Chapter III

PROCEDURE

This chapter consists of procedure adopted with selection of the subject, experimental design, the criterion measures, reliability of the data, administration of tests and collection of the data, development of the adapted physical education programme, model for the implementation of the programme, administration of the programme, and statistical techniques employed for testing the hypothesis.

Selection of Subjects

The subjects for the study were randomly selected on the basis of Stanford-Binnet Intelligence Test scores obtained from the school records. There were 60 educable mentally retarded (EMR) children and 46 trainable mentally retarded (TMR) children from Rotary Institute for Mental Retardation, Trivandrum, Kerala. The health examination of the subjects were carried out to ensure that the subjects were free from major orthopaedic and sensory impairments and medically fit to undergo the designed adapted physical education for this study.
The sixty subjects of educable mentally retarded children were randomly assigned into two groups - Group A (EMR) \((n = 21\) males and 9 females) and Group B (EMR) \((n = 22\) males and 8 females) - where Group A was the experimental group and Group B acted as the control group. The same procedure was used in classifying the forty six trainable mentally retarded (TMR) children into Group C (TMR) \((n = 16\) males and 7 females) and Group D (TMR) \((n = 18\) males and 5 females) ; where Group C was the experimental group and Group D acted as control group.

The educable mentally retarded (EMR) children ranged in age from eight to twelve years with mean age of 10.28 years for the experimental group and the mean age of 10.19 years for control groups. The trainable mentally retarded (TMR) children ranged in age from eight years to twelve years with mean age of 10.70 years for experimental group and mean age of 10.22 years for control groups. The IQ as measured by Stanford-Binnet Intelligence test of EMR subjects ranged between 57 to 68 and the IQ of TMR subjects ranged between 38 to 51. The Age, IQ and Sex of the control and experimental groups of educable and trainable mentally retarded children are presented in appendix B, C, D and E respectively.
**Experimental Design**

The experimental design used for this study was the random group design. Since the subjects were classified randomly into two groups namely Group A (EMR-control) and Group B (EMR-experimental) for the educable mentally retarded children and similarly trainable mentally retarded children also divided into two group, Group C (TMR-control) and Group D (TMR-experimental). The pre tests were administered before the application of the experimental treatments and all the groups were post-tested on the criterion variables at the conclusion of the experimental period.

**Criterion Measures**

The test items chosen as criterion measures were found most reliable and are widely used all over the world for assessing motor ability, particularly for mentally retarded. These tests appear to provide an adequate procedure for determining the level of motor ability and could be used in identifying students who need special consideration in physical education classes. The test items were selected from
the Bruininks-Oseretsky Test of Motor Proficiency\(^1\) and from the standardised tests of fitness on the basis of following characteristics:

(a) the size of the correlation between the item and its subtest and total test scores.

(b) the range of ages for which the item provided significant and useful information about the motor proficiency and fitness status.

(c) the amount of time needed to arrange the equipments and administer the items.

(d) the ease of scoring.

As such the following tests were used as criterion measures:

1. To measure running speed during a shuttle run, the Running Speed and Agility test was used and time recorded in one tenth of a second.

2. To assess static balance and balance while executing various walking movements following two tests were used
   (a) Standing on Preferred Leg on Balance Beam, was measured in seconds.
   (b) Walking Forward Heel-to-Toe on Balance Beam was measured by number of correct steps executed.

\(^1\)Bruininks, Bruininks-Oseretsky Test of Motor Proficiency p.50-99
3. To determine sequential and simultaneous coordination of the upper limbs with lower limbs (Bilateral Coordination) the following tests were used:

(a) Tapping Feet Alternately While Making Circles with Fingers, where one point was awarded to the each foot tap executed by the subject correctly.

(b) Jumping Up and Clapping Hands, where measured by number of claps executed.

4. To assess coordination of visual tracking with movements of the arms and hands (Upper-Limb Coordination) the following two tests were used:

(a) Catching a Tossed Ball with Both Hands, where points were awarded for correct catches.

(b) Throwing a Ball at a Target with Preferred Hand, where points were awarded for each correct execution.

5. To determine ability to respond quickly to a moving visual stimulus using the Response Speed test was used and measurement of unit as provided in Response Speed Stick was recorded for each subject as per standard procedure.

