Chapter IV

ANALYSIS OF DATA AND RESULTS OF THE STUDY

The Reliability of data, level of significance, findings and discussion of findings are presented in this chapter. The raw data is presented in Appendix C.

Reliability of Data

The reliability of responses in the three criterion variables, namely, Movement Satisfaction, Attitude Towards Physical Activity and Self-Concept was computed using the split-half method. Items on the questionnaires for each of the three variables were divided into two equal halves, putting odd-numbered items in one half and even-numbered items in the other. Correlation coefficients were computed between the resultant two sets of scores for each of the variables. The obtained half-test coefficients were converted into coefficients of reliability for the whole test using Spearman-Brown Prophecy formula. The reliability

coefficients are presented in Table 2.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient of Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Movement Satisfaction</td>
<td>.79</td>
</tr>
<tr>
<td>Attitude Towards Physical Activity</td>
<td>.74</td>
</tr>
<tr>
<td>Self-Concept</td>
<td>.76</td>
</tr>
</tbody>
</table>

These values of reliability coefficients are quite high and conform to the range prescribed for affective measurement.

**Level of Significance**

Significance of the difference between pre- and post-test means of the two groups as well as the significance of the difference between the groups on pre- and post-test means was tested at .01 level. A two-tailed test of significance was used to test the pre-test means of the two groups. Comparison of post-test means of the two groups and that between pre- and post-test means of each group was made using a
one-tailed test of significance.

Findings

Movement Satisfaction

The findings of the study pertaining to the comparison of Movement Education (ME) and Traditional Physical Education (TPE) groups on pre- and post-tests of Movement Satisfaction are presented in Table 3.

<table>
<thead>
<tr>
<th>Mean Scores</th>
<th>Groups Compared</th>
<th>Difference Between Means</th>
<th>$\sigma_{DM}$</th>
<th>$t$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>ME 105.98, TPE 104.52</td>
<td>1.46</td>
<td>2.035</td>
<td>0.717</td>
</tr>
<tr>
<td>Post-test</td>
<td>ME 110.58, TPE 106.40</td>
<td>4.18</td>
<td>1.820</td>
<td>2.296</td>
</tr>
</tbody>
</table>

$t .01 (98) = 2.63$ (Two-tailed test)

$t .01 (98) = 2.36$ (One-tailed test)

Table 3 reveals that the two groups did not differ significantly either before or after the experiment.
The comparison of pre-and post-test scores of the two groups is summarized in Table 4.

**TABLE 4**

**COMPARISON BETWEEN PRE-AND POST-TEST SCORES IN MOVEMENT SATISFACTION OF MOVEMENT EDUCATION GROUP AND TRADITIONAL PHYSICAL EDUCATION GROUP**

<table>
<thead>
<tr>
<th>Groups</th>
<th>Mean Scores Compared</th>
<th>Difference Between Means</th>
<th>$\sigma_{DM}$</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ME</td>
<td>105.98</td>
<td>110.58</td>
<td>4.60</td>
<td>1.159</td>
</tr>
<tr>
<td>TPE</td>
<td>104.52</td>
<td>106.40</td>
<td>1.88</td>
<td>1.236</td>
</tr>
</tbody>
</table>

*Significant at .01 level.

$t_{.01 (49)} = 2.40$ (One-tailed test)

It can be seen from Table 4 that the ME group exhibited a significantly higher level of movement satisfaction on post-test, whereas the progress made by the TPE group was insignificant.

Figure 1 presents the percentile bar diagrams for pre- and post-test scores of the two groups on movement satisfaction.

As can be seen, the position of the two groups on the pre-test is almost the same at the 50th percentile
Fig. 1. Percentile Bar Diagrams for Pre- and Post-test Scores in Movement Satisfaction of ME and TPE Groups.
However, on the post-test the ME group has a median of 111 whereas the TPE group has a median of 106. It is also noteworthy that the ME group shows a superiority on post-test from the zero percentile up to the 90th percentile, but at the 100th percentile the TPE group is superior to the ME group.

Discussion of Findings

The finding of no significant difference between the ME and TPE groups on pre-test clearly indicates that the two groups were comparable before the start of the experiment. The post-test group means also do not differ significantly. However, while on the pre-test the difference between the group means was 1.46 in favour of the ME group the difference on the post-test was 4.18, resulting in a 't' ratio of 2.30, which is very close to the tabulated value of 2.36. Thus, it can be said that the Movement Education programme was quite effective in enhancing the satisfaction felt by the students in their movement experiences. As the two groups were quite similar on the pre-test and exhibited considerable difference on post-test, it may be inferred that the movement experiences involving freedom of exploration, creative self-expression, problem-solving without imposed judgement, and guided-discovery
of new movement patterns are more conducive to greater satisfaction than are the experiences provided by the Traditional Physical Education programme which are largely restricted to teacher-controlled participation, rigid patterns of movement, competition-oriented performance, and that are finally judged as to their effectiveness by the outward results they produce.

