Attitudes, Knowledge, Skill, and Physical Fitness of Girls as Affected by Two Different Methods of Class Scheduling

Sister Mary Janice Iverson

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ATTITUDES, KNOWLEDGE, SKILL, AND PHYSICAL FITNESS
OF GIRLS AS AFFECTED BY TWO DIFFERENT METHODS
OF CLASS SCHEDULING

BY

SISTER MARY JANICE IVerson, O.S.B.

A thesis submitted
in partial fulfillment of the requirements for the
degree Master of Science, Major in
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1972
ATTITUDES, KNOWLEDGE, SKILL, AND PHYSICAL FITNESS
OF GIRLS AS AFFECTED BY TWO DIFFERENT METHODS
OF CLASS SCHEDULING

This thesis is approved as a creditable and independent investigation by a candidate for the degree, Master of Science, and is acceptable as meeting the thesis requirements for this degree. Acceptance of this thesis does not imply that the conclusions reached by the candidate are necessarily the conclusions of the major department.

Thesis Advisor

Date

Head, Health, Physical Education, and Recreation Department

Date
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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>Significance of the Study</td>
<td>1</td>
</tr>
<tr>
<td>Statement of the Problem</td>
<td>4</td>
</tr>
<tr>
<td>Hypothesis</td>
<td>4</td>
</tr>
<tr>
<td>Limitations and Delimitations</td>
<td>4</td>
</tr>
<tr>
<td>Definition of Terms</td>
<td>5</td>
</tr>
<tr>
<td>II. REVIEW OF THE LITERATURE</td>
<td>8</td>
</tr>
<tr>
<td>III. METHODS AND PROCEDURES</td>
<td>27</td>
</tr>
<tr>
<td>Organization of the Study</td>
<td>27</td>
</tr>
<tr>
<td>Source of Data</td>
<td>27</td>
</tr>
<tr>
<td>Administration of the Treatment</td>
<td>28</td>
</tr>
<tr>
<td>Collection of Data</td>
<td>30</td>
</tr>
<tr>
<td>Wear Physical Education Attitude Inventory Test, Forms A and B</td>
<td>30</td>
</tr>
<tr>
<td>Knowledge Tests</td>
<td>31</td>
</tr>
<tr>
<td>Skills Tests--Field Hockey</td>
<td>31</td>
</tr>
<tr>
<td>Volleyball</td>
<td>32</td>
</tr>
<tr>
<td>Bowling</td>
<td>33</td>
</tr>
<tr>
<td>AAHPER Youth Fitness Test</td>
<td>33</td>
</tr>
<tr>
<td>IV. ANALYSIS AND DISCUSSION OF RESULTS</td>
<td>34</td>
</tr>
<tr>
<td>Organization of Data for Analysis</td>
<td>34</td>
</tr>
<tr>
<td>Analysis of the Data</td>
<td>38</td>
</tr>
<tr>
<td>Discussion of Results</td>
<td>53</td>
</tr>
<tr>
<td>CHAPTER</td>
<td>PAGE</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS</td>
<td>60</td>
</tr>
<tr>
<td>Summary of the Study</td>
<td>60</td>
</tr>
<tr>
<td>Conclusions</td>
<td>62</td>
</tr>
<tr>
<td>Implications</td>
<td>62</td>
</tr>
<tr>
<td>Recommendations for Further Research</td>
<td>63</td>
</tr>
<tr>
<td>BIBLIOGRAPHY</td>
<td>65</td>
</tr>
<tr>
<td>APPENDIX A</td>
<td>71</td>
</tr>
<tr>
<td>APPENDIX B</td>
<td>75</td>
</tr>
<tr>
<td>APPENDIX C</td>
<td>80</td>
</tr>
<tr>
<td>APPENDIX D</td>
<td>89</td>
</tr>
<tr>
<td>APPENDIX E</td>
<td>99</td>
</tr>
<tr>
<td>APPENDIX F</td>
<td>105</td>
</tr>
<tr>
<td>APPENDIX G</td>
<td>109</td>
</tr>
</tbody>
</table>
LIST OF TABLES

TABLE

I. Group Means of the Variables ........................................... 36
II. The Significance of Change Between Group Means in Attitudes .... 38
III. The Significance of the Changes in Attitudes Within Groups from Pre to Post Test ...................................................... 38
IV. The Significance of the Difference Between Means of the Two Groups in the Knowledge of Field Hockey, Volleyball, and Bowling .......................................................... 39
V. The Significance of the Difference Between the Means for Both Groups in the Skills of Field Hockey, Volleyball, and Bowling .......................................................... 40
VI. The Significance of the Change Between Both Groups in Physical Fitness ................................................................. 42
VII. The Significance of the Change in Physical Fitness Within the Stabilized Group ................................................... 43
VIII. The Significance of the Change in Physical Fitness Within the Flexible Group ..................................................... 45
<table>
<thead>
<tr>
<th>FIGURE</th>
<th>DESCRIPTION</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>A comparison of percentile ranks of the flexed-arm hang test item as achieved by the Harmony Hill High School Girls at Watertown with the National AAHPER Norms</td>
<td>47</td>
</tr>
<tr>
<td>2.</td>
<td>A comparison of percentile ranks of the sit-up test item as achieved by the Harmony Hill High School Girls at Watertown with the National AAHPER Norms</td>
<td>48</td>
</tr>
<tr>
<td>3.</td>
<td>A comparison of percentile ranks of the shuttle run test item as achieved by the Harmony Hill High School Girls at Watertown with the National AAHPER Norms</td>
<td>49</td>
</tr>
<tr>
<td>4.</td>
<td>A comparison of percentile ranks of the standing broad jump test item as achieved by the Harmony Hill High School Girls at Watertown with the National AAHPER Norms</td>
<td>50</td>
</tr>
<tr>
<td>5.</td>
<td>A comparison of percentile ranks of the 50-yard dash test item as achieved by the Harmony Hill High School Girls at Watertown with the National AAHPER Norms</td>
<td>51</td>
</tr>
<tr>
<td>6.</td>
<td>A comparison of percentile ranks of the 600-yard run-walk test item as achieved by the Harmony Hill High School Girls at Watertown with the National AAHPER Norms</td>
<td>52</td>
</tr>
</tbody>
</table>
CHAPTER I

INTRODUCTION

Significance of the Study

In recent years traditional educational systems in some areas of the country have been replaced by many new trends and innovations. One such innovation is the adoption of the daily flexible modular schedule which advocates a personalized program where the curriculum could better meet the needs of the student.¹

The daily flexible smorgasbord modular schedule was accepted by the faculty at Harmony Hill High School, Watertown, South Dakota, a private girls' boarding school, in the fall of 1967. In planning the scheduling, the faculty of Harmony Hill considered and adopted the following assumptions as recommended by Glines:

1. Not all teaching jobs need be the same.
2. All classes in all subjects need not meet every day.
3. All classes need not meet the same number of periods per week or the same amount of time each day.
4. Students are capable of assuming responsibilities.
5. Learning is more important than teaching, and learning can take place without the teacher.
6. Substantial improvement must take place in the instructional program, and the teacher has the obligation to try and to invent and to experiment with ways to improve instruction.²

¹Don E. Glines, Implementing Different and Better Schools (Mankato, Minnesota: Campus Publishers, 1969), p. 110.
²Ibid., p. 90.
Glines mentioned seven methods of scheduling and he considers the seventh method the best, the daily flexible smorgasbord scheduling.\textsuperscript{3} Harmony Hill had initiated and was employing this method at the time the investigator began teaching at the school. The daily flexible smorgasbord method of scheduling allowed the teacher to request on a daily basis large groups, small groups, or individuals for the amount of time so desired. Also, the teacher might request one mod of fifteen minutes, or two, three, or more mods of fifteen minutes each, depending upon what had to be taught and how the class was to be conducted. Not only could the teacher request time in the daily flexible smorgasbord schedule, but also the student could request any help or class he felt necessary.\textsuperscript{4}

In order to have a successful daily flexible smorgasbord schedule, it was necessary to have very few large classes.\textsuperscript{5} However, at Harmony Hill, the "must" classes or requests are interpreted as a class which must meet at and for a specific time on a particular day or days due to external circumstances. For example, physical education at Harmony Hill is a "must" in the schedule due to the availability of a gymnasium and bowling alley at specific times for use. Or, if some other academic class invites a guest speaker, such a class would have to be scheduled on that day and at the time the speaker could come. Also, if a teacher were employed on a half day basis, his/her classes would have

\textsuperscript{3}Ibid., p. 110.
\textsuperscript{4}Ibid.
\textsuperscript{5}Ibid.
to be held at the time that teacher was in the school.

Theoretically, the daily flexible smorgasbord schedule should allow the student to meet his class without conflicts, that is, no student should be scheduled in two classes at the same time. Actually, the class would meet and the individual causing the conflict would be scheduled individually in her and the teacher's unscheduled mods or the student and the teacher would resolve the conflict independently of the schedulers.

As indicated by Sister Judith Fischer, Curriculum Director at Harmony Hill, it seemed that the daily flexible smorgasbord schedule required a great amount of time spent in the mechanics of preparing the daily schedule. As a result in 1971-72, the faculty at Harmony Hill High School initiated a schedule that was referred to as a "daily stabilized partial master schedule" along with a daily flexible smorgasbord modular schedule. The stabilized partial master schedule changes at the end of nine weeks. On this schedule were placed all the minimum requests each teacher felt were needed. With the minimum requests placed on the daily stabilized partial master schedule, the teachers' needs were met and the meetings of classes were assured. If for any reason, such as early dismissal or an assembly program, the classes on the daily stabilized partial master schedule could not meet, they were scheduled into the daily flexible schedule's unscheduled mods. On the daily flexible smorgasbord schedule were placed those classes that changed

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from day to day as the need arose, by the students and teachers and as such requests fitted back-to-back with the other teachers' classes.

The investigator believes that the daily flexible smorgasbord modular schedule produces excellent results in some areas of learning. However, in physical education, it was felt that because physical education was placed in the daily flexible smorgasbord schedule it could not meet as often as desired or as regularly due to conflicts that developed in scheduling. It was felt that conflicts developed with physical education classes which went back-to-back with other classes meeting less frequently and as a result there was less time for physical education classes. For those physical education classes that went back-to-back with many other classes that could meet more frequently, more time was scheduled for physical education. The investigator felt that the variation in the amount of time spent in physical education due to the two methods of scheduling would affect attitudes toward physical education and of knowledge, skill, and physical fitness of the students.

**Statement of the Problem**

The purpose of this study was to determine the difference in attitudes toward physical education and of knowledge, skill, and physical fitness of those students taking physical education in the daily flexible modular schedule and of those taking physical education in the daily stabilized partial master schedule.

**Hypothesis**

There will be no change in attitudes toward physical education and the knowledge, skill, and fitness of the students taking physical
education in the two methods of scheduling class.

**Limitations and Delimitations**

1. The subjects involved in this study were forty-five girls enrolled in physical education at Harmony Hill High School, Watertown, South Dakota.

2. The duration of this study was from September 7, 1971, to March 18, 1972.

3. Due to the lack of facilities at Harmony Hill High School, the students had to travel to town—to a gymnasium for volleyball and to a bowling alley for bowling. Such travel time was included in class time.

4. The grouping of the stabilized group and the flexible group depended upon (1) whether or not the student lived in the dorm as a resident, and (2) how the groups could be arranged to fit back-to-back with other classes.

5. Christmas vacation and a four-week interim necessitated a physical fitness test at the end of the second activity, volleyball.

6. The equivalent forms A and B of the Wear Physical Education Attitude Test were used to determine attitudes in this study.