6. To assess grip strength, Grip Dynamometer was used and scores recorded in nearest kilograms.

7. To assess flexibility Modified Sit-and-Reach test was used and performance measured in nearest quarter inch.
8. To assess the abdominal strength, Sit Up test was used and performance recorded in numbers.

9. To determine explosive strength, Standing Broad Jump test was used and distance covered was measured in inches.

**Reliability of the Data**

The reliability of the data was ensured by establishing the Instrumentation reliability, tester reliability, reliability of tests and subject reliability.

**Instrumentation Reliability**

The 1/10 second calibrated stopwatches (Racer, India) was used to take the time of physical fitness and motor performance tests. Calibrated Lafayette made Hand Grip Dynamometer was used to evaluate the performance of grip strength tests. Response speed stick supplied with Bruinnks-Oseretsky Examiner’s Manual was used to measure the Response Speed. Flexomeasure (B & L Products, Portland) was used to measure the Modified Sit-and Reach Test. Standardized steel tape (Freemans, India) calibrated in inches, was utilized to measure the performance of standing broad jump. All the instruments used except the response speed stick were obtained from the Research Laboratory of Nethaji Subhash
National Institute of Sports, Southern Centre, Bangalore which were supplied by well known manufacturers catering to need of research laboratories were accepted to be accurate and reliable enough for the purpose of the study.

**Tester Reliability**

Reliability of the investigator in measuring the motor performance and fitness variables were tested by computing Co-efficients of Correlation between the scores obtained by an expert on ten subjects. The co-efficients are presented in Table 3.1.

**Table 3.1**

COEFFICIENT OF CORRELATION FOR TESTER RELIABILITY ON MOTOR PERFORMANCE AND FITNESS STATUS VARIABLES

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient of Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Motor Performance</strong></td>
<td></td>
</tr>
<tr>
<td>1. Running Speed and Agility</td>
<td>.81*</td>
</tr>
<tr>
<td>2. Standing on Preferred Leg on Balance Beam</td>
<td>.77*</td>
</tr>
<tr>
<td>3. Walking Forward Heel-to-Toe on Balance Beam</td>
<td>.86*</td>
</tr>
</tbody>
</table>
Table 3.1 (Continued)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient of Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Tapping Feet Alternately While Making Circles with Fingers</td>
<td>.82*</td>
</tr>
<tr>
<td>4. Jumping Up and Clapping Hands</td>
<td>.88*</td>
</tr>
<tr>
<td>5. Catching a Tossed Ball with Both Hands</td>
<td>.79*</td>
</tr>
<tr>
<td>6. Throwing a Ball at a Target with Preferred Hand</td>
<td>.85*</td>
</tr>
<tr>
<td>7. Response Speed</td>
<td>.86*</td>
</tr>
</tbody>
</table>

B. Fitness Status

1. Right Hand Grip Strength                      | .94*                      |
2. Left Hand Grip Strength                       | .93*                      |
3. Modified-Sit-and Reach test                   | .83*                      |
4. Sit-Up                                       | .90*                      |
5. Standing Broad Jump                           | .95*                      |

\[ N = 10, r_{.01}^{(8)} = .765 \]

* Significant at .01 level of confidence

Apart from this the investigator practiced the method of measurement under the supervision of expert on five subjects at the research laboratory of Nethaji Subhash National Institute of Sports, Banglore.
Reliability of Tests

Test reliability refers to both the precision of test as measuring instrument and consistency with which the test measured a particular ability. The reliability of items from Bruininks-Oseretsky Test of Motor Proficiency selected for this study and reliability of selected fitness tests obtained from the texts/presented below in Table 3.2.

Table 3.2

| TEST-RETEST RELIABILITY COEFFICIENTS OF TESTS OF MOTOR PERFORMANCE AND FITNESS VARIABLES |
|==========================================================================================|
| Variables                                                                                   |
| Motor Performance²                                                                      |
| Running Speed and Agility                                                                 |
| Standing on Preferred Leg on Balance Beam                                                  |
| Walking Forward Heel-to-Toe on Balance Beam                                               |
| Tapping Feet Alternately While Making Circles with Fingers                               |
| Jumping Up and Clapping Hands                                                             |
| Coefficient of Reliability                                                               |
| .87                                                                                       |
| .76                                                                                       |
| .76                                                                                       |
| .87                                                                                       |
| .88                                                                                       |

