CHAPTER - III

PLAN AND PROCEDURE

In the preceding chapter the review of related literature has been provided. Subsequently the plan and procedure has been discussed in this chapter.

3.1 INTRODUCTION

“Research design is the planned, structured strategy of investigation conceived so as to obtain answers to the research questions. The plan is an overall scheme or program of research. It includes an outline of what the investigator will do from writing the hypotheses and their operational implications to the final analysis of the data. The structure of research is more specific. It is the outline, the scheme, the paradigm (diagrams, graphs and verbal outline) of the operation of variables. Strategy is more specific than the plan. It includes the methods to be used to gather and analyze the data. In other words, strategy implies how the research objectives will be reached and how the problems encountered in the research will be tackled” (Kerlinger, 1973).

Anything to be done properly must be planned before hand and designed meticulously so that it becomes more systematic. This part helps the researcher to proceed directly without confusing with the concomitant events. This part describes just about what is to be done; what data will be needed; what data gathering devices will be employed; how sources of data will be selected; and how the data will be analyzed and conclusions reached.

This chapter is devoted to the discussion on the plan and procedure followed in the investigation under the following subheads:
3.2 LOCATE OF THE STUDY

The present study had been undertaken in one of the districts of Haryana state i.e., Gurgaon out of twenty one districts. The district was selected through purposive sampling technique due to the convenient, easy access and proximity to the researcher’s placement. Fig. 3.1 which represents the political map of Haryana makes clear the location of the district in the state. The public schools of Gurgaon had been covered under the study.

3.3 METHODOLOGY

Methodology primarily helps us to understand and evaluate the merits of all the information we usually confront with any sort of research activities. A research methodology defines what the activity of research is, how to proceed, how to measure progress, and what constitutes success. The methodology adopted in the study answers these three main questions: How the sampling procedure is selected so that the sample can estimate the population (sampling)? How the data can be collected or generated (tool)? How it analyzed (statistical technique)? Further, it is necessary to adopt a systematic procedure to collect the necessary data, which helps researcher to test the hypotheses of the study under investigation. Keeping in mind the nature and need of the present research, the experimental method was considered to be most appropriate one. Experimental method is the sophisticated and scientific research approach that can truly test hypotheses concerning cause-and-effect relationships. In an experimental study, the researcher deliberately manipulates at least one independent variable, controls over confounding variables through appropriate research design, and observes the effect on one or more dependent variables. In this method, the total sample is randomly divided into two equal sampling groups i.e., the experimental group and the control group or more than two on the basis of certain criteria. Only the experimental group is exposed to
the manipulated variable. The researcher compares the pretest results with the post test results for both the groups. Any significant divergence between the two sampling groups is assumed to be a result of the experiment. In the present study, the researcher manipulated independent variable i.e., ‘set of intervention programme’ on dependent variable i.e., ‘developing writing skills of students with dysgraphia’ in a controlled classroom situation by controlling to a certain extent the confounding variables through the use of appropriate research design.

3.4 POPULATION AND SAMPLE

A population is a collection of elements about which an inference can be made. The population must be clearly defined before the sample is taken. For the present study, all students having dysgraphia and studying in seventh grade with mean age of twelve in public schools of Haryana constituted population. A sample is representative when it is an accurate proportional representation of the population under study and also helps to reflect the characteristics of the population from which it is drawn. The sample for the present study comprised all the students with dysgrapha of VII standard studying in three public schools of Gurgaon district of Haryana. For selecting these sampled schools and students, the researcher first visited District Education Office, Gurgaon for getting permission to collect data from schools and procured list of schools. The sample of the study was drawn purposively from these schools through two stages. In the first stage schools were selected and in the second stage subjects were selected for the study (Fig. 3.2).
3.5 DESIGN OF THE STUDY

The present study employed pre-test, post-test control group experimental design involving groups of students with dysgraphia of Grade VII in the age group eleven to thirteen years drawn from public schools. Fig. 3.3 highlights two parallel groups of fifteen subjects each taken for the present study, one is the experimental group, and the other one is the control group. The experimental group was given treatment based on a set of intervention strategies, in a sequential order for a period of six weeks duration, where as conventional method of teaching was followed in the case of control group.

For the present study, three identification tools were administered i.e., Raven’s Standard Progressive Matrices for identifying average or above average intelligent students because the learning disabled are having average or average intelligence potential; Teacher’s Observation Checklist for partial diagnosis of writing
deficits among students; and Test of Written Language for proper and comprehensive diagnosis of writing problems among students.

The design for collecting data also envisaged three operational phases. The first phase involved screening of subjects through Intelligence test of Raven’s Standard Progressive Matrices (SPM); Teacher’s Observation Checklist; and a diagnostic test i.e., Test of Written Language (TOWL). Therefore, the first operational phase was termed as **Pretesting** and **Identification stage**. The second phase covered **Treatment** spread over for a period of six weeks. The experimental treatment comprised the use of a set of intervention strategies. The third phase included **Posttesting** in which after completion of the experimental treatment, Test of Written Language was administered. The design of the study is summarized in **Fig. 3.4**.
FIGURE 3.4
Three Operational Phases for Pretesting, Treatment and Posttesting

<table>
<thead>
<tr>
<th>Phase</th>
<th>Description</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Phase One</strong></td>
<td>Identification and one week Pre-testing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Administered</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(a) Standard Progressive Matrices</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(b) Teacher’s Observation checklist</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(c) Test of Written Language</td>
<td></td>
</tr>
<tr>
<td></td>
<td>One Week</td>
<td></td>
</tr>
</tbody>
</table>

**Phase Two**

<table>
<thead>
<tr>
<th>Experimental Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching through</td>
<td>Teaching through Conventional approach</td>
</tr>
<tr>
<td>(a) Self Regulated</td>
<td></td>
</tr>
<tr>
<td>Strategy</td>
<td></td>
</tr>
<tr>
<td>(b) Other Strategies</td>
<td></td>
</tr>
<tr>
<td>for various</td>
<td></td>
</tr>
<tr>
<td>components of writing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Six Weeks</td>
</tr>
</tbody>
</table>

**Phase Three**

| Post testing           | Test of Written Language was administered                                 | One Week |
|                       |                                                                              |          |
3.6 VARIABLES

**Independent Variable:** The intervention programme i.e., self regulated strategy, alphabet warm up, alphabet practice, alphabet rocket, multisensory strategies, multiple strategies, whole word approach, linguistic strategies for the development of various components of writing comprised the independent variable for the study.