7. No effort was made to control participation in activity or exercise outside of the class time.

**Definition of Terms**

**AAHPER Youth Fitness Test.** The American Association of Health, Physical Education, and Recreation Youth Fitness Test is a battery of seven test items designed to give a measure of physical fitness for both
boys and girls in grades five through twelve. The seven test items are pull-ups (with flexed-arm hang for girls) for judging arm and shoulder girdle strength; sit-ups for judging efficiency of abdominal and hip flexor muscles; shuttle run for judging explosive muscle power of leg extensors; 50-yard dash for judging speed; softball throw for distance for judging skill and coordination; and 600-yard run-walk for judging cardiovascular efficiency.8

**Attitude.** An attitude as defined by Allport is "the mental and neural state of readiness, organized through experience, which exerts a directive or dynamic influence upon the individual's response to all objectives and situations with which it is related."9

**Knowledge.** Knowledge is the amount of content learned about the activity as demonstrated on the knowledge test.

**Daily flexible smorgasbord schedule.** The daily flexible smorgasbord schedule as used in this study refers to the requests that change from day to day.

**Daily stabilized partial master schedule.** The daily stabilized schedule as used in this study refers to the minimum "must" requests of one hour in length for physical education.

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8 Ibid.

"Must" class or request. A "must" class or request as used in this study and by the faculty of Harmony Hill High School means a class that must be met at a specific time on a particular day because of external circumstances.

**Mod.** A mod is a designated length of time for a class meeting.

**Back-to-backs.** Back-to-backs are the result of matching class lists in order that scheduled classes meet at the same time.

**Conflict.** A conflict develops when one or more students are scheduled to meet two classes that are being held at the same time.

The University of Oregon, dealt with the home life, early childhood experiences, high school experiences, and the University physical education situation. Her study indicated that the prevalence of an attitude of distance toward required physical education was not as great as many have thought.
CHAPTER II

REVIEW OF RELATED LITERATURE

This chapter contains the review of related literature pertaining to this study and is divided into the following categories:

1. Literature related to attitudes in physical education
2. Literature related to Wear's Attitude Inventory
3. Literature related to knowledge of and skill in the selected activities
4. Literature related to the AAHPER Youth Fitness Test.

Literature Related to Attitudes in Physical Education

In the teaching of physical education, educators are concerned with the attitudes of students toward the physical education activity program as well as the attitudes toward individual activities.1 Bullock, in her study of some factors determining attitudes of freshman women at the University of Oregon, dealt with the home life, early play experiences, high school experiences, and the University physical education situation. Her study indicated that the prevalence of an attitude of distaste toward required physical education was not as great as many have thought.2

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Attitudes toward physical activity and physical activity of selected groups of college students as concluded by Hickman were that both men and women majoring in physical education have high positive attitudes toward physical fitness and exercise. The students in education and the liberal arts have like attitudes toward physical fitness and exercise.\(^3\)

Lemen found that the degree to which a person enjoys her physical education program in high school is related to her attitudes toward physical education and activities, to her ability in sports, and to leisure time participation in sports.\(^4\)

Carr analyzed the relationship between success in physical education as represented by performances on a battery of athletic events and expressed attitudes by 335 freshmen high school girls. Carr concluded that attitudes held by entering freshmen girls do influence their success in physical education and indicated that if undesirable attitudes are obstacles to learning, they should be removed.\(^5\)

Baker, in her investigation of women between the ages of 15 and 25 years of age, concluded that attitudes concerning participation in

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\(^5\) Martha Carr, "Relationship Between Success in Physical Education and Selected Attitudes Expressed by High School Freshmen Girls," The Research Quarterly, 16:176-91, May, 1940.
physical education do not regulate participation so much as they reflect the influence of other causes that do. 6

Moore, at the University of California at Los Angeles, found that college women have a highly favorable attitude toward physical activity as a means of recreation, but the amount of time spent in activity was low due to lack of time needed for study, lack of companions, and outside work. 7

Mista's study was conducted to determine attitudes of college women toward their high school physical education programs and found that significant differences in attitude toward physical education did exist between:

1. Those earning interscholastic athletic letters in high school had more favorable attitudes than those who did not earn letters.

2. Those who participated in organized extra-school physical activity programs had more favorable attitudes than those not participating in organized extra-school physical activity programs.

3. Those who lived on farms had more favorable attitudes than those who did not.

4. Those who chose teaching careers had a more favorable attitude than those who did not.

5. Those whose high school graduate class was less than 75 had more favorable attitudes than those from classes larger than 140.

6. Those rating themselves above average in physical skills had a more favorable attitude than those who rated themselves below average.


7. Those who enjoyed high school physical education had a more favorable attitude than those who did not enjoy high school physical education.  

Graybeal used two groups of college freshmen women at the University of Minnesota and determined a greater improvement in attitudes, motor ability, knowledge of a subject, and posture of those enrolled in physical education than those not enrolled. Over a two year period, however, there was a decline in expressed attitudes by those not participating in class activity.  

Hunter studied attitudes of women students toward college physical education and concluded that learning skill early and parents interested in including their children in recreational activities promoted a favorable attitude toward these activities.  

At Wellesley College, Wiedamann and Howe investigated undergraduate attitudes and interest with regard to physical activities. Their study confirmed the favorable attitude of college women toward a requirement in physical education and a preponderance of opinion in favor of rhythmic activities and individual sports.  

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Alden chose three schools, each representing different sections of the country, to secure data on the trend in unfavorable attitudes of college girls in regard to the required physical education programs. Her findings seemed to indicate that the trend in unfavorable influences may be somewhat similar regardless of whether the college is a liberal arts or teacher-training institution.  

Anderson used an attitude questionnaire and a five point rating scale for indicating interest in various activities of junior high girls. She found that girls preferred a progressively planned program which stressed skill.  

Literature Relating to the Wear Attitude Inventory  

Wear constructed an effective instrument for the evaluation of attitudes toward physical education as an activity course. Wear's original inventory consisted of 120 items of which 40 items were statistically analyzed. These 40 items, called the Short Form of the Inventory, were placed on a numerical scoring scale ranging from five to one for reactions of "strongly for" to "strongly against" with each item phrased in support of physical education. For those items phrased negatively, an inverted scoring scale of one to five was used. The split-halves technique was employed to determine reliability. The reliability

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measured 0.96 for 472 cases and became 0.96 when raised by the Spearman-
Brown formula. 14

In 1955, Wear constructed two equivalent forms, Short Form A
and Short Form B. The items for the two equivalent forms were taken
from Wear's original inventory of 120 items. The reliability of Form A
as calculated by the use of the split-halves technique and the Spearman-
Brown formula was 0.94. The reliability of Form B was 0.96. The
product-moment correlation between scores on the two forms was 0.96. 15

Broer, Fox, and Way used the original form of Wear's inventory.
The freshman and sophomore women enrolled in physical education activity
classes at the University of Washington indicated very favorable atti-
tudes toward physical education. 16

At the University of Oregon, Brumbach employed the Short Form A
of the Wear Inventory to measure attitudes of lower division male stu-
dents. He found that athletes had better attitudes toward physical
education than did non-athletes. It was also found that the more years
of physical education a student had had in high school, the better his
attitude was likely to be toward physical education. Students who had

14 Carlos L. Wear, "The Evaluation of Attitude Toward Physical
Education as an Activity Course," The Research Quarterly, 22:114-26,
March, 1955.

15 , "Construction of Equivalent Forms of an Attitude

16 Marion Broer et al., "Attitudes of University of Washington
Women Students Toward Physical Education," The Research Quarterly,
attended smaller high schools had better attitudes toward physical 
education than those who attended larger schools.17

Campbell administered the Short Form A to 199 lower division 
males enrolled in the required physical education program at the 
University of Texas. He classified his subjects according to the size 
of high school attended, the college of matriculation, and the physical 
education class in which they were currently enrolled. Campbell con-
cluded that no significant variations in attitudes concerning physical 
education could be predicted by the size of the high school attended, the 
college of matriculation, and the physical education class in which they 
were presently enrolled.18

In another study, Campbell used the Short Form A, the 50-yard 
dash and the 600-yard run-walk, to determine relationship between scores 
on the Wear attitude inventory and selected physical fitness scores. No 
significant relationship existed between attitudes toward physical educa-
tion as measured by the Wear Short Form A and the ability to perform the 
50-yard dash and the 600-yard run-walk.19

Campbell also applied the Wear Short Form A to junior high 
school boys in Austin, Texas. Campbell found that the Wear Physical

17 Wayne B. Brumbach and John A. Cross, "Attitudes Toward Physi-
cal Education of Male Students Entering the University of Oregon," The 

18 Donald Campbell, "Student Attitudes Toward Physical Education," 

19 , "Relationship Between Scores on the Wear Attitude In-
vntory and Selected Physical Fitness Scores," The Research Quarterly, 
Education Attitude Inventory could be used effectively to evaluate attitudes of junior high school boys toward physical education.\textsuperscript{20}

Bell, Walter, and Staff studied the attitudes of all freshman women taking physical education and senior women who had taken required physical education at the University of Michigan. Having used Wear's attitude scale of 40 items, plus questions dealing with the objectives of physical education and the background of the students, it was concluded that the freshmen had a more favorable attitude toward physical education than did the seniors regardless of whether they had had physical education in high school.\textsuperscript{21}

Keogh analyzed the general attitudes toward physical education of 136 men and 130 women at the University of California at Los Angeles to determine whether men and women differed in this respect. The result of his study was that men and women do not differ in their stated attitudes toward physical education.\textsuperscript{22}

Miller administered the Wear Short Form A to the students enrolled in the basic physical education program at South Dakota State University. He found that the students had had a favorable

\begin{itemize}
  \item \textsuperscript{20} Margaret Bell et al., "Attitudes of Women at the University of Michigan Toward Physical Education," \textit{The Research Quarterly}, 24:379-91, December, 1953.
  \item \textsuperscript{21} Margaret Bell et al., "Attitudes of Women at the University of Michigan Toward Physical Education," \textit{The Research Quarterly}, 24:379-91, December, 1953.
\end{itemize}
attitude toward physical education. As Miller, Wessel and Nelson found that the women students at Michigan State University expressed a very favorable attitude toward physical education as an activity course as measured by the Wear Inventory.

Allerdice employed the Kneer adaptation of the Wear Attitude Inventory in her study to discover the relationship between attitudes toward physical education and the sociometric status of subjects within a physical education class. The results of studying 202 eighth and ninth grade girls did not demonstrate any substantial relationship between attitudes toward physical education and a degree of physical fitness.

Moyer, Mitchem, and Bell administered the modified Wear Attitude Inventory to measure women's attitudes toward physical education in the general education program at Northern Illinois University. Their findings indicated a highly favorable attitude toward physical education on the part of both freshmen and juniors.


Harrington re-worded sixteen items of the Wear Attitude Inventory to determine attitudes of later elementary children toward physical education and their physical fitness status. No relationship was found between a student's expressed attitude toward physical education and his physical fitness status. 27

Literature Relating to Knowledge and Skills

Knowledge testing is important and vital to the learning process in physical education. The tools employed in the measurement of knowledge should be so designed that the teacher can easily determine what the students have learned in participation and from facts and materials presented within the unit. 28 Any knowledge test should measure the student's ability to use her knowledge, to generalize, to make applications; therefore, they should not be built as learning-teaching devices. 29

Knowledge tests consist of several types. The most common and practical type used in the classroom is the teacher-made test which may be either objective or subjective in nature since standardized tests have not had widespread use in physical education on the national level. 30


28Johnson, loc. cit.


