CHAPTER III

METHODOLOGY

"Research is considered to be the more formal systematic intensive process of carrying on the scientific method of analysis"

- Best John. W

3.0 Introduction

The rationale of the present study along with its objectives and hypotheses has been given in Chapter I. The second chapter was devoted to the review of studies related to the work. The present chapter is devoted to the description of site, sample, design, tools, procedure of data collection and data analyses. The details in respect to each of them are given in different captions.

3.1Site Description

The researcher selected 36 private schools in three districts namely Hyderabad (12 schools 33%), Rangareddy (10 schools 28%) and Mahabubnagar Districts (14 schools 39%) of Telangana State including both rural and urban areas for the present study. The distribution of the sample across the districts is shown in table 3.2.

Table 3.1 The Distribution of the Sample Across the Districts

District	No of Schools	4th class	%	5th class	%
Hyderabad	12	41	27	38	25
Mahabub Nagar	14	64	42	64	42
R.R. Dist	10	63	41	50	33

3.2 Research Design

For the present study the researcher has adopted a quasi experimental design to find out "**Impact of Intervention Strategies in Overcoming Dysgraphia among 4th& 5th Class Children at Primary Level in Telangana State"** with Pre test-Posttest design without control group. The flow chart represents the methodology followed in the study.

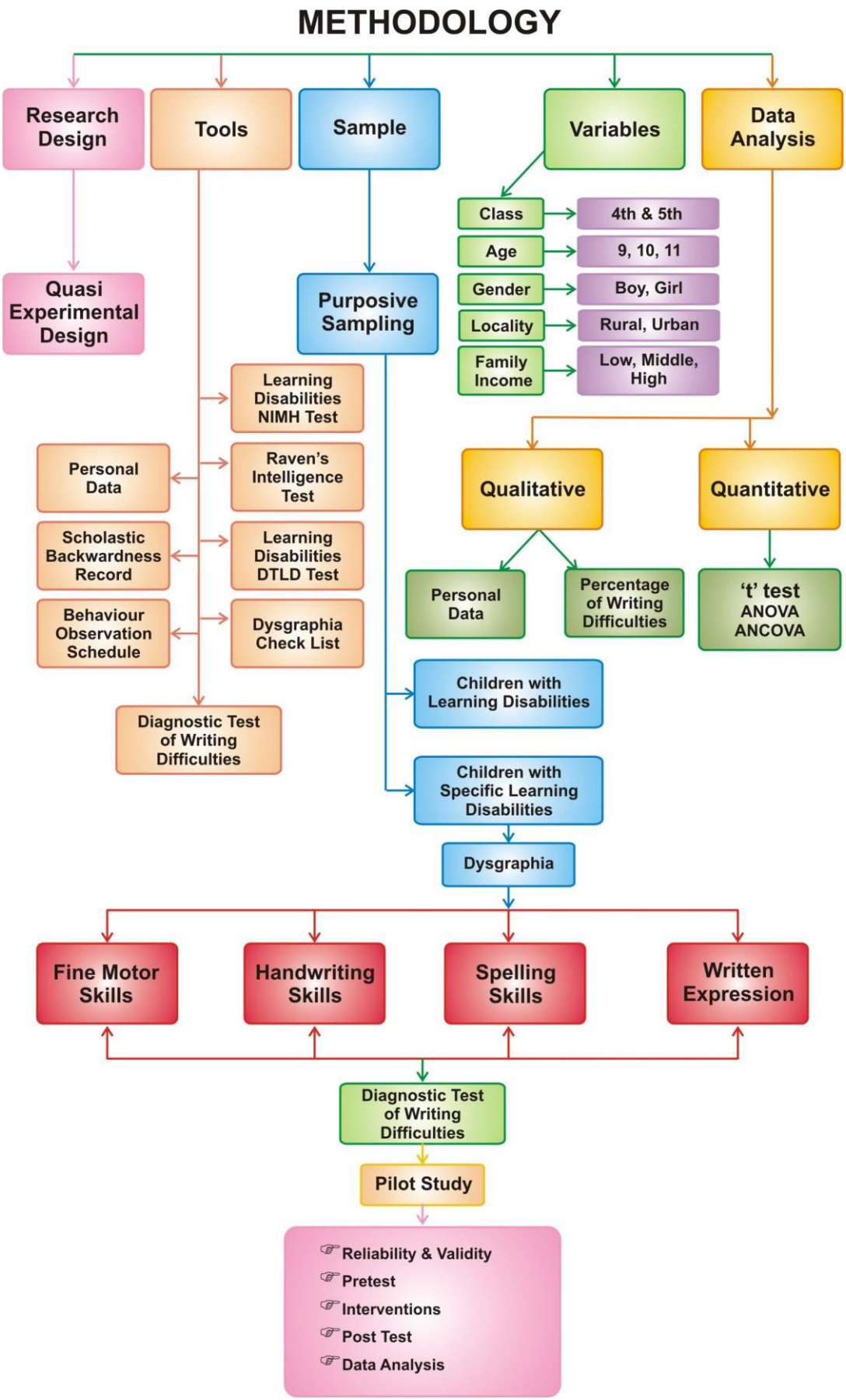


Figure 3.1 The Methodology of the Study

3.3 Selection of the Sample

The researcher used purposive sampling technique to select the sample for the study. The selection of the sample took place in few phases as shown in the 3.2 table below.

Table 3.2 Selection of the Sample based on the identification Criteria for 4^{th}& 5^{th}Classes

1.	Total sample of 4^{th}& 5^{th} class children	6675
2.	Scholastic backwardness	2335
3.	Learning Disabilities	935
4.	Dysgraphia	304

The sample shown above indicated that out of a population of 6675 children studying in the 4^{th} and 5^{th} classes in 36 schools, 2335 children were identified as scholastically backward. Out of them 935 were identified as having Learning Disabilities. Out of them 304 children were identified as having writing difficulties.

Using purposive sampling the researcher selected a total of 152 children from 4^{th} and 152 children from 5^{th} classes who exhibited writing difficulties out of a total population of 6675 children of 36 private schools from 3 districts of Telangana state from both rural and urban areas as shown in the table 3.3.