**Dependent Variable:** Writing skills of students with dysgraphia in English language was the dependent variable which was measured in terms of scores obtained on various aspects of writing skills that is handwriting, spelling, written expression and notes taking.

**Variables Controlled:** Intervening variables like qualification and teaching experience of teachers, intelligence of children, and previous knowledge of students in English language, content taught and socio-economic status were controlled. Contamination between experimental and control group was controlled by choosing different schools for experimental and control groups.

3.7 SELECTION OF SCHOOLS

Keeping in view the target size of sample, the investigator visited and surveyed six public schools of Gurgaon city. No Government and semi Govt. schools were selected for the present study because the main purpose of the present study was to identify writing deficit of students in English language who have been studying in English medium schools but in Govt. and semi Govt. schools the medium of instruction right from first standard is Hindi. The names of the schools are shown in Table 3.1.

Out of the six schools surveyed, three schools were selected for the study and giving intervention programme as they were willing to cooperate and provide all sorts of facilities required for conducting the experiment.
TABLE 3.1
LIST OF SCHOOLS SURVEYED

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of the Schools</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aravali Public School, Delhi-Alwar Road, Sohna, Gurgaon</td>
<td>Selected</td>
</tr>
<tr>
<td>2</td>
<td>Shiv Public Senior Secondary School, Old Alwar Road, Sohna, Gurgaon</td>
<td>Selected</td>
</tr>
<tr>
<td>3</td>
<td>Jeevan Jyoti Public School, Sohna, Gurgaon</td>
<td>Selected</td>
</tr>
<tr>
<td>4</td>
<td>Salwan Public School, Site No- 2, Sector-15, Gurgaon</td>
<td>__</td>
</tr>
<tr>
<td>5</td>
<td>St. P B N Public School, Sector 17, Gurgaon</td>
<td>__</td>
</tr>
<tr>
<td>6</td>
<td>South Town Public School-794, Sector 4, Urban Estate, Gurgaon</td>
<td>__</td>
</tr>
</tbody>
</table>

Therefore, a purposive sampling technique was employed to select these public schools for experiment because without cooperation of the schools the study could not have been conducted in the right perspective. Therefore, the schools selected for the experiment were three which are enlisted in Table 3.2.

TABLE 3.2
LIST OF SCHOOLS SELECTED FOR THE STUDY

<table>
<thead>
<tr>
<th>Sr No.</th>
<th>Name of the Schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aravali Public School, Delhi-Alwar Road, Gurgaon</td>
</tr>
<tr>
<td>2</td>
<td>Shiv Public Senior Secondary, School Old Alwar Road, Sohna, Gurgaon</td>
</tr>
<tr>
<td>3</td>
<td>Jeevan Jyoti Public School, Sohna, Gurgaon</td>
</tr>
</tbody>
</table>
3.8 SELECTION OF SUBJECTS

As has been indicated earlier, the students with dysgraphia in English language constituted the sample of the present study. In order to identify students with dysgraphia of Grade VII in public schools, three pronged identification strategy was used (Fig. 3.5). In the first phase, intelligence test i.e., **Standard Progressive Matrices** was administered to 210 students from three schools in order to know the intelligence level of students as learning disabled students’ IQ level is average or above average. This lead to the identification of 170 students between the 25th-75th or above percentile on Standard Progressive Matrices by discarding the lower extreme group in the preliminary stage. In the second phase using **Teacher Observation Checklist** 140 students out of 170 were partially diagnosed as having dysgraphia. In the third and final phase a **Test of Written Language (ToWL)** was administered upon these 140 students in order to identify writing skill deficits students and finally 30 students were identified from lowest extreme group and selected for experiment by dividing in two parallel groups i.e., experimental and control group through random assignment.

**FIGURE 3.5**

**Procedure to identify Students with Dysgraphia**

- **First Phase**
  Intelligence test i.e. Raven’s Standard Progressive Matrices was administered

- **Second Phase**
  Teacher Observation Checklist was administered

- **Third Phase**
  Test of Written Language (TOWL) was administered
3.9 FORMATION OF GROUPS

In experimental research, formation of groups and making some groups become experimental and some control are essential pre condition in order to know the effect of impact study. For this, of thirty subjects, ten subjects were selected from Aravali Public School, out of whom five each were randomly assigned to experimental and control group respectively. Another ten respondents were randomly assigned to experimental and control group from Shiv Public Senior Secondary School, and the remaining ten students were randomly assigned to two groups both experimental and control from Jeevan Jyoti Public School.

3.10 MATCHING OF GROUPS

In addition to groups formation, the matching was done concurrently among the experimental and control group. For this, they were made equivalent with respect to the grade, type of school being located in urban setting, English as medium of instruction, co-educational and privately managed and having common syllabi i.e., prescribed by Central Board of Secondary Education, New Delhi. The experimental and control group were also matched by taking pre test score and level of significance of Test of Written Language. Thus, the investigator after following all these criteria for the formation of groups, felt fully confident that experimental and control groups were similar in all respects that can reasonably be visualized except the treatment.

3.11 DEVELOPMENT AND DESCRIPTION OF TOOLS USED

There were two types of tools used in the study, i.e., measuring tools and treatment tools. The description of the tools is given in the following section.

3.11.1 MEASURING TOOLS

In order to identify students with dysgraphia three measuring tools were used in the present study. These were Raven’s Standard
Progressive Matrices, Teacher’s Observational Checklist and Test of Written Language (ToWL).

