Chapter III

METHODOLOGY

Of all the activities in research methodology the behavior of performing the different expansion of demonstration is evidently inevitable to the progress of invention in research. The research methodology leads the order of the following by which the research scholar begins with the primary solution for the matter and reaches its destination.

The purpose of this study was to investigate the effect of mass drill exercise training on selected fine and gross motor skill performance among school children. The procedure adopted for selection of subjects, selection of variables, selection of tests, orientation to the subjects, tester competency, reliability of the instruments, reliability of the data, pilot study, training programme, collection of data administration of tests, experimental design and statistical technique for analyzing the data were presented in this chapter.

Selection of Subjects

The subjects of this study comprised of sixty (n=60) students from The Vikasa School, Thoothukudi District, Tamil Nadu, India. their age ranges between 5 to 10 years. The selected subjects were
randomly (simple random sample) assigned to one of two groups of thirty \((n=30)\) each, such as one experimental group and a control group. The Group A \((n=30)\) underwent mass drill exercise training, Group B \((n=30)\) acted as control for a duration of 12 weeks with three days per week, in addition to the regular schedule, members of these groups will consists of healthy males, who had regularly mass drill exercise training for at least 3 months prior start of the study, participants were informed of all possible risks involved in this study, and necessary consent were obtained from each participant.

**Selection of Variables**

The development and assessment of the young child’s use of the large muscle masses of the body is the primary focus of this chapter. Not all of the skills included under the heading of fundamental motor skills will be addressed. Rather, major attention will be given to the lo-co-motor skills of running, jumping, galloping, hopping, and skipping, and to the object control skills of throwing, kicking, catching, and striking. Balance and postural control are also mentioned. Because motor skill development is a critical dimension of the overall development of the young child, it is important to have information about the present level of motor skill development of the child to establish a baseline against which to monitor the growth and development of the child. In this respect,
assessment of gross motor development is integral to screening out and/or identifying those children who may not be developing or progressing as expected, e.g., those children who are or may be at risk for future problems. In general, screening or preliminary assessment of gross motor development is necessary for identifying the nature and extent of children’s needs, in determining if additional diagnostic testing is needed, in deciding if and what type of enrichment may be appropriate for promoting optimum development, and in predicting potential neuro developmental outcomes at a later age. In the school setting, outcomes of motor development assessment are especially important for planning for and developing appropriate instructional strategies so that appropriate experiences for individual children can be implemented. It is also important to provide assessment information on the child’s gross motor skills to parents and other concerned individuals, particularly those who are or may be involved in providing for adequate follow-up support for the child with special needs. Results or outcomes of any evaluation of gross motor development should identify strengths and weaknesses and highlight those skills that are lagging or deficient along with the nature and extent of the deficit.

Fine motor skills are basic for individual development, and their absence would render the attainment of a number of
milestones in early child socialization unthinkable. The fine coordination of small muscle groups, above all those in the hand, is essential for a variety of activities. Among these are dressing and undressing; tying shoes; the utilization of eating utensils; holding and guiding pencils, paintbrushes and rulers; using scissors; turning the pages of a book; and piecing together Lego tiles or jigsaw puzzles (Cantell, Ahonen, & Smyth, 1994; Losse, Henderson, Elliman, Hall, Knight, & Jongmans, 1991). In fact, fine motor skills correlate consistently with general as well as specific cognitive abilities. Relationships have been confirmed with optical differential abilities, reaction speed and intelligence. In accordance with expectations, positive relationships have also been shown for achievement. Vacc, Vacc, and Fogleman (1987) found, for example, that fine motor skills among pre-school aged children can best predict later performance on standardized achievement tests in the first grade. Further studies confirm correlations between fine motor skills and scholastic performance up through, at the very least, the end of primary school (Baedke, 1980; Beilei, Lei, Qi, & von Hofsten, 2002).

Fine motor skills form the basis for several scholastic skills which retain importance over the course of scholastic education. Those worthy of emphasis include writing speed and the disposition to rework written assignments (Graham, 1990; Graham &
Interestingly, significant relationships have been detected between fine motor skills and reading skills which are indispensable for all scholastic subjects (Graham, 1990; La Paro & Pianta, 2000; Reno, 1995; Share, Jorm, Maclean, & Matthews 1984; Savage, 2004). Furthermore, deficits in fine motor skills can be expected to have indirect effects on cognitive achievement. For instance Losse, Henderson, Elliman, Hall, Knight, & Jongmans (1991) found increased dispositions towards irritated reactions and designative, depressive moods among schoolchildren with deficits in fine motor skills.

Appropriate motor development is an essential component for school children. Before entering kindergarten, children are expected to have a certain level of motor skills. A great deal of the work in kindergarten involves painting, cutting, pasting or gluing, drawing, tracing, using a pencil, constructing with paper or blocks, etc. To perform these tasks, motor skills are required.

