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A Comparison of the Effects on Development of Physical Fitness and Motor Skills of Two Physical Education Programs with Opposite Program Emphases

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A COMPARISON OF THE EFFECTS ON DEVELOPMENT OF PHYSICAL FITNESS AND MOTOR SKILLS OF TWO PHYSICAL EDUCATION PROGRAMS WITH OPPOSITE PROGRAM EMPHASES

A Thesis
Presented to
the Graduate Faculty
Central Washington State College

In Partial Fulfillment
of the Requirements for the Degree
Master of Education

by
David L. Haynie
August 1969
APPROVED FOR THE GRADUATE FACULTY

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Dan A. Unruh
ACKNOWLEDGMENT

I wish to express my appreciation to Dr. Robert N. Irving, Graduate Committee Chairman, whose enthusiastic support and wise counsel made this study possible. I wish also, to extend appreciation to Dr. Dan Unruh and Mr. Monte Reynolds for serving on my committee.

Special appreciation is expressed to my wife Marilyn for the encouragement and help she has given.
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CHAPTER I

THE PROBLEM AND DEFINITIONS OF TERMS

Much stress has been put on physical education, especially in the past decade. While physical education in the schools has been oriented to a peace time culture, nevertheless, wars have influenced physical education in this country. The tragic lessons of World War I, when a large proportion of our youth was found physically unfit to defend their country from mortal danger, resulted in a tremendous expansion of the number of physical education programs in educational institutions. During World War II, many physical educators were utilized by the armed forces in physical conditioning of military personnel (5:21-22).

Prior to the war, this nation, despite its tremendous resources, did not provide widespread and adequate training in physical education for all boys and girls. Only one half of our high-school population was enrolled in such programs. The situation is much worse on the elementary-school level, where adequate physical education programs in general, have been lacking (5:22).

Recently more emphasis has been placed on the elementary physical education program. The Kraus-Weber Test in 1953 was the stimulating factor needed to show the great importance for more emphasis on the elementary
physical education program.

The seriousness of this problem of the lack of emphasis on elementary physical education was well exemplified in the formulation of the Council on Youth Fitness and a national Citizens Advisory Committee on the Fitness of American Youth by President Dwight D. Eisenhower during his second term of office (5:22).

It should be emphasized, however, that physical fitness should not be considered the only objective in this field. Physical education should also include the development of proper skills for the continued use of physical education activities during one's leisure hours. With the average working week being less than 40 hours, people find they have more leisure time to enjoy their favorite recreational activities, than they did in the past.

With this increased stress on physical education, comes the responsibility of the personnel in the physical education department to develop the fitness and skills of our youth. To succeed at this task takes not only time, good facilities, and adequate personnel, but a well planned program effective in developing physical fitness and skills.

The writer, being in the field of physical education and especially interested in the area of elementary physical education, decided to conduct this study in an attempt to improve physical education in the elementary schools.
I. THE PROBLEM

Statement of the problem. The purpose of this study was to compare the effects on development of physical fitness and motor skills of two physical education programs having opposite program emphases, using as subjects for the comparison, seventh grade boys at Michael T. Simmons School in Tumwater, Washington.

Group A spent two-thirds of their class time emphasizing fitness and one-third of their time emphasizing skills. Group B spent two-thirds of their class time emphasizing skills and one-third of their time emphasizing fitness. The two groups were involved in a pre-test, post-test situation.

The major subproblems to be dealt with were: (1) the determination of the physical fitness level and the sports' skills level of the individuals in the two different groups; (2) the organization of the fitness and skills programs; and (3) the treatment of the data.

Importance of the study. The rapidly changing society puts a great emphasis on the need for change in curriculum development. Curriculum change and development must be made in the area of physical education as well as other areas of education. The knowledge of the students
performance level in physical education is essential to the understanding of the total capabilities of the children.

The writer feels that physical fitness seems to affect the performance of the pupil in other aspects of the education program as well as physical education. By improving the pupil's physical fitness level the writer believes that the pupil will also improve in other areas of education. Jenny stated that:

Physical fitness is a phase of total fitness and total fitness is not possible without physical fitness (12:115).

The school administrator must also concern himself with the physical fitness of students because of the tremendously important relationship between it and the total educational program.

Limitations of the study. The following are recognized as limitations of the study:

1. The study was limited to the number of boys in the seventh grade at Michael T. Simmons School in Tumwater, Washington.

2. The amount of time the boys had to participate was determined by the time scheduled for the programs. This time amounted to three periods a week, each period consisting of 40 minutes.
3. The study was limited to the variations of training of the students by their teacher as to what constituted "proper" execution of an exercise.

**Basic assumptions about the study.** The following are basic assumptions made in this study:

1. It is assumed that all students clearly understood the directions of the tests.
2. It is assumed that all students use their best form and exerted maximum effort.
3. It is assumed that each student received the same amount of extrinsic motivation.
4. It is assumed that the two groups are approximately equal in respect to the amount of outside of class participation in physical activity.

II. DEFINITIONS OF TERMS USED

The following definitions will aid the reader in interpreting the context of this thesis:

**Extrinsic motivation.** According to the Dictionary of Education, extrinsic motivation is the application of incentives that are external to a given activity to make work palatable and to facilitate performance (8:354).
Content validity. According to the Dictionary of Education, content validity is validity demonstrable from a careful examination of the items (8:593).

Physical fitness. Hunsicker's definition, as used by Hanson was stated as follows:

Physical fitness is composed of many components and attributes. A partial list would include body strength, muscular endurance, agility, cardiorespiratory efficiency, speed, balance, and flexibility (11:6).

Physical fitness level. For the purpose of this study, this term will be used to describe the subject's scores on physical fitness tests.

Student. A boy in the seventh grade.

Sports' skills. Miller and Whitcomb's definition as used by Hanson was stated as follows:

Sports' skills are fundamental skills of team or individual sports exclusive of the locomotor skills. Sports' skills are usually thought to include throwing, catching, striking, kicking, and combinations of these skills (19:118).

Sports' skills level. For the purpose of this study, this term will be used to describe the subject's scores on skills tests.

$T_1$. For the purpose of this study, the pre-test scores recorded in the fall will be referred to as the
$T_1$ scores.

$T_2$. For the purpose of this study, the post-test scores recorded in the spring will be referred to as the $T_2$ scores.

III. OVERVIEW OF REMAINDER OF THESIS

Chapter two will present briefly the background of the study, the influence of age, height, and weight, and the related studies.

Chapter three explains the procedures followed in the study, including the tests used, the organization and administration of the tests, collection of the data, the organization of the respective programs, and statistical treatment of the data.