3.11.1.1 STANDARD PROGRESSIVE MATRICES

Standard Progressive Matrices (SPM-1986) developed by J.C. Raven had been used to measure intelligence in the preliminary stage of present study. It is a non-verbal test that avoids reading and writing. Thus, it was a suitable test for learning disabled children who usually have problems in reading and writing.

DESCRIPTION

The Standard Progressive Matrices (SPM) is designed to be used with children as well as adults. It can be used satisfactorily with people who for any reason cannot understand or speak the language, people suffering from physical disabilities, aphasia, cerebral palsy or deafness as well as with people who are intellectually sub-normal. It is a widely used non-verbal group as well as individual test of intelligence, but not more than 8 or 9 children should be tested at any one time.

The five sets of 12 problems in each set constituting the SPM are arranged to assess the cognitive process of children and adults. The five sets (A, B, C, D and E) together provide five opportunities to a person to develop a consistent theme of thought, and the scale of 60 problems as a whole designed to assess as accurately as possible, mental development up to intellectual maturity.

PROCEDURE OF ADMINISTERING THE TEST

The test was given to a small group and the group was to be seated comfortably with sufficient distance between each other so as to avoid copying. The investigator then distributed the reusable standard test booklets, answers sheets, and pencils to individual subject and asked them to fill the needed information on answer
sheet. They were instructed not to open the test booklets until they are asked to do so.

The investigator explained the first item, A1 and said: “It is like this. At the top it says ‘Set A’ and you have column here, on your answer sheet, for ‘Set A’. This is ‘A1’. You see what it is. The upper part is a pattern with a bit cut out of it. Each of these pieces below (point to each in turn) is the right shape to fit the space, but they do not all complete the pattern. Number 1 (point to the bit and then to the pattern) is the right shape but is not right pattern. Numbers 2 is not pattern at all and Number 3 is quite wrong. They fit the space, but they are not the right pattern. What about no. 6? It is the right pattern (illustrate the pattern is the same as the pattern above) but is does not go all over. Number 4 is the right one. So the answer to “A1” is 4, write 4 here, against number ‘1’ in column A on your answer sheet. On every page in your book there is a pattern with a bit missing. You have to decide each time which of these pieces below is the right one to complete the pattern above. Do not write on the booklet. Try each in turn from the beginning right to the end of the book. Work at your own pace. Do not miss any of it”.

The investigator was not supposed to give any further assistance in the method of reasoning after this, but he verified whether each student was doing according to the instructions explained before.

**SCORING PROCEDURE**

A child’s score on the scale is the total number of problems he solves correctly. One mark was given to each right answer. Minimum maximum score can be ranged from zero to sixty. Scoring for SPM is shown in Table 3.3.
TABLE 3.3
SCORING KEY OF SPM

<table>
<thead>
<tr>
<th>Sets</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>4</td>
<td>5</td>
<td>1</td>
<td>2</td>
<td>6</td>
<td>3</td>
<td>6</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>B</td>
<td>2</td>
<td>6</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>5</td>
<td>6</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>C</td>
<td>8</td>
<td>2</td>
<td>3</td>
<td>8</td>
<td>7</td>
<td>4</td>
<td>5</td>
<td>1</td>
<td>7</td>
<td>6</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>D</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>7</td>
<td>8</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>E</td>
<td>7</td>
<td>6</td>
<td>8</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td>3</td>
<td>6</td>
<td>3</td>
<td>6</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

From the scores the percentiles points according to India norms developed by Dr JM Ojha were found out according to chronological age as given in Table 3.4 and Fig 3.6.

TABLE 3.4
CHILDREN PERCENTILES OF SPM

<table>
<thead>
<tr>
<th>Percentile points</th>
<th>11years</th>
<th>12years</th>
<th>13years</th>
<th>14years</th>
<th>15years</th>
</tr>
</thead>
<tbody>
<tr>
<td>95</td>
<td>46</td>
<td>47</td>
<td>48</td>
<td>49</td>
<td>50</td>
</tr>
<tr>
<td>90</td>
<td>45</td>
<td>46</td>
<td>47</td>
<td>48</td>
<td>49</td>
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<tr>
<td>75</td>
<td>37</td>
<td>39</td>
<td>41</td>
<td>44</td>
<td>45</td>
</tr>
<tr>
<td>50</td>
<td>31</td>
<td>33</td>
<td>35</td>
<td>38</td>
<td>40</td>
</tr>
<tr>
<td>25</td>
<td>20</td>
<td>23</td>
<td>25</td>
<td>28</td>
<td>31</td>
</tr>
<tr>
<td>10</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>15</td>
<td>16</td>
</tr>
<tr>
<td>5</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>N</td>
<td>39</td>
<td>92</td>
<td>143</td>
<td>164</td>
<td>131</td>
</tr>
</tbody>
</table>
The children after test were then classified on the basis of their percentile points as follow:

Grade I  “Intellectually Superior”: If his score lies at or above the 95th percentile for children of his age.

Grade II  “Definitely above average”: If his score lies at or above the 75th percentile of his age.

Grade III  “Intellectually average”: If his score lies between the 25th and 75th percentiles.

Grade IV  “Below average” If his score lies at or below the 25th percentile

Grade V  “Intellectually impaired or defective” If his score lies at or below the 5th percentile of his age group.

The test takes up at least forty five minutes to be completed. It is better to give one hour to the group being tested.
RELIABILITY AND VALIDITY

The reliability of the test by split half method is varying between 0.65 to 0.90 and test-retest method is varying between 0.71 to 0.87. The validity of the test varies from 0.40 to 0.70.

Ganguly(1967), Shina(1977), Dey(1984), and Rao and Reddy(1972) developed norms and reliability of Standard Progressive Matrices Test. They found the reliability range between 0.84 to 0.93. Findings indicate that the norms are applicable to Indian children.

For the present study, children who scored between the 25th percentile and 75th percentile or above percentile, students of Grade VII, intellectually average or above average were selected as the subjects for the study.

