Chapter III

PROCEDURE

In this chapter, the research scholar has been described about the Selection of Subjects, Selection of Variables, Selection of Tests, Reliability of Data, Administration of Test and Collection of Data and Statistical Analysis of Data.

Selection of Subjects

Thirty boys and thirty girls of each category namely normal, hearing impaired and visually impaired students respectively, were chosen randomly from both general and special schools in the districts of Kolkata, Howrah, Purba Medinipur, Paschim Medinipur, Purulia, North 24 Parganas, South 24 Parganas ctc. for the present study. The age of the subjects ranged from 13 years to 17 years as per school records.

Selection of Variables

In order to assess this study, the following variables were selected: -

1) Sensory Ability
   a) Visual Response
   b) Auditory Response

2) Motor Ability
   a) Power
   b) Arm-shoulder coordination
c) Agility

d) Hand-eye co-ordination

e) Strength

f) Speed

3) Kinesthetic Perception

**Selection of Tests**

To conduct this study, the investigator tested each subject for measuring the sensory ability, motor ability and kinesthetic perception.

**Sensory ability test:**

In the present study, the investigator measured the sensory ability by Snellen's Chart (to measure visual response) Pure - Tone Audiometry Test (to measure auditory response).

**Motor ability test**

The research scholar in his present study, used Barrow Motor Ability Test for the measurement of the motor ability with proper improvisations.

**Kinesthetic Perception test**

During measuring the kinaesthetic perception, the research scholar conducted Distance Perception Jump Test with proper improvisations.
Reliability of Data

The reliability of data was ensured by establishing the tester competency and reliability of tests, subjects and instruments.

Tester's Competency and Reliability of Tests

To ensure that the investigator was well acquainted with the technique for conducting the tests with assistants, who were also acquainted with the testing procedure.

The tester's competency was evaluated together with the reliability of tests. The reliability of different tests were described below:

The investigator used the Snellen's chart to measure visual response and Pure – tone Audiometry test to measure auditory response which are the internationally accepted method and hence regarded as reliable.

Using the test-retest method, reliability for each test item was computed. Objectivity was also established by having two persons score each subject on each item. The test item, the motor ability factor it represents, reliability coefficient objectivity coefficient and the correlation of that item with the criterion are represented below: -
<table>
<thead>
<tr>
<th>Test Item</th>
<th>factor</th>
<th>Reliability</th>
<th>Objectivity</th>
<th>Correlation with Criterion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standing broad</td>
<td>Power</td>
<td>0.895</td>
<td>0.996</td>
<td>0.759</td>
</tr>
<tr>
<td>Jump</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Softball throw</td>
<td>Arm-shoulder coordination</td>
<td>0.928</td>
<td>0.997</td>
<td>0.761</td>
</tr>
<tr>
<td>Zigzag run</td>
<td>Agility</td>
<td>0.795</td>
<td>0.996</td>
<td>0.736</td>
</tr>
<tr>
<td>Wall pass</td>
<td>Hand-eye coordination</td>
<td>0.791</td>
<td>0.950</td>
<td>0.761</td>
</tr>
<tr>
<td>Medicine ball put</td>
<td>Strength</td>
<td>0.893</td>
<td>0.997</td>
<td>0.736</td>
</tr>
<tr>
<td>60 yard dash</td>
<td>Speed</td>
<td>0.828</td>
<td>0.997</td>
<td>0.723</td>
</tr>
</tbody>
</table>

Reliability of Kinesthetic perception was increased with increased with increased trials. A coefficient of 0.54 was obtained with seventh and eighth grade boys on test-retest using the total of two trials as the score. A coefficient of 0.61 was found with seventh and eighth grade boys using the total of ten trials as the score.