The data are presented with the findings analyzed and discussed in chapter four, followed by the summary, conclusions, and recommendations in chapter five. The bibliography and appendices conclude the thesis.
CHAPTER II

REVIEW OF THE LITERATURE

I. BACKGROUND OF THE PROBLEM

In today's rapidly changing society great emphasis is placed on physical fitness. This great emphasis is not new, but rather an old concept that has affected society for a great number of years.

Man's earliest endeavor to perfect the body, discipline the mind and mold the character of the young by means of selected forms of physical activity could doubtless be traced back to prehistoric times (17:2).

However, the most recent surge of interest can be traced back to the research conducted by Kraus and Weber in 1953. As a result of the Kraus-Weber Test, which compared American school age children, with European school age children and found that the European children were superior in fitness to American children, President Eisenhower demonstrated the nation's interest in physical education when he established The President's Council on Youth Fitness in June of 1956 (10:16).

The past three presidents, Dwight Eisenhower, John Kennedy, and Lyndon Johnson, have declared that the strength of a nation can be measured by the fitness of its youth (10:16).
Increased emphasis on elementary education. In 1959, two hundred representatives from thirty-five states attended The National Conference on Fitness of Children of Elementary School Age, in Washington D.C. to consider ways whereby elementary physical education might contribute to the fitness of children (9:307). Since this time much has been done to improve the fitness of children.

Only in the last two decades has elementary education been given a spotlight equal in importance to that of secondary and higher education. Now experts and the public realize that the very best teachers, equipment and facilities should be provided not only at the elementary level, but also at the pre-school level. Likewise the importance of physical education at the elementary age has not been emphasized until recently (10:15).

Not only physical fitness, but physical skills have played an important role in today's society. Although the development of skills has not received as much publicity as the development of physical fitness, teaching skills is an integral part of our physical education program.

The increased emphasis on elementary physical education stresses not only the development of physical fitness but the development of physical skills. The elementary years are considered to be highly important in terms of skill learning.
II. TEST SELECTION

The nature of the testing procedure involved required tests to be selected to test both physical fitness and skills.

Criteria of selecting tests. The criteria used for selection of the tests were as follows:

1. The items selected for testing should represent basic fitness and sports' skills.
2. The tests should be applicable to boys in the seventh grade.
3. The tests should be simple to organize, to administer, to score, and to interpret.
4. The tests should be easy to administer within the time limits of the class.
5. The equipment for the tests should be inexpensive and easy to obtain.
6. The performances required should be safe for the children.

Tests to be used. The tests used in this study were taken from the study by Hanson (10:204).

Fundamental Sport Skills

1. Overhand Throw
2. Wall Pass
3. Soccer Punt
4. Soccer Wall Volley
5. Striking Underhand (Volleyball Serve)
6. Pitching Underhand

Fundamental Aspects of Physical Fitness
7. Shuttle Run (Short Potato Race)
8. Pull-Ups
9. Jump and Reach
10. Sit-Ups
11. Hanson Shoulder Test (Double Arm Travel)
12. Modified Bass Balance
13. Fifty-Yard Dash
14. Standing Broad Jump
15. 600 Yard Walk-Run

For a description of these test items see Appendix A.

Reasons for choosing these tests. Hanson developed a battery of sixteen tests to complete her Ph.D. dissertation at the University of Washington in the area of motor performance testing of elementary school age children. The analysis of these sixteen tests, which measured fundamental sports' skills and motor fitness, indicated that the tests were reliable for the population measured and also that the tests were acceptable by virtue of content validity. Hanson's dissertation included a table containing the reliability coefficients for all sixteen tests and also a complete percentile ranking of the sixteen tests.
These sixteen tests were developed to measure motor performance. Six of the tests were to be used to test sports' skills and the remaining ten tests were to be used to test motor fitness. It was decided that rope skipping, a measure of fitness, would be omitted from the testing program due to the fact that a certain amount of skill is required to jump rope and that one's fitness score in the test might very well be adversely affected by his inability to execute the skill of rope jumping.

Validity of tests. Hanson accepted her tests on the basis of content validity, because she stated in her dissertation that it was not her intent to make claims for the relationship of scores on individual test items to performance in any sport or to general accomplishment.

Reliability of tests. The reliability of Hanson's tests ranged from .60 in the volleyball serve to .90 in the overhand throw.

III. AGE, HEIGHT, AND WEIGHT

The influence of age, height, and weight. Research workers have long been interested in the use of classification indices to judge children's performances, most of them formulated upon age, height, and weight.
The value of the use of such indices has become a controversial topic. Many early leaders in the profession were convinced of the need to classify subjects into groups for proper and fair evaluation. These indices were composed of a weighted combination of age, height, and weight. After 1950, the research was more definitive, and the need for such classification indices was questioned. Recent textbooks differ in their recommendations. For example, Hanson quotes Barrow and McGee as stating that:

When the three factors of age, height, and weight are taken into consideration, a much fairer and more meaningful test score is obtained (10:52).

According to Hanson, Fleishman discussed the interpretation of fitness test scores and stated that:

It is our feeling that available 'size' indices leave much to be desired and may introduce more error than correction (10:53).

McCloy, who was the first to study the best weighting of age, height, and weight, developed the following classification index:

Classification Index I = (20 x age) + (6 x height) + weight (5:305).

According to Hanson, studies since 1950 have tended to dispute the claims of the importance of using a classification index to judge motor performance fairly. In most studies, there seemed to be little or no relationship between gross motor skills and age, height,
and weight (10:56). Seils (20:260) supported that finding in his research on primary children, and at the intermediate grade level, Josephs, (10:56) Latchaw, (10:56) and Cearly, (4:222) also arrived at the same conclusion. Age alone appeared to have the highest relationship.

In 1960, Solley tested 118 boys, ages, ten through fourteen and stated that:

There was no evidence to support the claim that boys who are big for their age or small for their age may be expected to perform better or worse in physical skills from the standpoint of motor coordination (22:304).

Barry and Cureton supported this statement in a factor analysis study of boys ages seven through eleven (1:297).

In 1963, Espenschade, reported on a restudy of the California Physical Performance Tests beginning with age ten. Multiple correlations on five test events with height and weight were low ranging from .20 to .44. However, significant changes did occur with age alone, and age was recommended as a basis for the development of test norms.

IV. RELATED STUDIES

A review of the literature revealed that there was limited research done involving a combination of fitness tests and skills tests at the intermediate grade level. The majority of the studies were either concerned only with fitness tests, motor fitness tests, or skills tests,
rather than a combination of the three.

**Fitness tests.** The period of World War II saw a return of the fitness emphasis and measurement. However, no national scales were developed for the elementary age level until 1957 following the controversial Kraus-Weber findings published in 1954 which indicated that American youth were much less fit than European youth (15:188). As a result, the Youth Fitness Test Battery was developed by the American Association for Health, Physical Education, and Recreation (10:35). Seven fitness tests were developed for boys and girls grades five through twelve and norms were computed on two scales. One scale was based on age, and the other on age, height, and weight. The seven tests were: pull-ups, sit-ups, softball throw for distance, standing broad jump, shuttle run, fifty-yard dash, and 600 yard run-walk.