The investigator reviewed the available scientific literature pertaining to the problem under study from books, Journals, magazines, research paper, on the basis of the experience oriented observation regarding the motor skills.

Also considering the need of the study, the feasibility criteria, following variables were selected for this study,
Independent Variables

- Mass Drill Exercise Training

Dependent Variables

I. Gross Motor Skills

- Walking - Walk down stairs
- Jumping – Jump with both feet
- Throwing – Over arm throw
- Kicking – Kick for distance
- Balance – Stands on one foot

II. Fine Motor Skills

- Colouring Pages
- Cutting Activities
- Dot to Dot activity
- Letter Formation

Selection of Tests

As per the available literature the following tests were used to collect relevant data on the selected dependent variables and they were presented in the table III.
TABLE 3.1
TESTS SELECTION

<table>
<thead>
<tr>
<th>S. No</th>
<th>Criterion Variables</th>
<th>Test</th>
<th>Unit of Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Walking</td>
<td>Walk down Stairs</td>
<td>Seconds</td>
</tr>
<tr>
<td>2</td>
<td>Jumping</td>
<td>Jump with Both Feet</td>
<td>Centimetre</td>
</tr>
<tr>
<td>3</td>
<td>Throwing</td>
<td>Over Arm Throw</td>
<td>Meters</td>
</tr>
<tr>
<td>4</td>
<td>Kicking</td>
<td>Kick for Distance</td>
<td>Meters</td>
</tr>
<tr>
<td>5</td>
<td>Balance</td>
<td>Walk 1 inch Straight Line</td>
<td>Seconds</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Gross Motor Skills</strong> (Ulrich, D., 2000)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>S. No</th>
<th>Criterion Variables</th>
<th>Test</th>
<th>Unit of Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Fine Motor Skill</td>
<td>Colouring Pages</td>
<td>Points</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Shape Cutting Activities</td>
<td>Points</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dot to Dot Activities</td>
<td>Points</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Letter Formation</td>
<td>Points</td>
</tr>
</tbody>
</table>

**Fine Motor Skills** (Karleen Brunt et al., 2012)

**Orientation to the Subjects**

The investigator explained the purpose of the study to the participants and their part in the study. For the collection of the data, the investigator explained the procedure of testing on selected dependent variables and gave instructions about the procedure to be adopted by them. Four sessions were spent to familiarize the participants with the technique involved to execute the mass drill exercise training programme. It helped them to perform mass drill exercise training perfectly and avoids injuries, further; the control
group was specially oriented, advised and controlled to avoid the special practice of any of the specific training programme till the end of the experimental period. The participants of all the groups were sufficiently motivated to perform their maximal level during training and testing periods.

**Tester’s Competency**

The investigator took all the measurement in this study with the help of Physical Education Teachers of the school. To make sure that the investigator was well-versed in the technique of conducting tests, he underwent a number of practice sessions in the correct testing procedure. The tester’s reliability was established by test and re-test method.

The data selected from random sample of sixteen subjects in test/re-test was correlated and coefficient of correlation thus obtained is presented in Table IV.

All the measurement in this study was taken by the investigator with assistance of students and to ensure that the investigator and his assistance were well versed with the techniques of conducting tests, they had a number of practice sessions in the correct testing procedure under the guidance of experts. The tester’s reliability was established by test and re-test.
process whereby consistencies of results were obtained for product
moment correlation.

The data selected from random sample of sixteen subjects in
test re-test was correlated and coefficient of correlation thus
obtained is presented in Table 3.1.

**TABLE 3.2**

**INTRA CLASS COEFFICIENT OF CORRELATION ON SELECTED
DEPENDENT VARIABLES**

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Test (Variables)</th>
<th>‘R’ Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Walking</td>
<td>0.95*</td>
</tr>
<tr>
<td>2</td>
<td>Jumping</td>
<td>0.96*</td>
</tr>
<tr>
<td>3</td>
<td>Throwing</td>
<td>0.91*</td>
</tr>
<tr>
<td>4</td>
<td>Kicking</td>
<td>0.97*</td>
</tr>
<tr>
<td>5</td>
<td>Balance</td>
<td>0.94*</td>
</tr>
<tr>
<td>6</td>
<td>Colouring Pages</td>
<td>0.93*</td>
</tr>
<tr>
<td>7</td>
<td>Shape Cutting Activities</td>
<td>0.96*</td>
</tr>
<tr>
<td>8</td>
<td>Dot to Dot Activities</td>
<td>0.92*</td>
</tr>
<tr>
<td>9</td>
<td>Letter Formation</td>
<td>0.98*</td>
</tr>
</tbody>
</table>

*Significant at 0.01 level of confidence.