²Ibid, p. 36
Table 3.2 (Continued)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient of Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catching a Tossed Ball with Both Hands</td>
<td>.89</td>
</tr>
<tr>
<td>Throwing a Ball at a Target with Prefered Hand</td>
<td>.86</td>
</tr>
<tr>
<td>Response Speed</td>
<td>.76</td>
</tr>
</tbody>
</table>

**Fitness Status**

<table>
<thead>
<tr>
<th></th>
<th>Coefficient of Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right Hand Grip Strength</td>
<td>.90&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
<tr>
<td>Left Hand Grip Strength</td>
<td>.90&lt;sup&gt;4&lt;/sup&gt;</td>
</tr>
<tr>
<td>Modified-Sit-and Reach test</td>
<td>.94&lt;sup&gt;5&lt;/sup&gt;</td>
</tr>
<tr>
<td>Sit-Up</td>
<td>.90&lt;sup&gt;6&lt;/sup&gt;</td>
</tr>
<tr>
<td>Standing Broad Jump</td>
<td>.95&lt;sup&gt;7&lt;/sup&gt;</td>
</tr>
</tbody>
</table>


<sup>4</sup>Ibid.


<sup>6</sup>Special Fitness Test Manual for the Mentally Retarded, p.12.

<sup>7</sup>Ibid.
Subjects Reliability

The test items were administered on ten randomly selected subjects on alternate days and their performance was recorded. The performance of alternate days was correlated to find out the subjects reliability. The coefficient of correlation obtained between the performance of subjects first and second day is presented in Table 3.3

Table 3.3

COEFFICIENT OF CORRELATION FOR SUBJECTS RELIABILITY ON MOTOR PERFORMANCE AND FITNESS VARIABLES

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient of Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor Performance</td>
<td></td>
</tr>
<tr>
<td>Running Speed and Agility</td>
<td>.86*</td>
</tr>
<tr>
<td>Standing on Preferred Leg on Balance Beam</td>
<td>.85*</td>
</tr>
<tr>
<td>Walking Forward Heel-to-Toe on Balance Beam</td>
<td>.89*</td>
</tr>
<tr>
<td>Tapping Feet Alternately While Making Circles with Fingers</td>
<td>.87*</td>
</tr>
<tr>
<td>Jumping Up and Clapping Hands</td>
<td>.91*</td>
</tr>
<tr>
<td>Catching a Tossed Ball with Both Hands</td>
<td>.89*</td>
</tr>
<tr>
<td>Throwing a Ball at a Target with Preferred Hand</td>
<td>.86*</td>
</tr>
<tr>
<td>Response Speed</td>
<td>.88*</td>
</tr>
</tbody>
</table>
Table 3.3 (Continued)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient of Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fitness Status</strong></td>
<td></td>
</tr>
<tr>
<td>Right Hand Grip Strength</td>
<td>.93*</td>
</tr>
<tr>
<td>Left Hand Grip Strength</td>
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</tr>
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<td>Modified-Sit-and Reach test</td>
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<tr>
<td>Sit-Up</td>
<td>.90*</td>
</tr>
<tr>
<td>Standing Broad Jump</td>
<td>.95*</td>
</tr>
</tbody>
</table>

N = 10, \( r_{.01}(8) = .765 \)

* Significant at .01 level of confidence

Since very high correlations from .85 to .95 were obtained for the variables, the results of subjects reliability are viewed as satisfactory.

**Administration of Tests and Collection of the Data**

All items were administered according to procedures outlined in the standardized tests of fitness and Bruininks Oseretsky test of motor proficiency, with following exceptions noted:
For the statistical analysis of motor performance only the raw score was used. The raw scores was calculated according to the procedures mentioned in the Bruininks-Oseretsky Examiners’s Manual. 8 The performance of Sit up and Standing broad jump tests; the purpose of statistical analysis, the raw scores were used.

While conducting the tests, the investigator made every effort to obtain optimal performance. The test items were briefly described and demonstrated to the subjects. Two practice trials were given in order to acquaint the subjects with the tests and equipment. When behaviour of a subject interfered with testing a particular item, another task was chosen and subject was returned to the original item later in the session. If a subject did not appear to understand the task or if disruptive behaviour persisted, scores were not recorded.

