Chapter III
METHODOLOGY

In this chapter selection of subjects, collection of data, and statistical procedures adopted have been explained.

Current educational approaches generally focus on logical-mathematical and linguistic skills. Intellectual capacity like bodily-kinesthetic intelligence of this study was an examination of the relationship between academic achievement and motor abilities. While there is increasing concern regarding the efficiency of our educational system, inadequate financial resources have limited the focus of programs which address individual differences in intelligence (ability). Instruction and assessment in the classroom focus on logical-mathematical and linguistic abilities. Teaching techniques such as lecturing and worksheets are easily comprehended by children with these abilities (intelligence). Paper-and-pencil measures, such as achievement tests, are primarily reflective of logical-mathematical and linguistic abilities. Therefore, children who do not have high levels of logical-mathematical and linguistic abilities are more likely to struggle with achievement tests and not do well in the classroom. It is possible that low achievers may have high learning potential if explored through abilities.

Selection of Tests

The study was under taken to analyze the academic achievement and bodily-kinesthetic intelligence of schoolchildren. Bodily-kinesthetic intelligence of
boys and girls were tested with the help of Barrow motor ability test and Scott motor ability test respectively (Margaret, 1990). Pramila group test of intelligence was used to test the general intelligence of the students (Pramila, 2003). Averages of the marks obtained for the core subjects in the terminal examinations were considered as index of academic achievement.

**Selection of Subjects**

For the purpose of this study a random sample of 2004 (1002 boys & 1002 girls) students at the age of 13 years, representing three districts of Kerala, that is Idukki, Kottayam and Eranakulam were taken as samples. The sample size for each district was further limited to 668 (334 boys and 334 for girls). From three districts the following schools were chosen randomly.

1. St. Aloysius Boys Higher Secondary School Kottayam
2. St. Mary’s Girls Higher Secondary School Kottayam
3. Excelsior Higher Secondary School Kottayam
4. Holy family Higher Secondary School Kottayam
5. Govt. Higher Secondary School Kottayam
6. SVGP Higher Secondary School Kottayam
7. Nirmala Higher Secondary School Eranakulam
8. Sacred Heart Higher Secondary School Eranakulam
9. SNDP Higher Secondary School Eranakulam


15. Sacred Heart Girls Higher Secondary School Idukki

16. St. Augustine Higher Secondary School Idukki

17. Govt. Higher Secondary School Idukki

Before the test was administered to the students in each school, permission from the concerned authorities of the schools were obtained. The dates were fixed and Subjects were asked to assemble in the space provided by the concerned schools and given necessary instructions for marking the answers. The examiner had taken the test herself before giving it to students, and also gave the test to a control group. To conduct the intelligence test the researcher sought the assistance of a psychology graduate. For every test, one page was devoted for instructions and practice examples. Time limit for each sub-test was administered strictly. Pupils were asked to use the pencils. They were not allowed to open the booklet until the examiner asked them to do so. After that, the directions were given and was confirmed that they had been understood by the pupils and asked them to clear their doubts. Background
information about the students was also collected with the aid of a self-made questionnaire with yes/no answers.

**Description of the Intelligence Test**

Pramila group test of intelligence was used to assess general intelligence of schoolchildren. In the questionnaire there are seven sub tests in the test booklet. The first one is a practice test containing 10 very easy items. The performance in the practice test is not to be taken into account. This fact was not revealed to the students’. The remaining six sub-tests from 1 to 7 are the tests proper. For every test, one page has been devoted for instructions and practice examples. Directions for taking the test are printed on the test booklet. Answers were to be marked on the separate answer sheet provided.

While undergoing the test students can indicate, the right answers by marking (x) in the space corresponding to the correct answer in the separate “answer sheet” provided. If the student at any time made a mistake, they were asked to put a circle around the cross and mark the correct answer space. When tests began, students were not allowed to ask any doubts. They were instructed, when to begin and when to stop the test. Here one question from the questionnaire.

**Test 1**

*(Time: 3 minutes)*

**Test Problems**

1. O-S-M-E-U

   A. Mouse  B. Usage  C. Enemy  D. Ounce  E. Sound
These letters are to be arranged in such a way that a sensible word is formed. Look at the five possible answers which are at A, B, C, D and E. The correct answer is at A. On the answer sheet in the space meant for TEST 1. Put a cross and mark the answer A.

Table 3.1
Number of items and time limit for each sub-test

<table>
<thead>
<tr>
<th>Sub-test</th>
<th>Number of items</th>
<th>Time-limit</th>
<th>Remarks (if any)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Scrambled words</td>
<td>10</td>
<td>3 minutes</td>
<td></td>
</tr>
<tr>
<td>2. Analogies</td>
<td>16</td>
<td>3 minutes</td>
<td></td>
</tr>
<tr>
<td>3. Classification</td>
<td>16</td>
<td>3 minutes</td>
<td></td>
</tr>
<tr>
<td>4. Disarranged sentences</td>
<td>10</td>
<td>3 minutes</td>
<td></td>
</tr>
<tr>
<td>5. Same-opposite</td>
<td>26</td>
<td>5 minutes</td>
<td>Practice test</td>
</tr>
<tr>
<td>6. Series</td>
<td>16</td>
<td>5 minutes</td>
<td></td>
</tr>
<tr>
<td>7. Best answers</td>
<td>16</td>
<td>3 minutes</td>
<td></td>
</tr>
<tr>
<td>(Including test 1)</td>
<td>Total 110</td>
<td>25 minutes</td>
<td></td>
</tr>
</tbody>
</table>

