CHAPTER – III

THE RESEARCH DESIGN

Research Design indicates what and how to do the work before starting it. Research Design also provides a picture of what has to be done in this chapter. Suitable Research design guards the researcher against the collection of irrelevant data and helps a researcher to collect the data more systematically and economically. This design provides a Blue Print of Research to the Researcher and limits the boundaries of the project and helps the researcher in controlling the various errors of the problem under investigation.

In this chapter a brief account of the method used in conducting the research has been explained. It also gives the complete idea of the population, sample frame work of the research being conducted. It also gives a brief account of the tools used (achievement test, inventory etc.) and the procedure adopted for collecting the data and also for the statistical techniques used in the collection of the data.

In this study a comparison of the achievement of the X Class students in Government and Private Schools in relation to Anxiety, Adjustment and Reading Interest have been made. The relevant tools for measuring the achievement in Science, Reading Interest Inventory have been designed for measuring the Reading Interest of the X Grade Students. Achievement Test in Science of the X Class students has been designed and constructed by the Researcher herself. Only Academic Anxiety test by Dr. A.K. Singh & Dr. A. Sen Gupta, Intelligence test for children by S. M. Mohsin for school children have been used for the collection of the relevant data. These tools have been administered upon 400 X Grade students. The results were complied and statistically analyzed for further conclusions.

3.1 THE RESEARCH DESIGN

Normative Survey Method has been used for the collection of the data of the present study. All the four tools were administered upon the sample because the nature of the study is very helpful for the collection of data through the Normative
Survey Method. The data thus was collected by the investigator for analysis, interpretation and for drawing out the conclusions etc.

The Population and Sample

In this study, the population comprised of X Grade students of Rohtak and Sonepat districts belonging to the formal/regular streams of Education and list of schools was obtained from D.E.O. Rohtak and Sonepat, out of which 200 students from Government Schools and 200 students from private schools were selected.

The sample consists of 400 students of Rohtak and Sonepat District’s Private and Government schools. School wise distribution of the students is as under:-

<table>
<thead>
<tr>
<th>S. No.</th>
<th>District</th>
<th>Govt./Pvt.</th>
<th>Name of the School</th>
<th>No of the students taken</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rohtak</td>
<td>Govt</td>
<td>Govt. Sr. Sec. School, Ismaila</td>
<td>10 10</td>
</tr>
<tr>
<td>2</td>
<td>Rohtak</td>
<td>Govt</td>
<td>Govt. Sr. Sec. School, Bhiwani Chungi</td>
<td>10 10</td>
</tr>
<tr>
<td>3</td>
<td>Rohtak</td>
<td>Govt</td>
<td>Govt. Sr. Sec. School, Kalanaur</td>
<td>10 10</td>
</tr>
<tr>
<td>4</td>
<td>Rohtak</td>
<td>Govt</td>
<td>Govt. Sr. Sec. School, Jassia</td>
<td>10 10</td>
</tr>
<tr>
<td>5</td>
<td>Rohtak</td>
<td>Govt</td>
<td>Govt. Sr. Sec. School, Sampla</td>
<td>10 10</td>
</tr>
<tr>
<td>6</td>
<td>Rohtak</td>
<td>Pvt.</td>
<td>M.D.N. Sr. Sec. School</td>
<td>10 10</td>
</tr>
<tr>
<td>7</td>
<td>Rohtak</td>
<td>Pvt.</td>
<td>Shiksha Bharti Sr. Sec. School</td>
<td>10 10</td>
</tr>
<tr>
<td>8</td>
<td>Rohtak</td>
<td>Pvt.</td>
<td>D.N. City Sr. Sec. School</td>
<td>10 10</td>
</tr>
<tr>
<td>9</td>
<td>Rohtak</td>
<td>Pvt.</td>
<td>Jyoti Parkash Sr. Sec. School</td>
<td>10 10</td>
</tr>
<tr>
<td>10</td>
<td>Rohtak</td>
<td>Pvt.</td>
<td>J.R. Kissan Memorial Public School</td>
<td>10 10</td>
</tr>
<tr>
<td>11</td>
<td>Sonepat</td>
<td>Govt</td>
<td>Govt. Sr. Sec. School, Mahmoodpur, Gohana</td>
<td>10 10</td>
</tr>
<tr>
<td>12</td>
<td>Sonepat</td>
<td>Govt</td>
<td>Govt. Sr. Sec. School, Bichpuri</td>
<td>10 10</td>
</tr>
<tr>
<td>13</td>
<td>Sonepat</td>
<td>Govt</td>
<td>Govt. Sr. Sec. School, Jagsi</td>
<td>10 10</td>
</tr>
<tr>
<td>14</td>
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<td>Govt</td>
<td>Govt. Sr. Sec. School, Barota</td>
<td>10 10</td>
</tr>
<tr>
<td>15</td>
<td>Sonepat</td>
<td>Govt</td>
<td>Govt. Sr. Sec. School, Rukhi</td>
<td>10 10</td>
</tr>
<tr>
<td>16</td>
<td>Sonepat</td>
<td>Pvt.</td>
<td>Om Public School, Gohana</td>
<td>10 10</td>
</tr>
<tr>
<td>17</td>
<td>Sonepat</td>
<td>Pvt.</td>
<td>Gita Vidhya Mandir, Sonepat</td>
<td>10 10</td>
</tr>
<tr>
<td>18</td>
<td>Sonepat</td>
<td>Pvt.</td>
<td>Shambhu Dayal Public School, Sonepat</td>
<td>10 10</td>
</tr>
<tr>
<td>19</td>
<td>Sonepat</td>
<td>Pvt.</td>
<td>Modern Public School, Gohana</td>
<td>10 10</td>
</tr>
<tr>
<td>20</td>
<td>Sonepat</td>
<td>Pvt.</td>
<td>Lord Krishna Public School, Mahra</td>
<td>10 10</td>
</tr>
</tbody>
</table>