Table 3.3 Gender and Locality Wise Distribution of the Sample

Locality	4^{th} class		4^{th} Total Boys & Girls	5^{th} class			5^{th} Total Boys & Girls
	Boys	Girls		Boys	Girls	Total	
Rural	38	38	76	38	38	76	152
Urban	37	39	76	37	39	76	152

The above table reveals gender and locality wise distribution of the sample where rural and urban have 76 boys and 76 girls in both 4^{th} and 5^{th} classes.

3.4 Variables of the Study

Selection of proper variable is an important ingredient for a good research. The research should have information such as the nature, number of independent variables and dependent variables in the study. The independent and dependent variable and its level used in the present study is tabulated below 3.4.

Table 3.4 The Variables and their Levels

S.No	Variables		Level
1.	Independent Variable	Class	4^{th} and 5^{th} classes
		Age	9, 10, 11 yrs
		Gender	Male and Female
		Locality	Rural, urban
		Family income	Low, middle & High
		Intervention Strategy	
2.	Dependent Variable	Development of writing skills	Fine Motor Skills
			Hand Writing Skills
			Spelling Skills
			Written Expression Skills
			Behavioural Skills

3.5 Research Tool

Based on the objectives of the study, the researcher adopted standardized tools such as, Raven's Progressive Color Matrices, GLAD Assessment Test for Learning Disabilities (NIMS). The researcher prepared personal data bank. The Scholastic Backwardness Record, Behaviour observation schedules Diagnostic Test in the Writing Difficulties of the children (DTWD), The Areas of Difficulty in Writing Skills Inventory (ADWSI) and the Intervention Strategies Inventory (ISI). All the tests were prepared based on the grade level competence of the children.

3.5.1 The Personal Data Bank

The researcher prepared a Personal data bank to collect the information about the subjects such as the name, age, gender, locality and parental income (Appendix 3).

3.5.2 The Scholastic Backwardness Record

The data relating to the 3 consecutive curriculum based assessment which was marked with failure in one or more subjects or classes, children in the lower 25 percentile of marks in that subject was collected. The report cards were taken as basis and a scholastic backwardness report and a student record which indicates the reasons whether the failure was due to socio-economic back ground, absenteeism, frequent change of schools or first generation literates or learning disability (Appendix 4).

3.5.3 Screening for Learning Disabilities check list

A screening for Learning Disabilities check list prepared by NIMH (Narayan, 2003) is administered on the children (Appendix). A list of children with learning disabilities are identified. To make the screening of learning problems easy for regular teachers NIMH developed a checklist for Learning Disabilities in English. With the checklist the teachers are able to short list the children having learning difficulties. (Appendix 5).

The content validity was established by comparing with similar checklists on learning disabilities for the coverage of all the aspects

3.5.4 Colored Progressive Matrices (CPM)

Colored Progressive Matrices (CPM) is administered to check the general intelligence of children. Using Raven's colored Progressive Matrice the intelligence of children is checked so the sample population have no other disabilities and the children are selected who showed average to normal IQ. It is an internationally recognized culture-fair, nonverbal IQ test, to measure the 'g' factor. It is specially designed for use with children between ages of 5½ and 11½ years. This is easily administered, paper and pencil test comprises of three sets of twelve problems, arranged to assess mental development up to a stage where a person is sufficiently able to reason by analogy to adopt this way of thinking as a consistent methods of inference. In the present study children having the raw scores and corresponding percentiles between $10^{th}$to below 25^{th}percentile were identified as slow learners. The content validity of CPM for different test items, correlations ranged from 0.2 to 0.8 (Appendix 6).

3.5.5 Diagnostic Test of Learning Disabilities [DTLD]

This was a test developed by Smriti Swarup and Dharmishta H. Mehta to diagnose learning disability in ten areas-from Auditory/Visual Perception to Cognitive areas. It consists of 10 sub-tests. It is to be individually administered on the age group 8-11 years old. The test was standardized on a sample of 1050 children with the age range of 8-11 years. Eye-hand Co-ordination, Figure Ground Perception, Figure Constancy, Position-in-Space, Spatial Relations, Auditory Perception, Memory, Cognitive Abilities, Receptive Language, Expressive Language. It was used to identify Learning Disabilities in the sample population (Appendix 7).

3.5.6 Behaviour Observation Schedule

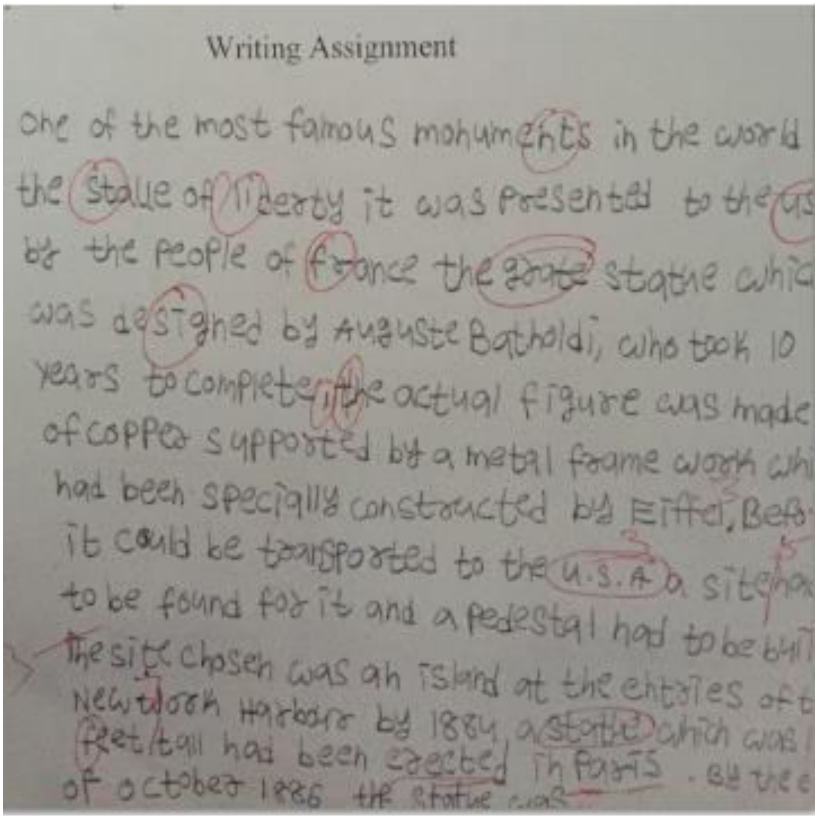
The children identified with Dysgraphia are asked by teachers to identify behaviour problems. For this a checklist consisted of 35 behaviour problems commonly noticed among children with learning disabilities is prepared based on the advice of teachers, special educators and psychologists. Based on the research reports and experiences and feed back of teachers all redundant items are removed and a final list of 16 items were prepared and administered on 100 children in 3 schools and established validity. The same observation schedule is administered on the children of these schools after an interval of 20 days. By computing Pearson Product Moment Correlation coefficient for each subtest and the total test. The reliability coefficient of 0.87 is established. The tool is appended in (Appendix 8).