Soon thereafter, the President's Council on Youth Fitness developed a screening test for minimum fitness (10:35). It was recommended that pull-ups, sit-ups, and squat thrusts be administered to children in the fourth grade and up. Any child failing a test is to repeat it every six weeks until he can pass the minimum standards.

With the help of Kirchner, the State of Washington developed a Physical Fitness Test Manual for Elementary Schools (14). This test was designed to be administered by
classroom teachers to children ages six through twelve years. In 1958, standardized norms were developed from tests scores obtained from 2105 children representing rural and urban populations from throughout the state. Extensive use of the test coupled with a time lapse of five years, revealed the necessity of establishing new norms in 1964. These revised norms were based upon 16,667 cases representing broader rural and urban populations in this state. This test battery is designed to measure strength, endurance, power, and speed which are considered to be basic elements of physical fitness. The norms for this test were based on age only for each sex.

The State of Indiana developed a motor fitness test for elementary-school boys and girls, grades four to eight (5:229). The norms for this test were established for each of six groups. The groupings were determined from Classification Index scores computed from the best combination of age, height, and weight (3:178).

Skills Tests. Latchaw selected seven tests used to measure the skills of fourth, fifth, and sixth grade boys and girls. The tests included the standing broad jump, vertical jump, basketball wall pass, softball repeated throws, soccer wall volley, shuttle run, and speed. Reliability coefficients were reported and percentile ranks were computed for each test by sex and by grade (16:499).
Johnson standardized for boys and girls, five motor performance tests which included a throw and catch, kicking at a target, jump and reach, zig-zag run, and batting. Johnson concluded that the five tests would objectively measure the achievement in fundamental skills of boys and girls in grades one through six (13:10). Validity was determined by rankings of ability by the classroom teachers and those coefficients ranged from a low of .04 to .78. Reliabilities were established by a test, retest method on 50 cases for each sex at each grade level which ranged from .38 to .96.

Another comprehensive set of achievement scales for boys and girls, ages seven through fifteen, was published by Peacock (10:43). This was a cooperative project with the public schools of North Carolina for the purpose of measuring proficiency of children in the softball throw and soccer punt for distance, the forty-yard run, the broad jump, side stepping, tennis ball throw for accuracy, and grip strength. T-scores were published for each skill by sex and age level based on approximately one hundred to two hundred cases in each group.
CHAPTER III

PROCEDURES OF INVESTIGATION

This chapter consists of: (1) selection of tests; (2) organization of test situations; (3) organization of the physical education programs; (4) collection of data; and (5) statistical treatment of the data.

I. SELECTION OF TESTS

On the basis of the test selection criteria referred to in Chapter II, it was decided that Hanson's test battery was best suited to the purposes of this study. For a description of the items in this test see Appendix A.

II. ORGANIZATION OF TEST SITUATIONS

The following administrative requirements were considered in the organization of the testing situations:

Health status. Only those students who were physically able to participate in the regular physical education classes were tested.

Pupil orientation. Prior to taking the test all students were oriented as to the purposes of the test, the procedure of taking the tests, and the manner in which scores would be recorded.
Dates of administration of tests. The pre-test was started the third week of school and the post-test was started the second week in April. It took approximately six weeks to complete the tests.

Materials needed. The materials needed for the tests were: test directions obtained from Hanson's dissertation, score cards for both groups, chinning bars, softball, measuring tape, stop watch, soccer ball, volleyball, and six blocks of wood — 2" x 2" x 12".

III. ORGANIZATION OF THE PHYSICAL EDUCATION PROGRAMS

The study was organized so that students involved in the first program spent 20 minutes of their class time working on physical fitness activities and the remaining 10 minutes of their class time working on skills activities during each class period. The students involved in the second program spent 20 minutes on skills activities and 10 minutes of their class time working on fitness activities during each class period. The duration of the study was the 1968-1969 school year.

Since it was impossible for the writer to conduct the activities of both programs, the regular physical education teacher agreed to perform the tests and conduct the activities of both programs under the writer's supervision.
Following the completion of the T₁ tests, observations by the writer were made every two weeks. For an account of selected examples of these observations in the form of lesson plans see Appendix C.

IV. COLLECTION OF DATA

Recording scores. Each individual's raw test scores were recorded on score cards at the time of administration of the test. (Appendix B)

Test scoring. The fifteen test items were scored and administered according to instructions given by Hanson. Scores earned on these tests were recorded in terms of six-sigma standard scores and can be compared to norms by referring to the appropriate tables in Hanson's dissertation.

V. STATISTICAL TREATMENT OF DATA

In order to statistically compare the difference in standard scores between Group A and Group B the sum of the six skills tests and the sum of the nine fitness tests had to be obtained from the score cards. Once this was complete the sums of the pre-test were labeled T₁ and the sums from the post-test were labeled T₂.

The T₁ standard scores from Group A and Group B were statistically analyzed by use of the two-tailed t ratio
test for the significance of difference between means of uncorrelated groups to determine if the groups were from the same population. The $T_2$ scores were then compared for significance of difference using the same test.

In order to evaluate statistically the change in standard scores within Groups A and B, their respective $T_1$ tests were compared to their own $T_2$ tests by means of a one-tailed $t$ ratio test applied to correlated groups.
CHAPTER IV

ANALYSIS OF THE DATA

The purpose of this study was to compare the effects of two physical education programs having divergent program emphases. The first group, Group A, emphasized the development of physical fitness two-thirds of the class time and the development of skills one-third of the class time. The second group, Group B, emphasized development of skills two-thirds of the class time and development of fitness one-third of the class time.

Group A started with twenty-nine participants in the fall \(N=29\) for the pre-test, which is indicated in this study by the symbol \(T_1\). One subject transferred at the middle of the year leaving twenty-eight participants in the spring \(N=28\) for the post-test, which is indicated in this study by the symbol \(T_2\).

Group B started with thirty-two participants \(N=32\) for the \(T_1\) test in the fall. One subject transferred and another subject broke his leg leaving thirty \(N=30\) participants for the \(T_2\) test in the spring.

I. INTER-GROUP COMPARISONS OF \(T_1\) SCORES

Inter-group comparisons of the \(T_1\) scores were made to see if the groups were initially from the same
population. See Table I. The standard scores for fitness from Group A were compared with the standard scores for fitness from Group B, using a two-tailed $t$ ratio test for the significance of difference between means of uncorrelated groups. The $T_1$ test mean score for Group A was 417.45. The $T_2$ test mean score for Group B was 417.78. The difference between the mean scores was .33. This resulted in a $t$ ratio of .012 which was not statistically significant. This meant that there was almost no difference in the fitness levels between Group A and Group B at the beginning of the program.

