Chapter IV

Design And Methodology

The present research work was designed to study the effect of school background (independent variable (IV)) and educational level (IV) on the reasoning ability i.e. verbal and abstract [dependent variable (DV)] of the students.

For testing the hypotheses formulated in Chapter III, a 2x2 factorial design was employed.

Sample:

Initially a sample of 100 male students of 8th and 10th class of public and non-public (50 students each) school of Rohtak city, Haryana was randomly selected. But finally by matching them on the basis of mean and SD of IQ scores (i.e. 100±10) a sample of 60 students of 8th and 10th class of public and non-public school (30 each) was selected.
The present research work was designed in the following manner:

**SCHOOL BACKGROUND**

<table>
<thead>
<tr>
<th>Educational Level</th>
<th>Public</th>
<th>Non-Public</th>
</tr>
</thead>
<tbody>
<tr>
<td>8th</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10th</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tools Used:

**Intelligence Test:**

For measuring the intelligence of the students, Alexander's Pass Along Test was used. It was published in 1932 and can be used for children aged 7-18 years. It can be used for literate, illiterate, deaf and dumb children. The reliability of this test for boys is .87.

It comprises of four trays (one end of tray is red, the other is blue), 13 square/rectangular shaped blocks of red and blue colour and 9 cards of design.

**Differential Aptitude Tests : (DAT)**

The interest in measurement of intelligence which originated with the overall scientific advancement was further extended to the assessment of the aptitude through psychological tests.
The 'Differential Aptitude Tests' were originally prepared by Drs. G.K. Bennett, H.G. Seashore and A.G. Wesman, published by 'The Psychological Corporation' first in 1947. In the present research work Indian adaptation of this battery (Hindi Version) by J.M. Ojha published by Manasayan (1961) has been used. In the Indian edition, some minor changes were made without affecting the actual test content, to make the tests more suitable for Indian pupils. These were incorporated on the basis of certain studies and experiences of the test-users in India. It consists of 8 sub-tests such as verbal reasoning (VR), abstract reasoning (AR), space relations (SR), numerical ability (NA), clerical speed and accuracy (CSA), mechanical reasoning (MR), Language-usage-spelling and language usage grammar.

In the present research work, the investigator has chosen only two aptitude tests of DAT such as verbal and abstract reasoning tests to assess and compare the verbal and abstract reasoning of 8th and 10th graders of public and non-public school.

Verbal Reasoning is a test [Appendix A- (a)] of verbal comprehension and is a "measure of ability to
understand concepts framed in words." This test employs analogy type items in which two words, the first and the last, are to be filled in from the 5 pairs given as the alternate responses (in Form LH). The items are universal and have been drawn from different areas of knowledge e.g. geography, history, politics and science. The test consists of 50 such items each in the form of a sentence.

The analogy type of items is particularly useful as a measure of reasoning ability. The situation presented in this test brings into play complex intellectual (reasoning) processes. This type of item stimulates one to seek and to know further and to "educe relations" which is helpful in creating new mental content.

This test is thus designed to predict success in areas where complex verbal relationships and concepts are important. The time-limit for the test is 25 minutes. The reliability of this test is .81 and is studied by split-half technique corrected by Spearman-Brown prophecy formula.
It is highly correlated with school marks in Hindi, English, Mathematics and total marks. The fact that this test measures 'verbal intelligence' which plays an important role in scholastic achievement. The ability measured by this test is similar to the verbal factor of Thurstone.

For measuring the abstract reasoning of the students Abstract Reasoning Test of DAT [(Appendix A-1 (b)] was used. This is a non-verbal measure of the reasoning and scholastic ability.

In this test subject has to perceive relations and has to think in abstract symbols. Difficulty level as also the conceptual complexity increases gradually.

The test has fifty items, each consisting of 4 problem figures which depict a relation between the first four shapes and subject is asked to locate the correct shape from among the five given as 'answer figures' which will fit in as the fifth shape of the problem figures. This ability is an important one for general intelligence as well as also for vocations or school courses which demand such perception of relationships in symbols. The time limit is 35 minutes.
The reliability of this test is .90 and is studied by split half technique corrected by Spearman-Brown prophecy formula.

Public and Non-public School

In the present research work the reasoning ability of male students of 8th (aged 12-14 years) and 10th class (aged 15-17 years) of public and non-public school of Rohtak City, Haryana has been assessed and compared. Keeping in view the objectives of the study as well as the large size of the school population of Rohtak city; the present researcher attempted to choose a representative sample of all the public and non public schools of Rohtak city.