Such a finding is not surprising as, children, being active by nature and having multiple individual differences, like to participate in physical activity according to their choice which necessitates a free atmosphere with ample facilities. These basic characteristics of children find correspondence in Movement Education and, hence, children perceive the Movement Education programme to be satisfying in nature.

The null hypotheses of no significant difference between the ME group and the TPE groups on pre- and post-tests were retained.

The findings of Table 4 indicate that the ME group made a significant improvement from pre-to post-test, whereas the TPE group did not make any significant improvement.

The Tanner Movement Satisfaction Scale has a
core continuum ranging from a minimum of 30 points to a maximum of 150 points. Thus, the initial score of 104.52 for the TPE group would correspond roughly to 62 per cent, indicating that even the Traditional Physical Education programme used in the school was fairly satisfying to the students. The significant improvement made by the ME group implies that even with good Traditional Physical Education programme the inclusion of Movement Education brings about further increase in movement satisfaction expressed by the students.

The post-test average score of 110.58 of the ME group corresponds to 67 per cent of the maximum possible score. Apparently, the practical limitations imposed by the duration of the experimental period as well as the frequency and duration of each session are the limiting factors in the increase of movement satisfaction and not the Movement Education programme per se. Given a place in the curriculum of elementary schools, Movement Education can effectively contribute to the allround development of children.

The superiority of ME group over the TPE group from $P_0$ to $P_{90}$ noted in Figure 1 above may be interpreted to mean that, whereas the children with the highest movement satisfaction do not show any preferen-
tial response to Movement Education, the other children do respond favourably. It is also relevant to note here that the extent of improvement in the ME group diminishes from 7 units at zero percentile to 5 units at 50th percentile, and further, to 3 units at the 90th percentile. On the other hand, the TPE group shows a mixed response of gain and reduction; exhibiting gain at the 10th, 25th, 50th, 75th and 100th percentiles, and reduction at zero and 90th percentiles.

Attitude Towards Physical Activity

The findings of the study pertaining to the comparison of the two groups on Attitude Towards Physical Activity before and after the administration of experimental treatment have been summarized in Table 5.

| TABLE 5 |
| COMPARISON OF MOVEMENT EDUCATION GROUP AND TRADITIONAL PHYSICAL EDUCATION GROUP ON PRE- AND POST-TESTS OF ATTITUDE TOWARDS PHYSICAL ACTIVITY |

<table>
<thead>
<tr>
<th>Mean Scores</th>
<th>Groups Compared</th>
<th>Difference Between Means</th>
<th>$t_{DM}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>235.38</td>
<td>235.9</td>
<td>0.52</td>
</tr>
<tr>
<td>Post-test</td>
<td>237.18</td>
<td>237.0</td>
<td>0.18</td>
</tr>
</tbody>
</table>

$t_{.01 (98)} = 2.63$ (Two-tailed test)

$t_{.01 (98)} = 2.36$ (One-tailed test)
The two groups do not differ significantly either on pre-test or on post-test.

Table 6 presents the comparison between pre- and post-test scores for the two groups separately.

**TABLE 6**

**COMPARISON BETWEEN PRE- AND POST-TEST SCORES IN ATTITUDE TOWARDS PHYSICAL ACTIVITY OF MOVEMENT EDUCATION GROUP AND TRADITIONAL PHYSICAL EDUCATION GROUP**

<table>
<thead>
<tr>
<th>Groups</th>
<th>Mean Scores Compared</th>
<th>Difference</th>
<th>$\sigma_{DM}$</th>
<th>n Means</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
<td>Be</td>
<td></td>
</tr>
<tr>
<td>ME</td>
<td>235.38</td>
<td>237.18</td>
<td>1.80</td>
<td>0.695</td>
</tr>
<tr>
<td>TPE</td>
<td>235.90</td>
<td>237.00</td>
<td>1.10</td>
<td>0.635</td>
</tr>
</tbody>
</table>

*Significant at .01 level.

$t_{0.01 (49)} = 2.40$ (One-tailed test).