(School wise break-up of the students can be seen in the table)
3.2 TOOLS USED IN THE PRESENT STUDY

The following tools have been used in this research study for the collection of data:

1. Academic Anxiety
2. General intelligence test
3. Achievement Test in Science
4. Reading Interest Inventory

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Variables Used</th>
<th>Tools Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Academic Anxiety</td>
<td>Dr. A.K.P. Sinha and Dr. I. N. K. Sinha</td>
</tr>
<tr>
<td>2</td>
<td>General Intelligence Test</td>
<td>Dr. S.M. Mohsin</td>
</tr>
<tr>
<td>3</td>
<td>Achievement Test in Science</td>
<td>Constructed by the Researcher himself</td>
</tr>
<tr>
<td>4</td>
<td>Reading Interest Inventory</td>
<td>Constructed by the Researcher himself</td>
</tr>
</tbody>
</table>

3.2.1 Description of Academic Anxiety Test by Dr. A.K.P. Sinha and Dr. I.N.K. Sinha

Anxiety plays an important role in human life. The desire to be on the top in the class puts a lot of pressure upon the students, which causes a great tension and Anxiety among them. Anxiety is the intimate experience for a man. It is at the core of all mental disorders. The word anxiety has been originated from the Latin word ANSIETUS, which means experience of varying blends of uncertainty, agitation and threat. Anxiety is a state, which occurs when an individual experiences a sense of threatening danger. Freud (1936) says, “There exists three sources of anxiety, the external word, the ID and the Super Ego.

The threat in anxiety situation does not exist, it is only imagined and subjectively apprehended. Fear is therefore a perceived threat to the biological self. Anxiety is a subjectively apprehended threat to the psychological self. In 1953, Sulliven said, “Anxiety is a state of tension arising from the experience of disapproval in inter-personal relations. Whereas, Tillich says that anxiety. He says the experience of being impelled to actualize for which the abilities have already been apprehended as uncertain. Dutt has clarified, “Anxiety into different components namely insecurity, loneliness, depression, self Consciousness, inferiority complex, guilt
proneness and emotional instability. A Trait Anxiety is a suitable characteristics or a trait of a person where as a state anxiety is one which is aroused by some temporary condition of the environment such as examination, punishment or accident etc. Academic anxiety is a kind of state anxiety which relates to the impending pressure from the environment made out of the academic situation including many other things, the teacher and certain subjects like mathematics and English etc. In this study, Academic Anxiety scale for children prepared by Dr. A.K. Singh and Dr. A. Sen Gupta has been used for measuring the academic anxiety of X class students.

Taylor in the year 1953 developed a personality scale for measuring manifest anxiety which has proved to be a useful devise in the hands of researchers and practitioners. Martin in the year 1959 reported that anxiety factor was relatively independent of intelligence, motivation, psychological experimentation and paper and pencil test. On examination of test of anxiety in existence the present author found that they were not covering certain factors of anxiety. Several aspects of the anxiety appeared to be ignored. All these consideration let to the development of this comprehensive test of anxiety in corporating a variety of anxiety indices proposed by different investigators from time to time keep in view the considerations available in this country.

Development of the Test

Items Construction

The items of the test were largely constructed on the basis of the symptoms of anxiety reported by those, who visited the institute of Psychological research and service, Patna University for psychological assistance. A few items from the existing tests of anxiety were also incorporated after such modification as were considered necessary. Thus initially 315 items were prepared in Hindi. These items were given to five judges (all engaged in counseling and psychological testing work) for examining the merit of each item for inclusion in the test of anxiety. They were also asked to score out those items, which they thought were redundant. On the basis of 100% agreement among the judges, 70 out of 315 items were eliminated.
**Item Analysis**

Before undertaking the work of item analysis, the remaining 245 items were tried out on smaller samples several times and necessary modification made in them to ensure that the item were intelligible to the students. Finally, the test was administered on 100 school students who approached for psychological assistance complaining of one or several symptoms of anxiety. No time limit was imposed. The subjects were required to respond to each item in terms of “yes” or “No” response. For item analysis, the point biserial correlation were computed. The criterion of a coefficient of correlation, being significant at .001 level was fixed for the inclusion of an item in the final test. Out of 245 coefficients of correlation 90 were significant at or beyond .001 level. Consequently those 90 items, which fulfilled the criterion constituted the test in its final form.

**Reliability**

The coefficient of reliability was determined by using the following two methods:

1. The test-retest method (N=100) was employed to determine the temporal stability of the test. The product moment correlation between the test and retest scores was 0.60
2. For the split-half reliability of the test, it was administered on a fresh sample of 100. Subsequently, the test was splinted by odd-even method. The resulting odd-even correlation of coefficient was .433. The coefficient of correlation is 0.65.