NORM

The percentile norm of Standard Progressive Matrices was also developed by taking sample from different age groups, culture, race and geographical background. As the study was planned in Indian context so the Indian norm was applied for this study.

3.11.1.2 TEACHER’S OBSERVATION CHECKLIST

An observation checklist developed by National Council of Educational Research and Training (NCERT) had been used in the second phase (Appendix-I). The checklist comprised sixteen items with Yes/No type and instructed the teachers to put tick mark if they found any observational and functional behavioral problems related to writing skill deficits among children in English language. English teachers who usually had been teaching the Grade VII were asked to fill the checklist of students who had poor and unsatisfactory performance in English or failed in English subject in school consistently. The checklist was used as a screening test.

Screening is a process that identifies children who need further assessment. The initial screening was done by English
subject teachers in the classroom. Then observed the child over a period of time and framed a judgment about the child.

3.11.1.3 TEST OF WRITTEN LANGUAGE (TOWL)

The Test of Written Language (TOWL) was developed by the investigator for the present study with a view to assess the writing skill deficits in English language of learning disabled students of class VII studying in public schools (Appendix-II). The test is individually administered test or can be given in group with the time limit of one and a half hour. The test comprised 28 questions i.e. 5 in handwriting, 8 in spelling, 10 in written expression and 5 in notes taking.

DESCRIPTION OF THE TOOL

The test was designed comprehensively and meticulously in order to identify the students with dysgraphia on the basis of which intervention programme was developed. The test mainly evaluates four components of writing skill viz. Handwriting, Spelling, Written expression and Notes taking.

The first component of Test of Written Language i.e., Handwriting is the graphomotor skill by which children express their ideas in written form. It combines visual perceptual, visual memory and the motor coordination necessary for executing the act. This component has six sub-components i.e., (i) Alignment (ii) Letter spacing, (iii) Word spacing, (iv) Letter size,(v) Slant,(vi) Line quality, with five questions of various types that measure holistically.

The second important component of Test of Written Language i.e., Spelling is the ability to produce writing materials without committing error and word analysis skill. This component has two sub-components i.e., (i) Correct words and (ii) Incorrect words with eight questions of various types.
The third component of Test of Written Language i.e., **Written Expression** is the ability to express thought in written form in an organized and coherent manner. This component has seven sub-components i.e., Organization, Cohesion, Originality, Mechanics, Language, Narrative text structure, Expository text structure, with ten questions of various types intended to measure those aspects. Again the seven sub-components have many additional components i.e., (i) In Organization: is there a good beginning sentence? is there a clear ending? is there a logical sequence of sub topic or events? use of measure details, highlight important ideas or main concepts and use appropriate words to link ideas together, (ii) In Cohesion: does the student use key words that clue the reader the direction of discourse (first..., then..., therefore..., on the other hand)? (iii) In Originality: does the student attempt humor and does the students present unique point of view? (iv) In Mechanics: end sentence with correct punctuation, use internal punctuation correctly, capitalization, spell regular words correctly, spell exception words correctly and paragraphing, (v) In Language: subject verb agreement, use of simple sentence, use of complex sentence, and correct use of grammar (vi) In Narrative text structure: provide setting(time, place), sequence ideas logically, highlight important events, include major details, use appropriate words to link ideas, combine sentence into cohesive paragraph, and describe ending or outcome (vii) In Expository text structure: highlight important ideas and main concepts, sequence ideas logically, include major details, use appropriate words to link ideas, and combine sentences into cohesive paragraph.

The last component of Test of Written Language i.e., **Notes taking** is the ability to take notes when someone dictates. This component has four sub components i.e., incorrect letters, incorrect words, missing words and correct sentences with five questions.
DEVELOPMENT OF TOOL

Content analysis of CBSE syllabi (Class VII- English) and other English literature

Content analysis is a quantitative analysis of content that relies on the scientific method including attention to objectivity, inter-subjectivity, a priori design, reliability, validity, generalisability, replicability, and hypotheses testing (Neuendorf, 2002). The content analyses also provides a summary of the intentions of the test expressed in content term which is supposed to be covered in the test, are there significant sections of this content, are there significant subdivisions within any of the sections, and which of these content areas should a representative test include (UNESCO, 2005). For the development of test of written language, in the first phase the content was analyzed and reviewed from English text book and supplementary English reader prepared and prescribed by NCERT and other literature meant for English language, research literature and partial review was made from the Test of Written Language (Hammill & Larsen, 1996).

Identification of core components of English language

After critically reviewing, analyzing the content and basic problem area of dysgraphic students, the researcher identified and selected the core components in English language i.e., handwriting, spelling, written expression and notes taking for development of a test.

Writing of items

In this phase, items were written down after identifying the core components of English language and objectives of the research study. Finally, forty three items were selected and arranged in proper order for a test by keeping in mind the students’ mental ability, simplicity, suitability of words, sentences, length of test and time limit for completion of a test.
**Reviewing questions content**

After the first phase of development of assessment instrument, the items were shared with academicians, administrators and researchers with various National Institutes like NCERT, NUEPA and university faculty. The items were improved in terms of language (language experts), ambiguity, vagueness and subjectivity according to their suggestions. The overlapping of items were also critically examined. In this way the items of the test of written language were thoroughly screened, edited and prepared. After preparation of items, the test of written language was considered for try out and revision of the tools.

**Piloting the items**

When the items have been written down and modified in the light of the suggestions and criticisms given by experts, the test was field tried out upon the seventh grade students by taking subjects from five public schools with the intention to avoid the major weaknesses, omissions, ambiguities, inadequacies and language difficulty in a test.

**Statistical analysis of items (Psychometric parameters)**

The item analysis contains statistical information for each individual item within an assessment scale segment, as well as summary information for the assessment scale as a whole. Item analysis is a process, which examines responses to individual test items (questions) in order to assess the quality of those items and of the test as a whole. Item analysis is especially valuable in improving items, which will be used again in later tests, but it can also be used to eliminate ambiguous or misleading items in a test. In addition, item analysis is valuable for increasing instructors’ skills in test construction, and identifying specific areas of course content which need greater emphasis or clarity.