30Johnson, op. cit., p. 410.
Johnson writes that in any sport there are many skills and abilities involved which make for successful performances. Although the fundamental skills can be identified, they can never be measured separately and then summed up to represent actual performance. The successful teacher must recognize that the total performance is greater than its individual components and strive to select those tests which will provide the student and teacher with the most accurate information of the student's progress and achievement.31

For women's volleyball, Clifton devised a single hit volley test to evaluate the volleying ability of college women students in volleyball. Clifton found her test to be most valid and reliable when administered from behind a seven foot restricting line, using the sum of scores from the first and second trial. She allowed thirty seconds for each trial with a two minute rest between trials.32

Liba and Stauff constructed a test for the overhead volleyball pass for college women and for junior high school girls with modifications. A good performance was considered as having the ability to pass the ball to a desired height and desired distance.33

Crogen felt that validity of volleyball skills should be based upon playing competition and not upon judges' ratings. Crogen

31 Johnson, op. cit., p. 368.
constructed a test having a validity based upon playing ability as demonstrated in competition.\textsuperscript{34}

The search of the literature revealed only one study in the area of skills testing for field hockey. The test examined was a test constructed in 1938-39 and published in 1940. Schmithals and French used fifty-one college women students at the University of Iowa and from the Iowa City Hockey Club. Three national rated umpires were asked to rate the players on general hockey playing ability during two consecutive class periods and classify them into five groups: (1) superior, (2) above average, (3) average, (4) below average, (5) inferior. An effort was made to determine a single test which was statistically best and which was most economical in time and the best combination of tests as determined by the results of multiple correlations. The items tested were fielding and drive; straight, right, left, goal shooting; push pass; goal shooting left; dribble, dodge, circular tackle, and drive; and drive for distance. Statistically the best single test were the fielding and drive with a reliability of .9010 and the combined goal shooting with a reliability of .9189. The most all-around and economical test was the dribble, dodge, circular tackle, and drive with a reliability of .9238.\textsuperscript{35}

Johnson states that the game of bowling is, in itself, an objective measurement.\textsuperscript{36} The literature related to bowling was concerned with

\begin{footnotesize}
\begin{enumerate}
\item Margaret Schmithals and Esther French, "Achievement Test in Field Hockey for College Women," \textit{The Research Quarterly}, 11:84-92, March, 1940.
\item Johnson, op. cit., p. 348.
\end{enumerate}
\end{footnotesize}
establishing bowling norms for men and women. Phillips and Summers have established ratings for different levels of ability as to progress at various stages up through twenty-five lines of bowling. Norms of superior, good, average, poor, and inferior performance were constructed for men and women, for experienced and non-experienced bowlers in the study done by Martin and Keogh.

Literature Relating to the AAHPER Youth Fitness Test

The measurement of physical fitness and methods of developing fitness have been the concern of physical educators as well as of the entire nation. The youth fitness test manual indicates that this concern was met with the development of the AAHPER Youth Fitness Test. The items selected for testing were: pull-up (with modified pull-up for girls), sit-up, shuttle run, 50-yard dash, softball throw for distance, and the 600-yard run-walk. This test was administered to a sampling of 8,500 boys and girls in grades five through twelve under the direction of Hunsicker of the University of Michigan with the assistance of the University's Survey Research Center. The data for the national

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39 Johnson, op. cit., p. 396.

testing was collected and analyzed during the school year of 1957-58. The national norms were published in September of 1958 by the AAHPER. Even though this first testing of American youth in 1957 demonstrated that the American boys and girls were not as physically fit as the youth in other countries, the AAHPER fitness test was met with great enthusiasm and was adopted and used by many school and youth-serving agencies.

Having been used for some five years, the AAHPER believed it was desirable to develop new norms to determine whether increased emphasis on testing and improvements in physical education were helping to increase fitness levels. Again, under the direction of Hunsicker and with the assistance of the Survey Research Center at the University of Michigan, a second national testing was undertaken to update the norms. The identical test items as in the first test, with the exception of one item, were administered to 9,200 boys and girls in the second testing. The flex-arm hang replaced the modified pull-up for girls because it gave a more efficient and reliable measure for the quality tested.

The norms of the second national testing were indicative of the fact that boys and girls from the ages 10 to 17 are generally more fit today, as measured by the revised AAHPER Youth Fitness Test.

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41 Ibid., p. 9.
42 Ibid.
43 Ibid.
44 Ibid.
45 Ibid.
46 Ibid.
Klesius conducted a study to consider the effect of correlating various combinations of measures collected in the administration of the AAHPER Youth Fitness Test to determine the reliability of the selected test items and the relative efficiency of performance measures. Acting upon his research, Klesius concluded that the best test items were in general judged reliable, with sit-up being a possible exception. The test items selected produced satisfactory indexes of performance with the exception of the shuttle run; and the mean on each of the test items when compared to trials 1, 2, and 3, on each item, yielded different from any other measure, based on more than one trial.47

Franks and Moore's study was to determine the effects of different amounts of calisthenics and volleyball, calisthenics, and volleyball on physical fitness. After a five week period, it was concluded that a daily calisthenics class or a combination of calisthenics and volleyball class caused greater improvements in muscular endurance, as measured by sit-ups and pull-ups, than an all-volleyball class. The combination class also caused greater improvement in speed as measured by the 5-yard dash, than the volleyball class.48

A study similar to Franks and Moore's was that of Marmis et al. which investigated the test-retest reliability of those items in which

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more than a single trial was employed with a view to obtaining evidence concerning the appropriateness of the prescribed trials. Their results indicated that the number of trials in most of the items should be changed. 49

Rothermel et al. conducted a study to determine the effects on the physical fitness of boys at the University of Illinois Sport-Fitness Summer Day School for Boys in 1950. They found that the changes that took place in items which were designed to measure muscular strength and endurance, power, and cardiorespiratory endurance were significantly greater for boys in the organized program and that no changes appeared for either group in the items which were designed to measure speed, agility, and coordination. 50

Yeatts and Gordon administered the AAHPER Youth Fitness Test and Gordon's "How I See Myself" scale to seventy-five seventh graders. Those students who had participated in an elementary program with the resources of a physical education specialist performed a higher degree of proficiency on the AAHPER physical fitness test and they were more accurate in self-estimates. 51


Zimmerman studied the physical performances of boys and girls taught by special physical education teachers and classroom teachers. She administered the AAHPER fitness test to boys and girls taught by each teacher. Zimmerman found that those students taught by a special physical education teacher exceeded the physical performance of those students taught by the classroom teacher.52

Using the AAHPER Youth Fitness Test, the New York State Fitness Test, and the Kraus-Weber Test, Anderson studied the relationships between physical performances of the seventh grade girls and a classification index based on age, height, and weight. The results indicated that these factors do not provide a reliable index for the grouping of the students and for establishing norms of test performance.53

Busch, in establishing AAHPER physical fitness norms for the state of South Dakota, selected one school to represent each region of the South Dakota High School Activities Association. The subjects chosen for study included one thousand South Dakota girls in grades seven to ten. In comparing the norms of the South Dakota girls to the national norms, it was found that the medians for the South Dakota girls were higher than the medians of the national girls on all items except the flexed-arm hang.54


Lilevjen and Schlekeway conducted a study utilizing the AAHPER Youth Fitness Test to compare the physical fitness of junior high school boys, Watertown, South Dakota, to the national norms. The authors found that on the initial test given, the subjects were well above the fiftieth percentile on the national norms in all test items except the 50-yard dash. On the final testing, all subjects were well above the fiftieth percentile on all test items. 55

Howlin compared the physical fitness of selected elementary schools in Sioux Falls, South Dakota, with the national fitness norms. His study revealed that the girls fell below the national average on the shuttle run, the broad jump, and the softball throw test items. The boys fell below the national average on the shuttle run and the standing broad jump. 56

Literature Relating to Other Fitness Tests

Keough studied the effects of a daily and two day per week physical education program upon motor fitness of children. Keough used the Iowa Test of Motor Fitness to measure the fitness of her third and fifth grade subjects. Keough's conclusion revealed that the two

55 Clar Lilevjen and Eugene Schlekeway, "The Effects of a Physical Education Program of 150 Minutes Per Week at Watertown, South Dakota, on Physical Fitness as Compared to the National Norms Established by the AAHPER Fitness Test" (unpublished Research report, South Dakota State University, 1962), pp. 1-43.
day per week program of physical education, as presented in her study, was as effective for developing fitness as measured by the Iowa fitness test as a program of physical education that met daily when the total time spent in activity was the same. 57

In England, Sutcliff and Canham applied varying periods of physical education work to three different groups of boys. Two groups had two physical education periods a week and one group had physical education daily. The groups were tested on fitness items of suppleness, strength, skill, and endurance. The authors found that the daily physical education class performed significantly better in suppleness and strength than did the two groups that met two times a week. 58

Rosenstein and Frost undertook a study to determine whether it could be demonstrated that the quality of the physical education program affected the amount of improvement in physical fitness among pupils of high school age in selected schools in New York State. They used the New York State Physical Fitness Test that measured posture, strength, agility, speed, balance, and endurance. Rosenstein and Frost indicated strongly that greater physical fitness results where facilities, personnel, and programs are of high quality. 59


CHAPTER III

METHODS AND PROCEDURES

Organization of the Study

This study was completed over a period of eighteen weeks, September 7, 1971, to March 18, 1972. The subjects included in this study were all those students enrolled in physical education at Harmony Hill High School, Watertown, South Dakota. The subjects were placed in physical education through two types of scheduling, the daily flexible smorgasbord schedule and the daily stabilized partial master schedule. Thus, two groups of subjects were established. All subjects were tested on attitudes toward physical education, knowledge, skill, and physical fitness. On September 7 and 8, 1971, a pretest on attitudes toward physical education was administered. On March 18, a post test on attitudes toward physical education was administered. Knowledge and skill tests were administered at the conclusion of each activity. The physical fitness testing was given three different times, (1) as a pre test, (2) before Christmas vacation, and (3) as a post test. The physical fitness testing occurred during the weeks of September 7-10, 1971, November 29 through December 10, 1971, and March 14-18, 1972. Test descriptions in this study appear in Appendixes A, B, C, D, E, and F.

Source of Data

Forty-five girls enrolled in physical education at Harmony Hill High School participated in this study. Twenty-two were scheduled in physical education by the daily flexible smorgasbord schedule and
twenty-three girls were scheduled to participate in physical education by the daily stabilized partial master schedule. Those girls placed in the two types of scheduling depended upon (1) whether they were residents living at Harmony Hill, thus being available to be scheduled for class before or after the regular school day because of conflicts in scheduling, and (2) how the students could be arranged in class lists to fit back-to-back with other academic classes. Once the class lists were made, the same students remained in either the daily flexible or the daily stabilized schedule throughout the entire study. Since other academic classes were small in number, the physical education classes were again divided into more classes with fewer in each class. However, twenty-two girls remained in the daily flexible schedule, not meeting as one class in each schedule but as two or three classes.

Administration of the Treatment

The two types of scheduling necessitated two groups of students; one group to function in the daily flexible smorgasbord schedule referred to as the flexible group, and one group to function in the daily stabilized partial master schedule referred to as the stabilized group.

Each group participated in three activities, field hockey, volleyball, and bowling. Field hockey and volleyball were taught by the investigator, and bowling was taught by the bowling alley personnel with the assistance of the investigator.

The stabilized group in field hockey was divided into two groups called PE ca and PE cb for identification purposes in scheduling. PE ca consisted of twelve girls and PE cb consisted of eleven girls. These two
groups met as individual classes four days a week for one hour. Then the two groups met together one day of the week for one hour in order to have participation.

The flexible group was also divided into two groups, PE 2a and PE 2b, for identification purposes in scheduling. Each group, PE 2a and PE 2b, consisted of eleven girls. PE 2a and PE 2b met twice a week, each meeting on one day for three mods or 45 minutes and each meeting on the other day for four mods or 60 minutes. These groups did not meet together for full team playing experience due to scheduling conflicts.

For volleyball, the stabilized groups remained the same as in field hockey. PE ca met every day from 7:45 until 8:45 a.m. PE cb met each day from 10:15 until 11:15 a.m. The actual playing time for each class was thirty minutes since traveling to the gymnasium was included in the scheduled hour.

Since the gymnasium was available for only three afternoons of the week for an hour, the investigator wanted each student in the flexible group to have the opportunity to play volleyball; hence, it was necessary to divide the flexible group into three classes, PE 2a, PE 2b, and PE 2c. Each class met in the classroom twice a week for a thirty minute lecture twice a week. PE 2a consisted of eight girls and met at the gymnasium on Tuesday from 1:45 to 2:45 p.m. PE 2b and PE 2c each had seven girls and met at the gymnasium from 1:45 to 2:45 p.m. on Thursday and Friday, respectively.

