CHAPTER - III

METHODOLOGY
In planning a study the investigator attempts to select the method or methods most appropriate to the particular problem under consideration. The quality of research depends not only on the adequacy of the research design but also on the fruitfulness of the measurement procedures employed. In this chapter the investigator dealt with the design and the procedure of the study.

**SAMPLE**

The investigator adopted the following selection criteria for the sample of the present investigation:

a) All the U.P. Government aided Intermediate Colleges/High Schools of the selected city would be represented in the sample.

b) The subjects would belong to the age group of 13 to 15 years, studying in VIII class of the selected schools.

c) The size of the sample would be restricted to 250 students.

d) The sample would consist of an equal number of boys and girls.

e) The subjects would belong to middle economic status and one of the parents would be at least graduate.

Keeping in view of the above criteria the method of sample for the present investigation was stratified random sampling. It consisted of 125 boys and 125 girls, ages between 13 to 15 years and studying in VIII class of various Intermediate Colleges/High Schools of Agra city, one of their parents was at least graduate belonging to middle economic status.

**TOOLS**

The appropriate tools for the problem under investigation were selected after careful review of the related literature.

**Parental Inducement of Academic Self-Regulation Questionnaire (PIASR):**

This scale was developed by Martinez-Pons in 1996. The scale consists of 20 items, 5 items for each of the four subscales, i.e., Modeling, Encouragement, Facilitation and Rewarding.
For the parental modeling, the question posed was “How true of your parents are the following things”. The response scale for these items ranged from 1 (not at all true) to 5 (completely true).

For the parental encouragement items, the question posed was, “Sometimes students have trouble doing any of the following things when a task seems too hard or unfamiliar, whenever this happens to you how much do your parents reassure you to encourage you to not give up trying?” The response scale for these items ranged from 1 (not at all) to 5 (a great deal). For parental facilitation, guiding was used as the target for assessment and the question posed was “How involved are your parents in doing the following things?” The response scale for these items ranged from 1 (not at all involved) to 5 (greatly involved).

The same question and response format were used for the parental rewarding items (Appendix - II).

The internal consistency reliability of the Parental Inducement of Academic Self-Regulation Questionnaire was calculated separately for each parent. For the mother related items $\alpha = .80$, for the father related items $\alpha = .90$ were obtained. Construct validity coefficients of the subscales ranged from .57 to .79.

**Goal Orientation Questionnaire:**

A 16 items questionnaire (8 items for learning goal orientation and 8 items for performance goal orientation) aimed at assessing students’ orientation toward the goal, the items for this questionnaire were pooled from the scales of Seifert (1995), Bouffard et al. (1995), Button, Mathieu, and Zajac (1996), and Nicholls, Patashnick, and Nalen (1985). The questionnaire is administered without a time limit. Each item of the questionnaire can be responded along the five point rating scale from completely disagree (score - 1) to completely agree (score - 5), (Appendix - III).

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Scales</th>
<th>Items No.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Learning goal orientation</td>
<td>1, 2, 5, 8, 10, 11, 12, 16</td>
<td>8</td>
</tr>
<tr>
<td>2.</td>
<td>Performance goal orientation</td>
<td>3, 4, 6, 7, 9, 13, 14, 15</td>
<td>8</td>
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Cronbach alpha coefficients calculated by the present investigator were .84 and .86 respectively for learning and performance goal orientation subscales. Test-retest reliability coefficients of correlation were .87 and .81 (p<.001) respectively for the learning and performance subscales.

**State Metacognitive Inventory:**

This inventory was developed by O’Neil and Abedi in 1996. The inventory consisted of 20 items, five items for each of the four subscales i.e. (I) Planning (ii) Self-checking (iii) Cognitive strategy (iv) Awareness. Two different versions of the inventory were prepared by O’Neil and Abedi (1996). For the 12th grade students, they used all four sub-scales of the inventory. For the 8th grade students, a version with two subscales was used: Cognitive strategy and Self-checking. In this inventory, the scoring is to be done as — (1) Not at all, (2) Somewhat, (3) Moderately so, (4) Very much so. The inventory is administered without a time limit (Appendix - IV).

<table>
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<th>Items No.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Cognitive strategy</td>
<td>1, 3, 5, 7, 9</td>
<td>5</td>
</tr>
<tr>
<td>2.</td>
<td>Self-checking</td>
<td>2, 4, 6, 8, 10</td>
<td>5</td>
</tr>
</tbody>
</table>

A single, total metacognition score is to be generated. The alpha coefficients for the subscales were .61 for cognitive strategy and .64 for self-checking. Factor analysis indicated that these subscales are reasonably reliable (alpha above .60) and unidimensional (no subscale has more than one factor). Construct validity was found to be satisfactory.

All these scales were translated in Hindi and the psychometric analysis was done before its final use. First of all, the questionnaires were translated into Hindi language by two experts who had the knowledge of both languages i.e., Hindi and English and had mastery in psychology subject also. Then the Hindi version of questionnaires were administered to a small sample of students (N=20) who knew both languages properly. After fifteen days, the English
versions of the questionnaires were administered to the same sample. After that, scoring was done for both the versions of questionnaires. Then correlation coefficients were calculated between the scores of Hindi and English versions of questionnaires. The values were found to be .90 for Goal Orientation Questionnaire and .92 for Parental Inducement of Academic Self-Regulation Questionnaire and .93 for State Metacognitive Inventory.