3.5.7 Dysgraphia Checklist

A checklist on Dysgraphia on extensive and broader terms is prepared by the researcher as a more in depth inventory is the need of the hour in India where the disability of writing is not well noticed by schools or educators. The researcher checked all the checklists available on Dysgraphia and prepared initially 230 items on four areas of writing difficulty 1.Fine Motor Skills 2.Hand Writing Skills 3.Spelling Skills 4.Reading Skills 5.Written Expression Skills. The items are presented to experts in the field of education, Special education, Psychologists and teachers. Based on their advice the redundant

items are removed and the final list of 145 items is prepared and administered to 100 children in 3 schools and established validity. The same checklist is administered on the children of these schools after an interval of 20 days. The coefficient of correlation between the scores of two tests was found using product moment correlation. The correlation coefficient obtained through this method was 0.6435(N=100). The 0.6435 correlation is due to the poor knowledge of English and distraction and forgetfulness due to frequent absenteeism of the children.The consistency reliability 0.9889 (Appendix 6). The reliability and validity of the tests reassured the quality of the responses and the findings of the study (Appendix 9).

Sample of Hand Writing of a Child



3.6 The Writing Skills and the Sub Skills

Based on the result of the Dysgraphia Inventory, the work samples, notes and class room observation by the teachers the researcher identified children with difficulties in different areas like Fine Motor Skills, .hand writing skills, Spelling Skills and Written Expression Skills. The Writing Skills and the sub skills are shown in the 3.5 table below.

Table 3.5 Sub Skills of Writing Skills

Fine Motor Skills	Hand Writing Skills	Spelling Skills	Written Expression Skills	Behaviour Manifestation Skills
12 skill areas	***13 skill areas***	***7 skill areas***	***6 skill areas in Grammar***	***16 areas of Behavioural Skills***
1. Fine Motor coordination 2. Motor memory and recall 3. Spacial & directional 4. Muscle coordination 5. Dexterity of hand & Fingers 6. In hand manipulation skills 7. Tactile discrimination 8. Kinesthetic awareness 9. Hand to eye coordination 10. Auditory motor coordination 11. Visual Coordination- 12. Drawing skills	1. Over all legibility 2. Capital & small letters mixing 3. Letter size 4. Reverse Letters& Numbers 5. Add or omit space between letters/words 6. Add or omit letters/words 7. Slow &laborious copying 8. Erasals/ Strike off 9. Write in all directions 10. Working in line & on margin 11. Pencil Grip 12. Paper Position 13. Alphabet, words, Sentences formation	1. Basic spelling vocabulary 2. Making sentences 3. Auditory discrimination 4. Visual discrimination 5. Silent & Scrambled words 6. Syllabication& Decoding skills 7. Reading fluency Comprehension	1. Capitalisation & punctuation 2. Sentence structure 3. Articles, prepositions, conjunction 4. Active-passive& Degrees of comparison 5. Basic grammar verb / noun / adverbs/adjectives. 6. Simple-complex-compound sentences **Writing Comprehension** 1. Hints development 2. Logical sentences using key & flashy words. 3. Integrating words / Sentences & organizing ideas 4. Narrative & Expository writing (composition/ Letter writing) 5. Visual picture comprehension 6. Contextual clues & conventions	1. Frustration getting along with the Disability 2. Stressed, fatigued, anxious & depressed 3. Difficulty getting along with teachers, parents, community & peer group 4. Difficulty maintaining social status 5. Frequently absent from school/drop out 6. Difficulty to follow instructions. 7. Low self esteem 8. Low self confidence 9. Disorganised with belongings 10. Frequently complains of losing books 11. Avoids tasks and forgets home works 12. Keeps moving around the class, disturbs others 13. Difficulty handling the peer group 14. Difficulty handling bullying 15. Lack of Parental awareness & acceptance 16. Lack of awareness in schools & teachers

3.7 Diagnostic Test for Writing Difficulties [DTWD]

Writing is the presentation of thoughts in a structured way. This skill includes how the thought process is converted into structured sentences. It also includes understanding how to connect ideas logically within a sentence. Writing, among all the other skills, emphasizes on clarity, accuracy, beauty and proficiency. Writing skill encompasses certain sub skills like using correct spelling and capitalization, proper lower and upper-case distinction of letters, appropriate punctuation, accurate grammar, coherent joining of sentences, writing legibly and choosing the right vocabulary.

The researcher developed the diagnostic test for writing difficulties to determine the nature and extent of writing difficulties in primary children. The writing skills are based on the Fine Motor Skills, hand writing skills, spellings, reading skills and Written Expression Skills. Based on these sub skills the researcher developed the following diagnostic tests under the DTWD test (Appendix 10).

3.7.1. Diagnostic Test of Fine Motor Skills for Writing (DTFMSW)
3.7.2. Diagnostic Test of Hand Writing Difficulties (DTHWD)
3.7.3. Diagnostic Test of Spelling Difficulties (DTSD)
3.7.4. Diagnostic Test of Written Expression Difficulties (DTWED)

3.8 Scoring Procedure

The scoring is done for the following:

3.8.1 Diagnostic Test of for Writing Difficulties [DTWD]

The test items were developed in the components of English that correspond to the difficulties in writing. It was in keeping with the grade level competence required of 4^{th} and 5^{th} class children based on the academic standards as prescribed by SCERT for Telangana state. The list of words, passages and grammar for Spelling Skills and Written Expression Skills were in tune with their syllabus.