For bowling, the stabilized group consisted of one large class of 23 girls. The class was referred to as PE ca. It met from 2:30 to 4:30 p.m. on Monday and Tuesday and from 2:30 to 3:30 p.m. on Thursday.
The flexible group also met as one and it consisted of 22 girls. It was referred to as PE 2a and met on Monday and Tuesday from 1:00 to 2:00 p.m.

A brief description of materials taught in each activity appears in Appendix A. The description includes the classroom instruction which was employed for the flexible and stabilized groups.

Collection of Data

The data collected in this study were the measurements taken from the following:

Wear Physical Education Attitude Inventory Test, Forms A and B. Based upon the examination of attitude scales, Wear's Inventory, Form A and Form B, was found to satisfy the needs of this study. In 1955, Wear constructed two equivalent attitude forms for the purpose of measuring changes in attitude toward physical education as a result of special experiences in which students might be involved. Since there are two equivalent forms of Wear's Inventory, Form A was used as a pre test and Form B as a post test. Description of the tests appears in Appendix B. Data appear in Appendix G.

Although Wear's Inventory was designed for college men, the difficulty of the vocabulary was not such that could not be used for high-school classes. The reliability proved to be .94 for Form A and .96 for Form B. The product correlation for both forms was .96. Face validity has been accepted for the two equivalent scales.

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2 Ibid.
Form A was given on September 7 and 8, 1971. Form B was administered on March 18, 1972.

**Knowledge Tests.** Field hockey knowledge tests consisted of items taken from the test manual designed for use with field hockey and volleyball, published by the William C. Brown Publishers to accompany their books of instruction. The bowling knowledge test was prepared by the investigator.

**Skills Tests—Field Hockey.** In searching for skills tests in field hockey, the investigator found a field hockey test developed for college women in 1938-39 by Schmithals and French and published in 1940. Their study consisted of constructing three tests: test one measured the skills of the dribble, dodge, circular tackle, and drive; test two measured the skills of goal shooting—straight, right, and left; test three measured the skills of fielding and driving. The investigator used only the skills of the three tests but allowed only five trials on each test for each subject being tested. The investigator felt that five trials were sufficient to measure the skill of her subjects. If there was a wrong technique employed by the one being tested, a dash was recorded. All trials of the field hockey test battery were timed and the best score recorded. Complete description of the test appears in Appendix D. Data appear in Appendix E, Tables I and II.

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Power Volleyball. Since power volleyball was taught to the students participating in this study and is a relatively "new" sport, the investigator devised a skill test employing the skills of power volleyball. Ideas were borrowed from other volleyball tests constructed by Brady, Clifton, and Brumbach.5

The investigator's volleyball skill test included the overhand service, the standing spike, the wall volley, and the two-handed dig. The overhanded service was administered from a distance of 30 feet and a distance of 25 feet, and could land anywhere in the opponent's court as long as the ball cleared the net. The distance of 30 feet was chosen because of the regulation service line. The distance of 25 feet was chosen to find out whether the subject lacked skill or just did not have the strength to hit the ball over the net from 30 feet. Five trials were allowed for each distance, with the best score recorded.

The wall volley was selected as a skill to be tested because power volleyball demands the use of high passes. Each subject was allowed two trials, the better trial being recorded. No restraining line was used and each subject was instructed to throw the ball against the wall above a ten foot marker and volley the ball against the wall consecutively for thirty seconds. If the ball did not go above the ten foot mark or hit the wall, the subject began again, and each time the subject began counting over. The highest score of consecutive counts

was recorded. Two trials of thirty seconds were given to each subject with a rest period of one minute between trials.

The ability to spike was tested because it is considered to be an offensive weapon used in scoring points. The two-handed dig was given to determine whether the subject could play the low ball effectively. Description of the tests appears in Appendix D. Data appear in Appendix E, Tables III and IV.

Bowling. Bowling is considered in itself an objective measurement of skill. Therefore, the investigator felt no need to administer a bowling skill test. To determine the amount of skill acquired by the subjects, a record of their bowling scores was kept. The bowling scores of the second week and of the sixth week were compared to measure the amount of improvement of each student in her bowling skill. Data appear in Appendix E, Tables V and VI.

AAHPER Youth Fitness Test. The AAHPER Youth Fitness Test was selected for this study because (1) national norms have been established by which the students at Harmony Hill High School could be compared with other students in the nation and (2) the test can be easily administered, requiring little equipment.

The AAHPER test was administered September 7 to 10, 1971; November 29 to December 10, 1971; and March 14 to 18, 1972. The softball throw test item for distance was eliminated because of weather conditions and the lack of indoor facilities. All data were recorded in inches and/or seconds for statistical purposes. Description of the test items appears in Appendix F. Data appear in Appendix G.
CHAPTER IV

ANALYSIS AND DISCUSSION OF RESULTS

Organization of Data for Analysis

The purpose of this study was to determine the difference in attitudes toward physical education, knowledge, skill, and physical fitness of those students taking physical education in the flexible modular schedule and of those students taking physical education in the daily stabilized "partial master" schedule.

A total of forty-five girls who were enrolled in the physical education program at Harmony Hill High School participated in the study. The stabilized group consisted of twenty-three girls and met physical education classes five times a week. The flexible group consisted of twenty-two girls and met twice a week.

In order to statistically test the null hypothesis in regard to attitudes, Garrett's procedures were employed and $t$ ratios were computed.¹ The first $t$ ratio was computed to compare the changes in attitudes from the beginning of the physical education program in September to the end of the program in March between the two groups. The last two $t$ ratios were computed to determine within group attitude changes from the beginning to the end of the program within each individual group.

The same statistical procedures were followed to test the null hypothesis in regard to physical fitness. Comparisons within groups and

between groups were made for the six physical fitness variables from trial one to trial two, and from trial one to trial three.

The statistical procedure used to analyze knowledge and skill differences between the groups was a t test for independent groups comparing the results on the tests at the end of each activity. This procedure was followed for knowledge in field hockey, volleyball, and bowling, and for skill level analysis in field hockey and volleyball. Bowling was treated in a somewhat different fashion because a pre unit skill test was possible in this case. The t test comparing the two groups analyzed the changes in bowling scores from the second week of the bowling unit to the sixth week of each group.

The .05 level of confidence was accepted as the minimum level for the t ratio to be considered significant. The group means for the variables tested appear in Table I. The raw data for all tests except the skill tests in field hockey, volleyball, and bowling in Appendix G.
### TABLE I

**GROUP MEANS OF THE VARIABLES**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Stabilized Group</th>
<th>Flexible Group</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Wear Attitude Inventory</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre Test</td>
<td>115.82</td>
<td>117.41</td>
</tr>
<tr>
<td>Post Test</td>
<td>119.17</td>
<td>110.27</td>
</tr>
<tr>
<td><strong>Flexed-Arm Hang (sec.)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trial 1</td>
<td>6.0</td>
<td>.6</td>
</tr>
<tr>
<td>Trial 2</td>
<td>5.2</td>
<td>2.0</td>
</tr>
<tr>
<td>Trial 3</td>
<td>7.2</td>
<td>2.4</td>
</tr>
<tr>
<td><strong>Sit-ups</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trial 1</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Trial 2</td>
<td>28</td>
<td>31</td>
</tr>
<tr>
<td>Trial 3</td>
<td>31</td>
<td>38</td>
</tr>
<tr>
<td><strong>Shuttle Run (sec.)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trial 1</td>
<td>11.9</td>
<td>12.2</td>
</tr>
<tr>
<td>Trial 2</td>
<td>11.8</td>
<td>12.1</td>
</tr>
<tr>
<td>Trial 3</td>
<td>11.2</td>
<td>11.4</td>
</tr>
<tr>
<td><strong>Standing Broad Jump (in.)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trial 1</td>
<td>62</td>
<td>61</td>
</tr>
<tr>
<td>Trial 2</td>
<td>61</td>
<td>60</td>
</tr>
<tr>
<td>Trial 3</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td><strong>50-Yard Dash (sec.)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trial 1</td>
<td>9.1</td>
<td>9.5</td>
</tr>
<tr>
<td>Trial 2</td>
<td>8.3</td>
<td>8.5</td>
</tr>
<tr>
<td>Trial 3</td>
<td>8.6</td>
<td>8.2</td>
</tr>
<tr>
<td><strong>600-Yard Run-Walk (sec.)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trial 1</td>
<td>190</td>
<td>218</td>
</tr>
<tr>
<td>Trial 2</td>
<td>152</td>
<td>179</td>
</tr>
<tr>
<td>Trial 3</td>
<td>144</td>
<td>189</td>
</tr>
</tbody>
</table>
TABLE I (Continued)

GROUP MEANS OF THE VARIABLES

<table>
<thead>
<tr>
<th>Variable</th>
<th>Stabilized Group</th>
<th>Flexible Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field Hockey Knowledge</td>
<td>30.39</td>
<td>30.90</td>
</tr>
<tr>
<td>Volleyball Knowledge</td>
<td>27.61</td>
<td>19.45</td>
</tr>
<tr>
<td>Bowling Knowledge</td>
<td>26.60</td>
<td>19.00</td>
</tr>
<tr>
<td>Field Hockey</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dribble, Dodge, Circular</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tackle, and Drive (sec.)</td>
<td>17.25</td>
<td>15.76</td>
</tr>
<tr>
<td>Goal Shooting Straight (sec.)</td>
<td>5.17</td>
<td>5.19</td>
</tr>
<tr>
<td>Goal Shooting Left (sec.)</td>
<td>5.10</td>
<td>6.45</td>
</tr>
<tr>
<td>Goal Shooting Right (sec.)</td>
<td>5.14</td>
<td>6.05</td>
</tr>
<tr>
<td>Fielding and Driving (sec.)</td>
<td>5.98</td>
<td>4.84</td>
</tr>
<tr>
<td>Volleyball</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service at 30'</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(best score out of 5 trials)</td>
<td>1.43</td>
<td>1.09</td>
</tr>
<tr>
<td>Service at 25'</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(best score out of 5 trials)</td>
<td>2.17</td>
<td>1.95</td>
</tr>
<tr>
<td>Wall Volley</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(better score out of 2 trials)</td>
<td>3.26</td>
<td>7.14</td>
</tr>
<tr>
<td>Two-handed Dig</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(best score out of 5 trials)</td>
<td>2.70</td>
<td>3.09</td>
</tr>
<tr>
<td>Spike</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(best score out of 5 trials)</td>
<td>2.74</td>
<td>3.05</td>
</tr>
<tr>
<td>Bowling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2nd Week (ave.)</td>
<td>93</td>
<td>85</td>
</tr>
<tr>
<td>6th Week (ave.)</td>
<td>104</td>
<td>92</td>
</tr>
</tbody>
</table>
Analysis of the Data

Table II shows the statistical comparison of the attitude mean changes between the stabilized group and the flexible group.

**TABLE II**
THE SIGNIFICANCE OF CHANGE BETWEEN GROUP MEANS IN ATTITUDES

<table>
<thead>
<tr>
<th>Variable</th>
<th>Stabilized Group Mean Change</th>
<th>Flexible Group Mean Change</th>
<th>Mean Difference</th>
<th>SE_D</th>
<th>df</th>
<th>t*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude</td>
<td>3.35</td>
<td>-7.14</td>
<td>10.49</td>
<td>4.43</td>
<td>43</td>
<td>2.37</td>
</tr>
</tbody>
</table>

\[t_{.05}^{(43)} = 2.02\]

The mean change for the stabilized group on the attitude pre test to post test was 3.35 as compared to a -7.14 mean change for the flexible group. The results revealed a significant difference at the .05 level of confidence as indicated by a \(t\) 3.27 compared to a required \(t\) of 2.02.

Table III shows the statistical analysis of the changes in attitudes from pre test to post test within the stabilized and flexible group.