The standard scores for skills from Group A were compared with the standard scores for skills from Group B using the two-tailed $t$ ratio test for the significance of difference between means of uncorrelated groups. The $T_1$ test mean score for Group A was 285.30. The $T_2$ test mean score for Group B was 267.28. The difference between the mean scores was 18.02. This gave a $t$ ratio of 1.059 which was not statistically significant. See Table I. Although the difference in skills mean score between groups was not statistically significant it was of sufficient magnitude to cast suspicion on any subsequent comparison between the groups.
TABLE I
INTER-GROUP COMPARISONS OF T₁
STANDARD SCORE MEANS

<table>
<thead>
<tr>
<th>TEST</th>
<th>Group A</th>
<th>Group B</th>
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<tbody>
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<td>417.45</td>
<td>417.78</td>
<td>.33</td>
<td>27.78</td>
<td>59</td>
<td>.012</td>
</tr>
<tr>
<td>Skills</td>
<td>285.30</td>
<td>267.28</td>
<td>18.02</td>
<td>17.01</td>
<td>59</td>
<td>1.059</td>
</tr>
</tbody>
</table>

In an effort to solve the dilemma of inequality between groups referred to above, four subjects from Group A and one from Group B were dropped from the study at T₁. This procedure resulted in a mean of 268.80 for Group A and a mean of 269.16 for Group B. The difference between means was .36 and the resulting t ratio was .022, indicating virtually perfect agreement between the two groups in sports' skills. In similar comparisons between the two groups at T₂ the same subjects were held out from the two groups.

The number of students involved in T₂ tests for fitness was 24, but the subject held out for the T₁ comparisons as explained above, transferred during the year leaving the number of students in the T₂ test for skills at 30.
II. INTER-GROUP COMPARISONS OF T₂ SCORES

Inter-group comparisons of T₂ mean scores were made to measure significance of difference between groups in fitness and skills. See Table II. The standard scores for fitness from Group A were compared with the standard scores for fitness from Group B using the two-tailed $t$ ratio test for the significance of difference between means of uncorrelated groups. The T₂ test mean score for Group A was 536.71. The T₂ test mean score for Group B was 533.90. The difference between the mean scores was 2.81. This gave a $t$ ratio of 0.078 which was not statistically significant. Therefore, at the end of the program there was no significant difference between the fitness levels of Groups A and B.

The standard scores for the skills from Group A were compared with the standard scores for skills from Group B using the two-tailed $t$ ratio test for the significance of difference between means of uncorrelated groups. The T₂ test mean score for Group A was 328.91. The T₂ test mean score for Group B was 344.93. The difference between the mean scores was 16.02. This gave a $t$ ratio of 0.891 which was not statistically significant, thereby indicating there was no significant difference between the skills levels of Groups A and B at the end of the program.
TABLE II
INTER-GROUP COMPARISONS OF $T_2$
STANDARD SCORE MEANS

<table>
<thead>
<tr>
<th>TEST</th>
<th>Group A</th>
<th>Group B</th>
<th>diff</th>
<th>SED</th>
<th>df</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fitness</td>
<td>N=28</td>
<td>N=30</td>
<td>2.81</td>
<td>35.76</td>
<td>56</td>
<td>.078</td>
</tr>
<tr>
<td></td>
<td>N=24</td>
<td>N=30</td>
<td>16.02</td>
<td>17.97</td>
<td>52</td>
<td>.891</td>
</tr>
</tbody>
</table>

III. INTRA-GROUP COMPARISONS BETWEEN $T_1$ AND $T_2$ MEANS

Intra-group comparisons between $T_1$ and $T_2$ means were used to analyze the changes made in both fitness and skills for Groups A and B.

The $T_1$ standard scores for fitness from Group A were compared with the $T_2$ standard scores for fitness from Group A using the one-tailed $t$ ratio test for the significance of difference between means for correlated groups. As seen in Table III, the $T_1$ test mean score was 417.45 and the $T_2$ test mean score was 536.71. The difference between the mean scores was 119.26. This gave a $t$ ratio of 4.91 which was statistically significant well beyond the .01 level of confidence, thereby indicating that the improvement shown
by Group A was genuinely attributable to factors other than chance.

The $T_1$ and $T_2$ standard scores for skills from Group A were compared using the one-tailed t ratio test. The $T_1$ test mean score was 285.30 while the $T_2$ test mean score was 345.90. The difference between the mean scores was 60.60. This gave a t ratio of 7.89 which was statistically significant well beyond the .01 level of confidence, also indicating improvement during the program attributable to factors other than chance. Table III summarizes these figures.

The $T_1$ and $T_2$ standard scores for fitness from Group B were compared using the one-tailed t ratio test. The $T_1$ test mean score was 417.78 while the $T_2$ test mean score was 533.90. The difference between the mean scores was 116.12. This gave a t ratio of 15.9 which is well above the .01 level of confidence, again attributable to something other than chance.

The $T_1$ and $T_2$ standard scores for skills from Group B were compared using the one-tailed t ratio test. The $T_1$ test mean score was 267.28 while the $T_2$ test mean was 344.93. The difference between the mean scores was 77.65. This gave a t ratio of 10.91 which is well above the .01 level of confidence. Table III summarizes the data.
### TABLE III
**INTRA-GROUP COMPARISONS OF THE AMOUNT OF CHANGE IN STANDARD SCORE MEANS:**
**PHYSICAL FITNESS AND MOTOR SKILLS**

<table>
<thead>
<tr>
<th>GROUP</th>
<th>M₁</th>
<th>M₂</th>
<th>r</th>
<th>diff</th>
<th>SED</th>
<th>df</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A Fitness</td>
<td>417.45</td>
<td>536.71</td>
<td>.596</td>
<td>119.26</td>
<td>24.31</td>
<td>55</td>
<td>4.91</td>
</tr>
<tr>
<td>Group A Skills</td>
<td>285.30</td>
<td>345.90</td>
<td>.818</td>
<td>60.60</td>
<td>7.67</td>
<td>55</td>
<td>7.89</td>
</tr>
<tr>
<td>Group B Fitness</td>
<td>417.78</td>
<td>533.90</td>
<td>.947</td>
<td>116.12</td>
<td>7.29</td>
<td>60</td>
<td>15.90</td>
</tr>
<tr>
<td>Group B Skills</td>
<td>267.28</td>
<td>344.93</td>
<td>.860</td>
<td>77.65</td>
<td>6.94</td>
<td>60</td>
<td>10.91</td>
</tr>
</tbody>
</table>

#### IV. MCCLOYS CLASSIFICATION INDEX I

The following comments may summarize sections I, II, and III up to the present:

Initially (at T₁) both groups could be considered equated in physical fitness but not sufficiently so in sports' skills until certain subjects had been dropped from the T₁ distribution. At T₂ neither fitness nor skills mean differences between groups were significant; in fact the t ratios were very low.