It can be seen from Table 6 that the ME group has made a significant improvement in its attitude towards physical activity; the mean gain of 1.80 being statistically significant at .01 level. The TPE group, however, has not exhibited significant improvement, though a fair amount of improvement is also seen in this group; the mean gain being 1.10.
The percentile bar diagrams for the pre- and post-test scores of the two groups in Attitude Towards Physical Activity are presented in Figure 2.

It can be noticed that the marginal superiority of the ME group on post-test is due to the improvement made by subjects falling below 50th percentile; those subjects in the ME group who are above 50th percentile, do not show any superiority over the subjects in the TPE group.

Discussion of findings

A perusal of Tables 5 and 6 brings out a noteworthy occurrence in the present investigation. While the two groups do not differ significantly either on pre-test or on post-test, and the TPE group does not exhibit a significant improvement from pre- to post-test, mean gain made by the ME group is significant. As it can also be seen from Figure 2, this occurrence is due to the fact that the ME group had a slightly lower average score on pre-test and a slightly higher average score on post-test in comparison to the TPE group. Thus, the nett improvement made by this group attains statistical significance.
The findings of this study are consistent with the conclusions drawn by Reenan, Fowler and Carlyle that those students who are exposed to Movement Education will have a more positive attitude towards physical activity than that of those who are exposed to traditional Physical Education.

Both the groups in the present investigation have exhibited very favourable attitude towards physical activity even before the experimental treatment was begun. This testifies to the overall efficacy of the physical education program at the school where the investigation was conducted. Thus, the improvement made by the ME group was very small, though significant. However, the expressed improvement for the ME group and the TPE group were 45.1 per cent and 35.6 per cent respectively, indicating that there is some hope for future improvement.

Fig. 2. Percentile Bar Diagrams for Pre- and Post-test Scores in Attitude Towards Physical Activity of ME and TPE Groups.
The findings of this study are consistent with the conclusions drawn by Reams, Fowler, and Carty that those students who are exposed to Movement Education will have a more positive attitude towards physical activity than that of those who are exposed to Traditional Physical Education.

Both the groups in the present investigation have exhibited a very favourable attitude towards physical activity even before the experimental treatment was begun. This testifies to the overall adequacy of the regular physical education programme of the school where the investigation was conducted. Thus, the improvement made by the ME group was very small, though significant. However, the average post-test scores for the ME group and the TPE group were 65.7 per cent and 65.6 per cent respectively, indicating that there is ample scope for further improvement.


66 Fowler, Dissertation Abstracts International p. 5095-A.

67 Carty, Dissertation Abstracts International, P. 2547-A.
Attitude being an affective trait, develops on a continuum of internalization — beginning at receiving, continuing through responding, valuing, organization, characterization and ending at evaluation.\(^{68}\)

The process of internalization is quite slow and, therefore, the development of attitudes becomes a fairly long process. The present study has revealed that significant improvement can be made in the attitude of elementary school children towards physical activity in twelve weeks; a longer experimental period would have brought about a greater improvement.

Thus, it may be safely inferred that inclusion of Movement Education in the curriculum would almost certainly bring about further improvement in attitude towards physical activity not only in terms of immediate outward expression of attitude but also an internalization which will last through the adult years, thereby acting as a positive influence for participation in physical activity.

As the ME group has shown a significant improvement from pre- to post-test, the null hypothesis in this

\(^{68}\)Krathwohl, Bloom and Masia, Taxonomy of Educational Objectives: The Classification of Educational Goals Handbook II: Affective Domain, pp. 4-7.
case is rejected and the alternative hypothesis of the superiority of Movement Education over Traditional Physical Education in bringing about a more favourable attitude towards physical activity is accepted. As the mean scores for the TPE group from pre- to post-test and the mean scores of the two groups on pre- as well as post-tests do not exhibit any significant differences, the null hypotheses in these cases are retained.

Much of the improvement made by the ME group is by subjects below the 50th percentile. Comparison of the percentile positions of the two groups on post-test reveals that above the 50th percentile, the TPE group has a slight edge over the ME group.

