, Vaikom, Changanacherry and Kanjirappally. Details regarding the schools were
obtained from the offices of the Assistant Educational Officers of the above five taluks. From the 203 upper primary schools in Kottayam district the investigator selected 22 schools which comprise 7 government schools 8 aided schools and 7 unaided schools by using simple random technique. There were 2312 students studying in the selected schools. In the second phase learning disabled students were identified from each school based on teachers’ observation, R.P.M Test scores, Achievement Test scores in English and Mathematics and diagnostic test scores of Reading, Writing, Spelling and Arithmetic Difficulties Diagnostic Tests. There were 224 VI standard students identified with LD. Out of which 58 were reading disabled, 93 writing disabled, 222 spelling disabled and 171 were arithmetic disabled.

4.6 Data Collection

The investigator obtained permission for data collection sufficiently early from the heads of schools from where data had to be collected. In the first phase of data collection, students with learning difficulties were identified using the three stages mentioned earlier viz identification phase, scientific confirmatory phase and counter check phase. To these students the other tools namely; Achievement Motivation Scale, Self Concept Scale, Personal Adjustment Inventory, Social Adjustment Inventory and Home Environment Inventory were administered. The tools were administered in the morning sessions. The researcher gave a brief explanation to the students regarding the purpose for which the data was collected and appealed for their co-operation. The rules and procedures prescribed for each test were strictly followed.

The following steps were invariably followed in administering the tests:
* Distribution of the test with answer sheets to the subjects together with printed instructions regarding the test.

* Explanation of the general directions about the test.

* Making the students familiar with the tests and answer sheets and the method of entering responses.

* Ensuring reasonable physical facilities to the students in the examination hall.

Prior to the administration of the tests, the students were guaranteed that test results would be used only for research purposes and not for any other purpose like grading students or promotion. This helped to minimize the examination anxiety and ensured their active co-operation.

### 4.7 Scoring Procedure

The response sheets of all the tests were scored as per the scoring procedure of the respective tests described earlier. The data relating to each student’s test scores in the case of different variables and the demographic details were entered separately. The data were either in numerical form or in descriptive form which again were indicated by number codes. The data were consolidated in such a way that they could be used for computer data processing.

### 4.8 Statistical Techniques Used in the Study

The collected data is analysed by using appropriate statistical techniques such as Mean, Standard Deviation, t-test, F-test, Product Moment Correlation and Stepwise Multiple Regression Analysis.

Descriptive analysis has been worked out to know the number and percentage of students facing the specific difficulty. To identify the students having difficulty in each component of reading, writing, spelling and
arithmetic, the number and percentage are worked out on each component of Reading, Writing, Spelling and Arithmetic Difficulties Diagnostic Tests.

To study the effect of Gender, Community, Parental education, Occupation of the parent, Number of children in the family, Exposure to different media, Type of school, Locale of the school and Medium of instruction on reading, writing, spelling and arithmetic difficulties of students mean and SD of each group have been calculated. Based on mean and SD, t-test/F-test has been worked out. Whenever two groups are involved in a variable, t-test has been used to know the significant difference between these groups. When more than two groups are involved in a variable, F-test has been worked out to know the significant difference among these groups.

The number and percentage are worked out to find the children falling under low, moderate and high level on each of the psycho-social variables viz. achievement motivation, self concept, personal adjustment and social adjustment and home environment

To find out the relationship between each of the psycho-social variable and academic achievement (achievement score of English, Mathematics and other subjects put together), Product Moment Correlation has been worked out.

To find out the influence of independent variables (achievement motivation, self concept, personal adjustment, social adjustment, home environment) on the dependent variable (academic achievement) of students with learning difficulties, Step wise Multiple Regression Analysis is worked out. This analysis helps to predict to what extent and how far the independent variables influence the dependent variable.

Analysis and interpretation of the data are presented in chapter-V.