Both the values ensure a high reliability of the test.

**Validity**

The AASC has been revalidated against the Sinha-Anxiety test, Neurotic scale of MPI & CAAT. Former two tests are the measures of general anxiety and latter intends to measure academic anxiety among school children.

<table>
<thead>
<tr>
<th>Test</th>
<th>Cri. Test of Neurotic</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA</td>
<td>Sinha</td>
</tr>
<tr>
<td>SC</td>
<td>Anxiety</td>
</tr>
<tr>
<td>Total</td>
<td></td>
</tr>
</tbody>
</table>
Table 2. Present the rapidity coefficient of AASC. On the basis of obtained correlation coefficients it can be said the AASC is valid test.

**Instructions for Administration**

1. The instructions printed on the test form should be made clear by test administrator to the testee.
2. No time limit is fixed for completing the test. However usually an individual takes 15 to 20 minutes in completing the test form.
3. It should be emphasized that there is no right or wrong response to the statements. They are designed to study individual’s reactions to different situations.
4. It should be pointed out that each item has to be responded in either positive or negative terms, i.e., Yes or no, and that no statement should be left out.
5. It is undesirable to tell test about the aim of the test.

**Scoring**

The maximum possible score of the test 20. In AASC each item of test do scored as either or 0. There are two type items. All positive item which are endorsed by the subject yes and all negative item no 4, 9, 16, 18 which are endorsed as No as given score of +1. A score of Zero do awarded to all other answer. These high score on test indicates high academic anxiety and vice-versa.

**Norms**

Higher scores in anxiety reveal extremely high for example 17 to 20 score reveal extremely high anxiety, while 7 to 10 score reveal low anxiety and 1 to 6 scores reveal extremely low anxiety.

**3.2.2 Description of General Intelligence Test of S.M. Mohsin.**

**Instruction for test conduction**

1. Each student sits separately and comfortably so that it is free from any disturbances.
2. This is not syllabus test, this involve many interesting questions.
3. This test consists of multiple questions each having four options. You have to tick the correct answer in the box.
4. This test does not require any prior planning and in this test cheating is harmful as it affect the score which determine you intelligence.
5. Don’t waste the time on such questions which you feel difficult.
6. Don’t open the booklet unless and until you are asked to do so.
7. There is time limit for each test.

Introduction of test

This book consists of 6 tests each test has different time limit for completion.
Test – 1 : This test start from page no. 1. This test consists of multiple choice questions. Each question has four options. Tick in box of the option which you think correct. This test consist of 20 multiple questions which have to be completed in 5 minutes.
Test – 2 : This test consist of 30 questions. These questions should be completed in 5 minutes. This test consist of multiple questions having 5 choice out of these 4 words are related do each other, one is odd. The odd one is the answer.
Test – 3 : This test start from page no. 5. In these questions, there words are give in which 2 words are related to each other and you have to find fourth word out of four words given below having same relation as first to have. This test consists of 40 questions. These should be completed in 8 minutes.
Test – 4 : This test starts fro page no 7. In this test, one word has given following by words and students had to tell which two words are necessary for the given word. This test consists of 22 questions. This test should be completed in 5 minutes.
Test – 5 : This consist of 26 questions a sentence and The questions are fill in the blank type. The students have to tick the correct option. The test should be completed in 7 minutes.
Test – 6 : This test starts from 10 page. The questions are finding relationship between two as per statement. This test consists of 18 questions which is to be completed in 10 minutes.

Reliability

The coefficient of reliability was determined by using the following two methods :-
1. The test-retest method (N=100) was employed to determine the temporal stability of the test. The product moment correlation between the test and retest scores was 0.60.

2. For the split-half reliability of the test, it was administered on a fresh sample of 100. Subsequently, the test was split by odd-even method. The resulting odd-even correlation of the coefficient was 0.433. The coefficient of correlation is 0.65. Both the values ensure a high reliability of the test.

3.2.3 Description of Achievement Test

The term ‘achievement’ refers to scholastic or academic achievement of the student at the end of unit or educational programme or academic year or the test which measures the scholastic or academic achievement. Prof. Harold E. Mitzel (1982), Editor in Chief of Encyclopedia of Educational Research 5th Edition, Vol.1 has mentioned on page 14 under Achievement Testing, Chapter I, Advantages and disadvantageous of common item types.

Multiple choice items can be used:
1. To assess wide range of skills.
2. Large sample of knowledge can be assessed in a brief period.
3. Efficient to score even for a large number of takers.
4. Can be made highly reliable.

Disadvantages
1. Multiple Choice type items are too consuming to write.
2. Measures complex skills indirectly.
3. Possible to answer correctly by guessing.

By studying and reviewing all the test items, the researcher has chosen the Multiple Choice items as a measure for the achievement test of the students of X grade in science. Although preparation of test item is very difficult, yet it is easy to score. Therefore, the researcher has constructed the achievement test in science for the X class students as well, which are based on the Multiple Choice Tests.
Definition

“An achievement test is essentially a tool or divide of measurement that helps in ascertaining quantity and quality of learning attained in a subject of study or group of subject after a period of instructions by measuring the present ability of the individual concerned.”