'University campus school'- a public school, has been randomly selected (On lottery system) from other public schools of Rohtak city. Public school means that school which has English medium and syllabus prescribed of Central Board of School Education.
'Jat Heroes Memorial' school-a non-public like public school has also been randomly selected. Non public school means that school which has Hindi medium and syllabus prescribed of Haryana Board of School Education.

The students of both schools have Hindi not English as their mother tongue. They have Hindi and English as the compulsory subjects. Both are co-educational schools.

**Procedure:**

In the present research work samples of public and nonpublic school of Rohtak city were randomly selected. Preliminary a sample of 100 male students of 8th and 10th class of both types of schools (50 each) was randomly selected. The tools used in the present research work were administered in two phases.

In the first phase all the students selected from 8th and 10th class of both university campus school (public) and Jat Heroes Memorial School (non public) were administered Alexander's Pass along test with the purpose of matching them on the basis of mean and SD of IQ scores.
In the first phase of data collection, the researcher having the required quantity of the material of Pass Along Test went to University Campus and Jat Heroes Memorial School.

Some time before the actual testing was done, the researcher discussed several problems which required the co-operation of the teachers of the above mentioned schools. Such problems included (1) The selection of a suitable testing place where a hall was generally preferred (2) suitable arrangements of the chairs and desks. (3) deciding about the teacher who would help the investigator. The students were instructed for intelligence test as follows.

"Dear Students! I would require you today to perform some interesting tasks, which will enable me to assess your intelligence. It comprises of four boxes and some blocks of red and blue colour. One side the box is red, the other is blue. I will place first card and will make the design in the tray with the help of blocks, just reverse to the design made in the card. And you have to make that design just like in the card only by moving the blocks not by lifting them. When I will
say ready then you have to start moving the blocks and with the word stop you have to stop moving the blocks. First I will demonstrate the whole procedure for the first card in front of you. Time is limited for each design. You should do as early as possible.

After giving the instructions and clearing the doubts rapport was established with the students. The researcher placed the first card and made the design just reverse to the design printed on the card and with saying ready, stop watch was on. The subject by moving the blocks, made the design just as it was in the card. The investigator stopped the watch and time was noted down. In case the subject failed to make the design within limited time the investigator demonstrated that design and subject was asked to proceed with next design. Failure in two successive designs means complete failure and demonstration of test was stopped. In this way the same procedure was adopted for measuring the intelligence of all the students. After Collecting the data and keeping in view the purpose of the study the students obtaining IQ scores between 90-110 were included and others were excluded. Thus out of 100
students, finally a sample of 60 students of 8th and 10th class (30 each) of public and non-public school was selected.

In the 2nd phase of the data collection these 60 students were administered the remaining tools i.e. Verbal and Abstract Reasoning Tests. The researcher after having the required copies of material of Verbal and Abstract Reasoning Tests, again went to those schools. The students which were earlier selected and matched on the basis of IQ were administered Verbal Reasoning Test with the following instructions.

"Dear Students! Again I have come today to assess your reasoning ability. I would give you all 2 forms (LH) and answer sheets. In the first form (LH) printed as Verbal Reasoning Test there are 50 items. Each item is an analogy statement in which two pairs of words are given having identical relationship. The first word of first pair and the last word of the last pair are not given but are to be found out from one of the given alternatives (with pair of words). And you should put cross (x) in the answer sheet against one of the given alternatives in which you would find both words correct
for your answer. There is a time limit of 25 minutes. After giving the instructions with saying ready the stopwatch was on and subjects stated to the work. After 25 minutes the forms and answer sheets from all the students were collected.

In this manner the Abstract Reasoning Test was also administered in those 60 students. They were instructed as follows. "This test has fifty items, each consisting of four problem figures which depict a relation between the first four shapes and you have to locate the correct shape from among the five given transfer figures which will fit in as the fifth shape of the problem figures. The time limit is 35 minutes." After giving the instructions, the subjects did their work. After 35 minutes the forms and answer sheets were collected. Then the data were collected by using scoring keys and thus one mark was given for each correct answer in both the tests. After collecting the raw data it were subjected to statistical analysis.

We may now pass on to the next chapter dealing with the result and discussion.