Both groups A and B however, improved impressively from T₁ to T₂ as seen in Table III. Thus far, therefore,
nothing distinguished them from each other in terms of program effects.

The possibility occurred to the writer that between the total distributions of boys in each of the groups, there might be compensating effects in physical size and maturity causing the respective total group means to be equated, whereas if sub-groups could be formed on the basis of size and maturity and subjected to statistical scrutiny real differences might become manifest.

It was decided to test this possibility by classifying each boy of each group at T1. From this classification scheme three empirically selected sub-groups were formed for Group A and three for Group B. McCloy had found in earlier research that a regression combination of age, height, and weight effectively discriminated size and maturity. He called one such classifier Classification Index I whose formula was: 20(age) + 6(height) + weight (18:60).

The three sub-groups formed at T1, composed of Groups A and B, had the following numerical limits:

- Top Group: 764 and up
- Middle Group: 720-763
- Low Group: 719 and below

A t test for the significance of difference between means of boys in Group A and Group B, in each of these
categorical classification sub-groups was made in September and again in May, using the same numerical limits for both comparisons. Table IV presents these \( t \) ratios and suggests the following conclusions.

First, none of the differences in size and maturity as shown by McCloy's Classification Index I were statistically significant between Groups A and B in September, at the outset of the experimental period. Thus, the forming of categorical sub-groups merely confirmed that in size and maturity, Groups A and B were not aberrant statistically. Second, during the course of the experimental period, boys from both Groups A and B proceeded at approximately equal rates in acquisition of height and weight as none of the \( t \) ratios in May were statistically significant.
TABLE IV
SIGNIFICANCE OF DIFFERENCE BETWEEN MEANS
OF CLASSIFICATION INDEX I
SUB-GROUPS: FALL AND SPRING

<table>
<thead>
<tr>
<th>Group A</th>
<th>Group B</th>
<th>diff</th>
<th>SE_{D}</th>
<th>df</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall N=5</td>
<td>782.60</td>
<td>782.14</td>
<td>.46</td>
<td>13.22</td>
<td>10</td>
</tr>
<tr>
<td>Fall N=8</td>
<td>798.13</td>
<td>785.63</td>
<td>12.50</td>
<td>9.06</td>
<td>22</td>
</tr>
</tbody>
</table>

| MIDDLE GROUP - CLASSIFICATION INDEX I = 720-763 |

<table>
<thead>
<tr>
<th>Group A</th>
<th>Group B</th>
<th>diff</th>
<th>SE_{D}</th>
<th>df</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall N=11</td>
<td>738.10</td>
<td>745.36</td>
<td>7.26</td>
<td>5.00</td>
<td>23</td>
</tr>
<tr>
<td>Fall N=14</td>
<td>743.36</td>
<td>742.60</td>
<td>.76</td>
<td>5.94</td>
<td>17</td>
</tr>
</tbody>
</table>

| LOW GROUP - CLASSIFICATION INDEX I = 719 AND BELOW |

<table>
<thead>
<tr>
<th>Group A</th>
<th>Group B</th>
<th>diff</th>
<th>SE_{D}</th>
<th>df</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall N=12</td>
<td>699.42</td>
<td>688.66</td>
<td>10.76</td>
<td>8.87</td>
<td>19</td>
</tr>
<tr>
<td>Fall N=5</td>
<td>704.00</td>
<td>699.14</td>
<td>4.86</td>
<td>8.50</td>
<td>10</td>
</tr>
</tbody>
</table>
V. INTER-GROUP COMPARISONS: KRUSKAL-WALLIS ONE-WAY ANALYSIS OF VARIANCE BY RANKS

The inter-group comparisons of Groups A and B at $T_1$ and $T_2$ using the $t$ ratio test, demonstrated no significant differences between the groups at the end of the program. Therefore, the writer decided to resort to the Kruskal-Wallis "$H$" Test in a final effort to determine if this test showed any significant difference between the groups.

The Kruskal-Wallis one-way analysis of variance by ranks, known as the "$H$" Test, is useful for deciding whether independent samples are from different populations. Siegel simplifies this in the following statement:

Some values almost invariably differ somewhat, and the question is whether the difference among the samples signify genuine population differences or whether they represent merely chance variation, such as are to be expected among several random samples from the population (21:184).

In this study the differences between $T_1$ and $T_2$ test scores for fitness were ranked using Rank 1 for the smallest difference from both Group A and Group B combined. The ranking process continued with the most improved score receiving the highest rank. By ranking the scores their magnitude is preserved and the resultant "$H$" test value is very sensitive to differences among the independent sample scores. The ranks were then summed for each group. Subsequent calculations resulted in an "$H$" value of .019,
thereby indicating that there was no significant difference between the fitness levels of Groups A and B at the end of the respective programs. Table V summarizes these data.

The Kruskal-Wallis "H" Test was also used to calculate the difference between the $T_1$ and $T_2$ test scores for skills for both Groups A and B. These differences were also ranked as described before. The summation of the ranks and subsequent statistical calculations resulted in an "H" value of .319, thereby indicating that there was no significant difference between the skills levels of Groups A and B at the end of the program. Table VI summarizes these data.

The consistent similarity between program outcomes despite planned differences suggests the following explanation. Group A, with only ten minutes of games and skills as a reward for twenty minutes in physical fitness activities may have lost enthusiasm for its' program as compared to Group B whose reward for ten minutes of physical fitness activities was twenty minutes in games and skills activities. It seems quite likely that Group B may have accelerated its' pace in the physical fitness activities thereby increasing the physiological overload effect enabling it to maintain close proximity with Group A despite opposite program emphasis.
**TABLE V**