**TABLE III**
THE SIGNIFICANCE OF THE CHANGES IN ATTITUDES WITHIN GROUPS FROM PRE TO POST TEST

<table>
<thead>
<tr>
<th>Variable</th>
<th>Groups</th>
<th>(M_D)</th>
<th>SE_{MD}</th>
<th>df</th>
<th>(t^*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude Changes from Pre to Post Test</td>
<td>Stabilized</td>
<td>3.35</td>
<td>1.66</td>
<td>22</td>
<td>2.01</td>
</tr>
<tr>
<td></td>
<td>Flexible</td>
<td>-7.14</td>
<td>3.62</td>
<td>21</td>
<td>1.97</td>
</tr>
</tbody>
</table>

\[t_{.05}^{(22)} = 2.07, \quad t_{.05}^{(21)} = 2.08\]
The mean difference for the stabilized group from pre test to post test was 3.35 as compared to the flexible group's group mean score of -7.14. The results revealed no significant difference within either group at the .05 level of confidence as indicated by a $t$ of 2.01 and 1.97, respectively, compared to a required $t$ of 2.07 and 2.08. Both groups, however, approached significance.

Table IV shows the statistical comparison of group means in the knowledge of field hockey, volleyball, and bowling.

### Table IV

<table>
<thead>
<tr>
<th>Variables</th>
<th>Stabilized Group Mean</th>
<th>Flexible Group Mean</th>
<th>$D$</th>
<th>$SE_D$</th>
<th>df</th>
<th>$t^*$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field Hockey</td>
<td>30.39</td>
<td>30.03</td>
<td>.30</td>
<td>1.36</td>
<td>43</td>
<td>.22</td>
</tr>
<tr>
<td>Volleyball</td>
<td>27.61</td>
<td>19.45</td>
<td>8.16</td>
<td>1.62</td>
<td>43</td>
<td>5.04</td>
</tr>
<tr>
<td>Bowling</td>
<td>26.60</td>
<td>19.00</td>
<td>7.60</td>
<td>1.62</td>
<td>43</td>
<td>4.69</td>
</tr>
</tbody>
</table>

*$t_{.05}^{(43)} = 2.02$, $t_{.01}^{(43)} = 2.70$

In the knowledge of field hockey, the stabilized group had a group mean of 30.39 as compared to the group mean of 30.09 for the flexible group. The results revealed no significant difference at the .05 level of confidence as indicated by a $t$ of .22 compared to a required $t$ of 2.02. The group mean for the stabilized group in the knowledge of volleyball was 27.61 as compared to the flexible group's group mean score of 19.45. In the knowledge of bowling, the stabilized group had a group mean of 26.60 as compared to the flexible group's group mean score of 19.00. Both mean scores were significantly different beyond the .01 level of confidence as indicated by a $t$ ratio of 5.04 and 4.69,
respectively, compared to a required $t$ of 2.70. Both differences were in favor of the stabilized group which met five times per week.

Table V shows the statistical comparison of the groups means in the skills of field hockey, volleyball, and bowling between the stabilized and the flexible groups.

TABLE V

THE SIGNIFICANCE OF THE DIFFERENCE BETWEEN THE MEANS FOR BOTH GROUPS IN THE SKILLS OF FIELD HOCKEY, VOLLEYBALL, AND BOWLING

<table>
<thead>
<tr>
<th>Variable</th>
<th>Stabilized Group Mean</th>
<th>Flexible Group Mean</th>
<th>$D$</th>
<th>$SE_D$</th>
<th>df</th>
<th>$t^*$</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Left (sec.)</td>
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<td>Driving (sec.)</td>
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<td>.34</td>
<td>.44</td>
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<td>.78</td>
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<tr>
<td>Service at 25'</td>
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<td>1.95</td>
<td>.22</td>
<td>.53</td>
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<td>5.46</td>
<td>.42</td>
<td>43</td>
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</table>

$t_{.05(43)} = 2.02$, $t_{.01(43)} = 2.70$, $t_{.05(41)} = 2.01$, $t_{.05(40)} = 2.01$, $t_{.01(40)} = 2.71$
The results of the skills tests administered for field hockey revealed that three of the five tests given differed significantly in their results. Goal shooting left, right, and fielding and driving resulted in $t$ ratios of 4.19, 2.09, and 3.08, respectively. The difference was in favor of the stabilized group in the first two variables, but in favor of the flexible group in the last variable.

The difference in bowling skill improvement between the two groups revealed a significant difference in results. The stabilized group improved to a significant degree over the flexible group as indicated by a $t$ of 12.99 compared to a required $t$ of 2.70 needed for the .01 level of confidence.

Table VI shows the statistical comparison of group change in physical fitness.
### Table VI

The significance of the change between both groups in physical fitness

<table>
<thead>
<tr>
<th>Variable</th>
<th>Stabilized Group Mean</th>
<th>Flexible Group Mean</th>
<th>D</th>
<th>SE&lt;sub&gt;D&lt;/sub&gt;</th>
<th>df</th>
<th>t*</th>
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<tbody>
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<td>Sit-ups</td>
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<td>3.96</td>
<td>3.64</td>
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<td>.79</td>
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<td>.86</td>
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<td>2.66</td>
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<td>600-Yard Run-Walk (sec.)</td>
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<tr>
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</table>

*<sup>t</sup><sub>.05 (43) = 2.02,  <sup>t</sup><sub>.01 (43) = 2.70</sub>*

Comparisons between groups in the physical fitness test items found no significant difference except for the 50-yard dash test item in which trial one to trial three resulted in a t ration of 2.66. The difference was in favor of the flexible group.
Table VII shows the statistical comparison of mean change within the stabilized group on the physical fitness test items from trial one to trial two and from trial one to trial three.

**TABLE VII**

**THE SIGNIFICANCE OF THE CHANGE IN PHYSICAL FITNESS WITHIN THE STABILIZED GROUP**

<table>
<thead>
<tr>
<th>Variable</th>
<th>( M_D )</th>
<th>( S_{EMD} )</th>
<th>df</th>
<th>( t^* )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexed-arm Hang (sec.)</td>
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<td>1.41</td>
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<td>22</td>
<td>1.16</td>
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<td>Sit-ups</td>
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<td>Trial 1-2</td>
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<td>19</td>
<td>3.20</td>
</tr>
<tr>
<td>Trial 1-3</td>
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<td>2.91</td>
<td>20</td>
<td>3.07</td>
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<tr>
<td>Shuttle Run (sec.)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trial 1-2</td>
<td>-.14</td>
<td>.17</td>
<td>22</td>
<td>.82</td>
</tr>
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<td>.26</td>
<td>22</td>
<td>2.65</td>
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<tr>
<td>Standing Broad Jump (in.)</td>
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<td></td>
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<tr>
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<td>.90</td>
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<td>1.35</td>
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<td>1.60</td>
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<tr>
<td>50-Yard Dash (sec.)</td>
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<tr>
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<td>.38</td>
<td>22</td>
<td>1.71</td>
</tr>
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<td>Trial 1-3</td>
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<td>.27</td>
<td>22</td>
<td>1.59</td>
</tr>
<tr>
<td>600-Yard Run-Walk (sec.)</td>
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<td>22</td>
<td>4.74</td>
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<td>-43.96</td>
<td>8.79</td>
<td>22</td>
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</table>

\( t_{.05}(22) = 2.07, \quad t_{.01}(22) = 2.82, \quad t_{.05}(20) = 2.08, \quad t_{.01}(20) = 2.84, \quad t_{.05}(19) = 2.09, \quad t_{.01}(19) = 2.86 \)
Analyses within the stabilized group indicated five significant changes. From trial one to trial two, two of the six test items administered changed significantly. Sit-ups and the 600-yard run-walk resulted in t ratios of 3.20 and 4.74, respectively. Both the sit-ups and the 600-yard run-walk showed a significant improvement at the .01 level of confidence. The results of the physical fitness test items within the stabilized group from trial one to trial three revealed that three of the six items given changed significantly. Sit-ups, the shuttle run, and the 600-yard run-walk resulted in t ratios of 3.07, 2.65, and 5.00, respectively. The sit-ups and the 600-yard run-walk showed significant improvement at the .01 level of confidence, and the shuttle run showed a significant improvement at the .05 level of confidence.
Table VII shows the statistical comparison of mean change within the flexible group on the physical fitness test items from trial one to trial two and from trial one to trial three.

**TABLE VIII**

THE SIGNIFICANCE OF THE CHANGE IN PHYSICAL FITNESS WITHIN THE FLEXIBLE GROUP

<table>
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<tr>
<th>Variable</th>
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<th>( SE_{MD} )</th>
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<th>( t^* )</th>
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<td>Flexed-arm Hang (sec.)</td>
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<td>.64</td>
<td>21</td>
<td>2.60</td>
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<tr>
<td>Sit-ups</td>
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<td>50-Yard Dash (sec.)</td>
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<td>8.60</td>
</tr>
<tr>
<td>600-Yard Run-Walk (sec.)</td>
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<tr>
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<td>-30.95</td>
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</table>

\[ t_{.05}(21) = 2.08, \ t_{.01}(21) = 2.83, \ t_{.05}(18) = 2.10, \ t_{.01}(18) = 2.88 \]
The results of the physical fitness test items from trial one to trial two within the flexible group revealed that three of the six test items administered changed significantly. The sit-ups, the 50-yard dash, and the 600-yard run-walk resulted in \( t \) ratios of 3.36, 4.25, and 3.42, respectively. All test item changes represented an improvement. The results of the physical fitness test items from trial one to trial three within the flexible group revealed that five of the six test items administered changed significantly. The flexed-arm hang, the sit-ups, the shuttle run, the 50-yard dash, and the 600-yard run-walk resulted in \( t \) ratios of 2.60, 5.00, 2.62, 8.60, and 2.68, respectively. All test item changes represented an improvement.

Figures I through VI show a comparison of the percentile ranks of the six physical fitness test items as achieved by the Harmony Hill High School girls of Watertown to the National AAHPER Norms.

The girls from both groups scored above the fiftieth percentile on the national norms on the sit-ups and the shuttle run. The stabilized group equaled the fiftieth percentile on the standing broad jump for trial one, above the fiftieth percentile on the 50-yard dash for trial two, and the 600-yard run-walk for trials two and three. The flexible group scored above the fiftieth percentile on the sit-ups for trials two and three, the shuttle run for trial three, and the 50-yard dash for trial three. The Harmony Hill girls fell below the national average on the remaining AAHPER test items.
# FLEXED-ARM HANG

## Classification Index for HSG

<table>
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<th>Percentile</th>
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<th>Trial 3</th>
<th>Median</th>
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</table>

*Figure 1. A comparison of percentile ranks of the flexed-arm hang test item as achieved by the Harmony Hill High School Girls at Watertown with the National AAHPER Norms*
<table>
<thead>
<tr>
<th>Percentile</th>
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<th>Trial 3</th>
<th>Median</th>
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</table>

Figure 2. A comparison of percentile ranks of the sit-up test item as achieved by the Harmony Hill High School Girls at Watertown with the National AAHPER Norms.
### Classification Index for HSG

<table>
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<tr>
<th>Percentile</th>
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<th>Trial 3</th>
<th>Median</th>
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</table>

- **Stabilized Group**
- **Flexible Group**
- **National**

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**Figure 3.** A comparison of percentile ranks of the shuttle run test item as achieved by the Harmony Hill High School Girls at Watertown with the National AAHPER Norms
### STANDING BROAD JUMP

#### Classification Index for HSG

<table>
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</table>

Figure 4. A comparison of percentile ranks of the standing broad jump test item as achieved by the Harmony Hill High School Girls at Watertown with the National AAHPER Norms.
Figure 5. A comparison of percentile ranks of the 50-yard dash test item as achieved by the Harmony Hill High School Girls at Watertown with the National AAHPER Norms.
Figure 6. A comparison of percentile ranks of the 600-yard run-walk as achieved by the Harmony Hill High School Girls at Watertown with the National AAHPER Norms.
Discussion of Results

Campbell reported that a score of ninety on the Wear Attitude Inventory indicated a favorable attitude toward physical education.\(^2\) Miller also used the same form and considered a score of ninety to indicate a favorable attitude toward physical education, and the score of 120 to indicate a most favorable attitude.\(^3\)

The results of the present study revealed that the girls at Harmony Hill High School had a favorable attitude toward physical education. The stabilized group had a group mean score of 115.82 on the pre test and a group mean score of 119.17 on the post test. The flexible group had a group mean score of 117.41 on the pre test and a group mean score of 110.27 on the post test.