Self-Concept

The comparison of ME and TPE groups on pre- and post-tests for self-concept is presented in Table 7.
TABLE 7

COMPARISON OF MOVEMENT EDUCATION GROUP AND TRADITIONAL PHYSICAL EDUCATION GROUP ON PRE- AND POST-TESTS OF SELF-CONCEPT

<table>
<thead>
<tr>
<th>Mean Scores</th>
<th>Groups Compared</th>
<th>Difference Between Means</th>
<th>( \sigma_{DM} )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ME</td>
<td>TPE</td>
<td></td>
</tr>
<tr>
<td>Pre-test</td>
<td>136.14</td>
<td>135.68</td>
<td>0.46</td>
</tr>
<tr>
<td>Post-test</td>
<td>138.16</td>
<td>136.82</td>
<td>1.34</td>
</tr>
</tbody>
</table>

\( t_{.01 (98)} = 2.63 \) (Two-tailed test)

\( t_{.01 (98)} = 2.36 \) (one-tailed test)

As the 't' ratios for both pre-test and post-test comparison between the groups are far below the value required for significance, the mean differences of 0.46 and 1.34 on pre- and post-tests respectively, may be attributed to sampling error; there is no real difference between the two groups with regard to self concept either before or after the experiment.

The comparison of pre- and post-test mean scores in self-concept for the two groups is presented in Table 8.
TABLE 8

COMPARISON BETWEEN PRE- AND POST-TEST SCORES IN
SELF-CONCEPT OF MOVEMENT EDUCATION GROUP
AND TRADITIONAL PHYSICAL EDUCATION
GROUP

<table>
<thead>
<tr>
<th>Groups</th>
<th>Mean Scores Compared</th>
<th>Difference Between Means</th>
<th>( \sigma_{DM} )</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
<td></td>
</tr>
<tr>
<td>ME</td>
<td>136.14</td>
<td>138.16</td>
<td>2.02</td>
</tr>
<tr>
<td>TPE</td>
<td>135.68</td>
<td>136.83</td>
<td>1.14</td>
</tr>
</tbody>
</table>

*Significant at .01 level.
\( t_{.01 (49)} = 2.40 \) (one-tailed test).

The ME group has made an improvement of 2.02 which is statistically significant whereas, the TPE group has not made any significant improvement.

Figure 3 presents the percentile bar diagrams for the two groups on pre- and post-tests of self-concept.

The percentile positions of the two groups on pre-test are almost similar. On post-test, however, the ME group exhibits better positions through the whole range of percentiles, especially so at the zero percentile.
Though the two groups do not differ significantly on pre-test or on post-test, the significance of movement made by the group trained in movement is clearly indicative of the superiority of Movement Education over traditional Physical Education.

The mean scores of the ME and TPE groups are 80.1 and 80.5, respectively. Once again, it is not exactly that the subjects in this study had a fairly homogenous self-concept. Even before the comparisons were made, Movement Education had been proved to be more effective than traditional Physical Education in improving the self-concept of the subjects tested.

The improvements made by the ME group in the pre-test being significant, the null hypothesis of no real difference between the pre- and post-test scores of the group is rejected. The other three hypotheses of no real difference could not be rejected, i.e., the differences between the mean scores were not significant.

Fig. 3. Percentile Bar Diagrams for Pre- and Post-test Scores in Self-Concept of ME and TPE Groups.
Discussion of findings

Though the two groups do not differ significantly either on pre-test or on post-test, the significance of improvement made by ME group from pre- to post-test is clearly indicative of the superiority of Movement Education over Traditional Physical Education.

The percentage scores of the ME and TPE groups on pre-test are 60.1 and 59.8 respectively. Once again it is noticeable that the subjects in this study had a fairly healthy self-concept even before the experimentation was begun. Movement Education has been proved to be more effective than Traditional Physical Education in improving the self-concept of the subjects further.

The improvement made by the ME group from pre- to post-test being significant, the null hypothesis of no real difference between the pre- and post-test scores of this group is rejected. The other three hypotheses of no real difference could not be rejected, as, the differences between the mean scores were not significant.

The findings of Wescott⁶⁹ lend further support

---

to the findings of the present investigation in concluding that a free atmosphere with ample opportunities for children to satisfy their intrinsic urge for physical activity through creative self-expression and movement exploration is essential for the development of a positive self-concept.

The fact that subjects in the present investigation had a positive self-concept before the experiment, and, that only the ME group exhibited an improvement after twelve weeks of participation, indicates that, though a good programme of Traditional Physical Education is conducive to the development of a positive self-concept, children participating in such a programme for a fairly long duration, exhibit a levelling off of the increase in self-concept, but the Movement Education programme can lead the children through further improvement.

As pointed out by Mauser and Reynolds, improvement of self-concept is a time-consuming process. It would require not only excellent skill, leadership

---

lities and a thorough understanding of the foundations of Movement Education, but also continued application of the method to bring about desired changes in self-concept.