A brief discussion about the procedure adopted for the conduct of motor performance and fitness tests is follows:

8Bruininks, Bruininks-Oseretsky Test of Motor Proficiency: Examiner’s Manual, p.102
A. MOTOR PERFORMANCE

Bruininks-Oseretsky Test of Motor Proficiency

SUBTEST 1: Item 1

Running Speed and Agility

The subject runs to the end line, picks up the block, and runs back across the start/finish line. The subject is timed between the first and last crossings of the timing line.

KIT EQUIPMENT: tape measure, masking tape, block

OTHER EQUIPMENT: stopwatch

Trials: 2

![Diagram of running course]

**Figure 3.1**: Layout of Running Course (Subtest: 1 Item: 1)

PROCEDURE AND SCORING

Stand beside the timing line and have the subject stand behind the start/finish line. Say: *When I say "On your mark, get set, go," run as fast as you can to the block (point to block), pick it up, and bring it back across this line*
(point to start/finish line). Don’t slow down; run fast across this line(point again to start/finish line). "On your mark, get set, go!"

Start the watch when the subject crosses the timing line and stop the watch when the subject crosses the timing line with the block. If the subjects slows down as she or he approaches the timing line, remind the subject to continue to run fast across the start/finish line.

Start the trial over if the subject:

a. stumbles or falls

b. fails to pick up the block

c. drops the block before crossing the timing line

On the second trial, encourage the subject to run faster.

Record the time to the nearest 0.1 second in the appropriate space on the Individual Record Form. If the hand of the stopwatch is between two numbers, record the higher number.

SUBTEST 2: Balance

SUBTEST 2: Item2

Standing on Preferred Leg on Balance Beam

The subject stands on preferred leg on the balance beam, looking at the target, with hands on hips, and with other leg bent so that it is parallel to the floor. The subject must
maintain the position for 10 seconds to achieve a maximum score.

KIT EQUIPMENT: target, balance beam

OTHER EQUIPMENT: stopwatch

Trials: 2

Administer a second trial only if the subject does not achieve a maximum score on the first trial.

Figure 3.2: Standing on Preferred Leg on Balance Beam (Subtest 12 Item 2).

PROCEDURE AND SCORING:

Prepare the target to the wall with masking tape so that the lowest point on the circumference is at the subject's eye
level. Make a walking line by taping an 8-foot (2.4 meter) piece of masking tape to the floor in front of the target, about 10 feet (3 meters) from the wall. The walking line should be as straight as possible. Place the balance beam over the walking line.

Say: **Stand on the beam on your (right/left) leg and raise your other leg like this (demonstrate).** Place your hands on your hips and look at the target. Stand like this until I tell you to stop.

If necessary, help subject achieve the correct position. Begin timing as soon as position is achieved and remind subject as needed to keep hands on hips and to look at target. Slight swaying is acceptable. Allow only one warning to keep the raised leg parallel to the floor (or above a 45 degree angle).

After 10 seconds, tell the subject to stop the trial and record the time before 10 seconds if the subject:

a. drops the raised leg so that it touches the floor
b. drops the raised leg below a 45 degree angle after one warning.

c. hooks the raised leg behind the supporting leg.
d. shifts the supporting foot out of place.

On Individual Record Form, record to the nearest second the time that the subject maintains the correct position.
SUBTEST 2: Item 7

Walking Forward Heel-to-Toe on Balance Beam
The subject walks forward on the balance beam heel-to-toe, with hands on hips. The subject must make six consecutive steps correctly to achieve a maximum score.

Trials: 2
Administer a second trial only if the subject does not achieve a maximum score on the first trial.

![Figure 3.3: Walking Forward Heel to Toe on Balance Beam (Subtest: 2 Item: 7).](image)

PROCEDURE AND SCORING:
Place the balance beam over the walking line.
Have the subject stand at one end of the beam. Say: **Place your feet on the beam like this** (demonstrate) **Place your hands on**
your hips. When you walk down the beam, hit the toe of your back foot with the heel of your front foot (demonstrate). Walk to the end of the beam. Remember, keep your feet on the beam and your hands on your hips as you walk. Ready, begin

Stand at one side of the beam and count the subject's steps, keeping track of both correct and incorrect steps. A step is incorrect if the subject:

a. does not touch the heel of the front foot to the toe of the back foot.
b. moves the back foot forward to touch the heel of the front foot.