Construction of Achievement Test

The following steps are involved in the construction of Achievement Test:

1. **Instructional Objectives**

   The first and most important step in planning a test is to identify the instructional objectives. Each subject has a different set of instructional objectives. In the subjects of Science, Social Sciences, and Mathematics the major objectives are categorised as knowledge, understanding, application and skill, while in languages the major objectives are categorised as knowledge, comprehension and expression. Knowledge objective is considered to be the lowest level of learning whereas understanding, application of knowledge in sciences or behavioural sciences are considered higher levels of learning.

2. **Design**

   The second step in planning a test is to make the “Design”. The Design specifies weightages to different (a) instructional objectives, (b) types (or forms) of questions, (c) units and sub-units of the course content, (d) levels of difficulty. It also indicates as to whether there are any options in the question paper, and if so, what their nature is.

   The design, in fact, is termed as an instrument which reflects major policy decisions of the examining agency, whether it is a Board or an individual. A sample format for presenting design of a test is given ahead.

3. **Blueprint**

   The third step is to prepare the ‘Blueprint’. The policy decisions, as reflected in the design of the question paper, are translated into action through the Blueprint. It is at this stage that the paper setter decides as to how many questions are to be set for different objectives. Further he/she decides under which unit/topic a particular question is to be set. Further more, he/she picks up various forms of questions.
Therefore, the paper setter decides how all the questions are to be distributed over different objectives and content areas so as to obtain the weightages decided in the Design. The three dimensions of the blueprint consist of content areas in horizontal rows and objectives and forms of questions of the blueprint consist of content areas in horizontal rows and objectives and forms of questions in vertical columns. Once the blueprint is prepared, the paper setter can write/select the items and prepare the question paper.

**DESIGN**

Subject:
Class:

THE WEIGHTAGE OF THE DISTRIBUTION OF MARKS OVER THE DIFFERENT DIMENSIONS OF THE QUESTION PAPER IS/SHALL BE AS Follows:

1. **WEIGHTAGE TO INSTRUCTIONAL OBJECTIVES/LEARNING OUTCOMES**

<table>
<thead>
<tr>
<th>S.NO.</th>
<th>OBJECTIVES</th>
<th>MARKS</th>
<th>%AGE OF MARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>KNOWLEDGE</td>
<td>20</td>
<td>33.5</td>
</tr>
<tr>
<td>(2)</td>
<td>UNDERSTANDING</td>
<td>20</td>
<td>33.5</td>
</tr>
<tr>
<td>(3)</td>
<td>APPLICATION</td>
<td>15</td>
<td>25</td>
</tr>
<tr>
<td>(4)</td>
<td>SKILL</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td><strong>60</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

2. **WEIGHTAGE TO CONTENT /SUBJECT UNIT:**

<table>
<thead>
<tr>
<th>S.NO.</th>
<th>UNITS &amp; THEIR SUB-UNITS</th>
<th>MARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>STATE OF MATTERS</td>
<td>10</td>
</tr>
<tr>
<td>(2)</td>
<td>LIGHT AND ITS PHENOMENA</td>
<td>9</td>
</tr>
<tr>
<td>(3)</td>
<td>LIFE PROCESSES</td>
<td>15</td>
</tr>
<tr>
<td>(4)</td>
<td>ATOM AND ELEMENTS</td>
<td>8</td>
</tr>
<tr>
<td>(5)</td>
<td>SOURCE OF ENERGY</td>
<td>10</td>
</tr>
<tr>
<td>(6)</td>
<td>ATMOSPHERE</td>
<td>8</td>
</tr>
</tbody>
</table>
BLUE PRINT

EXAM : 
SUBJECT : 
UNIT : 
MAXIMUM MARKS :

<table>
<thead>
<tr>
<th>OBJECTIVES</th>
<th>KNOWLEDGE</th>
<th>UNDERSTANDING</th>
<th>APPLICATION</th>
<th>SKILL</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>FORMS OF QUESTION / CONTENT UNIT</td>
<td>E</td>
<td>SA</td>
<td>VSA</td>
<td>E</td>
<td>SA</td>
</tr>
<tr>
<td>1. State of Matters</td>
<td>4 (4)</td>
<td>5 (5)</td>
<td>1 (1)</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>2. Light And Its Phenomena</td>
<td>3(3)</td>
<td>3(3)</td>
<td>1(1)</td>
<td>2(1)</td>
<td>9</td>
</tr>
<tr>
<td>3. Life Processes</td>
<td>3(3)</td>
<td>6(6)</td>
<td>5(5)</td>
<td>1(1)</td>
<td>15</td>
</tr>
<tr>
<td>4. Atom And Elements</td>
<td>3(3)</td>
<td>2(2)</td>
<td>3(3)</td>
<td>--</td>
<td>8</td>
</tr>
<tr>
<td>5. Source Of Energy</td>
<td>4 (4)</td>
<td>2 (2)</td>
<td>3 (3)</td>
<td>1(1)</td>
<td>10</td>
</tr>
<tr>
<td>6. Atmosphere</td>
<td>3 (3)</td>
<td>2 (2)</td>
<td>2 (2)</td>
<td>1(1)</td>
<td>8</td>
</tr>
<tr>
<td>SUB TOTAL</td>
<td>20</td>
<td>20</td>
<td>15</td>
<td>5</td>
<td>60</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SUMMARY