**Reliability of Subjects**

The test – retest method was also used to determine the subject’s reliability. Tests were administered on the same subjects under similar conditions by the same tester. No motivational technique was used nor was any training given.
Reliability of Instruments

Hearing response was measured by Audiometer, Model no. M. K. 500 manufactured by a reputed concern, Arphy Co., of Bombay, India. The responses recorded through that machine were regarded as reliable. Stop watches, manufactured by Racer Co. of India were used to measure the exact time required for zigzag run, sixty yard dash etc. tests. Before commencement of the tests, the watches were synchronised and found time to its purpose. Thus the time was recorded on those watches regarded as reliable.

Measuring tape, manufactured by Freeman Co. of India was used to measure the exact distance of standing broad jump, soft ball throw, medicine ball put etc. tests and also the distance of zigzag run and sixty yard dash. The distances were recorded on measuring tape, regarded as reliable. Whistle, blind fold, soft ball, medicine ball etc. were also used during administration of the tests, manufactured by reputed companies to make the data more reliable.

Administration of Test and Collection of Data

In this study, the investigator conducted the practical tests individually and separately under adequate improvisation so that the subjects could perform it with a good manner and the other subjects could see while one of the subjects was performing.
Sensory ability test

In the present study, sensory ability test includes vision test and auditory test.

Vision test

Snellen’s chart is used for the purpose of testing the vision. This method is called as ‘Trial and Error’ Method. It contains letters in seven rows. The letters are of diminishing sizes. The first line is 9 cm. in size. In second row, the letters are 5.5 cm. and 4.5 cm., 3.5 cm., 2.5 cm., 1.5 cm., 0.5 cm. etc. in 3rd, 4th, 5th, 6th, 7th rows respectively.

The subject was asked to sit on a tool or chair 6 ft away from the chart for longer sight and then asked to read the letters of different rows. If a subject was able to see the letters clearly upon the 6th row, then his vision was regarded as quite normal.

For short sight, the chart was held at 18 inches away from the eyes and at an inclination of 45°. Here again the subject was asked to read the letter of different rows and the same fashion was determined¹.

Auditory test

Pure Tone Audiometry test was used for determining the level of hearing of a subject. Any loss of hearing was noticed through an audiometric machine. This test was regarded as high reliable and valid. It was applicable to both sexes and to all ages.

For conducting the test, audiometer was manufactured by good concerned, was used. The test was conducted in a sound proof chamber.

The subjects were seated on a tool inside the sound proof chamber, placing the hands on the table. The tester sent the signals through the audiometer of different frequencies (250 Hz, 500 Hz, 1000 Hz, 1500 Hz, 2000 Hz, etc.) and was received by the subjects through a headphone, attached to the audiometer. The subjects taped, as instructed, on the table when a signal was received by his or her ear.

Hearing loss was measured in terms decibels loss. Degree of hearing loss was classified as normal-less than 25 decibel loss, mild - 25 to 50 decibel loss, moderate - 51 to 70 decibel loss and severe -71 to 90 decibel loss and Profound - above 90 decibel loss².

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FIG 3.2 AUDIOMETER
Motor Ability Test

Barrow Motor Ability Test\(^3\) was used for this purpose.

Objective: - To measure motor ability for purposes of classification, guidance and achievement.

Equipment and Materials

The equipment and space needed for the six items are as follows:

a) **Standing Broad Jump:** - A mat 5 by 12 feet and a measuring tape if the mat is not marked off.

b) **Softball throw:** - Several 12 inch inseam softballs, a target area of about 100 yards. A football field marked off in 5 yard intervals is ideal for this test.

c) **Zigzag run:** - Stop watch, five standards or obstacles, and space enough to accommodate the sixteen by ten feet course.

d) **Wall pass:** - Regulation basket ball, stop watch, wall space.

e) **Medicine ball put:** - Space approximately 90 by 20 feet and tape measure.

f) **60 yard dash:** - stop watch, whistle, and smooth surface at least 80 yards long with start and finish line.

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Administration of Test

i) Standing Broad Jump: -

**Directions** - With the feet parallel to each other and behind the starting mark, the performer bends the knees and swings the arms and jumps as far forward as possible.