Remind the subject to walk heel-to-toe and to keep hands on hips. After six steps are taken, tell the subject to stop. If subject places one or both feet completely off the beam before taking six steps, stop the trial and record the number of steps taken on beam.

SUBTEST 3: Bilateral Coordination

SUBTEST 3: Item 1

Tapping Feet Alternately While Making Circles with Fingers

The subject taps feet alternately while making circles with index fingers. The subject is given 90 seconds to complete 10 consecutive foot-taps correctly.
OTHER EQUIPMENT: two chairs, table, clipboard, stopwatch

Trials: 1

![Correct and Incorrect Tapping](image)

**Figure 3.4**: Tapping Feet Alternately While Making Circles with Fingers. (Subtest: 3 Item: 1).

**PROCEDURE AND SCORING**

Place two chairs facing each other; make the subject sit facing you. The subject’s arms are held at, or slightly below, shoulder height with elbows bent and index fingers pointing toward the examiner. One index finger is to move clockwise and the other counter-clockwise.

Say: **First tap one foot and then the other foot like this (demonstrate).** At the same time you tap your feet, hold your arms in front of you and close your hands, pointing your
first(index) fingers to me like this(demonstrate). Make circles with just your fingers; try not to move your hands, wrists, or arms(demonstrate). Keep tapping your feet and making circles with your fingers until I tell you to stop. Ready, begin.

(The subject may tap toes with heels resting on floor, tap with the entire foot, or tap heels with toes resting on floor, as long as the tapping rhythm is consistent.) Begin timing. If necessary, provide additional instruction. Start counting taps as soon as the subject establishes a consistent tapping rhythm. During the trial, correct the subject and start counting over if he or she:

a. does not maintain a consistent tapping rhythm
b. fails to alternate feet
c. fails to make circles simultaneously with both fingers
d. uses wrists and fore-arms in making circles
e. fails to make complete circles(Wiggling fingers is incorrect)

Allow no more than 90 seconds, including time needed for additional instruction, for the subject to complete 10 consecutive foot-taps correctly. After 90 seconds, tell the subject to stop. On the Individual Record Form, record number of taps executed correctly.
SUBTEST 3: Item 6

Jumping Up and Clapping Hands

The subject jumps as high as possible, clapping in front of face, as many times as possible before landing. The subject must clap five times to achieve a maximum score.

Trials: 2

Administer a second trial only if the subject does not achieve a maximum score on the first trial.

Figure 3.5: Jumping Up and Clapping Hands
(Subtest: 3 Item: 6).

PROCEDURE AND SCORING

Stand facing the subject. Say: *When I tell you to begin, jump straight up as high as you can. As you jump, clap your hands in front of your face, as many as you can, before you land (demonstrate). Ready, begin.*
Count claps as subject jumps. Do not count claps that are made while subject’s feet are on the floor or claps that are on the floor or claps that are made below chest level. Mark the trial "0" if the subject loses balance and touches the floor with one or both hands when landing. On Individual Record Form, record the number of claps made correctly.

SUBTEST 5: Upper-Limb Coordination : Item 3

Catching a Tossed Ball with Both Hands

The subject stands on the standing mat and, with both hands, catches a tennis ball tossed underhand from a distance of 10 feet (3 meters). The number of correct catches is recorded.

KIT EQUIPMENTS: standing mat, masking tape, tape measure, target, tennis ball

OTHER EQUIPMENTS: stopwatch

Trials: 1 practice, 5 recorded

![Diagram showing correct placement of mat and masking tape](image)

Figure 3.6 : Correct Placement of Mat and Masking Tape
(Subtest: 5 Item: 3).
PROCEDURE AND SCORING:

Say: stand on the mat and catch this ball with both hands when I throw it to you. Give the subject one practice trial. Stand behind the strip of masking tape and slowly toss the ball underhand in a slight arc so that it comes down between the subject’s shoulders and waist. Then say: Catch the ball with both hands each time I throw it to you.

Count the number of correct catches made in five trials. A catch is incorrect if the subject:

a. misses the ball or traps it against the body
b. steps off the mat
c. catches the ball with one hand

If the subject misses the ball because it is thrown above the shoulders, below the knees, or outside the subject’s reach, readminister that trial. Between trials, repeat instruction as necessary. On Individual Record Form, record the number of correct catches.

