CHAPTER IV
METHOD AND PROCEDURE

Research means an in-depth investigation on a particular topic, scientifically and systematically. The investigator defines and redefines the problem by setting the objectives and formulating hypotheses. It further comprises of collecting, organizing and evaluating the data. The important part of the research is to make the inferences and reaching the conclusions by testing the formulated hypotheses. In brief, research means systematic investigative process which is carried out to revise the existing knowledge and to add more current and relevant knowledge to it. As said it is a systematic process, so well planning is needed to knit the whole process. A good research is well planned and this planning majorly depends on its methodology.

Methodology is the blueprint to solve the research problem. Basically it is the discussion of the methods and it includes the theoretical ideas. So the researcher not only need to know how to calculate mean, median, mode or standard deviation or how to apply particular research tool or techniques, but the researcher also needs to explain which of these methods or techniques are relevant. So it is very important for the researcher to design his/her own methodology for research problem, as methodology varies from problem to problem.

This chapter covers the methodology adopted for the present study. It describes the nature of variables under the study, population, sample selection and research design of the study. As the chapter proceeds, it discusses about the process of data collection, tools and techniques used for data collection and analysis so as to achieve the set objectives.

4.1 Variables
The present study includes the following variables:

Treatment variable:

Treatment variable is independent in nature which is assumed to affect the dependent variable/s. In this study, Mindfulness training is the treatment variable.

Dependent variable:

A dependent variable is what the researcher measures in the experiment and which is assumed to be affected by the treatment variable. In the present study, the
assessments of Reading Anxiety, Reading Ability and Self-esteem are the dependent variables.

4.2 Research Design

Research design is the blue print of the research which is designed by connecting the conceptual research problem to the empirical data. It gives the direction for collecting and analyzing the data by using the appropriate methods and procedures. Research design is considered as the back bone of the research. So, it is the most important part of any research study.

Research design is a plan, a roadmap and blueprint strategy of investigation conceived so as to obtain answers to research questions; it is the heart of any study. It is needed because it facilitates the smooth sailing of the various research operations, thereby making research as efficient as possible yielding maximal information with minimal expenditure of effort, time and money (Kothari, 2004).

The present study is based on pretest-posttest control group experimental design (Table 4.2a). The experimental group was exposed to mindfulness intervention and students in control group did routine activities as conducted in their class by their teachers. The effect of the independent variable i.e., Mindfulness training was studied on the dependent variables (viz; reading anxiety, reading ability and self-esteem). Though the present study is majorly quantitative in nature but the researcher tried to incorporate qualitative aspect also by collecting feedback from the students, parents and teachers in order to further strengthen the findings of the study.

Table 4.2a Research Design

<table>
<thead>
<tr>
<th>Phase</th>
<th>Experiment Group (N=22)</th>
<th>Control Group (N=22)</th>
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<tbody>
<tr>
<td>Pre-test</td>
<td>● Reading Anxiety</td>
<td>● Reading Anxiety</td>
</tr>
<tr>
<td></td>
<td>● Reading Ability</td>
<td>● Reading Ability</td>
</tr>
<tr>
<td></td>
<td>● Self-esteem</td>
<td>● Self-esteem</td>
</tr>
<tr>
<td>Intervention</td>
<td>Mindfulness Intervention (6 weeks)</td>
<td></td>
</tr>
<tr>
<td>Post-test</td>
<td>● Reading Anxiety</td>
<td>● Reading Anxiety</td>
</tr>
<tr>
<td></td>
<td>● Reading Ability</td>
<td>● Reading Ability</td>
</tr>
<tr>
<td></td>
<td>● Self-esteem</td>
<td>● Self-esteem</td>
</tr>
</tbody>
</table>
4.3 Population and Sampling Frame

A population is the group of people that the researcher intends to study or infer about. As it is impractical to conduct the research on the entire population so sample is selected from the target population. Sample is basically a representative of the population, which displays the same traits of the population so the results obtained from the sample can be generalized to the entire population.

The target population of the study was the students with dyslexia of 6th grade. The researcher had delimited the study to students with dyslexia studying in 6th grade in the Government Model Schools located in Chandigarh.

The sampling frame of Government Model Schools of Chandigarh was prepared by the researcher on the basis of the list available on the website of Department of Education, Chandigarh Administration (http://www.chdeducation.gov.in/schoolslist.asp). As the schools do not allow any researcher to conduct any study without seeking permission from the DEO, so the researcher took the permission from the DEO who shortlisted the number of schools to 15 (Appendix xv). The researcher visited all the 15 schools. Out of these 15 schools only 4 schools permitted the researcher to conduct experiment. These schools were very supportive in giving flexible time slot and space to carry out mindfulness training activities etc.