This study revealed that the attitude of the stabilized group toward physical education improved from pre test to post test, whereas, the flexible group retrogressed from pre test to post test. It seemed that the stabilized group regarded physical education as important as any other class and came prepared, whereas, the flexible group did not regard physical education as important as any other class and felt little need to come prepared for the physical education class. However, the review of literature investigated revealed that the present subjects tested on attitudes toward physical education was favorable.


\(^3\)Jerry Miller, "Attitudes Toward Physical Education of Students Enrolled in the Basic Instruction Program in Physical Education at South Dakota State University, 1966), pp. 1-53.
Campbell found favorable attitudes among male college students and found his subjects to have a group mean score of 115.50. Campbell also reported that a sample of seventh grade boys had a group mean score of 115.35, eighth grade boys had a group mean score of 120.25, and ninth grade boys had a group mean score of 115.06.

Miller studied the attitudes of college students toward physical education and used Wear Inventory. His study revealed a group mean score of 121.76 for the male subjects and a group mean score of 123.32 for the female subjects.

Wear constructed the two inventories and administered both Form A and Form B to college freshmen. Wear found the mean score of Form A to be 114.59 and the group mean score for Form B to be 114.45.

The statistical results in knowledge of field hockey, volleyball, and bowling showed a significant difference between the stabilized group and the flexible group in volleyball and bowling in favor of the stabilized group which met 5 times per week. This would seem to indicate that being in activity 5 times a week, more knowledge is gained and retained because of repetition. However, in field hockey there was no significant difference in knowledge between groups. It was the feeling of the investigator that because field hockey was a "new" sport to the girls, all

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4 Campbell, loc. cit.
6 Miller, loc. cit.
subjects were receptive and interested enough in the "newness" of the sport to investigate by reading and studying outside of class time. This would indicate that knowledge gained in a new activity does not necessarily depend upon how much time was spent in activity.

Comparing the two groups in skills, it was found in this study that the stabilized group did significantly better in the field hockey test items of dribble, dodge, circular tackle, and drive; goal shooting left and right, and in bowling skill. The flexible group did significantly better on the fielding and driving test item of field hockey and also on the wall volley in the volleyball test item. It would seem logical that the more time spent in skill activity, the more proficient one group would become. However, the results of the skills tested in this study indicated that such was not the case. The investigator cannot explain the reason why the flexible group meeting twice a week performed significantly better than the stabilized group in the skills of fielding and driving in field hockey, and the wall volley skill in volleyball.

For bowling, the groups were not divided as in field hockey and volleyball because of the schedule at the bowling alley and the wishes of the bowling alley personnel. Therefore, the stabilized group had to be scheduled for bowling as one large group as did the flexible group. The stabilized group, meeting 5 hours a week, performed significantly better on bowling skills than the flexible group, meeting two hours a week. In a skill such as bowling, it would seem to indicate that the more time spent in instruction and practice, the group meeting more times per week would show greater improvement.
Between the two groups in this study, there were no significant differences on the physical fitness test items except in the 50-yard dash from trial one to trial three. In this item, the flexible group made a significant gain over the stabilized group. The results of this study indicate that overall physical fitness improvement between the two groups was not dependent upon the number of times per week each group met for physical education. The results of this study were not in agreement with a study completed by Rothermel et al. who investigated the effects of an eight-week organized program of activity and physical fitness on boys, ages 7-13, and those not in an organized program. The authors found that the test items that measured muscular strength and endurance, power, and cardiorespiratory endurance (pull-ups, sit-ups, standing broad jump, and 600-yard run-walk) were significantly greater in the organized program. Sutcliff and Canham measured fitness by testing flexibility, strength, and endurance on one group of boys participating daily in physical education and two groups of boys participating in physical education two times a week. Those boys participating daily in physical education had a significantly higher means on the items tested than did those boys participating twice a week. The present study would agree with Sutcliff and Canham in that the stabilized group meeting daily had

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9 Ibid.

a higher mean score on the items that measured strength and endurance (the flexed-arm hang and the 600-yard run-walk) than the flexible group meeting twice a week. Keough used the Iowa Test of Motor Fitness to measure the strength and endurance, power, coordination, flexibility, endurance, and arm strength among third and fifth grade students participating in physical education daily and twice a week.$^{11}$ Keough found significant gains in composite motor fitness of both third and fifth grade children regardless of the frequency of physical education classes.$^{12}$ The present study would not be in agreement with Keough on the test items measuring strength and endurance between the two groups.

However, within the groups, there were significant changes. The flexible group meeting only twice a week improved significantly on the flexed-arm hang (trials 1-2), the sit-ups (trials 1-2 and 1-3), the shuttle run (trials 1-3), the 50-yard dash (trials 1-2 and 1-3), and the 600-yard run-walk (trials 1-2 and 1-3). The stabilized group meeting five times a week improved significantly on the sit-ups (trials 1-2 and 1-3), the shuttle run (trials 1-3), and the 600-yard run-walk (trials 1-2 and 1-3). Within the flexible and stabilized groups, the improvement of the physical fitness would agree with Rothermel et al. on the test items that measured strength and endurance (flexed-arm hang, sit-ups, and 600-yard run-walk). Also, with the groups, the improvement of physical

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$^{12}$ Ibid.
fitness would agree with Keough on the test items that measured strength and endurance.

In comparing the physical fitness of the Harmony Hill High School girls to the National AAHPER Norms, this study showed the girls of both groups to be above the fiftieth percentile on the national norms of the final trials on the test items of sit-ups and shuttle run. The stabilized group was above the national norms in the 600-yard run-walk, and the flexible group was above the national norm on the 50-yard dash on the final trial. On the first trial of the standing broad jump test item, the stabilized group equaled the fiftieth percentile. The results of this study would agree with Lilevjen and Schlekeway on only four of the six physical fitness test items. Lilevjen and Schlekeway reported that the Watertown Junior High boys were above the fiftieth percentile on the national norms in all test items on the final testing.13 Howlin reported that the girls from selected elementary school in Sioux Falls fell below the national norms on the shuttle run, standing broad jump, and softball throw. The result of this study is in agreement with the standing broad jump test item as found by Howlin.14 Busch constructed physical fitness

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13 Clar Lilevjen and Eugene Schlekeway, "The Effects of a Physical Education Program of 150 Minutes Per Week at Watertown, South Dakota, on Physical Fitness as Compared to the National Norms Established by the AAHPER Fitness Test," (unpublished Research report, South Dakota State University, 1962), pp. 1-43.

norms for the girls in South Dakota, grades 7-10, and found that her subjects were equal to, or well above, the national AAHPER Youth Fitness Test medians on all test items.15 According to the South Dakota norms, the girls at Harmony Hill would be below the norms in the physical fitness test items except in the sit-ups and shuttle run.

The physical fitness of the Harmony Hill High School girls was not necessarily accredited to the physical education program since it would seem that such factors as the lack of physical education and physical fitness in previous years would indicate low fitness scores. Also, physical fitness was not a major objective of the physical education program. At the time this study was conducted, the activities offered in the physical education program were field hockey, volleyball, and bowling. Background information on the students indicated a lack of organized participation in physical activity. Also, the history of physical education at Harmony Hill indicated a lack of an organized activity programs. Thus, the investigator's major objective was to create a liking for and an appreciation of physical activity. The overall physical fitness scores indicate that such activities did not significantly increase physical fitness, whether the subjects participated in the stabilized group or in the flexible group schedule. The low physical fitness scores possibly indicate to the investigator that physical fitness activities should become one of the major goals of the physical education program.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary of the Study

The purpose of this study was to determine the difference in attitudes toward physical education, knowledge, skill, and physical fitness of those students taking physical education in the daily flexible modular schedule and of those students taking physical education in the daily stabilized partial master schedule.

The subjects were forty-five girls who were enrolled in the physical education program at Harmony Hill High School during the 1971-72 school year. The study was limited to eighteen weeks. Subjects were assigned to stabilized and flexible groups according to how they fit back-to-back with other academic class lists. The same girls remained in the stabilized and flexible groups throughout the entire study. The stabilized scheduled group met physical education classes five times a week and the flexible group met two times a week.

The following hypothesis was investigated: There will be no change in the attitudes toward physical education, knowledge, skill, and physical fitness of the students taking physical education in the two methods of scheduling.

All subjects were tested on attitudes toward physical education, knowledge, skill, and physical fitness. The subjects were pre-tested, re-tested at the end of twelve weeks, and post-tested on physical fitness. The subjects were tested on knowledge and on skills of field hockey, volleyball, and bowling at the end of each activity.
The t ratio was employed to determine the significance of the difference between the means of the stabilized group and the flexible group. The .05 level of confidence was accepted as the minimum level necessary for t ratio to be considered significant. Also, the physical fitness scores as obtained by the girls of Harmony Hill High School were compared to the norms established by the AAHPER Youth Physical Fitness Test.

The analysis of the results indicated that:

1. Both groups had a favorable attitude toward physical education as determined by accepted rating scales

2. The stabilized group did significantly better on the volleyball and bowling knowledge test than did the flexible group.

3. The stabilized group performed significantly better on goal shooting to the left and right in field hockey skills.

4. The flexible group performed significantly better on the fielding and driving skill in field hockey.

5. The flexible group performed significantly better on the wall volley test item.

6. The stabilized group performed significantly better in bowling.

7. There was no significant difference between the two groups on the physical fitness test items except from trial one to trial three on the 50-yard dash.

8. There was significant improvement on the sit-up test item from trial one to trial two and from trial one to trial three, and on the 600-yard run-walk test item from trial one to trial three within the
9. There was significant improvement on the sit-up test item from trial one to trial three, the shuttle run test item from trial one to trial three, the 50-yard dash test item from trial one to trial two and from trial one to trial three, within the flexible group.

Conclusions

Under the conditions of this present study, and within the limitations described, the following conclusions were drawn:

1. That the students taking physical education at Harmony Hill High School have a favorable attitude toward physical education

2. That the stabilized scheduling of physical education promoted more conducive attitudes toward physical education than did the flexible scheduling

3. That activities of the physical education program did not improve the overall physical fitness between the two groups

4. That, on the final testing of physical fitness, both groups were above the national norms on three of the test items and fell below the national norms on three of the test items

5. That the amount of time spent in activity does not necessarily account for more knowledge acquired about the activity.

Implications

Based upon the findings of this study, the following implications were indicated:

1. That the physical education program at Harmony Hill High School should include a physical fitness program.
2. The improvement of favorable attitudes toward physical education by the stabilized group meeting five times per week seemingly indicated that a better teacher-student relationship developed, a better learning situation was present, and more enjoyment of activity was evident.

In the investigator's subjective opinion, it appears that the five-day physical education program created more student eagerness and interest than the physical education program conducted two days a week. The students scheduled for five days a week for physical education seemed to accept physical education as a regular academic class more so than did those in the two-day per week scheduling plan.

**Recommendations for Further Research**

The following recommendations are made for further study:

1. That a similar study be completed comparing a physical fitness program in a stabilized schedule to the physical fitness in a flexible modular schedule

2. That a similar study be completed comparing a physical fitness program of a public school to the one at Harmony Hill High School

3. That a similar study be completed employing activities other than field hockey, volleyball, and bowling.
BIBLIOGRAPHY

A. BOOKS


B. PERIODICALS


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C. UNPUBLISHED MATERIALS


Lilevjen, Clar, and Eugene Schlekeway. "The Effects of a Physical Education Program of 150 Minutes Per Week at Watertown, South Dakota, on Physical Fitness as Compared to the National Norms Established by the AAHPER Fitness." Unpublished Research report, South Dakota State University, 1962.