The researcher elicited suggestions from teacher educators, text book writers working at school and college level and incorporated some test items to suit the writing disability. The researcher made some changes to modify the

test items incorporating objective type questions like fill in the blanks, multiple choice, one word answers etc.

The test items were 100 with a score of one mark and zero was awarded for wrong answer (Appendix 11).

3.8.2 Behaviour Manifestation Schedule

If the child is observed to exhibit behavioural problem always, strongly agree is ticked and a score of 1 is given, if the child frequently shows the behavioural problem sometimes agree is ticked and a score of 2, If the child exhibits behavioural problem some times, agree is ticked and a score of 3, , if the child in frequently shows the behavioural problem sometimes is ticked and a score of 4, if the child never shows behavioural problems then strongly disagree is ticked and a score of 5 is given.

3.8.3 Dysgraphia Checklist

There are 145 items in the check list with an yes/no option. Yes is awarded one and no is given zero score. A score between 1-20 was Perceived as the child exhibiting this aspect as **Never,** 20-40 was Perceived as the child exhibiting this aspect as **Infrequently,** 40-80 was Perceived as the child exhibiting this aspect as **Sometimes,** 80-120 was Perceived as the child exhibiting this aspect as **Frequently,** 120-145 was Perceived as the child exhibiting this aspect as **Always.** A child with a score between 40 and 145 were identified as dysgraphic after careful consideration of all factors and intervention is given.

The children are grouped into various categories of difficulties based on their score in each areas of difficulty in the Dysgraphia checklist where children who got less than 15 score are considered deficient in that area of difficulty.

3.9 Administration of the Tools

The sample was drawn out of 6675 children of 4^{th} and 5^{th} classes from 36 schools in 3 districts. 1800 children were identified as scholastically backward by the teachers based on the grade level performance of the 4^{th} and 5^{th} class children in three consecutive curriculum based assessment

(CBA) tests. Using the Raven's Progressive Matrices the intelligence of the children was tested. DTLD test of was administered to identify the learning disabilities of these children. 690 children were identified as having one type of learning disability or the other. To find out the specific learning disability in writing in these children a Dysgraphia check list was administered on the 690 children and identified a sample of 415 childrening with learn disabilities. 210 children from 4th class and 205 children from 5th class with difficulties in finemotor skills, hand writing skills, spelling and reading skills and written expression skills and behaviour manifestation skills based on their score in Dysgraphia Checklist. Parents permission was sought to conduct the study. 165 parents from 4th class and 160 parents from 5th class accepted for their wards to undergo the interventions. Few children got dropped out of the study in the middle leaving the study with 152 children from 4th and 152 children from 5th classes.

Assistance was sought from 50 teachers who underwent three days training program on the procedure of identification and assessment of children with learning disabilities. It took 2 months to identify children in 36 schools and administer the assessment tools. Again three days training was given to train the teachers about intervention strategies.

The researcher visited all the schools three times once during identification phase before pre test, second time during implementation of intervention program and finally before post test to ensure a uniform protocol was followed in all the schools.

A pre test was conducted to know the level of the sample children before implementing the intervention strategies. The teachers were asked to document the behaviour of the children in the Behaviour manifestation schedule for further analysis. The intervention was conducted for 9 months. A post test was conducted.

3.10 Pilot Study

A pilot study was conducted by the researcher on 24 children from 4thand 5th classes in twin cities in a private school who were identified by teachers as having writing difficulties. The Diagnostic Test for writing

difficulties was conducted. Based on the scores secured by children and feedback from teachers few changes were made. It also helped to establish the reliability and validity of the Diagnostic test. The modified tool is further scrutinized by experts namely the educationists, special educators, psychologists before the final Diagnostic tool was implemented.

3.10.1 Item Analysis

The adequacy of a test whatever its purpose depends upon the care with which the items of the test have been chosen. There are many approaches to the study of items analysed (Garrett, 1981).

The Diagnostic test for Writing Difficulties was administered on 24 students. After completing the scoring of all test answer papers, the answer papers are arranged in the order of scores from highest to the lowest. The top 27% of total group formed the highest group and the bottom 27% formed the lower group. The two main features of item analysis namely difficulty index and discriminating power item analysis is done through the following ways.

1. Determination of the best 27% and the poorest 27% of the sample.
2. Determination of percentage within two groups (Upper and lower groups) that answer each item correctly.

Determination of difficulty index of the items:

Difficulty index (D) is determined by the formula.

$$D = \frac{U+L}{N} \times 24$$

U-Total number of correct responses to an item in the upper group

L- Total number of correct responses to an item in the lower group

N - The number of students in the upper and lower group

Determination of discriminating power

It is calculated by the formula Index of Discrimination $= \frac{U+L}{}$

On the basis of difficulty index and discriminating power considered at the same time items are rated. Difficulty index of a good item was considered between 0.3 and 0.7. Discriminating power more than 0.3 was considered while selecting an item. The index of D of an item is determined by the extent to which the given item discriminates among students that differ sharply in the area measured by the test. After item analysis the researcher has selected area of difficulty wise items for the test.

3.10.2 Reliability

Reliability is an important characteristic of any measuring tool. It refers to the accuracy of the measurement obtained in a test. The researcher established the reliability using the test and retest methods. The same test was given to the children of these schools after an interval of 20 days. The correlation obtained through this method was 0.87 which was significant. Items giving rise to less than 0.25 coefficient of correlation were deleted. This indicated the reliability of the test.

3.10.3 Validity

Validation of the test

Validity refers to the degree to which the test actually measures what it purports to measure. Fundamentally all procedures for determining test validity are concerned with the relationships between performances on the test and other factors.

a. Intrinsic Validity

Intrinsic validity is a form of validity that is said to exist when the test items necessarily or inherently measure the construct in question. For example, a test to measure children's ability to recognize and name letters of the alphabet has intrinsic validity if it involves presenting each of the letters in turn and asking the child to try to name it. It is measured using pre and post tests of intervention.

b. Content Validity

It refers to the extent to which an assessment represents all facets of tasks within the domain being assessed. Content validity of the scale is validated by carrying expert judgment from experts in the field and language experts and educators who teach the 4^{th} and 5^{th} classes English. The researcher has given special attention to the content validity. It is determined based upon careful examination of IV and V standard text book of English of state syllabus in terms of coverage of content, instructional objectives and the type of items and the scrutiny of subject experts.