ESSAY TYPE ANSWER (E) MARKS: 00
SHORT ANSWER (SA) MARKS: 00
VERY SHORT ANSWER (VSA) MARKS: 60

Preparation and Editing of Test Items:

1. Writing of items by the investigator. The numbers of items forms were three times the number required for the final test.
2. Submission of items to authorities for critical evaluation.
3. Revision of items in view of suggestions received from the subject experts.
4. Preparation of experimental form of the test.
5. Writing of Questions:

   The next step after the finalization of the blueprint is writing appropriate questions in accordance with the broad parameters set out in the blueprint. One should take one small block of the blueprint at a time and write out the required questions. Thus, for each block of blueprint which is filled in, questions have got to be written one by one. Once it is done, we have all the questions meeting the necessary requirements laid down in the blueprint. While selecting each small block for writing a question, you can proceed in several ways.
either writing all questions (one by one) belonging to one objective at a time i.e. knowledge or understanding or application followed by other objectives, or

b) by taking up question according to their form or type i.e. Essay Type followed by Short Answer and Very Short Answer Type or in any other order, or

c) by writing questions for one unit of the syllabus or portion to be covered by the test at a time.

6. **Marking Scheme**

   The fifth step is to prepare the “Marking Scheme”. The marking scheme helps prevent inconsistency in judgment. In the marking scheme, possible responses to items in the test are structured. The various value points for response are graded and the marks allowed to each value point indicated. The marking scheme ensures objectivity in judgment and eliminates differences in score which may be due to idiosyncrasies of the evaluator. The marking scheme, of course, includes the scoring key, which is prepared in respect of objective type question.

7. **Question-Wise Analysis**

   The sixth and the last step is that of question-wise analysis. Such an exercise helps the paper setter to ensure that there is no imbalance in the question paper. During question-wise analysis, the paper setter analyses each question on various parameters stated in the Blueprint.

**Advantages and Disadvantages of Objective Tests**

   One problem immediately presents itself with any form of choice response, viz. guessing. Instructions not to guess are impossible to enforce and it is equally impossible for an evaluator to tell whether answer have or have not been guessed. This is particularly true of True/False tests where a candidate has a 50/50 chance of making a correct guess.

   However, there are several positive advantages in using objective tests. Probably the most obvious advantage is the speed at which they can be marked. Marking doesn’t need any special skill and so can be done by anyone. Moreover, as questions are short and easily answered, knowledge of a large syllabus content can be sampled. By using such tests to sample content knowledge, there is time available to use other assessment techniques to test skills. Objective tests also give an opportunity
to pupils who are poor writers to demonstrate their knowledge without subjective elements creeping in.

However, objective tests are not appropriate for all occasions. Whereas they are excellent for sampling knowledge, it is much more difficult to construct them to test higher order skills. They can never test written expression, or ability to argue in one’s own words. If well written, however, they can test higher order skills. The overuse of objective tests at the expense of other forms of assessment may result in an assessment which can be biased and invalid. But probably the main disadvantage of objective tests is the difficulty in writing good ones. Just as, well-written tests are highly valid, so badly written objective tests are highly invalid.

**Administration of Experimental Form and Preparation of Tentative Final Form**

1. Framing of different instructions to be given to the testes.
2. Administration of experimental forms over 50 students of X class.
3. Deletion of ambiguous items and modification of the items which has language difficulty.
4. Revision and final editing of the item for tentative final form.

For this the investigator particularly kept in mind the following points:

(i) The statements of the items were clearly and concisely worded.
(ii) There was no ambiguity in meaning and construction of the statements.
(iii) The statements were related directly to the topic.
(iv) The irrelevant statements were avoided.
(v) The statements were arranged properly and systematically under several problem areas.
(vi) The sequence of the item was maintained in such way that they were educationally sound.
(vii) Efforts were made to test as much information as possible.

The number of items in the tentative final form was almost double the number required in the final form. Having prepared a good test, you should plan to administer it in such a way that each of your students will do his/her best. Some of the values of designing a good test and preparing students well for the test may be lost if you do not plan in advance for its administration. Detailed planning is necessary as any confusion
in the administration of a test is found to disturb the examinee and lower the validity of the results. Some tips to be kept in mind while planning for the administration of a test are given below:

a) **Time Schedule**

Be sure you plan your time schedule carefully, ensuring teacher and pupil readiness. Much preparation may be done a day before. It will be wise to schedule enough time for briefing the invigilators.

b) **The Room**

It is important for any examination to provide a quite, comfortable atmosphere, in which the students are encouraged to do their best. As much, as possible, try to test in a quiet place with a minimum of distracting noises.

c) **Desks, Etc.**

Remember that the students will be writing on a single-thickness answer sheet, not a thick answer book. Be sure the writing surfaces are at least 30×38 cm, and as smooth as possible.

d) **Equipment**

It is wise to make up a check-list, ahead of time, of what you will have to take with you to the examination hall. Be sure to include chalk to write necessary notices on the black board. If there is no black board make up placards or poster ahead of time. Also invest in a dozen or so soft pencils, preferably with erasers.

e) **Invigilators**

For anything more than an informal, half-period quiz, you will probably need the help of one or more invigilators. Choose persons who are willing to give their full attention to the task. Neither you nor your invigilators should talk, read, correct papers or do any other work during the examination time.