4.3.1 Sampling

Sampling is a method by which a researcher selects the sample for study with an aim that it represents the entire population. Since the selection of sample has direct implications on the findings and their generalizations so, it is very important to know what method the researcher used to select sample. Sampling is not a straightforward method as it seems to be. Sampling depends upon the identification of the population of interest and the feasibility of that technique. Two schools were selected randomly out of those four schools wherein the principals had given the permission for experiment. From these two schools, students with dyslexia were purposively selected using Teacher referral form, Standard Progressive Matrices (SPM) and Diagnostic Test for Reading Disorder (DTRD). Further the identified students with dyslexia were randomly assigned to two groups viz; Experiment Group (EG) and Control Group (CG).
4.3.2 Criteria for Selection of Sample

The researcher used the following criteria to select the sample of students with dyslexia as per the requirement of the present research:

STEP I: Teacher referral forms for identification of students with dyslexia were given to the class teacher.

STEP II: Standard Progressive Matrices (SPM) Test for intelligence was administered on all the students identified through the teacher referral forms. The students scoring between the 25th and 75th percentile on SPM were identified as intellectually average according to the manual. The scores above the 75th percentile is indicative of above average intelligence. Since students with dyslexia have average or above average intelligence, therefore all those students who scored below 25th percentile were excluded from the further study.

STEP III: Further, Diagnostic Test for Reading Disorder (DTRD) was administered on the students having average or above average intelligence (as identified by SPM). With the help of DTRD manual, scoring was done and on the basis of these scores, students with dyslexia were identified and they formed the final sample for study.

4.3.3 Procedure of Sample Selection

With the permission of District Education Officer (DEO) (Appendix xv), the researcher visited all the 15 schools which were shortlisted by the DEO. Though most of these schools were ready to allow for the experiment but were not very accommodating except four schools. Out of these four schools which extended full co-operation, two schools were randomly selected. Both the selected schools were Government Model Senior Secondary Schools (GMSSS) of Chandigarh, affiliated to CBSE and the medium of instruction/examination was English. One of these schools was Government Model Senior Secondary School, sector-16, Chandigarh, having four sections of 6th grade with 40 students in each section (total of 160), and the other school was Government Model Senior Secondary School, sector-33, Chandigarh, which also had four sections of 6th grade with 40 students in each section (total 160).
Out of the total 320 students, 160 students were identified through teachers’ referral form who showed some traits of dyslexia. SPM was administered on these 160 students. 78 students possessed above average or average intelligence. Further DTRD was administered on these 78 students and 65 students were identified as students with dyslexia. From these 65 students 44 students were selected (on matching basis of gender, intelligence and school) for the study (22 each from both the schools). These 44 students were randomly assigned to the Experiment Group and Control Group. Thus, the Experiment Group and Control Group were formed at both the schools with equal number of students. The school wise distribution of sample is presented in Table 4.3.3a

**Table 4.3.3a Sample distribution**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Name of School</th>
<th>Experiment Group</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Government Model Senior Secondary School, Sector-16, Chandigarh</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>2.</td>
<td>Government Model Senior Secondary School, Sector-33, Chandigarh</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>22</td>
<td>22</td>
</tr>
</tbody>
</table>

**4.4 Tools and Techniques**

The research instruments which are used to collect data are termed as tools and techniques. Selection of appropriate tools depends on the type of research and objectives of the study, nature of the sample and design of the study. For the present study following tools were employed:

I. **Identification Tools**

   i. Teacher referral form developed by researcher


   iii. Diagnostic Test of Reading Disorders (DTRD) by Swarup and Mehta (2003).
II. Assessment Tools

i. Mindfulness Questionnaire for School Students (MQSS) developed by researcher

ii. Reading Anxiety tool developed by researcher

iii. Reading Ability test developed by researcher

iv. Self-esteem Inventory developed by researcher

III. Intervention Tool

i. Mindfulness Modules

Details of Identification tools and Intervention tools is given in the following section and the Assessment tools prepared by researcher are described in Chapter III.

4.4.1 Teacher Referral Form

Teacher referral forms are as important as any other tool as it helps to identify the defined population. For the present study the investigator made the teacher referral form (Appendix I) to be used by the teachers to identify the students with dyslexia which was made by studying the traits of the students with dyslexia and with the help of Reading Difficulty Checklist given by Landmark School Outreach Program.

4.4.2 Standard Progressive Matrices (SPM) by Raven, Raven and Court (2000)

The Standard Progressive Matrices (SPM) is a nonverbal intelligence assessment tool designed to measure an individual’s ability to perceive and think clearly. The nonverbal aspect of the SPM minimizes the impact of language skills on performance and the assessment. Each item in the SPM comprises a pattern of diagrammatic puzzles with one piece missing.