SUBTEST 5: Item 5

Throwing a Ball at a Target with Preferred Hand

With the preferred hand, the subject throws a tennis ball overhand at the target from a distance of 5 feet (1.5 meters).
The subject receives a point each time the ball is correctly thrown and hits the target.

Trials: 1 practice, 5 recorded

Figure 3.7: Correct Place of Target and Masking Tape (Subtest 5, Item 5).

PROCEDURE AND SCORING:

Say: **Stand behind this line** (point to the masking tape on the floor in front of the target). **You are to throw the ball overhand at the bull’s-eye** (point to target; then demonstrate). **Throw from behind this line.** Give the subject one practice trial. The subject may throw overhand in a modified sidearm motion with both feet stationary, or may take one step forward toward the target while throwing. Then say: **Ready, begin**

Stand behind the subject and count the number of correct throws in five trials. A throw is incorrect if the subject:
a. misses the target (Hitting the black perimeter of the target is acceptable)
b. throws underhand
c. steps over the line

Between trials, repeat instructions as necessary. After five trials, tell the subject to stop.

On Individual Record Form, record a "1" for each correct throw and a "0" for each incorrect throw.

SUBTEST 6: Response Speed

SUBTEST 6: Item 1

Response Speed

The subject places the preferred hand flat on the wall, next to the response speed stick. The examiner holds the stick vertically against the wall and then drops the stick. The subject uses the thumb of the preferred hand to stop the stick as it drops. The response speed stick number that is at or just above the tape strip when the stick is stopped is the trial score. The point score is derived from the trial scores.

KIT EQUIPMENT: masking tape, response speed stick

Trials: 2 practice, 7 recorded
PROCEDURE AND SCORING:

Sit beside the subject, facing the wall, the subject should be seated with his or her preferred arm away from you. Say: We are going to find out how fast you can stop a falling stick. Place the response speed stick flat against the wall in front of the subject so that the starting line on the stick is even with the top edge of the tape. Then say: Let me show you what to do. Out your (right/left) hand against the wall next to the red line on the stick. Help the subject place the preferred hand against the wall with the thumb about 1/2 to 1 inch (1.3 to 2.5 cm) away from the stick, spreading the fingers in a comfortable, fan-like position. The thumb should be over, but not on, the stick; no part of the subject's hand
should touch before it is dropped.
Say: Watch the red line on the stick (point to red line) When the red line moves, stop the stick as fast as you can with your thumb (demonstrate by placing the subject's thumb against the stick). Just before I let the stick fall, I will say "Get set!" Then, when you see the red line move, stop the stick with your thumb as fast as you can.

Give the subject two practice trials. For each trial say "Get set!" slowly and deliberately and then wait the number of seconds shown on the table below before releasing the stick. Count the seconds silently - one thousand and one; one thousand and two; etc. Keep the stick perpendicular to the tape stripe and make certain that the subject is observing the red line before you release the stick.

<table>
<thead>
<tr>
<th>Trial</th>
<th>Seconds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practice</td>
<td>1</td>
</tr>
<tr>
<td>Practice</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>3</td>
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<td></td>
<td>2</td>
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<td>1</td>
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<td></td>
<td>3</td>
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<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>
Administer seven test trials. Repeat instructions and readminister a test trial if the subject:
   a. fails to look at the stick when it is dropped
   b. touches the stick before or just as it is released.

On the Individual Record Form, record the response speed stick number that is at, or just above, the tape stripe when the subject stops the stick. This is the trial score. Record "0" for a trial if the subject does not stop the stick before it hits the floor.

The raw scores pertaining to motor performance variables of pre and post tests control and experimental group of educable and trainable mentally retarded children are presented in appendix F, G, H, I, N, O, P and Q respectively.

B. Fitness Status

Right/Left Grip Strength Test

Measurement Objective: To measure grip strength (isometric) of each hand.

Equipment and Materials: Hand dynamometer, equipped with adjustable handle.

Procedure: Performer places the hand dynamometer in the palm of the right/left hand, with dial towards the palm. The grip is adjusted so that the bottom of the dynamometer is resting
against the base of the palm and the fingers grasp the adjustable portion of the handle. The hand should then be stretched so that the grip is taken between the first and second joint of the fingers. The performer should bend the elbow slightly and rise the arm. He or she then moves the arm forward and downward gripping with maximum strength. Two trials should be given for each hand with a 30 second rest between trials.