APPENDIXES
APPENDIX A

COURSE OUTLINE FOR FIELD HOCKEY

I. Objectives
   A. To learn the skills of field hockey
   B. To have a knowledge of the game of field hockey
   C. To have social contact
   D. To become more physically fit
   E. To become more mentally alert
   F. To become more aware of moral values of right and wrong
   G. To be able to play field hockey adequately
   H. To enjoy oneself and have fun participating in field hockey
   I. To be tested over the knowledge and skills of field hockey

II. History of the game of field hockey

III. Nature of the game of field hockey

IV. Techniques and fundamentals of field hockey
   A. Holding and carrying the stick
   B. Dribble
   C. Drive
      1. Straight
      2. Left
      3. Right
   D. Push-pass
   E. Flick
   F. Jab
   G. Fielding-passing
   H. Tackle
      1. Straight
      2. Lunge
      3. Circular
   I. Dodge
      1. Right
      2. Left
   J. Scoop
   K. Triangular pass
   L. Corner
   M. Free hit
   N. Roll-in
   O. Goalkeeping

V. Playing strategy
   A. Attacking
   B. Defending

VI. Rules of field hockey

VII. Courtesies in field hockey
APPENDIX A (Continued)

COURSE OUTLINE FOR POWER VOLLEYBALL

I. Objectives
   A. To learn the skills of power volleyball
   B. To have a knowledge of power volleyball
   C. To have social contact
   D. To become more physically fit
   E. To become more mentally alert
   F. To become more aware of the moral values of right and wrong
   G. To be able to play volleyball more competently
   H. To enjoy oneself and have fun participating in volleyball
   I. To be tested over the knowledge and skills of volleyball

II. History of volleyball

III. Nature of the game of volleyball

IV. Techniques and fundamentals of volleyball
   A. High pass
   B. Low pass
   C. Overhead hit
   D. Overhand serve
   E. Dig pass
   F. Set-up
   G. Placement of serve
   H. Spiking
      1. Standing
      2. Running
   I. Blocking
   J. Net recovery

V. Strategy
   A. Offensive
   D. Defensive

VI. Rules of power volleyball

VII. Courtesies of volleyball
APPENDIX A (Continued)

COURSE OUTLINE FOR BOWLING

I. Objectives
A. To learn the skills of bowling
B. To have a knowledge of bowling
C. To have social contact
D. To become more physically fit
E. To become more mentally alert
F. To become aware of the courtesies of bowling
G. To become a better bowler
H. To enjoy and have fun bowling
I. To be tested over the knowledge and skill of bowling

II. History of bowling

III. Nature of bowling

IV. Basic skills of bowling
A. Ball selection and grip
B. Stance and approach
C. The four-step approach
D. Delivery
   1. Straight
   2. Back-up
   3. Hook
   4. Curve
E. Aim
   1. Spot
   2. Pin
F. Scoring

V. Strategy
A. Getting the strike
B. Picking up spares

VI. Courtesies in bowling

References


APPENDIX A (Continued)

COURSE OUTLINE FOR BOWLING


WEAR PHYSICAL EDUCATION ATTITUDE INVENTORY FORM A AND FORM B

DIRECTIONS: PLEASE READ CAREFULLY. On pages one and part of two you will find 30 statements about physical education. I am interested to know how you feel about these statements. Each one of you will probably feel differently about each statement. There are no right or wrong answers. Before each statement there is a blank line for marking your reaction to the statement. (1) Read each statement carefully, and (2) select the initials "SA" (strongly agree), "A" (agree), "U" (undecided), "D" (disagree), and "SD" (strongly disagree) and mark your response on the blank line. Try to avoid marking "U" in most instances. Whenever possible, let your experience determine your answer. Do not spend too much time on any one statement. This is not a test, but a survey to determine how one feels toward physical education. In no way will your response to the 30 statements affect your physical education grade.

* Form A and Form B were sent to the investigator by Carlos Wear to be used in this study.
APPENDIX B (Continued)

WEAR ATTITUDE INVENTORY FORM A

____1. If for any reasons a few subjects have to be dropped from the school program, physical education should be one of the subjects dropped.

____2. Physical education activities provide no opportunities for learning to control the emotions.

____3. Physical education is one of the more important subjects in helping to establish and maintain desirable social standards.

____4. Vigorous physical activity works off harmful emotional tensions.

____5. I would take physical education only if it were required.

____6. Participation in physical education makes no contribution to the development of poise.

____7. Because physical skills loom large in importance in youth, it is essential that a person be helped to acquire and improve such skills.

____8. Calisthenics taken regularly are good for one's general health.

____9. Skill in active games or sports is not necessary for leading the fullest kind of life.

____10. Physical education does more harm than it does good.

____11. Associating with others in some physical education activity is fun.

____12. Physical education classes provide situations for the formation of attitudes which will make one a better citizen.

____13. Physical education situations are among the poorest for making friends.

____14. There is not enough value coming from physical education to justify the time consumed.

____15. Physical education skills make worthwhile contributions to the enrichment of living.

____16. People get all the physical exercise they need in just taking care of their daily work.
APPENDIX B (Continued)

WEAR ATTITUDE INVENTORY FORM A

17. All who are physically able will profit from an hour of physical education each day.

18. Physical education makes a valuable contribution toward building up an adequate reserve of strength and endurance for everyday living.

19. Physical education tears down sociability by encouraging people to attempt to surpass each other in many of the activities.

20. Participation in physical education makes for a more wholesome outlook on life.

21. Physical education adds nothing to the improvement of social behavior.

22. Physical education class activities will help to relieve and relax physical tensions.

23. Participation in physical education activities helps a person to maintain a healthful emotional life.

24. Physical education is one of the more important subjects in the school program.

25. There is little value in physical education as far as physical well-being is concerned.

26. Physical education should be included in the program of every school.

27. Skills learned in a physical education class do not benefit a person.

28. Physical education provides situations for developing desirable character qualities.

29. Physical education makes for more enjoyable living.

30. Physical education has no place in modern education.
APPENDIX B (Continued)

WEAR ATTITUDE INVENTORY FORM B

1. Association in physical education activities give people a better understanding of each other.

2. Engaging in vigorous physical activity gets one interested in practicing good health habits.

3. The time spent in getting ready for and engaging in a physical education class could be more profitably spent in other ways.

4. A person's body usually has all the strength it needs without participation in physical education activities.

5. Participation in physical education activities tends to make one a more socially desirable person.

6. Physical education in schools does not receive the emphasis that it should.

7. Physical education classes are poor in opportunities for worthwhile social experiences.

8. A person would be better off emotionally if he did not participate in physical education.

9. It is possible to make physical education a valuable subject by proper selection of activities.

10. Developing a physical skill brings mental relaxation and relief.

11. Physical education classes provide nothing which will be of value.

12. There should not be over two one-hour periods per week devoted to physical education in schools.

13. Belonging to a group, for which opportunity is provided in team activities, is a desirable experience for a person.

14. Physical education is an important subject in helping a person gain and maintain all-around good health.

15. No definite beneficial results come from participation in physical education activities.
APPENDIX B (Continued)

WEAR ATTITUDE INVENTORY FORM B

16. Engaging in group physical education activities is desirable for proper personality development.

17. Physical education activities tend to upset a person emotionally.

18. For its contribution to mental and emotional well-being physical education should be included in the program of every school.

19. I would advise anyone who is physically able to take physical education.

20. As far as improving physical health is concerned, a physical education is a waste of time.

21. Participation in physical education class activities tends to develop a wholesome interest in the functioning of one's body.

22. Physical education classes give a person an opportunity to have a good time.

23. The final mastering of a certain movement of skill in a physical education class brings a pleasurable feeling that one seldom experiences elsewhere.

24. Physical education contributes little toward the improvement of social behavior.

25. Physical education classes provide values which are useful in other parts of daily living.

26. By the time a person has acquired a skill he has less emotional control than before.

27. Physical education should be required of all who are physically able to participate.

28. The time devoted to physical education in schools could be more profitably used in study.

29. The skills learned in a physical education class do not add anything of value to a person's life.

30. Physical education does more harm socially than good.
APPENDIX C

FIELD HOCKEY KNOWLEDGE TEST

Field Hockey Test

NAME

DIRECTIONS: For each statement that is true place a (+) on the blank, and for each statement that is false place a (O) on the blank.

1. Field hockey is a game for women only.
2. The wing must take the corner hit.
3. The recommended size for a hockey field is 60 x 100.
4. A goal can be scored only when the ball is hit by an attacking player within the circle.
5. The center-half should mark the inners.
6. If you have been passed by an opponent or have missed a tackle, you should tackle back immediately.
7. When dribbling, the ball should be kept close to the stick.
8. A player's stick should always be kept close to the ground.
9. When driving, the hands should be close together at the top of the stick.
10. Only forwards may score goals.
11. It is easier to run fast with the ball than without it.
12. Poor judgment, poor footwork, poor ball control, and lack of consideration can make hockey a rough game.
13. Both players must have their feet still while taking a bully.
14. Two players are enough to be on the ball at one time.
15. If a player stays in line with the ball, she cannot be offside.
16. The three inside forwards do most of the shooting in a hockey game.
APPENDIX C (Continued)

FIELD HOCKEY KNOWLEDGE TEST

DIRECTIONS: Match the definitions on the right side with the terms on the left side by placing the letter of the definition on the blank before the term.

_____ 31. Bully   a. keeping watch of a specific opponent
 _____ 32. Dribble  b. breaking of the rules
 _____ 33. Marking   c. used to put the ball into play at the beginning of the game
 _____ 34. Free hit  d. Broken line the length of the field 5 yds. in from the side line
 _____ 35. Roll-in  e. series of short strokes used to move the ball downfield
 _____ 36. Striking circle  f. put the ball back into play after going out-of-bounds over the side line
 _____ 37. Foul    g. stopping the ball so it can be played immediately
 _____ 38. Alley    h. hit taken because of a foul outside the circle
 _____ 39. Fielding  i. getting in the way of a player and the ball so the player is hindered and can't play the ball
 _____ 40. Obstruction  j. area from where the ball must be hit in order to score a goal
APPENDIX C (Continued)

FIELD HOCKEY KNOWLEDGE TEST

17. A tackle and a spoil are the same stroke.

18. The best defense is a good defense.

19. All players should be responsible for distributing the play.

20. In a push-pass the ball never leaves the stick.

21. If you only touch the ball when taking a free hit, you may touch it again.

22. The backswing and follow through in a drive should be quick and low.

23. The player taking a roll-in must have her feet and stick behind the line.

24. A penalty bully is awarded when the ball goes over the line off the foot of the defense.

25. Forwards should always receive the ball with their feet facing the goal they are attacking.

DIRECTIONS: Choose the correct statement and place the letter of the statement on the line.

26. In driving, it is necessary to (A) keep control of the body (B) bring hands together at the top of the stick (C) keep head steady and over the ball.

27. For a foul within the circle by the defending team, (A) a long corner is taken (B) a free fit is taken (C) a penalty corner is taken.

28. When a foul occurs outside the circle, the free hit must be (A) where the ball is (B) where the foul occurred.

29. When a free hit is taken, all players must be (A) 3 yd. away (B) 3 ft. away (C) 5 yd. away.

30. A roll-in is taken when (A) the ball is kicked over the side line (B) the ball is hit over the side line (C) a player's feet are over the side line while playing the ball within the side line.
APPENDIX C (Continued)

VOLLEYBALL KNOWLEDGE TEST

Volleyball Test

NAME

DIRECTIONS: For each statement that is true place a (+) on the blank, and for each statement that is false place a (0) on the blank.

1. Even though it appears to be a clean hit, playing a ball below the waist with an open is usually considered bad form.

2. You may step on but not over the side lines while serving.

3. You may step on but not over the service line during a rally.

4. The ball is good if it lands on the back lines in a serve.

5. A point is scored if the served ball touches any part of the side line on the receivers' side.

6. If you cannot reach the ball with your hand you may field it with your foot.

7. Each team is allowed two time outs per game.

8. Simultaneous contact of the ball by two teammates constitutes two hits.

9. A server hitting the ball into the net commits a foul.

10. A team match consists of best three out of five games.

11. "Side out" and "rotate" are synonymous. They result in the same action but terms do not mean the same thing.

12. A back court player who moves to the front court to participate in a block may spike the ball if it has come over the net.

13. If a player desires to make a net recovery, he should drop down low toward the floor under the ball even though the ball is in the net.