For this test, the individual items score and total score
correlation was calculated through Pearson Product Moment correlation technique to understand the characteristics of items. As with all correlation indices, the Pearson Product Moment correlation ranges from −1.00 to +1.00. A positive Pearson Product Moment correlation tells us that those scoring higher on the assessment score were more likely to answer the individual item positively (i.e., the item “discriminates” between high-scoring and low-scoring test takers). To interpret with Pearson Product Moment correlation, correlation the higher is the better.

As a general rule, a coefficient of correlation of +0.30 is desirable for the retention of items and coefficient correlation below +0.30 and negatively correlated items are desirable for rejection in a test. The coefficients of Pearson Product Moment correlation of individual items were placed in the table 3.5.

**Finalization of Items**

The finalization of items was done on the basis of psychometric properties of test items. Of forty three items, thirty one items with +0.30 or above coefficient correlations were retained in the final draft and twelve items with below 0+.30 coefficient correlation and negatively correlated were discarded.

**PROCEDURE OF ADMINISTERING THE TEST**

The test was given to a group of students on an individual basis and it was ensured that they were seated comfortably in a distraction free environment and with sufficiently apart from each other so as to avoid copying. They were told to respond to test items frankly without any speculation and the researcher assured them that, in any way it would not damage their personality and the test is exclusively used for research purpose and that, their responses would be kept confidential. The investigator distributed the test booklets to individual subjects and asked them to write the needed
<table>
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<tr>
<th>Item No.</th>
<th>Correlation coefficient</th>
<th>Significant level</th>
<th>Remarks (Accepted/Rejected)</th>
<th>Item No.</th>
<th>Correlation coefficient</th>
<th>Significant level</th>
<th>Remarks (Accepted/Rejected)</th>
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</table>
information on the test booklet as per the instructions given. They were instructed not to open the test booklets until they are asked to do so.

**RELIABILITY OF THE TEST OF WRITTEN LANGUAGE**

Item statistics are used to assess the performance of individual test items on the assumption that the overall quality of a test derives from the quality of its items. However, test statistics like reliability and validity are calculated for consistency and fidelity of the test. To meet the standardization process, reliability of the test was calculated through test re-test method. In this method, the test was administered twice on the same sample group with an interval of one week. For estimating test re-test reliability, Pearson Product Moment method was used. Further, Cronbach Alpha was calculated for determining the internal consistency of a test. The coefficient of reliability was found in four components of a test by two methods which are given in table 3.6. It suggests that the test can be used with confidence.

**TABLE 3.6**
**COMPONENTS WISE RELIABILITY CO-EFFICIENT OF TOWL**

<table>
<thead>
<tr>
<th>Components of Written Language</th>
<th>Test re-test Reliability Co-efficient</th>
<th>Cronbach Alfa</th>
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<tbody>
<tr>
<td>Handwriting</td>
<td>.71</td>
<td>.72</td>
</tr>
<tr>
<td>Spelling</td>
<td>.80</td>
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<tr>
<td>Written Expression</td>
<td>.76</td>
<td>.80</td>
</tr>
<tr>
<td>Notes Taking</td>
<td>.79</td>
<td>.83</td>
</tr>
</tbody>
</table>

**VALIDITY OF THE TEST OF WRITTEN LANGUAGE**

Content validity was determined for the Test of Written Language. For determining content validity, the test was given to a
group of subject experts from NCERT, NUEPA and Department of Education, Kurukshetra University, Kurukshetra and the test was modified, refined and edited again on the basis of inputs and suggestions received from experts. The test was also given to language expert in order to determine the language ambiguity, vagueness and subjectivity of questions for ease of comprehension. The overlapping items were critically scrutinized and some of them were discarded.

**SCORING OF TEST OF WRITTEN LANGUAGE**

The Test of Written Language had 28 questions. The 15 questions in two components i.e., 5 in Handwriting and 10 in Written Expression were assessed in five point Likert scale ranging from very poor to very good. In this scale numerical value was assigned to each scale point i.e., 0 for very poor, 1 for poor, 2 for average, 3 for good, and 4 for very good for the quantitative analysis of data. In handwriting and written expression component, there are 6 and 7 sub-components having five questions and ten questions respectively. The minimum and maximum score of two dimensions is ranged between 0-24 and 0-120 respectively. The Spelling component is assessed in terms of number of correct and incorrect words in spelling test and misspelled words in written expression component and totaled thereafter. The Notes taking component is assessed in terms of number of incorrect letters, numbers of incorrect words, number of missing words and number of correct sentences copied by the child and is totaled separately.

**3.11.2 TREATMENT TOOLS**

The intervention programme was used as treatment tool for improving the writing skills of students with dysgraphia. For handwriting component of writing skills development different types of handwriting programmes were organized in proper manner and sequential order day wise. For spellings and notes taking
components of writing skills development different treatment activities were also organized. For the development of written expression, self regulating strategy was used. The contents of the intervention programme were taken and developed by the researcher after reviewing literature, general English book and text book of English of class VII prescribed by NCERT respectively.

3.12 INTERVENTION PROGRAMME

Intervention programme includes all such efforts organized in planned and sequential manner for the benefit of children with special needs. There are basically three types of intervention programmes i.e. preventive, remedial and compensatory. The main effort in the present study was remedial in nature with special reference to writing skill development of students with dysgraphia. The investigator for the present study had organized various intervention strategies and activities for developing the various components of writing.

The investigator developed an intervention programme for developing handwriting component of writing skills of class VII students after perusal of literature, English books meant for students’ pre writing skills and writing skills development. The investigator personally consulted and discussed with various educators and experts from NCERT, NUEPA and professors from Jamia Millia Islamia University and Kurukshetra University in order to get their opinions, suggestions and remarks for improving and modifying the intervention programme. In the final draft, after due modifications twenty nine lessons were incorporated (Appendix –III).