**Scoring and Recording of Test Results**

Despite the objectivity of scoring short answer tests, certain procedures are indispensable if scoring is to be done with maximum accuracy and efficiency. The necessity for extreme care in scoring has been indicated by several studies showing that scoring errors occur with appalling frequency. “Constant” errors can be due to failure to understand scoring directions, with resultant scores which are consistently
too low or too high. “Variable” errors can be due to carelessness in marking, adding, computing, or transcribing scores. These errors can be due to carelessness in marking, adding, computing, or transcribing scores. These errors warrant (1) the careful training and instruction of scores and (2) the rescoring of at least a sample of any group of test booklets or answer sheets.

(a) **Order of Scoring**

With essay test, it may be desirable to have one person score all answers to the first questions, than to the second, and so on. If, for objectives tests, separate answer sheet are provided, the scorer may score a given page in all booklets first, then the next page, and so on, rather than scoring all of one booklet before going onto the next. If so many booklets must be scored that several scores are needed, each person may specialize on a given page or group of pages of the booklet, but should score only one page in all booklets at a time.

(b) **Rescoring**

With a large number of booklets to be scored and sufficient help available, it is always worthwhile to rescore them so as to eliminate errors that otherwise are almost inevitable in a clerical task like this. If complete rescoring is not feasible every fifth or tenth booklets should be rescored to get a rough idea of the frequency and magnitude of scoring errors. Rescoring a sample, sometimes uncovers such an inaccuracy as to make it desirable to rescore the remainder.

(c) **Keeping Records**

As soon as possible after the tests have been administered, the answer-sheet should be checked and scored, and the scores should be recorded on the permanent records of the school. Each teacher should be given copies of the score reports for each pupil, which provides space for recording standardized test results.

**Try Out of the Test**

The test was administered over a representative sample of X class students of Government and Private Schools of Rohtak. As for item analysis the researcher needed 370 test papers; the test was administered over 400 students so as to keep margin for discarding the spoilt ones.
The testes were given following instructions.

1. This is a test of what you have learned during the whole year. The results of this test will used for research purpose only.
2. This test has one part corresponding to the science.
3. In each of the part, there are 60 multiple choice items. For each item select the answer the best completes the statement, of answers the question, and encircle the letter of that answer.
4. Do not make unnecessary haste/delay to finish the test.
5. Since your scores will be the number of items answered correctly, be sure to answer every item.
6. The result of this test will be used for the research purpose only.

**Time Limit**

For taking the try-out test no time limit was kept. The test was ministered and was taken back from the students after they had completed the on an average the students took three and a half-hours to complete the test.

**Scoring**

The test papers were scored with the help of scoring key already prepared by the researcher on the basis of 1 mark for a correct answer and a zero for an incorrect one.

**Measurement of Discrimination and Difficulty Value of the Test Items**

For measuring the difficulty value and discrimination power, the following was adopted:

1. Selected 370 test papers randomly.
2. All 370 scored test papers were arranged in descending order from the highest score to the lowest score.
3. Counted off 20% of the total number of test papers from the top of the stack. This formed the upper group.
4. Counted off 27% of the total number of papers from the bottom of the stack. This formed the lower group.
5. Put aside the middle group i.e. 46% papers of the total number, since it is not used in the item analysis.
6. For each item counted the number of students, in the upper group and in the lower group, who answered the item correctly and recorded the same as PU i.e. Proportion of students in the upper group who answered the item correctly and PL i.e. proportion of the students in the lower group who answered the item correctly.

7. Following formula was applied for determining the difficulty value (dv) of each item

\[ Dv = \frac{PU + PL}{2} \]

Where

Dv = Difficulty value of the item
PU = Proportion of correct responses to the item in the upper group.
PL = Proportion of correct responses to the item in the lower group.

8. The formula applied for determining the discriminating power is as follows:

\[ D = PU - PL \]

Where

D = Index of discriminating power
PU = Proportion of correct responses to the item in the upper group
PL = Proportion of correct responses to the item in the lower group

9. For determining the difficulty value and discriminating power, although our calculation is based on the upper and lower groups only and middle 46% are discarded, it provides a close approximation of the estimate that would be obtained with the total group.

In this regard, it becomes essential to quote that:

Davis (1951) computed the reliability coefficient of a group of typical item difficulty indicates estimated in this way and has found it to be 0.98, when the sample included 100 examinees in the highest 27% and 100 examinees in the lowest 27% group.

**Item Selection for the Final Draft**

The items for the final tests were selected on the basis of the following criteria:
1. Difficulty Value

Since “Difficulty” refers to the percentage answering the item correctly the smaller the percentage figure, the more difficult the item. Only those items were retained, the difficulty value of which ranged from 0.2 to 0.8 as the item having difficulty value below 0.2 are considered to be very difficult and above 0.8 very easy.

2. Discriminating Power

The “Discriminating Power” of an item is reported as a decimal fraction maximum positive discrimination is indicated by an index of 1.00. This is obtained only when all students in the upper group answer the item correctly and no one in the lower group does.

Zero is obtained when an equal number of students in each group answer the item correctly. Negative discriminating power is obtained when more students in the lower group than in the upper group answer correctly. Both of these types of items were deleted from the test and only those items whose discriminating power ranged from 0.1 to 0.6 were retained.

Reliability

By reliability is meant the degree to which the test agrees with itself. To what extent can two or more forms of the test be relied upon it give the same results; or the same test to give the same results when repeated? If the scores on the test are stable under these conditions, the test is said to be reliable. In other words, we can say the reliability means consistency.