**Scoring** – The number of inches between the starting line and the nearest heel upon landing is the score. Three trials are permitted, and then the best trial is recorded as the score.

**Additional pointers** – (a) If the performer falls backward upon landing, the measurement is made between the starting line and the nearest part of the body touching the landing surface. (b) The jump should be practiced until the movement can be executed correctly, since validity and reliability can be improved thereby.
FIG 3.3 STANDING BROAD JUMP IN BARROW MOTOR ABILITY TEST
ii) Softball throw

**Directions** – The subject is allowed three trials in which he attempts to throw the soft ball as far as possible. A short run is allowed, but the subject must not over the restraining line.

**Scoring** – The best trial is recorded as the score.

**Safety** – Students who are assisting with marking and measuring of the throws must be warned to keep their eyes on the ball when it is thrown. The subject should not be allowed to throw until the field is clear. Adequate warm up should be provided.

**Additional pointers** – (a) Student helper can be utilised effectively in marking each throw, measuring and retrieving the balls. If a foot ball field is used, markers can be prepared, reading in feet and placed at each five yards line. (b) One of the student helpers should be assigned to immediately run and stands at the spot at which the ball lands while another brings the subject's marker. A decision can then be made whether the subject has a better throw. (c) Measuring from the nearest five yard line facilitates the process as opposed to the use of a tape measure from the point of throw.
FIG 3.4 SOFT BALL THROW IN BARROW MOTOR ABILITY TEST
iii) Zigzag run

**Directions** – The student begins from a standing start on the command to go. He runs the prescribed pattern shown to him as quickly as he can without gasping or moving the standards. Three complete circuits are run. The stopwatch are started when the command to go is given and stopped when the subject crosses the finish line.

**Scoring** – The elapsed time to the nearest tenth of a second is recorded. If the student should grasp or move a standard, run the wrong pattern, or otherwise fail to follow the direction, he should run again after a suitable rest period.

**Safety** – The subject should wear proper fitting shoes with good traction to avoid blisters and slipping. Other students should be kept well away from the perimeter of the obstacle course and especially, away from the finishing area. Sufficient warm-up should be allowed.

**Additional pointers** – (a) The instructor should demonstrate the pattern of the course and stress the point that three complete circuits are to be made. (b) The students should be allowed to jog through the course. (c) If any students relieves he can improve his score he should be given another trial after he has rested.
FIG 3.5 ZIG ZAG RUN IN BARROW MOTOR ABILITY TEST
Wall pass

Directions – The subject stands behind a restraining line that is drawn 9 feet from the wall. On the signal to begin he passes the ball against the wall in any manner he chooses. He attempts to catch the rebound and pass it again as many times as possible for fifteen seconds. For the pass to be legal, both of the subject's feet must remain behind the restraining line. If he should lose control of the ball, he must retrieve it and return to the line and continue passing.

Scoring – The score is the number of times the ball hits the wall in the 15 sec.

Safety – There are no special safety measure with the test.

Additional pointers – (a) The teacher should consider the possible variations in the cases where a subject loses control of the ball. He may wish to standardize the distance behind the subject by having the students line up to block the ball, or have a wall of rolled mats etc. (b) The teacher should the fact that the subject must maintain control of the ball and that he would not be thrown a new ball if he missed the rebound.
FIG 3.6 WALL PASS IN BARROW MOTOR ABILITY TEST
v) **Medicine ball put**

**Directions** – The subject stands between two restraining lines which are 16 feet apart. He then attempts to propel the medicine ball out as far as possible without stepping on or over the restraining line. He should hold the ball at the junction of the neck and shoulder and thrust it away from his body at an angle of approximate 45 degrees. He is given three throws.

**Scoring** – The best of three throws is recorded. The distance is computed to the nearest foot. A throw in which the subject commits a foul is not scored. However, if all three trials are fouls, he should try until he makes a fair put.