(a) Total number of Lessons: Twenty Nine
(b) Individualized treatment in small group of seven or eight students.
(c) Treatment period: Thirty six days with a period length of thirty five minutes to one hour per day.
(d) Teaching Aids: Chalkboard, white and colored chalks, flash cards, card boards, dictionary, graphic and visual organizers, mnemonics, needles, thread, different balls of hard and soft material, different length lined papers, beads, newspapers, scissors, different colors etc.

3.12.1 INTERVENTION PROGRAMME FOR HANDWRITING COMPONENT OF WRITING SKILLS

Day One

❖ **Develop gross motor, fine motor, and readiness through various activities**

In the outset of intervention programme, the researcher first established good rapport with students. Then he delivered introductory lecture regarding the importance of writing for success in academic endeavor as well as in future profession. The main intention of lecture was to develop readiness skills among students and to make them aware about the different aspects of writing skill. The researcher on the first day instructed the students after introductory lecture followed by different activities performed by students in order to develop their visual memory, fine and gross motor skills and readiness towards writing.

Day Two

❖ **Trace, Color and Draw Vertical, Horizontal and Curve line in different direction**

Some exercises were provided by researcher through flash cards relating to vertical lines, horizontal slanted and curved lines. Students were asked to frequently trace, draw and fill various colors in horizontal, vertical and semi circled lines in upward, downward, left and right direction followed by independent practice.
Trace, Color and Draw various Geometrical Shapes and pictures

Some geographical shapes like triangles, squares, rectangles and pictures were provided to students in flashcards. They were told to trace over the various geometrical shapes and pictures, and shade them with different colors. They were also provided scissors to cut geometrical shapes and pictures which they colored in order to improve the gross motor and visual perception skills.

Day Three to Five

Alphabet Warm-up

In these days the researcher provided Alphabet Warm-up activities in a sequential manner. In alphabet warm up activities, the students learnt the letters of the alphabet, identifying, sequencing, and naming them. Students practised four different tasks. The first task involved singing the alphabet song, while pointing to the corresponding letter on an alphabet chart. Within the second task, the researcher said the name of a letter, and the student pointed to it on an alphabet chart. On the third task, the researcher pointed to a letter on an alphabet chart, and the students named the letter. For the fourth task, the researcher said the name of a letter and asked the students to tell what letter comes before or after it in the alphabet. For each task, the researcher provided feedback and assistance as needed.

Alphabet Practice

The alphabet practice lesson had five stages. First, the researcher traced and described aloud how to form each of the target letters (e.g., l, i, t), using flash cards with numbered arrows that show the order and direction of strokes for each letter (modeling stage). Second, the students imitated the researcher, tracing each letter, while describing how to form it (imitation stage). Third, the
researcher and the students discussed how the formation of the letters is similar and different (discussion stage). Fourth, using a practice worksheet, the student practised each letter, tracing with a pencil a copy of the letter with numbered arrows, then tracing three copies of the letter without numbered arrows, followed by writing the letter three times within the confines of an outline of the letter, and finally writing the letter three times on regular-lined paper (practice stage). Fifth, students identified and circled their best written letters (evaluation stage).

Day Six

❖ Alphabet Rocket

In Alphabet Rockets, the activity involves copying of alphabets. The students were asked to copy alphabets, as quickly as possible without making mistakes, for a period of 3 minutes on this day. The number of letters copied were then counted. During the second lesson of each unit, the students were again performed the Alphabet Rockets with the goal of beating their previous performance. The number of letters copied by the students were again counted.

❖ Alphabet Fun

In Alphabet Fun, the fourth activity, the researcher told the students to learn how to write one of the letters in the unit in an unusual way (e.g., as long and tall, or short and fat), or to use it as part of a picture (e.g., turning an "i" into a butterfly or an "s" into a snake).

Day Seven to Ten

Repetition of the exercises of day Six to Nine for cursive and manuscript alphabet

After writing properly the manuscript upper and lower, the researcher exposed the students with a list of cursive uppercase and lowercase letters. The researcher discussed with students steps
needed for writing alphabets and also modeled them on the board. They were encouraged to observe the movement of hand position in different directions for writing various alphabets. After that they were called to write on the board independently and also provided different sized lined paper for writing followed by homework.

**Day Eleven**

*Write individual letters in various sized line papers*

On this day students were provided with various size lined paper and allowed to practise writing letters of both upper and lower case alphabets as quickly and accurately as they could from memory.

**Day Twelve**

*Write and shade with colors words of uppercase and lowercase*

This day was devoted for students to write upper and lower case words from pictures and put different colors to them.

**Day Thirteen**

This day was preserved for some additional alternative activities in order to develop their handwriting skills.

### 3.12.2 Intervention Programme for Spellings Component of Writing Skills

**Day Fourteen**

- **Alphabetize first letter of words**

  On this day, the researcher taught through flash card and practised among the students the sequential order of alphabets by asking them which letter comes first and which latter.

- **Letter by letter proof reading**

  This day was also devoted for spelling development of students with dysgraphia. The researcher through flashcards presented the list of words in a stimulus column and the students learnt words by
writing in other four columns through dictation, proof read and rewriting.

**Day Fifteen**

**Whole word corrections**

This approach requires the students to memorize the overall letter patterns of individual words rather than attending to the sounds and syllables within the word. The stimulus column and four columns in a flash card were provided by researcher for identifying and correcting the misspelled words.

**Day Sixteen**

**Orientation with visual, auditory and kinesthetic approach to learn words**

The researcher developed among students the ability to learn words through multisensory approach.

![Diagram](image)

**Day Seventeen**

❖ **Develop proof reading skills of words and identify mistakes**

The researcher instructed the students to read each sentence carefully, and then told them if any word in the sentences is misspelled; write it correctly on the dotted line. If all the words in a sentence were spelled correctly write them on the dotted line.
Learn spelling through cross words puzzle game

The researcher by showing a flash card instructed the students that some letters were omitted in the puzzle box and below the puzzle boxes some sentences written. Try to insert appropriate letters by comprehending meaning from sentences.