SPM is an intelligence test consisting of 60 problems divided into five sets of 12 i.e. A₁-A₁₂, B₁-B₁₂, E₁-E₁₂. In each set, the first problem is as nearly as possible self-evident. The problem which follows becomes progressively more difficult. The five sets provide five opportunities for grasping the method and five progressive assessment of a person’s capacity for intellectual activity. To ensure sustained interest and freedom from fatigue, the figures in each problem are boldly presented,
accurately drawn and as far as possible, pleasing to look at. All the subjects, whatever their ages are given exactly the same problems in the same order and asked to work at their own speed without interruption from the beginning to the end of the scale.

**Scoring:**

Set-wise columns are so arranged on the SPM response sheet that it can be marked quickly and accurately by using a scoring key. A person’s score on the scale is the total number of problems correctly solved. The raw score is obtained by adding the column-wise correct responses in all the five sets. By making use of the norms table, the percentile scores are calculated which makes it possible to classify the subjects according to the grade in which one falls, which defines the intellectual capacity of the subject.

**Reliability**

For the British Standardization, the correlation between item difficulties were established for different socio-economic groups which ranged from 0.97 to 0.99. For U.S standardization these correlations for item difficulties established for different ethnic groups ranged from 0.97 to 1.00. As per the SPM manual, two Indian studies reported Kuder-Richardson consistency of 0.67 and Spearman Brown Co-efficient of 0.73.

**Validity**

SPM manual reports several studies that have ensured Criterion-oriented validity, content validity and factorial construct validity. For concurrent validity Inter-test correlations were established by Burke and Bingham (1969) and it was found to have very high correlation between SPM and WAIS (Wechsler Adult Intelligence Scale), $r = 0.75$. Narayanan and Paramesh (1978) established a correlation of 0.58 between SPM and Catell’s Culture Fair Test. It is evident from these studies that SPM is a relatively good measure of general intellectual ability.

**4.4.3 Diagnostic Test of Reading Disorders (DTRD) by Swarup and Mehta (2003)**

The Diagnostic Test of Reading Disorders (DTRD) has been designed to identify deficits in the sub-processes leading to a reading failure in children. The sub-
processes identified in the DTRD cover areas in phonemic skills and linguistic skills, through its eight dimensions. The DTRD is clinical – prescriptive in nature, whereby the child’s performance in the test forms a base for intervention. Perceptual and cognitive deficits, assumed to be the underlying causes for the reading, writing problems, in the learning disabled provides the base for the development of the Diagnostic Test of Reading Disorders. The test identifies and diagnoses the process deficits that cause disorders in both fluency and accuracy of reading. It is an individually administered instrument. It has two levels, Level I and Level II tests. It was standardized on a sample of 1100 school going boys and girls in the age range of 8-11 years. It is a non-timed test. The test has two levels. If a child fails to complete level 1, level 2 need not to be administered.

The Rationale for DTRD

In the DTRD, the authors have focused on those processes which will assess the child (from 8-11 years) for fluency and accuracy, the two major aspects of reading. The test identifies and diagnoses the process deficits that cause disorders in both fluency and accuracy. The DTRD aims at measuring the following process through its two levels:

Level- I

1. Sound-symbol Association (SSA)
2. Blending of Sounds (BS)
3. Phonic Analysis (PA)
4. Visual Conditioning (VC)
5. Semantic Closure (SC)
6. Lexical Processing (LP)
7. Language Internalization (LI)
8. Copy Writing (CW)

Level-II

1. Grapheme Phoneme Association (GPA)
2. Verbal Phonetic coding (VPC)
3. Phonemic Synthesis (PS)
4. Verbal Visual Correspondence (VVC)
5. Verbal Memory (VM)
6. Listening Comprehension (LC)
7. Reading Comprehension-Aloud (RCA)
8. Reading Comprehension Silent (RCS)

Reliability of DTRD

The Reliability coefficient was computed using the Test-Retest Reliability method. The test was administered twice with a time gap of 20 days. The reliability coefficient for each dimension was computed by correlating the scores obtained by the students, on the two administrations. The reliability co-efficient and reliability index for the test (Level-I and Level-II) are presented in the Tables 4.4.3a and 4.4.3b

<table>
<thead>
<tr>
<th>Table 4.4.3a Reliability co-efficient and reliability index (LEVEL-I)</th>
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<tbody>
<tr>
<td><strong>Item</strong></td>
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<tr>
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<tr>
<td>Sub-Areas</td>
</tr>
<tr>
<td>Test-Retest Reliability Co-efficient</td>
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<tr>
<td>Reliability Index</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Table 4.4.3b Reliability co-efficient and reliability index (LEVEL-II)</th>
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<tbody>
<tr>
<td><strong>Item</strong></td>
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<td>---</td>
</tr>
<tr>
<td>Sub-Areas</td>
</tr>
<tr>
<td>Test-Retest Reliability Co-efficient</td>
</tr>
<tr>
<td>Reliability Index</td>
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</tbody>
</table>
Validity of DTRD

The validity of the test items was established by applying the procedure of item analysis. Item analysis determined the discriminatory power of each item with regard to delineation of students with, and without reading disorder.