Scoring: The score is the best of two trials for each hand. The dynamometer scale is read in kilograms (1 kilogram = 2.2 pounds). Any trial in which performers touch part of his or her body or any object should be discarded.

**Modified Sit-and-Reach Test**

**Purpose:** To measure the development of hip and back flexion as well as extension of the hamstring muscles of the legs. The object is to see how far you can extend your fingertips beyond your foot line with legs straight.

**Equipment:** Flexomeasure case with yardstick and tape.

**Directions:**

1. Line up the 15-inch mark of the yardstick with a line on the floor and tape the ends of the stick to the floor so that the flexomeasure case (window side) is face down.
(2) Sit down and line up your heels with the near edge of the 15-inch mark and slide seat back beyond the zero end of the yardstick.

(3) Have a partner stand and brace his or her toes against your heels. Also, have an assistant on each side to hold your knees in a locked position as you prepare to stretch.

(4) With heels not more than 5 inches apart, slowly stretch forward, while pushing the flexomeasure case as far down the stick as possible with the fingertips of both hands.

Scoring: The best of three trials measured to the nearest quarter of an inch at the near edge of the flexomeasure case is recorded.

Sit-Up

Equipment: Gymnasium mat and stopwatch.

The pupil assumes a lying position with knees bent, feet flat on the floor, heels not more than 12 inches from the buttocks (knees bent at an angle less than 90 degrees), and hands clasped behind neck and elbows squarely on mat, floor, or turf. The feet are held by the a partner. To perform the sit-ups, the pupil brings head and elbows forward in a curl-up motion, touching elbows to knees. In retraining to the supine position, the elbows should touch the floor each time.
No sit-ups are counted when the pupil does not: (a) keep the fingers clasped behind neck; (b) bring both elbows forward in starting to sit up, without pushing off the floor with an elbow; or (c) return to the starting position with elbows flat on the starting position with elbows flat on the surface before sitting up again.

Scoring: The number of sit-ups the pupil can execute correctly in one minute will constitute the score.

Standing broad jump

Equipment: Mat, floor, or outdoor jumping pit and tape measure.

Procedure: A takeoff line is drawn on the floor, ground, or mat. The pupil stands with the feet slightly apart and toes just behind the take-off line. Preparatory to jumping, the pupil swings the arms backward and bends knees and swinging forward the arms. Taking off from both feet simultaneously, jumps as far as possible, landing on both feet.

Scoring: Record the best of three trials to the nearest inch from the takeoff line to the closest heel position; if the pupil falls back, he or she should retake the test.

The raw scores pertaining to pre and post tests of fitness variables of control and experimental groups of educable and
trainable mentally retarded children are presented in appendix J, K, L, M, R, S, T and U respectively.

**Development of the Programme**

Through the review of literature and promising practices in the field, and also with help of the instructional resource materials, the investigator has developed a draft of 12-weeks adapted physical education programme. The programme represented a wide range of content derived from a set of educational goals for students which were based on findings of research, assumptions in the rationale explicity stated, and values of participants within the programme.

The 12 weeks adapted physical education programme examined initially by five experts who deals with adapted physical education at Lakshmibai National College of Physical Education, Gwalior and Trivandrum. The suggestions and recommendations recieved from the these experts were taken into account in order to improve the 12 weeks adapted physical education programme.

After making the neccessary changes and modifications, the revised programme was once again send to the experts for their final approval and comments. On the basis of the feedback received from the experts a final draft of the
programme was developed and administered on the experimental groups. The 12 weeks adapted physical education programme for educable and trainable mentally retarded children is presented in appendix-A.

**Model for Implementation of the Programme**

The implementation model contributes to quality programming in important ways.

1. It provides a systematic model for planning, implementing, and evaluating instructional programmes for mentally retarded students.

2. It provides a systematic approach to design and implement effective instruction for students with handicapping conditions.

3. It provides the basis for inservice programme design directly linked to student's assessed needs on a set of education goals and to teacher's strength and needs in planning and implementing the programme.

The implementation model presented below illustrates the series of sequential steps that investigator has taken to plan, to implement and to evaluate the programme.
1. **Programme Goals**:

To improve mentally retarded children's motor, cognitive and social process and their resulting behaviour following subordinate goals, programme objectives, performance objectives were formulated.