(Table value required for significance at 0.01 level of confidence with df 11 is 0.68)

Since, the obtained ‘R’ values on selected criterion variables
were much higher than the required value, the data were accepted
as reliable in terms of instruments, tests and the participants.
Reliability of Instruments

The instruments used for this study were stop watches, measuring tapes, chunnam were availed from The Vikasa School, Thoothukudi District, Tamil Nadu, India. The instruments were purchased from reliable and standardized companies and were considered accurate enough to serve for the purpose of the study.

Reliability of the Data

Test and retest method was followed in order to establish the reliability of data by using ten subjects selected at random. The same persons under similar condition tested all the dependent variables selected in the present study twice for the subjects. The intra-class co-efficient of correlation was used to find out the reliability of the data.

Pilot Study

Prior to the formal study sessions, a pilot study was conducted to validate research procedure and the initial capacity of the participants to fix the load and also to design the training programme. For the purpose, sixteen participants (n=16) were selected at random, and they were divided into two groups of eight participants each. This pilot study is given clear idea for fixing the progressive overload.
Group A (n=8) underwent mass drill exercise training, Group B (n=8) acted as a control group for five sessions under the watchful eyes of the investigator.

While constructing the training programmes the basic principles of sports training (progression of over load and specificity) were followed and the individual differences were also considered.

**Training Programme**

It was a twelve week progressive mass drill exercise training programme for the experimental group at progressive intensity method. Pre and post tests data were collected from experimental group as well as from the control group. The duration of training session in three alternative days was between 20 min -30 min at the beginning of training in later phase it was increased to 1 hour to one and half hour due to the progressive load of training, which included warming up and limbering down.

All athletes want to make the most gains from their training as possible. To do this, the principle of progressive overload must be used. Progressive overload involves systematically applying a training stimulus that forces the body to adapt and grow. Adapting conditioning workouts involves manipulating specificity, frequency, duration, and intensity.
variables. When we neglect proper progression during training, certain unwanted consequences may result. These consequences include overtraining symptoms along with decreased performance. The progressive overload principle is a way to safely make training gains. So, the trainer must be aware of his training stimulus and how the individual’s body is recovering from training. Major performance gains take time and dedication, but are possible if we consistently progress our workouts the training program was designed in such a way that progressive overload is applied through manipulation exercise frequency, exercise duration and intensity and load. (Baechle TR, Earle RW. (Eds.). (2000); & Pearson D, Faigenbaum A, Conley M, Kraemer WJ., 2000).

Group A underwent mass drill exercise training. The mass drill exercise training was performed in the school grounds. First they were familiarized with each exercise which they undergone with the help of an expert. Load was increased progressively for every three weeks.

All the subjects involved in this study were carefully monitored throughout the training programme to be away from injuries. They were questioned about their health status throughout the training programme. None of them reported any
injuries. However, muscle soreness appeared in the earlier period of the training programme and was reduced in due course.

Group B acted as control that did not participate in any specific training on par with experimental group. Detailed training programme was presented in Appendix I.

Collection of Data

The data were collected from the selected subjects during the academic year 2013-2014 on the selected gross and fine motor skill. The investigator administered the tests to measure the criterion variables to sixty subjects. The investigator collected the data from the subjects during their rest time. The purpose of the study was clearly mentioned.

Administration of the Tests

Gross Motor Skill

1. Walking (Walk down Stairs)

Purpose

To assess the walking ability of children

Equipments

Stopwatch, Lime powder, score card, and pencil
**Procedure**

The subject took a position behind the starting line. The starter used the command “ready” and “go”. The participants walked down 12 stairs and ran 6 meters to reach the finish line without help. The stopwatch was started on the command “Go” and stopped when the child crosses the finish line.

**Scoring**

The score was the elapsed time to the nearest tenth of a second between the starting signal and the instant the child crossed the finished line. The fractions were rounded to the next largest one length of a Second. One trail was permitted.

**2. Jumping (Jump with Both Feet)**

**Purpose**

To measure the jumping ability of the children

**Equipments**

Measuring tape, Lime powder

**Procedure**

The subject stood behind the line with his/her feet several inches apart. The subject jumped forward with both feet. Three trails were given.
Scoring

The distance between the take off line and the nearest point where any part of the subject’s body touched the floor was measured. The best of three trails was recorded.

3. Throwing (Over Arm Throw)

Purpose

To assess the throwing ability of children

Equipments

Tennis ball, measuring tape, paper and pen

Procedure

The subject stood behind the restraining line and from within a restraining area, he/she threw a tennis ball over hand as far as possible. Three trails were given.

Scoring

The performance was measured from the mid-point of the restraining line to the ball’s point of contact with the ground. The measurement was taken to the nearest one centimeter. The best of three trials was taken as the final score.