**Academic achievement tests:**

To measure the academic achievement the investigator used three tests viz., Hindi, Mathematics and Science achievement test. It is because of the fact that the aim of scholastic achievement is to develop reasoning, thinking and language skill in the child. Although one Mathematics achievement test in Hindi language was available (Dubey, 1990) but was standardized for students of Madhya Pradesh. It was found that Uttar Pradesh Board’s syllabus was different from that of Madhya Pradesh Board. As no other test was available/suitable for U.P. Board syllabus, it was decided to construct the test to serve the purpose. Similarly, achievement test on Science subject was also not available in Hindi language for class VIII students, hence the investigator decided to construct the Science achievement test also. The details of test construction are given in chapter-IV.

Hindi achievement test developed by Dubey (1990) was found to be suitable for the present purpose hence it was used as it is.

(i). **Hindi Achievement Test:**

This test was developed by Dubey in 1990. The test has been standardized over a representative population of 1860 pupils of the VIII class, age range was from 13 years to 15 years. There were five sections. The time limit for every section was different i.e.: Section (1) 5 minutes, Section (2) 5 minutes, Section (3) 6 minutes, Section (4) 7 minutes, Section (5) 7 minutes. Total time limit was 30 minutes (Appendix - V).

Every correct answer is to be given one mark. Total marks are 100. Each section consisted of 20 items.
Reliability of the test is .78 (Spearman Brown method). Validity of the test is .67 (correlation with annual examination marks).

(ii). Mathematics Achievement Test:

This test was constructed by the investigator herself for the present study. Textbook of the VIII class was taken as a base for the item selection. The entire procedure for the test construction has been discussed in chapter-IV. The final test consisted of 50 items. The test has been standardized over a representative sample of 300 students of VIII class, age range was from 13 to 15 years. The testees were told to fill this test carefully. The time limit was 60 minutes. The reliability coefficients of the test were found to be: (1) split half reliability .84, (2) test-retest reliability .78. The validity coefficient of the test was found to be .71 (correlation with annual examination marks).

(iii). Science Achievement Test:

This test was also designed by the investigator to measure knowledge and understanding in Science subject. The test has been standardized over a representative sample of 300 students of VIII class, age range was from 13 to 15 years. The time limit for the test was 60 minutes. There are 50 items. Every correct answer is to be given one mark. The entire procedure for the test construction has been discussed in chapter-IV.

Reliability of the test is .78 (split half-reliability) and .75 (test-retest reliability). Validity of the test is .73 (correlation with annual examination marks).

Interviews:

In the present study the researcher conducted interviews of the selected extreme subjects. Semi-structured interviews were conducted on parents, teachers, friends and the subjects themselves to explore the greater knowledge of the personality characteristics and home environment of the subjects (Appendix-XIV).
DESIGN

To study the relationship between goal-orientation, parental SR inducement, metacognitive skills and academic achievement scores, correlational design was used.

VARIABLES

There were four variables—

1. Goal Orientation:
   (A) Learning goal orientation
   (B) Performance goal orientation


3. Metacognitive skills.

4. Academic Achievement:
   (A) Hindi test scores
   (B) Mathematics test scores
   (C) Science test scores
   (D) Total academic achievement test scores.

Control Variables:

Age, sex, type of institution, parental education, and economic status were the control variables.

PROCEDURE

To administer the test on the subjects (both boys and girls), the investigator obtained prior approval of the concerned Heads of the institutions and fixed up date and time. The class teachers were also approached for necessary co-operation in proper administration of the tests. The teachers were requested to ask the children to get the personal data sheets (Appendix - I) filled in by their parents. On the basis of the information collected the elements for the sample were randomly selected, conforming to the criteria. Prior from the start of the final examination, when the course was completed by the course teacher, then the dates for Hindi, Mathematics, Science test were fixed. The data collection phase was divided into four sessions on two separate days.
During the first session of first day all the students were contacted in a class at a scheduled date and time and they were explained the purpose of the study. The investigator, before administering the questionnaire, made sure, that there was enough comfortable seating arrangement for the students while filling the test proforma accurately.

At the outset, the subjects were assured, that it was not an examination. Special care was taken to keep uniformity in giving instructions and in administering the tests.

The parental inducement of academic self-regulation questionnaire (PIASR) was administered to the sample. The respondents were reminded that there are no right or wrong answers to the items. They were, therefore, encouraged to respond without hesitation the way they really felt, not the way they might (have) liked their parents to be. The goal orientation questionnaire was also administered on the same subjects after obtaining their response to the PIASR questionnaire.

During the second session on first day when the students met again on the day and time, Hindi achievement test (HAT) was administered on the same group with the instructions that you can keep on doing the assigned work up to 30 minutes. After 30 minutes, the test sheets were collected.

During the first session on second day they were administered Mathematics achievement test. The investigator instructed them that you can keep on doing the assigned work up to 60 minutes. There are five sections and a total of 50 items. After 60 minutes, the test sheets were collected and instructed them to meet again after 60 minutes break.

During the second session on second day The Science achievement test was administered to them. 60 minutes were given for this test. After 60 minutes the test sheets were collected. Again they were given the state metacognitive inventory. After ensuring that the students had filled all the items of inventory the investigator collected the sheets and thanked the subjects for their co-operation.
The researcher selected 10 extreme subjects (5 high achievers and 5 low achievers) on the basis of total academic test scores, to highlight the fact that the academic achievement was directly related to the parental inducement of academic self-regulation; learning and performance goal orientation and metacognitive skills, and other related family variables.

The next chapter embodies the steps used for constructing the tests of mathematics and science achievement.