The validity index and the difficulty index for each item were calculated. The $r_{bis}$ ranged from .20 to .57 for Level-I and .21 to .36 for Level-II. The difficulty index ranged from .48 to .64 for Level-I and .55 to .70 for Level-II. Cross validation of the items was done on another parallel sample of children with reading problems Level-I (N=146) and Level-II (N=126). The biserial co-efficient of correlation thus obtained ranged from .24 to .53 for Level-I and .19 to .46 for Level-II.

4.4.4 Assessment Tools

The investigator constructed and standardized the following tools to measure the mindfulness, reading anxiety, reading ability and self-esteem of the students with dyslexia.

i. Mindfulness Questionnaire for School Students (MQSS)

ii. Reading Anxiety Tool

iii. Reading Ability Test

iv. Self-esteem Inventory

The details of all the above mentioned assessment tools is provided in Chapter III.

4.4.4.1 Modules on Mindfulness

The present study required modules on mindfulness and this intervention program was designed for six weeks. It was implemented on students with dyslexia in the experiment group for six days a week wherein each session was of 35 minutes (i.e. 21 hours in total). The mindfulness program includes both group and individual activities. The whole intervention was designed according to their age group. Initially a few sessions were designed for rapport building with students and to create interest among students. The mindfulness program emphasized on strengthening attention and awareness, observation skills, describing skills and to be non-judgmental.
The following domains were targeted through the mindfulness program: Inattention, misconduct, aggressive behavior and emotions.

The main activities included mindful breathing, meditation, body scanning and the activities which could break the habitual response pattern e.g. bubble blowing and watching it by remaining non-judgmental or observing patterns of clouds etc. or stop being automatic by being mindful of the daily activities. Besides these activities the students were asked to put the reminders on cell phones, alarm clock and time table, to remind them of their activities and paying attention on present moment by simply asking themselves ("where is my attention right now?" "What I am doing right now?")

Furthermore the students were trained to apply mindfulness in routine life to get out of the difficult situations and dealing with emotions (anger, jealousy, competition, distractions, etc).

4.5 Data Collection Procedure

Data collection took place in three phases and these have been discussed below

Phase I: Pre-testing

In the pre-testing phase, the researcher administered assessment tools, viz; Mindfulness Questionnaire for School Students (MQSS), Reading anxiety tool, Reading ability test and Self-esteem inventory.

Phase II: Intervention/Treatment

During this phase the mindfulness based training intervention was given to the experimental group for six weeks. The intervention was given six days a week and each session was of 35 minutes. On the whole, approximately 1,260 minutes’ mindfulness training was provided to the Experiment Group.

Phase III: Post-testing

In this phase, post-testing was done so as to measure the effect of the intervention by collecting data through re-administering of assessment tools viz; Mindfulness Questionnaire for School Students (MQSS), Reading anxiety tool, Reading ability test and Self-esteem inventory.
4.6 Statistical Techniques

Following statistical techniques were used to analyze the data and to test the hypotheses of the present study:

- **Descriptive Statistics:** Descriptive statistics like mean (M), median (Md), mode (Mo), standard deviation (SD), skewness (Sk), kurtosis (Ku) were calculated to understand the nature of distribution of scores on assessment of mindfulness, reading anxiety, reading ability and self-esteem of the students with dyslexia.

- **Inferential Statistics:** t-test was used for both paired and independent samples to study and compare the effect of the intervention on the scores of mindfulness, reading anxiety, reading ability and self-esteem of the students with dyslexia.

4.7 Difficulties and Constrains Faced

The researcher has faced many difficulties not only in development of tools but also in the process of conducting the experiment and data collection. The very step of selection of the schools was a challenging task as most of the schools were not fully co-operating. At times, due to time-table constraints the researcher could not conduct the experiment in the fixed/pre-decided slot. Other problem faced by the researcher was the unavailability of proper room. Besides this data collection was also a tough task. The data is majorly quantitative in nature despite researcher’s best efforts to incorporate qualitative data. Feedback was collected from students, teachers and parents but due to non-response of some parents and teachers, investigator had to repeatedly request and remind them, and still the response was little may be because of time constraints.