Day Eighteen

Chunking skills (words within words, common letter patterns, base words, prefix and suffix)

The researcher modeled on board and instructed the students to perceive groups of letters as a whole and encourage them to find out words within words, common letter patterns, base words, prefixes and suffixes from group of words.

Day Nineteen

Phonemic and morphemic awareness

The researcher modeled and taught the students that every word is formed with certain syllables division. The researcher read out each word and in turn students repeated and wrote the same.

Day Twenty

Words construction through Game

The researcher provided sets of anagrams and taught students how to play game of anagram. Students were asked to formulate as many words as possible by altering position of letters.

Day Twenty One

Recall of correct word structure

On this day, the researcher wrote on the board some words and sentences with the missing letters in words and students were told to act as detectives and find the missing letters in words, asked where they might have seen the words before and asked them to visualize the words and listen to the sounds as clues.
Homophone

Homophones are words that sound the same when you say them but they are not spelled in the same way and do not mean the same. Together with students, researcher read out pairs of homophones on the board, discussed with them each pair as to meaning, spelling pattern, context clues and correct spelling for each missing homophone. Two teams i.e. “A” and “B” were formed for playing the game Homophone Spell Down. Team “A” was provided a homophone card and one player used the word in a sentence. Team “B” player spelled the word. Again team “B” player used the companion homophone in a sentence and team “A” player spelled the homophone. If incorrect, the other team got the turn. One point was awarded for each correct answer.

Day Twenty Two

Singular and plural

The researcher provided the students with group of singular and plural words and told them to convert these from singular to plural and plural to singular by stating them the rule involved for plural form of words.

Spelling conscience through Puzzle grid

The researcher placed word puzzle grid on the board with words which were familiar to children and they acted as detectives. Asked them to find out words spelled correctly and words spelled incorrectly (vertically or horizontally) and prepared two lists, correct and incorrect, under the grid. After listing the words spelled incorrectly the correct words were put in parenthesis. By placing another grid on the board, the researcher asked some words and told them to search out whether these words were available or not by putting thumb up or down followed by independent practice. The students were also encouraged to create their own grids by using their own spelling words and then exchange papers with friends.
3.12.3 INTERVENTION PROGRAMME FOR WRITTEN EXPRESSION COMPONENT OF WRITING SKILLS

Day Twenty Three to Twenty Five

❖ Develop writing skill on narrative essays

Stage 1: Developing background knowledge

During this stage the researcher discussed with students the background knowledge for writing narrative essay of “The Hare and the Tortoise”. For this, students were told to think of what they already knew about the topic and to find out additional information. They were encouraged to brainstorm with their friends and also from a variety of sources.

Stage 2: Discussing

During this stage, students discussed with the researcher what they learned with one another; then there was discussion on specific writing strategy required for writing a story or narrative essay. The researcher introduced, described and oriented mnemonic strategies viz. POW, and WWW, What=2, How=2 for writing essay (Appendix-IV).

In this orientation programme, students were acquainted with the acronym POW to write an essay or story through planning, organizing and writing. In step 1, i.e., “P”, the students prepared and listed out all the ideas. It was similar to a brainstorming process. Graphic and visual organizer was also used in this stage by circling main ideas and small parts for supporting details. In step 2, i.e., “O”, student assembled and organized information, including sequencing the ideas and the flow. A graphic organizer of Hamburger was shown for writing a paragraph, or story involving three main components i.e., in top bun or the introduction, there is filling representing the internal or supporting information and the bottom bun represents the conclusion and also other graphic organizers were shown for writing essay (Appendix-IV). In step 3 i.e., “W”, the
students wrote finally the story or essay coupled with editing and revising.

For writing story of Hare and Tortoise, the students were also oriented with W-W-W, What=2 and How=2’s basic components i.e. who is the main character, and who else is in the story? When does the story take place? Where does the story take place? What does the main character do or want to do and what do other characters do? What happens when the main character does or tries to do it, and what happens with other characters? How does the story end? How does the main character feel, and how do other characters feel?

Stage 3: Modeling

The researcher modeled before students instructions such as:

- Asked students if they remembered some of the things said out loud during POW or WWW.
- Prompted students to think of things they could say to themselves and had them record these on paper or writing to themselves or whispering.

Stage 4: Memorizing

In this stage, students were told to memorize the steps of the strategy and meanings of mnemonics being used. Peer practice was done to be effective for supporting students or students who struggled to memorize.

Stage 5: Supporting

Students in this stage were encouraged to write their own stories by using the writing strategy. The researcher also helped those students who had problems to write story and collaboratively planned and wrote a story and gradually shifted control to the students.

Stage 6: Independent performance

The researcher encouraged the students during this stage to
write a story of “Hare and Tortoise” by using graphic organizer or mnemonic devices independently and encouraged to write other essays in similar fashion.

**Day Twenty Six and Twenty Seven**

- **Repetition of same exercise for writing narrative essays**

  The researcher followed the same stages and steps as described earlier for writing other narrative essay by giving students stories viz. The Fox and the Grapes, Albert-The Fish, Tiger’s Whiskers etc.

**Day Twenty Eight and Twenty Nine**

- **Develop writing skills on expository essays**

  **Stage 1: Develop background knowledge**

  During this stage, the students were oriented with background knowledge for writing persuasive or opinion essay of “should children have to go outside for recess”. For this, students were told to think of what they already knew about the topic and to find out additional information. They were encouraged to brainstorm with their friends and also from a variety of sources.