Thirty five questions were given in each area of difficulty to the experts and teachers for review and suggestions. On the basis of their opinions and suggestions, items were modified and final set of questions are selected.

c. Concurrent Validity

Concurrent validity is the degree to which results from a test agree with the results from other measures of the same or similar constructs. Here the purpose of the test is to assess English language competence in the context of academic programs of study where English is the language of instruction. The concurrent validity of the test is computed which is found to be significant at 0.639. The learning through various activities of a concept, the children are identified to have mastered the concept and a test is administered on them. The 0.639 concurrent validity is due to difficulty in writing what they know orally. Sometimes felt difficult to apply their knowledge to their grade level tests.

3.11 Intervention Strategy (IS)

It is always within the knowledge of all that the hand writing of each child is based on the unique personality of her/him that need to be explicitly identified, addressed and directly corrected. The multi sensory approach adopted for the present study is a direct realization and instant recognition of immediate recognizable change in the learning of a child when visual, auditory, kinaesthetic or tactile learners show response to one or the other or all the approaches which were carefully implemented for each and every individual learner's choice.

The medium of instruction is English in most of the private schools who cater to large number of school going children of the country in India. With the backdrop of a state policy in Telangana to introduce English as Medium of instruction in the government schools also, it assumes great importance to improve written language skills of English. At the same time integrating English into every other subject help children enhance the learning of other subjects also. As children appreciate the connectedness of specific isolated skills to content areas across subjects, the teaching learning process becomes increasingly meaningful and more beneficial. Same way all the four areas of difficulties in the present study cannot be isolated for any one branch of subject. The intervention strategies for one will never be a panacea for remediating a child troubled with writing skills difficulties. For a research on Dysgraphia to be whole and complete it should axe on all the four areas of difficulties in writing. For example a child with significant fine motor deficits can be negatively affected in their written output if the intervention focuses just on fine motor problems.

The children were selected from 4^{th} and 5^{th} classes from 36 schools from 3 districts of Telengana State.

After selecting and grouping the children under different categories of difficulties in writing skills a diagnostic test was conducted to know their present level of performance. After the interventions same test was used to collect as posttest data. The researcher adopted the intervention strategies to overcome writing difficulties based on the various writing skills namely Fine Motor Skills(FMS), Hand Writing Skills (HWS), Spelling Skills (SS), Written Expression Skills (WES) and the Behaviour Manifestation Skills(BMS).

The intervention with the 4^{th} and 5^{th} class children was conducted 5 days a week for 90mts. The time was allocated for 6 activities for 9 months.

Activity 1: Fine Motor Development Activities for 15mts
Activity 2: Hand writing Development Activities for 15mts
Activity 3: Spelling Skills Development Activities 15mts
Activity 4: Written Expression Skills Grammar 15mts
Activity 5: Writing Comprehension Activities 15mts
Activity 6: Yoga/Drawing/Sports & Games/Music& Dance 15mts

Behaviour Modification skills are integrated into 90mts class where the teachers used all the techniques and activities to develop good behaviour. Description of the intervention program is as follows.

3.11.1 Activity1: Fine Motor Development Activities

Gross and fine motor efficiency is very essential for learning, as poor fine motor coordination, poor motor memory, audio visual discrimination & perception and eye-hand coordination interfere with learning. Any strategies for fine motor problems should be need based typical to the problem or difficulty of the child as visual-motor integration skills and executive functions require additional attention during assessment and instruction (Fenwick et al., 2015).Based on the difficulty in writing of a child the following activities were planned as an intervention strategy to tackle fine motor difficulties of 4^{th}& 5^{th} class children. There was an interesting case of a girl in 4^{th} class. Whenever it was her turn to say spellings she has to go to the first alphabet and come to the first letter of the word. Her struggle to recall the spelling (visual perception) made her stumble in her writing. The researcher gave an intervention to connect the letters to the known objects of her surroundings from her mother tongue. A lot of effort was put to make her immediately say the minute a letter is said the recalled object from her memory. For ex: As should recall amma (mother), arati (banana) in Telugu (her mother tongue) so on. Slowly this relating a letter to a familiar object was transferred to her new knowledge of words. Activities to develop Fine Motor Skills were are as shown in the 3.6 table below.

Table 3.6 Activities to Develop Fine Motor Skills

S.No	Sub Skills	Activities
1.	Fine motor Coordination	Activities to make shapes, tower the coins, glue seeds and pulses, sewing, Build with small building blocks, String small beads, climbing & crawling activities, big to small, yoga.
2.	Motor Memory & Recall	Big to small games, recall the items of the basket, Games &action songs.
3.	Spacial & Directional Awareness	Climbing & crawling, treasure hunt, directional games, circles the patterns, movement songs & games that navigates the child into different directions as instructed by the teacher.
4.	Muscle coordination	Running, jumping and throwing and playing games, pull a rope holding on both sides, playing with clay to strengthen hand muscles.
5.	Dexterity of hand and fingers	Cutting, squeezing, string beads, painting, pot& kite making activities, activities using scissors, and cutting, and sewing and weaving, finger painting, gluing, marble play with fingers etc.
6.	In hand manipulation and bilateral skills	Pleat long cloth, unscrew a nut, bat & ball, Ball-Wall Toss & catch activities.
7.	Tactile Awareness	Feely bag with shapes & animals, Blindfolded feel it and recognise what it is Games, Handbag Hunt.
8.	Kinaesthetic awareness	Rhythmic Clap and Tap for spelling & memorization, air writing.
9.	Hand to eye coordination	Eye Exercises in yoga, ping pong, tennis, tie shoe lace, string a bead, hand stitch embroidery etc.
10.	Auditory Motor Coordination	Music & dance in circles pay attention to the beat and reverse the direction when the beat changes. Identify different sounds made at the same time.
11.	Visual motor Coordination	Sort out and join the two halves of a picture or word cards, Recall Items from the basket, to develop proper identification of words and remember and apply what is learnt in other areas also.
12.	Drawing skills	Drawing skills to develop auditory, visual and motor skills Sequential drawing enhancing visual perception and accuracy, Draw from board, as narrated in a story by teacher or as per the hints given, child's own free drawing & art therapy.