Table 3.2
The Reliability Coefficient by the Split-Half method

\[ r = .943 \pm .005 \ (N = 543) \]

Table 3.3
Validity Coefficient with examination marks

\[ r = .494 \pm .042 \ (N = 371) \]
Academic Achievement

Averages of the marks obtained in the terminal examinations were considered as index of academic achievement. Core subjects (English, Hindi, Malayalam, Mathematics, Science, Social Studies) were only taken into consideration.

Bodily-kinesthetic intelligence (ability) of the boys and girls were tested with the help of Barrow Motor Ability Test and Scott Motor Ability Test respectively. Background information’s were collected through questionnaires.

Barrow Motor Ability Test

The Barrow Motor Ability Test consisting of three items designed to test the motor ability of high school boys.

Test – I Standing Long Jump

The standing Long Jump Test, used as a measure of explosive leg power.

In the standing long jump test the student stands behind the restraining line, with feet several inches apart and the toes pointed straight ahead. The student should swing the arms forward, extend the knees, and jump forward as far possible.

The test-retest reliability is 0.895 and the objectivity (comparing the two scores) is 0.996.

The validity based on a comparison with the composite of 29 tests, is 0.759.
Test 2 – Zigzag Run

Test Objective to measure agility.

The examinee assumes a ready position (standing) at the starting point. On the signal Ready, Go! He runs the course in the designated manner as fast as possible. The cones should not be touched throughout the run. The examinee continues to run the course for a total of three times. As the finish line is crossed at the end of the first circuit, the timer stops the stop watch. The score is the time recorded to the nearest tenth of a second. If the cones are moved during the run, the trial is re-taken.

Test Area Floor area 30 feet by 50 feet. Equipment stopwatch, five traffic cones, floor tape, and score cards.

Validity: Test Validity is 0.736

Reliability: Test–re-test reliability is 0.795

Before the test, procedure was demonstrated and the examinee allowed jogging through the course.

Test 3 – Medicine Ball Put

Test objective to measure arm and shoulder girdle strength. The examinee is required to put a 6-pound medicine ball as far as possible.

For the medicine ball put, the examinee between two restraining lines 15 feet apart. The medicine ball is held in one hand, close to the point where the shoulder joints the neck. The ball is thrust outward as far as possible. If the
subject steps on or over the restraining line during or after the put the trial is no scores. Three trials are taken. The score is the best of three throws recorded to the nearest foot.

Tests are floor 90 feet by 25 feet.

Validity of the test is 0.736.

Reliability of the test-retest is 0.893 and the objectivity for two scores is 0.997.

Scott Motor Ability Test

Test 1 – Long Jump

The standing Long Jump Test, used as a measure of explosive leg power.

In the standing long jump test the student stands behind the restraining line, with feet several inches apart and the toes pointed straight ahead. The student should swing the arms forward, extend the knees, and jump forward as far possible.

The test-retest reliability is 0.91.

The validity coefficients 0.78

Test 2 – Obstacle Race

Test objective is to measure speed, agility, and general body coordination.

Description, the examinee assumes a back-lying position with heels just behind the starting line. On signal Ready, Go! She gets up quickly and begins.
Moving through the obstacle course examinee runs to the first square and steps on the square with both feet. The same protocol is followed with the next two squares. Examinee then runs to the jump stand, circle it twice and races to the crossbar, attempting not to touch it, gets up, and runs to the end line as quickly as possible, touching this line with hand and runs back to the other side-and to the end line again, each time touching the line with hand. Then races across the end line to complete the test sore is the time required to complete the course.

Test area, 60 feet by 30 feet

Validity coefficient 0.65

Reliability – Test re-test reliability 0.91

Test 3- Basket ball throw

Test Objective, to measure arm and shoulder girdle strength and coordination.

Description, the examinee stands behind the restraining line and throws the basket ball as far as possible. Any type of throw may be used. Three trials are taken. If the subject steps on or over the restraining line during or after the throw, the trial is not scored. The trial score is the distance recorded to the nearest foot. The test score is the best of the three trials. Demonstration of the basket ball throw is not permitted.

Test area, floor area 80 feet by 20 feet.

Validity, test validity is 0.79.
Reliability estimate is 0.89.

**Statistical tools**

The following statistical tools were adopted in this study to evaluate the hypothesis framed. To test the significance of correlation coefficient t-test was carried out. t-test was used for testing whether the variables differed with respect to syllabus and gender. One-way analysis of variance was employed to test whether the variables differed with respect to region. Bodily-kinesthetic intelligence scores of low academic achievers and high academic achievers were compared using t-test and illustrated using graphs. A regression line of bodily-kinesthetic intelligence on academic achievement and intelligence quotient was estimated. A chi-square test of independence was also carried out to study the association of bodily-kinesthetic intelligence with respect to gender, syllabus and districts.