  **Stage 2: Discussing**

  During this stage, the researcher discussed with students what they learned from one another and then there was a discussion on specific writing strategy required for writing a story or expository essay. The researcher introduced, described and discussed mnemonic strategies viz. POW and TREE *(Appendix-IV)*. During the second step, each student was oriented to develop an outline for his or her essay that included establishing the premise for the paper, generating ideas to support the premise, evaluating readers’ reaction to each idea, noting a conclusion for the paper, and determining how the argument would be structured or sequenced. For further accommodating the students, the researcher used a real-world link to help students to remember TREE as compared to the parts of a
living tree. Then explained to the students that the topic of a paragraph or title of paragraph is similar to the trunk of a living tree, because all the other parts of the paragraph are connected to the topic sentence; just like all of the other parts of a tree are connected to the trunk. The reasons in a persuasive paragraph are like the roots of a living tree. The roots of a tree support the trunk of a tree, like the reasons in a paragraph support the topic sentence of the paragraph. The examples were given that included in a persuasive paragraph like the roots of a tree, because they support the reasons and the topic sentence of a persuasive paragraph. Finally, the ending of a persuasive paragraph was like the dirt that a tree is planted in. The ending held the parts of a persuasive paragraph together just as the dirt holds the tree together. In order to help the students remember this analogy, the researcher created a worksheet that contained a picture of a tree and, in words, the elements of a persuasive paragraph. The researcher introduced the connections between living trees and genre elements of persuasive writing and labeled each of the parts of the six-foot tree picture on the wall with the appropriate elements of a persuasive paragraph.

*Stage 3: Modeling*

The researcher modeled before students through instructions such as:

- Asked students if they remembered some of the things said out loud during POW or TREE.
- Prompted students to think of things they could say to themselves and had them record these on paper (if students were resistant to self-speech, gave the option of reading or writing to themselves or whispering or talking into a tape-recorder as they work).
Stage 4: Memorizing

In this stage students were told to memorize the steps of the strategy and meanings of any mnemonics being used and develop outline for writing. Peer practice was done as an effective way for supporting students or students who struggled to memorize.

Stage 5: Supporting

Students in this stage were encouraged to write their own stories by using writing strategy. The researcher also helped those students who had problems to write story and collaboratively planned and wrote a story, gradually shifted control to the students.

Stage 6: Independent performance

The researcher in this stage encouraged them to write a story of “should children have to go outside for recess” by using of the graphic organizer or mnemonic device independently.

Day Thirty to Thirty Two

❖ Develop writing skills on expository essays

The researcher on those days followed the same stages and steps as described earlier for writing other persuasive or opinion essay by giving students stories viz. is it better to live in the city or country?, my best friend, visit to picnic, my school etc.

3.12.4 INTERVENTION PROGRAMME FOR NOTES TAKING COMPONENT OF WRITING SKILLS

Day Thirty Three

❖ General Instructions

Some general principles were discussed and shared with students prior to giving intervention programme on notes taking. For example

• Keep lots of space on the page as you take notes: skip lines between details and leave extra space to add information later.
• Use as few words as possible-do not write out full sentences.
• Draw a horizontal line across the page to signal the end of one main idea and the start of another.
• Number the details that support the main idea.
• Highlight the key words, names, dates, and the like.
• Insert questions marks next to notes that are unclear and require more information from a classmate or teacher.
• Use only one side of the page when taking notes. When students reach the end of the page, they should start a fresh page instead of turning it over to write on the back. This leaves a whole blank page beside each page of notes. The blank page offers space for questions for the teacher, a list of words to memorize, or study summaries.
• Revise and review notes within twenty-four hours of taking them.

❖ Orientation with various Abbreviations

This day was also devoted to exposure of various abbreviations, or shortened versions of longer words, that helped students to breakdown words, or breakdown words into smaller chunks of letters. Some abbreviations were discussed with students. They were also told to make up their own abbreviations as there were no set rules for abbreviating most words like therefore as thfr, maybe as mbe, or assignment as asmt according to their convenience and they were encouraged to frame abbreviations from their memory followed by independent practice.

❖ Orientation with various type of Symbols

The researcher also discussed with students about various symbols that helped them to save time while taking notes and helped them to write quickly and also take up less space than the much longer words they represent. Some symbolic examples were given to
students through flash cards. For practice, students were encouraged to use various symbols like equals, star, and, sun, circle etc. The researcher then dictated mock sentences including these words and the students wrote each sentence using abbreviations followed by home assignment.

**Day Thirty Four**

**Orientation with various Contractions**

The students were oriented with various contractions by combining two words into one shorter, more compact word. Some examples of contractions were given by the researcher i.e., couldn’t (stands for could not), he’s (stands for he is) and encouraged to form various contractions from their mind followed by independent practice.

**Column Style Notes taking**

The researcher discussed with them the column style notes taking techniques. In column style notes taking the students were told to draw two columns having left column as 1/3 portion from the left side of the page, and the right column as 2/3 portion from the right side of the page. Then students were told to label the left column as “main ideas” and the right column as “notes”. While making notes they were told to write main ideas in left column and major details in right column.

**Day Thirty Five**

**Webbing Style Notes taking**

The researcher provided the students the webbing style notes taking. In webbing style technique the students were oriented first to draw circle in the center of their page and inside the circle they were told to write the topic of the lecture or main ideas. After that they could draw a line branching out of the center circle. Then they were instructed to draw bubbles branching out of that line containing
important details which described that main idea followed by independent practice.

**Day Thirty Six**

- **Orientation with Partially completed notes**

  The researcher provided two types of notes of same content in different formats, one was completed form notes and another was partially completed form notes with the instruction to go through the notes and filled the partially completed notes with words and phrases.

- **Discussion**

  In the last day of the intervention programme, there was discussion among students, teachers about intervention programme. They both opined that the intervention programme was interesting, meaningful, impressive, informative and effective for developing writing skills of students with dysgraphia. They further reiterated that the programme also developed among students the self efficacy, writing efficacy, positive attitude towards writing.

**3.13 STATISTICAL TECHNIQUES USED**

For analyzing data both descriptive and inferential statistics were used. In the first phase of identifying writing skill deficits, the descriptive statistics like Mean, Standard Deviation and Percentages were used and in the second phase, inferential statistics i.e., Critical Ratio ‘t’ test was used for finding significant difference between mean scores of Experimental and Control group in pre test and post test of writing skills.