**Kruskal-Wallis One-Way Analysis of Variance by Ranks**  
**Physical Fitness Tests, Inter-Group Comparisons**

<table>
<thead>
<tr>
<th></th>
<th>Group A</th>
<th></th>
<th>Group B</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>$T_1$</td>
<td>$T_2$</td>
<td>rank</td>
<td>$T_1$</td>
<td>$T_2$</td>
</tr>
<tr>
<td>412</td>
<td>401</td>
<td>1</td>
<td>464</td>
<td>487</td>
</tr>
<tr>
<td>230</td>
<td>248</td>
<td>2</td>
<td>281</td>
<td>307</td>
</tr>
<tr>
<td>271</td>
<td>499</td>
<td>55</td>
<td>466</td>
<td>709</td>
</tr>
<tr>
<td>287</td>
<td>598</td>
<td>57</td>
<td></td>
<td></td>
</tr>
<tr>
<td>409</td>
<td>822</td>
<td>58</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$\text{R} = 817 \quad \text{R} = 894$

$$H = \frac{12}{N(N+1)} \sum_{i=1}^{N} \frac{R_i^2}{N} - 3 \frac{(N+1)}{N}$$

$$= \frac{12}{58 \cdot (59)} \left[ \frac{(817)^2}{28} + \frac{(894)^2}{30} \right] - 3 \frac{(59)}{58}$$

$$= 177.019 - 177 = \chi^2 .019 \chi^2$$

Within each section the $T_1$ scores appear in the first column and the $T_2$ scores appear in the third column. The difference between the scores appears in the second column, while consecutive rankings between groups appear in the last column. The summation of the rankings appear as the "R" values in each section. The "H" value was .019.
### TABLE VI

**KRUSKAL-WALLIS ONE-WAY ANALYSIS OF VARIANCE BY RANKS**

**MOTOR SKILLS TESTS**

**INTER-GROUP COMPARISONS**

<table>
<thead>
<tr>
<th></th>
<th>Group A</th>
<th></th>
<th>Group B</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>T&lt;sub&gt;1&lt;/sub&gt;</td>
<td>diff</td>
<td>T&lt;sub&gt;2&lt;/sub&gt;</td>
<td>rank</td>
<td>T&lt;sub&gt;1&lt;/sub&gt;</td>
</tr>
<tr>
<td>276</td>
<td>-31</td>
<td>245</td>
<td>1</td>
<td>354</td>
</tr>
<tr>
<td>302</td>
<td>9</td>
<td>311</td>
<td>3</td>
<td>158</td>
</tr>
<tr>
<td>311</td>
<td>15</td>
<td>326</td>
<td>4</td>
<td>.</td>
</tr>
<tr>
<td></td>
<td>.</td>
<td>.</td>
<td>.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>.</td>
<td>.</td>
<td>.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>138</td>
<td></td>
<td>121</td>
<td>259</td>
</tr>
<tr>
<td>138</td>
<td>128</td>
<td>266</td>
<td>55</td>
<td>207</td>
</tr>
<tr>
<td>235</td>
<td>187</td>
<td>422</td>
<td>58</td>
<td>300</td>
</tr>
<tr>
<td>R = 723</td>
<td></td>
<td></td>
<td></td>
<td>R = 980.5</td>
</tr>
</tbody>
</table>

\[
H = \frac{12}{N (N+1)} \sum \frac{R^2}{N} - 3 \frac{(N+1)}{N}
\]

\[
= \frac{12}{58 \cdot (59)} \left[ \frac{(723)^2}{28} + \frac{(980.5)^2}{30} \right] -177
= 177.319 - 177 = \chi^2 \cdot 319 \cdot \chi^2
\]

Within each section the T<sub>1</sub> scores appear in the first column and the T<sub>2</sub> scores appear in the third column. The difference between the scores appears in the second column, while the consecutive rankings between groups appear in the last column. The summation of the rankings appear as the "R" values in each section. The "H" value was .319.
CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

I. SUMMARY OF THE STUDY

Briefly, the purpose of this study was to compare the effects of two physical education programs having opposite program emphases, on development of physical fitness and motor skills among selected seventh grade boys.

Inter-Group Comparisons of T₁ Scores

In September the two groups, A and B, were equated in physical fitness as shown by the very low t ratio for significance of difference between means of .012. The initial t ratio for skills was 1.059, a non-significant one but too high to justify the statement that the groups could be considered equal. A reduction in "N" by four subjects from Group A and one subject from Group B resulted in a satisfactory t ratio of .022.

Inter-Group Comparisons of T₂ Scores

At the conclusion of the 20 weeks of physical education programs, the t ratio for significance of difference between means of the two groups in physical fitness was .078 and for motor skills was .891, neither being significant. This indicated that program emphases
had no apparent effect on program outcomes as gauged by the tests employed as measures of the respective attributes, physical fitness and motor skills.

Intra-Group Comparisons — T₁ to T₂

T-ratios calculated for significance of difference between means at T₁ and T₂, for correlated groups, were statistically significant beyond the .01 level of confidence. This indicated that in both programs of physical education, both physical fitness and motor skills were improved regardless of the emphasis in the program.

McCloy's Classification Index I

It was suspected that some real differences between the groups might be being obliterated by the possibility that one group had a preponderance of large and small boys whereas the other had a preponderance of average-sized boys. To test this possibility, each boy was classified by a regression weighting of age, height, and weight. Three sub-groups were empirically formed from this process and t ratios for significance of difference between Group A and B in each of the sub-groups, were computed, both for fall and spring. Lack of significance of any of the resultant t ratios indicated that the boys composing each of the main groups were essentially comparable in age, height, and weight.
A final effort was made to discern significant differences between groups by employing the Kruskal-Wallis One-Way Analysis of Variance by Ranks Test. In the case of both physical fitness and motor skills neither "H" value was statistically significant thereby corroborating previous analyses, namely that in both attributes the two groups were from the same population and that neither program had produced a significant position of advantage over the other.

II. CONCLUSIONS

It is the writer's conclusion that there are two reasons why the comparison of the two programs did not show significant results although the programs had opposite emphases. One, the divergent emphases of the program as outlined in the fall were not as divergent as the writer thought they were, therefore failing to show any significant difference between the two programs. Two, it seems quite likely that Group B may have accelerated its' pace in the physical fitness activities thereby increasing the physiological overload effect enabling it to maintain close proximity with Group A despite opposite program emphasis.
III. RECOMMENDATIONS

This research has led the writer to make the following recommendations:

1. This study was based on fifteen tests, six of which were skills tests and nine of which were fitness tests. It is the writer's belief that this is too many tests, the main reason being the time involved in testing. It is therefore suggested that test batteries measuring physical fitness and motor skills be utilized whose known relationship to an adequate criterion is established.

2. A study be made of the same two attributes over a school year where the influence of the acquisition of age, height, and weight on gains made in physical fitness and motor skills is separately determined.
BIBLIOGRAPHY
BIBLIOGRAPHY


APPENDIX
FUNDAMENTAL SPORT SKILLS

1. **Overhand Throw:** One pre-trial. Use a softball (12"). Stretch out a 100-foot line or mark the area. Mark off a starting line six feet behind restraining line. Child must stay within this area. If he hits an obstacle, give him another trial. He may not step over restraining line. Child should take all throws at one time. Only an overhand throw is allowed. Record the distance to the nearest foot from restraining line to spot perpendicular to the restraining line. Record best of two trials.