4. Kicking (Kick for Distance)

Objective

To assess the kicking ability of children
**Equipments**

Volleyball, measuring tapes, paper and pencil

**Procedure**

The subject stood behind the restraining line and from within a restraining area, he/she kicked volleyball as far as possible. Three trials were given.

**Scoring**

The performance was measured from the mid-point of the restraining line to the ball’s point of contact with the ground. The measurement was taken to the nearest one centimeter. The best of three trials was taken as the final score.

**5. Balance (Walk 1 inch Straight Line)**

**Purpose**

To measure the balancing ability of the children

**Equipments**

Stopwatch, Lime powder, score card and pencil

**Procedure**

The subject took a position behind the starting line. At the signal the child walked on a 1 inch straight line for 10 meters and across the finish line. The stopwatch was started on the command “Go” and stopped when the child crossed the finish line.
Scoring

Three trails were given. Time was recorded in Seconds. The best of three trials was the final score.

Fine Motor Skill

6. Colouring Pages

Equipments

Sketch, diagram sheet, score card and pencil

Procedure

Before the test started, the researcher distributed the uncolored diagram to all the subjects. Then the researcher showed the same diagram with color to all subjects and kept it at the centre. The subjects were asked to paint the diagram as shown in the model. After the completion of the tests the sheets were collected from the subjects.

Scoring

The subjects were graded with 7-point scale as explained below depended on their performance.

Excellent - 7
Very good - 6
Good - 5
Average - 4
Fair - 3

Poor - 2

Very Poor - 1

7. Shape Cutting Activities

Equipments

Scissors, diagram sheet, score card and pencil

Procedure

The researcher distributed the rectangular diagrams sheets to all the subjects. Then the researcher demonstrated the procedure to cut the rectangular sheet. The subjects were asked to cut the rectangular diagram as shown in the model. After the completion of the tests the sheets were collected from the subjects.

Scoring

The subjects were graded with 7-point scale as explained below depended on their performance.

Excellent - 7

Very good - 6

Good - 5

Average - 4

Fair - 3
Poor - 2

Very Poor - 1

**8. Dot to Dot Activities**

**Equipments**

Pencil, diagram sheet, score card and pencil

**Procedure**

Before the test started the researcher distributed the draw picture sheet to all the subjects. Then the researcher showed the same picture to all subjects and kept the picture sheet at the centre. The subjects were asked to draw the diagram as shown in the picture. After the completion of the tests the sheets were collected from the subjects.

**Scoring**

The subjects were graded with 7-point scale as explained below depended on their performance.

Excellent - 7

Very good - 6

Good - 5

Average - 4

Fair - 3
9. Letter Formation

Equipments

Alphabetical letters, score card and pencil

Procedure

The researcher shuffled the letters in front of the students and then demonstrated the procedure to arrange the letters in the alphabetical order. After the demonstration the subjects were asked to arrange the letters with alternative colours.

Scoring

The subjects were graded with 7-point scale as explained below depended on their performance.

Excellent - 7
Very good - 6
Good - 5
Average - 4
Fair - 3
Poor - 2
Very Poor - 1
Experimental Design and Statistical Procedure

This study was conducted to determine the possible cause and effects of mass drill exercise training on selected fine and gross motor skill performance among school children. The pre test and post-test randomized design was employed for this investigation. The sixty students are divided into two groups, one experimental group, Group A (n=30) underwent mass drill exercise training, and another Group B (n=30) acted as control group. All the participants were tested prior and after the experimentation on selected fine and gross motor skill performance such as walking, jumping, throwing, kicking, and balance and colouring pages, shape cutting activities, dot to dot activities and letter formation. The collected data from the two groups prior to and immediately after the training programme on selected criterion variables were statistically analyzed with dependent ‘t’ test to find out the significant improvement between pre and post-test means and analysis of co-variance (ANCOVA) was used to find out the significance difference between experimental and control groups. In all the cases 0.05 level of significant was fixed to test the hypothesis.
RESEARCH FLOW CHART

Identification of variables

Gross motor skills

Fine motor skills

SELECTION OF SUBJECTS
The Vikasa School Children (5 to 10 years)

DESIGN - Randomized Group Design (60 Students)

Group I

Experimental Group
(n=30)

(Mass Drill Training)
(12 weeks)

Group II

Control Group
(n=30)

PRE - TEST

Gross Motor Skills
i) Walking, ii) Jumping
iii) Throwing, iv) Kicking
v) Balance

Fine Motor Skills
i) Colouring pages
ii) Shape cutting
iii) Dot to Dot Activities
iv) Letter Formation

POST – TEST

Statistical Analysis (‘t’ test & ANCOVA)

Results, Discussion

Contributory variables

Conclusion & Recommendation