**Additional pointers** – (a) Two students are needed at all times to assist in the marking and measuring the throws. It is helpful also have a student assigned to retrieve the ball. One student quickly run to the exact spot where the ball lands while another comes to mark (or measure) it. (b) Any of several plans could be followed in measuring the individual throws. Since the test is conducted on the gymnasium floor, small piece of tape could be used to quickly mark each of three trials. (c) Another approach is to leave the tape stretch out from restraining line and then measure each throw. One disadvantage to this method is that each throw must be recorded unless; of course the succeeding throw(s) is not as far. The tape should not swing in an arc in order to be sure that the distance from the point of the throw to the spot of landing is obtained. (d) Still another method is to have arcs marked on the floor 5 to 10 feet apart. In this way the measuring tape would not have to be as long, and it may facilitate testing.
FIG 3.7 MEDICINE BALL TEST IN BARROW MOTOR ABILITY TEST
vi) 60 yard dash

**Directions** – The subject starts from a standing position on the signal to go and run as rapidly as possible to the finish line. One trial is given.

**Scoring** – The score is recorded in sec. to the nearest tenth of a second. The time begins when command "go" is given. In 60 yards there should be no appreciable time lag due to the relative speed of sound versus the speed of light.

**Safety** – The most important safety precaution has to do with pulled muscles. The teacher should make it a point to provide a thorough warm up. The other safety measures Concern foot ware, Running surface and adequate space beyond the finish line.

**Additional pointers** – (a) The timer should stationed parallel to the finish line to make sure that he obtains an accurate score. (b) The starter should standardize the preparatory commands such as "on your mark," "set," "go." If an arm signal is employed for starting, the movement of the arm must be practised to synchronize it with verbal command to "go."

**Scoring for Total Battery:** - A regression equation utilizing weighted standard scores is provided to determine the total General Motor Ability Test Score (GMAS).

The equation as follows: -

\[
\text{GMAS} = 2.2 \text{ (standing broad jump)} + 1.6 \text{ (soft ball throw)} + 1.6 \text{ (zigzag run)} + 1.3 \text{ (wall pass)} + 1.2 \text{ (medicine ball put)} + 60 \text{ yard dash}
\]
FIG 3.8/60 YARD DASH IN BARROW MOTOR ABILITY TEST
**Kinesthetic perception test**

Kinesthetic perception was measured by Distance Perception Jump test\(^4\).

**Objective:** - To measure the ability to perceive distance by concentrating on the effort involved in a jump.

**Equipment and Materials:** - Yardstick or measuring tape, blindfold and chalk.

**Directions:** - The performer was instructed to sense the distance between the two lines without a practice trial. The blindfold was then put on and the subjects jumped from behind the starting line trying to land with the heels as close to the target line as possible. He was allowed to see where he lands on each trial. Ten trials were given.

(Note: - This was a modification of the original Distance Perception Jump test in which two trials were allowed. Another variation of the test was to allow the subject to jump first with his eyes open. Then he was blindfolded to measure his ability to duplicate the amount of afford required. However, very few could jump perfectly on the first trial; therefore, it again became a matter of interpreting the feedback from each jump.)

**Scoring:** - For each jump the distance to the nearest $\frac{1}{4}$ inch from the target line to the farthest heel was measured and recorded. The score was the total of ten jumps.

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FIG 3.9 DISTANCE PERCEPTION JUMP TEST
**Statistical Analysis of Data**

For analyzing the data, following methods were taken:

To compare the means of the variables, 't' test was used (in case of small sample test).

In case of large sample test, 'z' test was used to compare the means of the variables.

To measure better sensory response of the students, percentage method was employed.

For comparison among all groups, One Way Analysis of Variance (ANOVA) was computed. Further, wherever 'F' value was found significant, it was subjected to post – hoc test (LSD) to find out the significant difference among the groups.

For testing hypotheses the level of significance was set at 0.05 level.