3.11.2 Activity 2: Hand writing Development Activities

The skills of handwriting, spelling, vocabulary, sentence construction, and paragraph writing are the building blocks of proficient writing.

Raghu a 10yr old boy from a rural place had very illegible hand writing with all his words and sentences often a combination of upper and lower case letters, with no spacing between words. He could orally answer, but he could not get his thoughts on paper. Teachers used to find his notes very difficult to correct. Raghu was given intervention activities in hand writing initially with verbal cues while he was writing prompting repeatedly where he needs to write capital and where small letters prompt to leave a space along with drill and practice in writing for mastery of hand writing. Cursive hand writing helped him to lift pen where space need to be given and it also reduced unwanted space between letters and words. Four lined paper was useful to him to practice cursive than graph paper. The researcher prepared hand writing activities for the 4^{th}& 5^{th} class children to overcome hand writing difficulties which were given in the 3.7 table below.

Table 3.7 Activities to Develop Sub skills in Hand Writing Skills

S.No	Sub Skills	Activities
1.	Overall legibility of hand writing	Trace letters tray, drill and practice alphabets, words, paragraphs & sentences on 4 lined sheets. connecting dots or dashes to create complete letter forms, modeling, sequential strokes in letter formation, arrow cues to the direction of writing of the letter
2.	Capital letters and small letter mixing	Bingo with words using letters which are prone to write in capital letters
3.	Writing in line and over margins	Colour the margins or glue & raise them till they stop writing in line
4.	Irregular Letter size and font	Say-trace-write model, restrict the writing to the size of the box, circle the correct sized word
5.	Omission and addition of letters/ words	Mapping sounds and letters with verbal cue aloud while writing, what is missing game
6.	Frequent Erasals and wipe offs	Practice on dry erase boards, attention and focus techniques to concentrate on what is getting written
7.	Reverse letters and numbers	Visual reversal cue cards with images associated with letters and numbers, finger tracing the embossed letter, activities with rubber stamp
8.	Add or omit space between letters and	1 or 2 finger spacing, paper with vertical line,

S.No	Sub Skills	Activities
	words	box writing, dot writing
9.	Flow of writing moving to all directions	The slate chalkboard and wood pieces to reinforce the size and direction of letters, model the directionality, repeatedly, produce letters in a 4 lined paper, join patterns and dots
10.	Improper pencil grip	teach "tripod" grip, cotton wool grip, two hold-three fold technique
11.	Holding paper in position and bilateral coordination skills	activities like plait rope, twine or knot rope, make a bow for bilateral skills
12.	Slow and laborious copying from board	wrist rotation, marble striking strengthen finger dexterity, who wrote first speed drill activities
13.	Alphabets, words, sentence formation	Drill and Practice method with Trace and copy, follow the dots and cues and arrows

3.11.3 Activity 3: Spelling Skills Development Activities

Spelling is an important part of writing that many students struggle to master. To spell a word properly the child must be able to read the word, apply phonetics, visualize the word and then write the word. Spelling difficulties may arise from problems in visual memory, auditory memory and visual discrimination or motor skills. Spelling programs often encourage Children to write each spelling word five times or 20 times (Regina Richards, 1999). To improve the Spelling Skills of the 4^{th} and 5^{th} class children the intervention activities implemented were given in the 3.8 table below.

Table 3.8 Activities to Develop Sub Skills in Spelling Skills

S.No	Sub Skills	Activities
1.	Basic grade appropriate vocabulary(Dictation)	Daily 10 words from text book drill and practice and write dictation, Teach word study, word walls, word hunts, word maps, mnemonics
2.	Phonetics	Guess-the-word game, Robot talk, Segmenting cheer activity,Cover-Copy-Compare and repeat the spelling of the word
3.	Auditory Discrimination	Listen to a word, recognise it from the list of words displayed on the digital board, flash cards, find similarities and dissimilarities in the words from a sentence read out,

S.No	Sub Skills	Activities
4.	Visual Discrimination	Find and circle the hidden words in a picture or from digital board, search & find words from a book/news paper visualise and image repeatedly to recall it, odd man out in the row of words. What you like most? Ask and recall the answers.
5.	Silent & Scramble words	Mix and match letters to make new syllables, divide it with a beat or clap. Jumble and make new words , chunk banks, Multisyllabic manipulation ,
6.	Decoding skills and syllabication	Break the word with the sound of a clap and count syllables in the word. Blending and Segmenting Games Onset/Rime Games, Rhyming Games
7.	Oral Reading/Listening Comprehension-fluency	Listen-Read-Discuss (LRD), Reading orally followed by echo reading &choral reading by students, Picture Quiz. RIDER (Read, Image, Describe, Evaluate, Repeat)

3.11.4 Activity 4: Written Expression Skills and Grammar

Written expression requires the whole brain. Students with writing problems often write simple sentences that lack syntactic maturity (Robinson & Howell, 2008). For the intervention strategies in Grammarthe 4^{th} and 5^{th} class grammar as given by the SCERT, Telangana state was taken into consideration as per the competency levels expected of their grade and the following activities were implemented to teach gramamar mechanics. The problem of a child in India with syntactical error in grammar was always due to the difference in the way a sentence is made in English and the way it is made in many Indian languages. For ex in English it is Sub+Verb + obj where as in many Indian languages including Sanskrit the base for all the Indian languages it is subject +obj+verb. The mother tongue influence on children who are first generation literates in rural areas adds to the already struggling difficulties in writing gets more excrucially difficult. Written Expression Skills, with Grammar Activities conducted were given in the 3.9 table below.