A. **Subordinate Goals**:

1. Improvement and control of movement of body.
2. Improvement of perceptive faculty (e.g., Spatial orientation)
3. Improved knowledge of different kinds of equipment.
4. Improved adaptability and capacity to co-operate in exercises and games with other children.

B. **Programme Objectives**:

1. To improve motor ability
2. To improve fitness
3. To improve body mechanics
4. To learn a variety of skills, games and sports
5. To develop acceptable social traits
6. To develop acceptable emotional traits
7. To develop positive body image
8. To develop positive self-concept
9. To promote a better understanding
10. To use leisure time more constructively

C. PERFORMANCE OBJECTIVES:

Performance objectives is the basic element of the materials used in programme planning.

Body Management

Body awareness 7
Space concepts 4
Body control 4

Fundamental Skills

Locomotor skills 7
Non-locomotor skills 4

Manipulative Skills 8

Health/Fitness

Physical fitness 7

Apparatus and Non Apparatus Skills 3

Gymnastics 6

Stunts

Animal walks 5
Individual stunts 4
Partner and group stunts 6
Balance stunts 2
Individual Sports

Track and Field 3

Team Sports

Basket ball 10

Total (80)

2. PROGRAMME PLAN:

(a) Duration : 12 weeks
(b) Schedules : 12 (5 days/week)
(c) Instructional Units : 60 (12 weeks x 5 days)
(d) Instructional Time : 50 Minute (per day)

3. MANAGEMENT DETAILS OF THE PROGRAMME:

Method of Teaching:

Verbal, Visual, Kinesthetic, Tactile, Movement exploration and combination.

4. ON-GOING EVALUATION PLAN:

Summative Evaluation - Pre/Post tests
Formative Evaluation - End of the each instructional units
5. **REINFORCEMENT PROCEDURES**:  
- Show more and explain less.
- Repeat more and explain less.
- Repeat their successes several times.
- Shorten sentences, using fewer verbal cues and more visual and tactile cues.
- Simplify instructions and repeat them frequently.
- Use frequent demonstrations of the task to be learned.

6. **FACILITIES AND EQUIPMENT**:

   Facilities and equipment were evaluated in terms of safety, adequacy, appropriateness and efficiency.

7. **EVALUATION**:

   The programme evaluation can help to determine the degree of effectiveness of the programme, provide instructional accountability at all levels of decision-making in the delivery of the programme, and strengthen planning and implementation activity when data are systematically collected about context and operation of the programme.

   The effectiveness of the programme was measured by the statistical analysis of pre and post test results.
8. RECOMMENDATIONS:

On the basis of information drawn from the evaluation yields data to develop cost-benefit analyses to properly document and/or define programmatic needs; to revise and redevelop the program or its components; as well as to judge its effects.

Administration of the Programme

The programme was implemented for a period of twelve weeks excluding the period utilized for initial and final tests of the selected criterion variables.

The prescribed programme schedule was applied to the two experimental groups by the research scholar with help of the other physical education teachers who strictly followed the instructions of the research scholar. At the same time the control group spent the same amount of time in participating freeplay and other teacher directed recreation activities.

The educable mentally retarded (EMR) subjects performed the workouts in forenoon session and trainable mentally retarded (TMR) subjects carried out their training programme in the afternoon session.

The programme was implemented on the experimental groups for twelve weeks during the regular school hours for a
period of 50 minute per day, five days per week.

Training load is the principal stimulus for starting the psycho-physiological process of adaptation which eventually lead to increase in performance capacity. Higher performance will be achieved, when the organism adapts to a higher level of functioning. This is possible only by increasing the load. The step method of increasing load on the basis of principal of progression of load was used to result stronger stimulus to the organism for adaptation of the mentally retarded children.

**Statistical Techniques Employed**

To test the effects of the adapted physical education programme on the experimental groups of educable and trainable mentally Retarded children in the motor performance and fitness status seperately, the Analysis of Covariance (ANCOVA) was used. ANCOVA was used because even with random assignment the mean and S.D of the groups were not exactly equal. ANCOVA helps the research scholar to statistically control the differences on the pretest. So that post test differences would not be due to initial differences, prior to training.

For testing the hypothesis the level of significance was set at 0.5 level.