2. **Wall Pass:** One pre-trial. Draw a restraining line six feet from wall. Subject must stand with both feet behind the line for each item. Count the number that hit the wall. Use regulation well-inflated rubber soccer ball. Ball may be thrown or caught in any way. Score is number of hits in 30 seconds. Record one trial.

3. **Soccer Punt:** One pre-trial. Use regulation size rubber soccer ball, well-inflated. Stretch out a 100-foot tape line or mark area. Mark off a starting line six feet behind restraining line. Child must stay within this area. If his ball hits an obstacle, give him another trial. Child should take all kicks in succession. Record the distance to the nearest foot. Record best of two trials.

4. **Soccer Wall Volley:** One pre-trial. Use well-inflated soccer ball. Draw a restraining line six feet from the wall. Child on signal "Ready, go" kicks the ball against the wall as rapidly as possible for 30 seconds. He may use any kind of a kick. He may use his hands to retrieve the ball. Anytime the ball is kicked, it must be kicked while the supporting leg is on or behind the restraining line to count as a score. The score is the number of fair hits against the wall.
Record one trial.

5. **Striking Underhand (Volleyball Serve):** One Pre-trial. Use leather volleyball, rubber is acceptable if leather is not available. How far can the child hit the ball (serve)? Measure from starting line to nearest foot of where ball first touches. Start with both feet on the line. One step is allowed over the line as follow through.

Record best of two trials.

6. **Pitching Underhand for Accuracy:** One pre-trial. Use 12" softball. Pitch underhand at target from a distance of 25 feet. Child stands with both feet on line in official pitching position and is allowed one step forward over line.

Center of target should be three and one-half feet from the floor. Make five concentric circles one foot, two feet, three feet, four feet and five feet in diameter. The circle lines should not be over one inch in width. In determining the diameter of each circle, include the width of the line. The circumference of the outside circle is one foot from the ground.

To facilitate drawing the circle, use a string of desired length with chalk attached. Place end of string at center of circle and quickly sketch circle. Suggest constructing target with masking tape or water base paint.

Record 5 points for center circle, 4, 3, 2, and 1 in that order.
Ball hitting line counts as higher score.
Record 10 trials.

**FUNDAMENTAL ASPECTS OF MOTOR FITNESS**

7. **Short Potato Race:** One pre-trial. Two lines are drawn on the floor twelve feet apart. The student starts at one line, dashes to the other line and touches the floor on or across that line with either hand. He then crosses the space between the lines and touches the space on the floor on or across the
other outside line. Repeating this as many times as possible in 15 seconds. Score is number of times he touches either line. Do on hard surface.

Record one trial.

8. Pull-Ups: One pre-trial. A metal or wooden bar approximately one and one-half inches in diameter is preferred. A doorway gym bar can be used and, if no regular equipment is available, a piece of pipe or even the rungs of a ladder can also serve the purpose. The bar should be high enough so that the pupil can hang with his arms and legs fully extended and his feet free of the floor. Use the overhand grasp (back of hands toward face, palms away). After assuming the hanging position, the pupil raises his body by his arms until his chin can be placed over the bar and then lowers his body to a full hang as in the starting position. The exercise is repeated as many times as possible.

Record one trial.

9. Jump and Reach: One pre-trial. Start facing the wall, toes touching with both hands raised overhead. Reach evenly with both hands and mark the height of the reach with chalk or a damp finger. Then turn sidewards to the wall, jump and reach with one hand touching as far up the wall as possible, and mark the height of the reach with chalk or damp finger. The score is the difference between the reach while standing and while jumping.

Record one trial.

10. Sit-Ups: One 15-second pre-trial. Child lies on floor with knees up, feet flat on floor and near his hips. Child clasps his hands behind his neck with elbows flat on the floor. Partner kneels in front and presses downward on feet of partner. Partner should not hold ankles, sit on feet, or sit on floor and try to hold feet. Partner's pressure on the feet is very important. Partner should keep pushing feet of child taking test toward his hips to help retain initial position. To perform sit-up, child curls his head and elbows forward each time to touch elbow
to top of knees. No cross over is used. The number of times a child touches the top of his knees with elbows in 60 seconds is his score. Knees should be kept together.

Record one trial.

11. Double Arm Travel (Hanson Shoulder Test): One pre-trial. Child assumes and keeps good regular push-up position, body in straight line, feet resting against the wall and feet together in the middle of the space. Two lines are drawn parallel and perpendicular to the wall, three feet apart. He starts with his hands on the left, moves his hands first to the far right, then to the far left. Both hands should touch the far right line, then both hands should touch the far left line. The score is the number of times both his hands touch either line in 30 seconds.

Record one trial.

12. Modified Bass Balance: One pre-trial. A stick 1-5/8" by 1-5/8" by 12" is needed. (Lumberman calls this a 2 by 2. They are a standard cut so cost only about 5¢ apiece.) Subject stands erect with the ball of his foot crosswise on the middle of the stick.

Eyes should be open, hands free and other foot free for help in balance. Encourage child to focus on something to aid balance (floor or object ahead). Score is the number of seconds the student can stay on the stick without touching the supporting foot, the free foot or any part of his body to the floor.

Record one trial.

13. Fifty-Yard Dash: No pre-trial. Two stopwatches or one with a split-second timer. It is preferable to administer this test to two pupils at a time. Have both take positions behind the starting line standing upright with feet spread. The starter will use the commands, "Ready, (pause) go". The latter will be accompanied by a downward sweep of the starter's arm or flag to give the timer a visual signal. The score is the amount of time between the starter's signal and the instant the pupil crosses the finish line.
record in seconds to the nearest tenth of a second.

Record one trial.

14. **Broad Jump**: One pre-trial. Stand with toes touching restraining line. Keep both feet in contact with the floor before jumping and land with both feet at the same time. Measure distance from start to nearest mark made to restraining line by heels, hands, or hips. Record to the nearest inch. Test on floor or hard surface.

Record one trial.

15. **600 Yard Walk-Run**: No pre-trial. Use large enough area so child has to make as few turns as possible. Use a stopwatch. From a standing start, at the signal "Ready, go" the subject starts running the 600 yard distance. The running may be interspersed with walking. It is possible to have a dozen children run at one time by having the pupils pair off before the start of the event. Then each pupil listens for and remembers his partner's time as the latter crosses the finish. Runner should listen for his time, also. The timer merely calls out the times as the pupils cross the finish. Walking is permitted, but the object is to cover the distance in the shortest possible time.