Table 3.9 Activities for the Development of Grammar

S.No	Grammar	Activities
1.	Capitalization and punctuation	COPS &SCOPE strategy to learn the proper usage of capitalization and punctuation
2.	Sentence structure	Students are given flash cards with one word. They need to join them to make a sentence, they hold hands and make a circle to visualise joining words to make sentence.
3.	Nouns, Verbs, adverbs, adjectives & tenses	A sentence that combines all these words be given to the class and inturn every one try theirs out.
4.	Articles, Prepositions and conjunctions	Colour the flowers in the basket articles with red, prepositions, green, conjunctions yellow
5.	Active Passive/ Degrees of Comparison	Calendar game where the turn of the paper exposes a word/sentence using which the3 degrees of comparison/ the active/ passive voice be given
6.	Clauses, phrases in simple / complex / compound sentences	The connectors, sentences can grow, n words transition Conjunctions Bank, explicit instruction

3.11.5 Activity 5: Writing Comprehension Activities

Sumeet was a child of 11 yrs in 5th class. His creativity in making up a story based on clues and pictures was amazing. His Dysgraphia does not allow him to get the credit for the clarity of comprehension he showed orally. The intervention strategies were planned one on one with him based on Self Regulatory Strategy Development (SRSD) of Graham where Sumeet first orally narrates the story and then writes his narrative and the teacher parellelly writes the narrative as narrated to him orally by Sumeet. Then both scripts are kept in a row and Sumeet will check what he missed in his script and writes again. It is supportive help that improved the high end writing tremendously of the child.The intervention strategies & activities to overcome comprehension given below table 3.10.

Table 3.10 Daily Activities

Vocabulary									
Round 1		**Round 2**		**Round 3**		**Round 4**		**Round 5**	
1	Paste	1	Sharpen	1	Poison	1	Northern Circars	1	Cardinal
2	Scissors	2	Capsicum	2	Complained	2	Stretches	2	Compass
3	Trunk	3	Halves	3	Mongoose	3	Inhabited	3	Horizontally
4	Sheet	4	Raindrops	4	Chasing	4	Coromandel Coast	4	Continent
5	Eater	5	Pictures	5	Dangerous	5	Cuddled	5	Reluctant
6	Mammals	6	Domestic	6	Appliance	6	Squeezed	6	Primitive
7	Babies	7	Themselves	7	Balcony	7	Fluttered	7	Procedure
8	Grains	8	Hippo-potamus	8	Railings	8	Spluttering	8	Thatched
9	Leopard	9	Wander	9	Suffocated	9	Sobbed	9	Plastered
10	Insect	10	Sized	10	Electricity	10	Delicious	10	Synthetic

Spot Talk

A trip to my favourite place.My dream of life, one blissful day in my life.

Read the story loud and write it on a paper

Once upon a time, there was a beautiful princess. She lived in a big castle. One day, as the princess was playing with a golden ball, the ball fell into a pond. Just then, a frog appeared. He said, “i will get the ball back for you if you promise to marry me” the princess agreed.

Picture Talk:


Context convention: Narrate a story on any picture shown above using the following words(What, where, when, which, while, who, how, with whom?

Context clues:

Words	Parts of Speech	Meaning	Contextual clues
Reflection			
Steady			
Trapped			
Mouse			

Table 3.11 Writing Comprehension Activities

S.No	Writing Comprehension	Activities
1.	Develop hints & word choice	Graphic and semantic organizers on the content, concept maps, story add one word at a time, one sentence at a time.
2.	Logical sentences, ideas and content	Story sequence, think alouds, think-pair-share, visual imagery, treasure hunt map & clue sheets.
3.	Integrating Sentences	Match the half sentences from flash cards, join half pictures to make a whole, pick up words from basket/board and make a sentence.
4.	Organization of writing elements narrative & expository writing	Start or complete unfinished stories, plot structure graphic organizers, who-where-when-why of a story.
5.	Visual/Picture Comprehension	Ripple effect maps, Using Visual Art in Classes, pictures from news papers/ journals/ stories and weave a story around it.
6.	Contextual Clues and conventions	Using graphic organizers, concept maps, Context clues activity, Bring back oh bring back my lost word to me!

3.11.6 Activity 6: Yoga/Drawing/Sports & Games/Music&Dance

Yoga, Drawing, Sports Games, Music & Dance were incorporated into the intervention strategies for children to handle frustration, stress, strain, anxiety and fatigue.

3.11.7 The Behaviour Intervention Strategies

Gowtham hailed from a family where his father was dyslexic. He was a business man and his math calculations were amazing for a learning disabled adult. Gowtham was both dyslexic and dysgraphic. His learning disability nor his father's were never identified. His continuous below average performance made everyone label him as a rich man's lazy son. In the screening for this study the researcher identified him as dyslexic- dysgraphic. Lot of effort was taken to make him attend school regularly. He was made the leader of the class and was adopted by the class topper as his peer tutoring partner. He showed marked improvement in his study habits. He would definitely benefit from some more months of intervention period to cope up with his disability effectively. The Children who have attitudinal and behavioural problems due to the writing difficulties were given intervention strategies in Yoga, Sports & Games, Music Dance. The researcher found children responding very positively to the intervention activities as given below.

Table 3.12 Activities for Behaviour Manifestation Skills

S. No	Behaviour Manifestation Skills	Activities
1.	Frustration, angry to cope up with the disability	Individualised instruction, and activities to facilitate learning academics, yoga, music, dance, art therapy
2.	Feels stressed, fatigued, anxious and depressed	Stress Buster activities, sports and games, Yoga, music and dance
3.	Difficulty getting along with teachers, parents and community	Interactions and communication with both teachers and parents was promoted with regular meetings and counselling
4.	Difficulty in maintaining social status	The students are trained & made into school and class leaders with important portfolios for a status and building self esteem
5.	Not able to adjust to the school environment so frequently absents from school or drop out.	School atmosphere is made caring, responsive, supportive, and attentive to the needs of the child
6.	Difficulty Following directions	Many games like hunt for things, follow the teacher, as she moves she leaves clues to get the next item, find all the items.
7.	Low Self esteem	Encouraged to say the answers irrespective of the correctness of it. Praised for attempting