The absence of reliability in a test is a sign of weakness. Although high reliability is no guarantee that the test is good, low reliability does indicate it is poor. There are many ways by which reliability of a test can be found out. The reliability of this achievement test was found out by test-retest method.

This method has certain limitations, for example in the case of achievement test, this delay is likely to introduce other variables, the pupils may discuss the test between trials, do extra study or do other things that effect a change in the status of their knowledge. In addition to this, their physical and mental conditions may also affect the test. But in spite of these limitations the method has many advantages.
Firstly, construction of two or more than two forms is always not possible and usually it is a troublesome job. Secondly, even if there is only one form, the split-half technique may not be possible or feasible in all cases, as one to one matching is difficult to obtain.

The researcher used this method because of its superiority over other methods. This method was used as only one form of the test was required, no matching between the items was required and it was easy to administer the test to the respondents even twice. Also, the gap between the first and second test would not make the difference because the respondents cannot talk with other so easily. The reliability of the measures of this achievement test was found out to be 0.73, using the test-retest method.

**Validity**

‘Validity’ refers to the degree to which the test or other measuring instrument measures, what it claims to measure. We can say that validity means “Truthfulness”. No matter what other merits the test may possess, if it lacks validity, it is worthless.

According to Lindquist (1951) “the content of an achievement test is often formulated by the analysis of curriculum and test books and by the pooled judgment of recognized authorities in the field. Under these circumstances, a well constructed test may constituted the best available measure to criterion in a sense that the test itself defines the function it is to measure. Such tests may be described as self defining.

Guilford (1954) also says here are some measures whose validity is taken for granted, for example : achievement test scores”.

In view of the above view points the validity of the achievement test used for the present study was taken for granted, because it was an achievement test and was constructed, keeping in view the weight age of the different portions of the syllabi. Thus, the content validity method was used for determining the validity of the achievement test constructed by the investigator.

**Final Form of Achievement Test**

1. Both consisted of 60 items each.
2. The scoring key was prepared for it.
3. The instructions to be given to the testers were printed on cover page of the test.

4. The time limit for the test was one and a half hours.

3.2.4 Reading Interest Inventory

An Inventory can be defined as a detailed questionnaire to provide some specific information about a person’s likes and dislikes habits and preferences. It is used to measure the personality and interest of a person.

Reading Interest Inventory has been designed and constructed by the Researcher herself to measure the Reading Interest of the X class students. As there was no Inventory available to measure the Reading Interest of the X class students, the researcher has tried to create certain situations and made the students on the basis of the questions to answer on the basis of the personal experiences of the X class students.

The behavior of the students was measured by asking the students to reply the various situations, questions and query questions or various checks. Almost all the item in the Reading Inventory were selected after taking the opinion of the subject experts and only those items were kept in the Reading Interest Inventory, where there was 75% or above agreement was found in the opinion of the subject experts was sought.

63 items were selected in the beginning for the Reading Interest Inventory and after getting the opinion of the experts for the language and communication problems, suggestions and desired modifications suggested. 8 items were dropped. Reading Interest Inventory was edited and vetted and 55 items were finally selected to be kept in the Reading Interest Inventory.

First Try Out of the Inventory

First out of the Reading Interest Inventory was made upon 100 X class students to find out the difficulty and comprehensiveness of the questions. The instructions were printed on the Reading Interest Inventory, which were to be followed by the X class students. Every question has three choices and every choice of the question has been assigned a score depending upon the reply of the question. Every student upon whom the test was administered asked to tick the choice from the
given three choices of the questions as the Reading Interest Inventory has multiple type questions.

The Multiple Choice questions have been selected due to the following reasons:

According to the Encyclopedia of Educational Research by Harold D. Mitzel, Multiple choice items have following advantages over the other types:

1. Multiple choice type items can be used to assess wide range of skills.
2. By the use of these items large sample of knowledge can be assessed in a brief period.
3. These items are efficient to score, even for large number of takers.
4. These types of items can be made highly reliable.
5. It is easy to score, but difficult to construct.

On the basis of scoring of the Reading Interest Inventory of the first try out, 8 questions were dropped which were found either difficult in language or had strong confusing distracters or were too easy to be replied. Now 55 questions were left in the Inventory.

**Second Try Out of the Inventory**

The Reading Interest Inventory was administered upon a sample of 100 X class students for the second try out. In this Second try out, the sample is large in comparison of the first try out, because the researcher wanted to use these Results for the item analysis of the Reading Interest Inventory. There were 55 items with three choices in the Reading Interest Inventory, when the second try out was administered by Researcher.

**Item Analysis of the Reading Interest Inventory**

Reading Interest Inventory has no correct to incorrect answers, therefore the item analysis represented the power of discriminating the item. The score of the X class students were arranged in the descending order and 27% of the lower scores were taken into consideration for item analysis. It also helped in measuring the extent to which high and low responses were different.

After the item analysis only 50 questions were selected for the final Reading Interest Inventory.
Scoring Process of Reading Interest Inventory

Scoring of the Reading Interest Inventory was done by using the key for each item. No response is correct or incorrect, but the replies have been given marks as 3, 2, 1; 3, 1, 2'; 2, 3, 1; 2, 1, 3 or 1, 2, 3 or as the case may be.