Record one trial.
APPENDIX B

SCORE CARD USED FOR GROUPS A AND B
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<thead>
<tr>
<th>Activity</th>
<th>Pre-Test</th>
<th>Standard Scores</th>
<th>Post-Test</th>
<th>Standard Scores</th>
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<td>Soccer Wall Volley</td>
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<td>Striking Underhand</td>
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<td>Pull-Ups</td>
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<td>Sit-Ups</td>
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<tr>
<td>600 Yard Walk-Run</td>
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APPENDIX C

OBSERVATIONS OF THE PROGRAM
MADE BY THE WRITER
November 20, 1968 - Fitness Group - Time 1:50-2:30

1:50-1:55 - Dress

1:55-2:15 - Calisthenics and Fitness Activities
   1. Stretching Exercises
   2. Jog 600 Yards
   3. Push-Ups - two sets of 10
   4. Double Arm Travel - two sets each (15 sec.)
   5. Four-Count Jumping Jack
   6. Sit-Ups - two sets of 10
   7. Six-Count Burpee - two sets of 10

2:15-2:25 - Skills Activity
The students were divided into two groups.  
First group was to practice soccer punt and  
second group practiced overhand throw. After  
five minutes the groups exchanged stations  
for remainder of class.

2:25-2:30 - Dress

November 20, 1968 - Skills Group - Time 2:40-3:20

2:40-2:45 - Dress

2:45-2:55 - Calisthenics and Fitness Activities
   1. Stretching Exercises
   2. Push-Ups - one set of 10
   3. Double Arm Travel - 15 sec.
   4. Four-Count Jumping Jack - one set of 10
5. Sit-Ups - one set of 10
6. Six-Count Burpee - one set of 10

2:55-3:15 - Development of Skills

The students were divided into four groups to practice their skills. They spent five minutes at each of the four stations which included:
(1) soccer punt; (2) overhand throw; (3) volleyball serve; (4) soccer wall volley

3:15-3:20 - Dress

December 15, 1968 - Fitness Group - Time 1:50-2:30

1:50-1:55 - Dress

1:55-2:15 - Calisthenics and Fitness Activities

1. Stretching Exercises
2. Run Lines on Basketball Court
3. Four-Count Jumping Jack
4. Sit-Ups - two sets of 10
5. Push-Ups - two sets of 10

After the calisthenics the students were divided into three lines and participated in cart relays which consisted of putting ones' chest on a small four roller cart, holding the feet off the floor and moving down the floor, around a pin and back to the starting line using only the arms to move the cart.
2:15-2:25 - Skills Activity

Staying in the same formation used in the cart relays the three groups participated in soccer ball dribble relay which consisted of setting the soccer ball on the starting line, using the feet only to dribble the ball down the floor, around a pin and back to the starting line.

2:25-2:30 - Dress


2:40-2:45 - Dress

2:45-2:55 - Calisthenics and Fitness Activities

1. Windmill - four count
2. Trunk Twister
3. Three-Count Toe Touches
4. Sit-Ups - one set of 10
5. Push-Ups - one set of 10
6. Jog 600 Yards

2:55-3:15 - Skills Activities

After the students finished jogging 600 yards they were divided into three groups for relay races. The relay races performed on this date are as follows:

1. Soccer Dribble Relay
2. Basketball Dribble Relay - which consisted
of dribbling to the end of the gym, using chest type pass to bounce the ball off the wall five times and dribbling the ball back to the starting line.

3:15-3:30 - Dress

January 20, 1969 - Fitness Group - Time 1:50-2:30

1:50-1:55 - Dress

1:55-2:15 - Calisthenics and Fitness Activities

(Sitting) 1. Arm Reach - legs spread
   2. Curl-Ups - two sets of 10
   3. Leg Cross Over - two sets of 10

(Standing) 4. Running In Place - Jog - Sprint
   5. Squat Thrust
   6. Four-Count Trunk Twister
   7. Five-Count Toe Touch
   8. Four-Count Jumping Jack
   9. Single Leg Stand - alternating feet every 30 seconds for three minutes.
   10. Run Around Gym - four minutes

2:15-2:25 - Skills Activity

The students divided into their four teams and continued their volleyball tournament.

2:25-2:30 - Dress

2:40-2:45 - Dress

2:45-2:55 - Calisthenics and Fitness Activities

   (Sitting) 1. Arm Reach - legs spread
   2. Curl-Ups
   3. Leg Cross Over

   (Standing) 4. Squat Thrust
   5. Four-Count Jumping Jack
   6. Run Around Gym - two minutes

2:55-3:15 - Skills Activity

   The students divided into four teams and
   continued their volleyball tournament.

3:15-3:20 - Dress

February 17, 1969 - Fitness Group - Time 1:50-2:30

1:50-1:55 - Dress

1:55-2:15 - Calisthenics and Fitness Activities

   1. Side Straddle Hop
   2. Four-Count Jumping Jack
   3. Curl-Ups - two sets of 15
   4. Push-Ups - two sets of 10
   5. Ten Laps Around Gym

   Tumbling Activity: Development of forward roll, head stand, squat hand stand. Extend squat stand into head stand then into forward roll.
2:15-2:25 - Skills Activity

The class divided into two teams and participated in the soccer dribble relay the remainder of the class period.

2:25-2:30 - Dress

February 17, 1969 - Skills Group - Time 2:40-3:20

2:40-2:45 - Dress

2:45-2:55 - Calisthenics and Fitness Activities

1. Jog - 10 laps around gym
2. Side Straddle Hop
3. Push-Ups - two sets of 10
4. Curl-Ups - two sets of 10
5. Four-Count Leg Lifts - 6" off floor

2:55-3:15 - Skills Activities

Circuit training with four stations. Each group would spend five minutes at each of the following stations:
1. Modified Bass Balance
2. Pitching Underhand
3. Rope Skipping
4. Soccer Wall Volley

3:15-3:20 - Dress

March 18, 1969 - Fitness Group - Time 1:50-2:30

1:50-1:55 - Dress
1:55-2:15 - Calisthenics and Fitness Activities

1. Three-Count Toe Touching Exercise
2. Four-Count Trunk Twister
3. Push-Ups - two sets of 15
4. Squat Thrust
5. Wind Sprints - 25 yards
6. Jog - two laps around field - 1200 yards

2:15-2:25 - Skills Activities

Divide class into two groups to continue working on skills as part of baseball unit. Each group will spend five minutes at each station to work on a particular skill:

1. Pitching Skill
2. Fielding Skill

2:25-2:30 - Dress

March 18, 1969 - Skills Group - Time 2:40-3:20

2:40-2:45 - Dress

2:45-2:55 - Calisthenics and Fitness Activities

1. Three-Count Toe Touching Exercise
2. Four-Count Jumping Jack
3. Push-Ups - two sets of 15
4. Curl-Ups - two sets of 15
5. Run 600 Yard Dash

2:55-3:15 - Skills Activities

Divide class into three groups to continue
working on skills as part of baseball unit.

Each group will spend seven minutes at each station to work on a particular skill:

1. Pitching Skill
2. Fielding Skill
3. Batting Skill

3:15-3:20 - Dress