S. No	Behaviour Manifestation Skills	Activities
8.	Low self confidence	The children are encouraged to participate in all activities of the school and every attempt is appreciated irrespective of success or failure
9.	Disorganised with belongings scattered everywhere	list of sequence of tasks stuck on the desk and activities to collect things around and recall
10.	Due to difficulties in learning avoids tasks, loses books, forgets home work	Skill deficiencies are attended with intervention strategies
11.	Weak cognitive and learning abilities and cannot keep up with the curriculum,	Extra support and direction is given to cope with difficulty, personalize classroom instruction to accommodate a student's intrinsic motivation and capabilities
12.	Disruptive behaviour	Teacher was asked tobe alert about volatile situations to prevent disruptive behaviour. reward and praise for good model behaviour
13.	Difficulty in handling bullying	Cooperative learning activities to reduce social isolation, and increasing adult supervision at all times
14.	Difficulty getting along with peer group	Peer counseling, and assertiveness training, group learning is given
15.	Parental awareness	A parental awareness campaign was conducted during parent-teacher conference days, through parent tele calls, and at regular PTA meetings
16.	Inter personal connection for the cause of learning disabilities	Students, teachers, school personnel, and families felt connected to the school and to each other, as part of a community

The Children who have attitudinal and behavioural problems due to the writing difficulties were given intervention strategies in Yoga, Sports & Games, and Music& Dance. The researcher found children responding very positively to the intervention given.

3.11.8 Use of Technology to Overcome Writing Difficulties

The researcher used multi sensory approach to teach children to overcome their disability wherever necessary. The use of technology like computer, internet, TV, projectors, digi- smart boards, CD players and amphi theatres helped children have variety of presentations and exposure to knowledge drove away monotony in learning.

They exhibited great interest to learn what was hitherto very difficult to learn now practised in multifold ways till they found the easy technique that they can take to learn. Audio visual aids used in the Intervention Programme were given below.

3.11.8.1Audio visual aids used in the Intervention Programme

Aids for audio visual coordination &discrimination

Digital boards with various programmes stories, narrations, places, people, animals and interesting information with associated sounds, Multimedia kit with Phonics cds, aids and play items with sound to discriminate, music interval games, drills with drums.

Aids for audio visual, kinaesthetic, tactile spacial and directional perception and awareness:

Alphabet flash cards and magnetic board with letters of small and capital, manuscript and cursive, four lines charts with strokes, curves and slants, pin boards to pin same sized letters to the same row, charts with sight words, homophones, flash cards of pictures and words to match, syllables to blend, charts to represent pictures, stories and hints, basket full of flowers of verb, noun, adverb, adjectives to sort out. Prefix suffix cards, Drawing tools and model pictures to trace and draw, Black boards and white boards to practice, word game with words and meanings. Bean bags, beads, pulses threads and differ fabrics, show laces and strings of different coloured beads, word walls, bulletin boards, pictures of different story books of Panchatantra, syntax and grammar rule charts.

Fine Motor coordination Memory & Recall

Games and puzzles, Sudoku and word building, Identify hidden words in a picture, find similarities and dissimilarities, word families, sequence of events and role-plays, pictures to comprehend people and tasks, contexts and clues, sight words and transition words charts.

3.12 Conduct of the Study

The present study was conducted in four phases.

1. First phase

In the first phase the researcher visited the schools and collected information about the sample population. The sample was drawn out of 6675 children of 4th and 5th classes from 36 schools in 3 districts. 2336 children were identified as scholastically backward by the teachers based on the grade level performance of the 4thand 5thclass children in three consecutive curriculum based assessment (CBA) tests. Using the Raven's Progressive Matrices the intelligence of the children was tested. GLAD test of LDs was administered to identify the learning disabilities of these children. 934 children were identified as having one type of learning disability or the other. To find out the specific learning disability in writing in these children a Dysgraphia check list was administered on the 934 children and identified a sample of 415 childrening with special learning disabilities. 210 children from 4th class and 205 children from 5th class with difficulties in Fine Motor Skills, hand writing skills, spelling and reading skills and Written Expression Skills and behaviour manifestation skills. Parent's permission was sought to conduct the study. 165 parents from 4th class and 160 parents from 5th class accepted. Few children got dropped out of the study in the middle leaving the study with 152 children from 4th and 152 children from 5th classes.

2. Second Phase

The Second Phase started with three days training given to 50 teachers about the Diagnostic Test in Fine Motor Skills, Hand writing Skills, Spelling Skills, Written Expression Skills and behavioural skills. The diagnostic test was conducted to know the level of specific learning disabilities in the sample before implementing the intervention strategies. The teachers were asked to document the behaviour of the children in the Behaviour manifestation schedule for further analysis.

3. Third Phase

The third phase was intervention stage where an intervention strategy was prepared by the researcher. Training was conducted to the 50 teachers

who implemented the intervention strategies on the selected 4th and 5th class children for 8 months for 90mts five days a week. The associated programs included Parents awareness camps were conducted and community work shops were organised. Peer group were encouraged to take part in peer tutoring, cooperative and group learning. Normal children were encouraged to foster a child with disabilities as a mentor and many support groups shot up in school who were vigilant on the children's overall performance and mental growth. Many events were organised where the children with learning difficulties actively participated in Musical nights and cultural programmes.

4. Fourth Phase

In the fourth phase posttest was conducted using the same diagnostic test for writing difficulties which was used for pretest and the data was collected. The collected data was processed and analysed with data analysis procedures. The researcher used both qualitative and quantitative analysis procedure as given below.

1. The descriptive analysis procedures were used to analyze the demographic data, the effectiveness of IP on children with writing difficulties with respective to the writing skills and sub skills like Fine Motor Skills, Hand writing skills, Spelling Skills and Written Expression Skills and Behaviour Manifestation skills were presented in percentage.
2. For studying the performance of children pre and posttest before and after the intervention programme in all the writing skills with mean and standard deviation, 't' **test** was used.
3. For analyzing the relationship with regard to the effectiveness of IP between pre and posttest with reference to selected variables using 't' **test.**
4. For studying the influence of variables like age, class, gender, type and family income before and after IP on the writing skills of children **ANCOVA** was used.
5. To see the interactive influence of class with respect to the age, gender, type and family income on the writing difficulties of children before and after **ANCOVA** test was used.

6. Statistical Power analysis was done to assure that the study has sufficient power to detect significant changes to avoid Type II error where accepting the hypothesis which should have been rejected.