<table>
<thead>
<tr>
<th>Scoring Marks</th>
<th>Item Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>3, 2, 1</td>
<td>3, 4, 5, 6, 9, 11, 12, 13, 18, 23, 37, 38, 39, 41, 42, 43, 47</td>
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<tr>
<td>3, 1, 2</td>
<td>2, 16, 21, 29, 48, 49</td>
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<tr>
<td>2, 3, 1</td>
<td>7, 15, 17, 24, 25, 27, 32, 33, 45</td>
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<tr>
<td>2, 1, 3</td>
<td>30, 40, 46</td>
</tr>
<tr>
<td>1, 3, 2</td>
<td>1, 8, 19, 26, 31, 34, 35, 36, 50</td>
</tr>
<tr>
<td>1, 2, 3</td>
<td>10, 14, 20, 22, 28, 44</td>
</tr>
</tbody>
</table>

Internal Consistency of the Reading Interest Inventory

After finding the internal consistency of the Reading Interest Inventory, item Analysis of the Inventory was done the opinions of the subject experts were sought by selecting the items for Reading Interest Inventory and only those questions were kept in Reading Interest Inventory, which has 75% or above unanimity as suggested by Dr. Udai Pareikh in the year 1965.

Reading Interest Inventory Finalize

The final draft of the Reading Interest Inventory consisted of 50 statements of multiple choice. Each statement consisted of three choices. The Researcher prepared the final draft after editing and vetting of the Reading Interest Inventory. The total weight age of Reading Interest Inventory is of 150 marks for which the scoring key has been given in the scoring process.

Reliability of the Reading Interest Inventory

According to Hanery E Garret (1973), Statistics in Psychology and Education, The reliability of any test or measuring instrument depends upon the consistency with which it measures the ability when it is applied. The important characteristic of a tool is to measure accurately whatever it is made to measure.

The reliability of the test scores is represented by means of a reliability coefficient or it represents the standard error of measurement, which is derived from
it. The reliability of the Reading Interest Inventory here has been calculated by test-retest method. After a gap of three months and the same has found to be 72, which shows that the test inventory is quite reliable.

**Validity of the Reading Interest Inventory**

Validity means what the test measures and how well it does so. A test can be considered valid if it measures effectively the property for which it has been made to measure. The validity of the Reading Interest Inventory has been measured in the following ways:

1. **Face Validity of the Reading Interest Inventory**
   
   According to A Anastasy, “Differential Psychology”. Macmillan, New York in the year 1858 face validity means what the test appears to measure. Reading Interest Inventory test appears to have good face validity because it seems to be relevant to its objectives. This was the opinion expressed by the 20 experts in the field of Education, whose suggestions were sought by the Researcher for the Reading Interest Inventory.

2. **Content Validity Of The Reading Interest Inventory**
   
   The Reading Interest Inventory was systematically analysed to mixture that all the major aspects were adequately covered by the test and in the correct proportions. The analysis of the content of the concept of the teachers and the opinion of the 20 Educationists confirmed that the Reading Interest Inventory was logic and valid.

3.3 **STATISTICAL TECHNIQUES USED**

For analysis of data, it must be organized in a proper manner. In order to find out relationships of male and female secondary school teachers in adjustment, job stress, job satisfaction and job involvement, the coefficient of correlation techniques was used. In order to find out the significance of difference between the adjustment of secondary school teachers belonging to different categories of job stress, job involvement and job satisfaction of secondary school teachers, ‘t’ test technique was employed.

1. **Mean**

\[
\text{Mean} = \frac{\sum x}{N}
\]
Where
\[ \Sigma x = \text{Sum of scores} \]
\[ N = \text{Total number of items.} \]

2. **Standard Deviation**

\[ \text{S.D.} \sigma = \sqrt{\frac{\Sigma x^2}{N}} = \sqrt{\frac{\Sigma (X - M)^2}{N}} \]

Where
\[ X = \text{Individual Score} \]
\[ M = \text{Mean of the given set of scores} \]
\[ N = \text{Total number of scores} \]
\[ x = \text{Deviation of each score from mean} \]

3. **‘t’ test**

\[ \text{S.E.}_p = \sqrt{\frac{\sigma_1^2}{N_1} + \frac{\sigma_2^2}{N_2}} \]

Where
\[ \text{SE} = \text{Standard error} \]
\[ \sigma_1 = \text{Standard deviation of the first sample} \]
\[ \sigma_2 = \text{Standard deviation of the second sample} \]
\[ N_1 = \text{Size of first sample} \]
\[ N_2 = \text{Size of second sample} \]

4. **Correlation**

\[ r_{XY} = \frac{\Sigma xy}{N \sigma_x \sigma_y} \]

Where
\[ r = \text{Coefficient of correlation} \]
\[ r_{XY} = \text{Correlation between X and Y scores} \]
\[ x = \text{Deviation of any x-score from the mean in test x} \]
\[ y = \text{Deviation of any y-score from the mean in test y} \]
\[ \Sigma_{xy} = \text{Sum of all the products of deviation} \]
\[ \sigma_x = \text{Standard deviation of the distribution of scores in test } x \]
\[ \sigma_y = \text{Standard deviation of the distribution of scores in test } y \]
\[ N = \text{Total number of scores of frequencies.} \]