14. A spike should be executed by driving the heel of the hand directly behind the center of mass of the ball.

15. Defensive players can relax and rest a little when the play is away from their area.
VOLLEYBALL KNOWLEDGE TEST

16. It is rarely worthwhile to hit the ball over the net on the first or second hit.

17. A spike which hits a receiver's hands and then bounces off his chest can be set and spiked.

18. A regulation game could finish with a score of 5-3.

19. The team which loses the first game in a match is given the opening serve in the second.

20. Team rotation always takes place after the team loses its serve.

21. It is legal to reach over or under the net during play.

22. A player may not play the ball twice during the time it is on his side of the net.

23. A player may not stand anywhere behind the back line and serve.

DIRECTIONS: Choose the correct statement and place the letter of the correct statement on the blank.

24. The serve is determined by: (A) toss of a coin (B) visiting team (C) referee's choice

25. A game is complete when one team scores: (A) 15 points (B) 7 points more than the opponent (C) 15 points to opponents' 13 points

26. Net height for women’s play is: (A) 7 ft. (B) 7 ft. 4 in. (C) 8 ft.

27. The most difficult serve to return is a well hit: (A) overhand (B) underhand (C) roundhouse

28. The best spot to contact the ball in an overhand serve is: (A) behind and slightly below the center of mass (B) behind and directly even with the center of mass (C) slightly to the right side below the center of mass

29. Volleyball originated: (A) USA (B) Russia (C) Japan
APPENDIX C (Continued)

VOLLEYBALL KNOWLEDGE TEST

DIRECTIONS: Match the definitions on the right side with the terms on the left side by placing the letter of the definition on the blank before the term.

30. DGWS  a. rebound from arms
31. Key offensive weapon in volleyball  b. Division of Girls and Women's Sport
32. Center front player is usually the c. originator of volleyball
33. Left and right front players  d. the spike
34. Received serve should be passed to e. spikers
35. Regulation volleyball team  f. setter
36. Service area  g. hard-driven drive
37. William Morgan  h. six players
38. Bump  i. mishandled balls
39. Spike  j. six feet behind the back line
40. Jungle ball  k. the setter
**APPENDIX C (Continued)**

**BOWLING KNOWLEDGE TEST**

<table>
<thead>
<tr>
<th>Bowling Test</th>
<th>NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DIRECTIONS:</strong> For each statement that is true place a (+) on the blank, and for each statement that is false place a (0) on the blank.</td>
<td></td>
</tr>
<tr>
<td>___ 1.</td>
<td>Timing is the coordination of footwork and armswing.</td>
</tr>
<tr>
<td>___ 2.</td>
<td>The spot bowler should look at the spot until the ball rolls past it.</td>
</tr>
<tr>
<td>___ 3.</td>
<td>There are thirteen strikes in a perfect game.</td>
</tr>
<tr>
<td>___ 4.</td>
<td>The pocket for a right-handed bowler is the 1-2.</td>
</tr>
<tr>
<td>___ 5.</td>
<td>The maximum weight for both a man's and a woman's bowling ball is 18 lb.</td>
</tr>
<tr>
<td>___ 6.</td>
<td>A set of pins consists of twenty-one pins.</td>
</tr>
<tr>
<td>___ 7.</td>
<td>Handicap is given to all bowlers regardless of their average.</td>
</tr>
<tr>
<td>___ 8.</td>
<td>The weight that is allowed for variation in a given set of pins is four ounces.</td>
</tr>
<tr>
<td>___ 9.</td>
<td>Scratch bowling is bowling with handicap.</td>
</tr>
<tr>
<td>___ 10.</td>
<td>Standard pins must weigh 4 lbs.</td>
</tr>
<tr>
<td>___ 11.</td>
<td>If a bowler fouls on his second ball, he receives a zero for the pin or pins knocked down with that ball.</td>
</tr>
<tr>
<td>___ 12.</td>
<td>The right-handed bowlers should have a leather brake on the right shoe sole.</td>
</tr>
<tr>
<td>___ 13.</td>
<td>For beginning bowlers, the curve ball is recommended over the straight ball.</td>
</tr>
<tr>
<td>___ 14.</td>
<td>ABC means &quot;American Bowling Congress.&quot;</td>
</tr>
<tr>
<td>___ 15.</td>
<td>The slide foot should be pointed straight ahead at the target.</td>
</tr>
<tr>
<td>___ 16.</td>
<td>The bowling ball should be released behind the bowler's body.</td>
</tr>
</tbody>
</table>
APPENDIX C (Continued)

BOWLING KNOWLEDGE TEST

17. Long steps are taken with each of the steps.
18. The pins should be hit as hard as possible.
19. Kegler is a synonym for bowler.
20. A foul can be changed even though the detector light and buzzer do not go off.

DIRECTIONS: Match the definitions on the right side with the terms on the left side by placing the letter of the definition on the blank before the term.

21. Turkey
22. Strike
23. Frame
24. Foul
25. Gutter ball
26. 300
27. Spare
28. Split
29. Set-up
30. Pocket

a. A ball that settles into one of the two channels on the side of the alley.
b. The area between the one and three pins and the one and two pins.
c. Three consecutive strikes.
d. When the first ball rolled leaves two or more pins standing.
e. An infraction of the rules involving any part of the foot, hand, or arm coming in contact with or crossing the foul line.
f. The highest score that is possible for one game.
g. Knocking all the pins down with one ball.
h. Knocking all the pins down with two balls.
i. One-tenth of the total game involving the delivery of either one or two balls.
j. All ten pins standing on their triangular pattern.
DIRECTIONS: Score the following lines of bowling. (9 pt.)

DIRECTIONS: Label by number the position of the pins. (1 pt.)
APPENDIX D

DESCRIPTION OF THE FIELD HOCKEY SKILL TEST*

Dribble, Dodge, Circular Tackle, and Drive

Equipment:
1. Hockey stick for each participant.
2. Stop watch.
3. One ball necessary; two balls convenient.
4. High jump standards.
5. Field markings (see Figure I, page 96).
   a) A line 20 feet long to be used for a starting line.
   b) A line perpendicular to the midpoint of the starting line and extending 35 feet from it. This is the foul line.
   c) A line 10 feet long, perpendicular to and being bisected by the foul line at a point 30 feet from the starting line. This is the restraining line.
   d) A line 1 foot long, perpendicular to and being bisected by the foul line at a point 35 feet from the starting line.
   e) Two lines, each 1 foot long, bisecting each other at a point which is 45 feet from the starting line and in a straight line with the foul line.
6. Position of the standards:
   a) One standard is placed so that the middle of the base of the standard is directly over the point where the foul line and the line described in 5d bisect each other.
   b) The other standard is placed in similar fashion over the point formed by the two lines described in 5c.

Test: The player being tested shall stand behind the starting line with the hockey ball placed on the starting line at any point to the left of the foul line. At the signal "Ready? Go!" the player shall dribble the ball forward to the left of and parallel to the foul line. As soon as the restraining line is reached, the ball shall be sent from the left side of the foul line to the right of the first obstacle (from the player's point of view), and the player shall run around the left side of the obstacle and recover the ball. (This is analogous to a dodge.) Next, the player shall execute a turn toward her right around the second obstacle, still keeping control of the ball. (This is analogous to a circular tackle.) As soon as possible after that, the ball shall be driven toward the starting line. If the drive is not hard enough to reach the starting line, the player may follow it up and hit the ball again. This procedure shall be repeated until the five trials have been given.

*This test was the instructor's adaptation of the Schmithals and French "Achievement Tests in Field Hockey."
APPENDIX D (Continued)

DESCRIPTION OF THE FIELD HOCKEY SKILL TEST

Scoring: The score for one trial shall be the time it takes from the signal "Go" until the player's ball has again crossed the starting line. The score for the entire test is the best time of the five trials. It is considered a foul and the trial does not count if:
1) the ball or player crosses the foul line before reaching the restraining line,
2) in executing the dodge, the ball is not sent from the left side of the foul line, and
3) the player makes "stics."
APPENDIX D (Continued)

DESCRIPTION OF THE FIELD HOCKEY SKILL TEST

This procedure shall be repeated until five trials have been given.

2. Drive from Right Inner's Position. The same procedure shall be repeated, the only difference being the position of the board, which is placed on the right inner target line.

3. Drive from Left's Inner Position. The same procedure shall be repeated, the only difference being the change in position of the target to the left inner target line.

Scoring: The score for one trial shall constitute the time elapsing from the timer's signal "Go!" until the ball strikes the board. The score for the entire test is the best time out of the five trials. Players will receive no score if:
1) the ball is not driven from within the rectangle,
2) the driven ball fails to reach the board or misses it at either end.

The attempt is not counted as a trial if:
1) "sticks" are made,
2) player raises the ball so that it doesn't touch the ground before it passes over the target.

Fielding and Driving

Equipment:
1. Same as for 1 and 2 in test one.
2. At least three balls necessary; seven or eight balls convenient.
3. Two ice picks with brightly colored tops.
4. Regulation hockey goal, including goal line and striking circle.
5. Special field markings (see Figure III, page 98).
   a) "Goal line" that is referred to is the line between the two goal posts. Midpoint of the goal line is referred to as point B.
   b) Foul line, 12 feet long, parallel to and 10 feet from the goal line.
   c) Restraining line, 30 feet long, parallel to and 10 feet from the foul line.
6. An ice pick is placed on the foul line at a point directly opposite each goal post.

Test: The player being tested shall stand behind the goal line. The examiner shall stand at the edge of the striking circle directly in front of the goal with a hockey ball in one hand and a stop watch in the other. At the examiner's signal "Ready? Go!" the hockey ball is rolled toward the goal. Simultaneously, the player
APPENDIX D (Continued)

DESCRIPTION OF THE FIELD HOCKEY SKILL TEST

shall run forward and attempt to field the ball before it reaches the foul line, tap it once, and drive it out of the striking circle from within the area between the restraining line and the foul line. This procedure shall be repeated until five trials have been given.

Scoring: The score for one trial is the time from the moment the player first touches the hockey ball to the moment the ball reaches the striking circle. The score on the entire test is the best trial of the five.

The attempt does not count as a trial if:
1) the rolled ball does not pass between the two ice picks,
3) the player makes "sticks."

The player receives no score on a particular trial if the ball is advanced illegally.
APPENDIX D (Continued)

DESCRIPTION OF THE VOLLEYBALL SKILL TEST

Overhand Service at 30 feet and 25 feet

Purpose: To measure the ability to serve the volleyball over the net within the boundaries of a regulation volleyball court.

Equipment: The net set up according to volleyball regulations and properly inflated volleyballs.

Directions: Upon the signal "start" the student will serve five volleyballs overhand across the net from behind the 25 foot line or 30 foot line so the ball crosses the net without touching and lands within the boundaries of the court.

Scoring: The number of volleyballs served out of five trials that are served successfully across the net are recorded as the score.

Wall Volley

Purpose: To measure volleyball playing ability of the physical education girls at Harmony Hill for the purposes of classification, measurement of improvement of skill, improvement of teaching, and for evaluation.

Equipment: The equipment needed includes a stop watch, a volleyball, and a smooth wall with the following marking: a horizontal tape line ten feet long and ten feet high.

Directions: The student stands with the ball near the wall, and on the signal "start," the student throws the ball underhanded against the wall. She plays the rebound with a legal volleyball hit and attempts to volley it against the wall above the tape line as many times as possible. Only legal volleys count. If she loses control of the ball or catches it, she starts it again with a throw as at the beginning of the test. A rest period of one minute is given between the two trials.

Scoring: The number of successful consecutive legal volleys that hit the wall above the ten-foot marker in thirty seconds. Two trials are given and the higher number of the two trials is recorded as the score.
DESCRIPTION OF THE VOLLEYBALL SKILL TEST

Two-handed Dig

Purpose: To measure the student's ability to return low hit balls.

Equipment: A net set up to regulation size and a properly inflated ball.

Directions: The student shall stand behind a marked line fifteen feet from the net. The instructor will bounce the ball to the student who attempts to dig the ball over the net within the boundaries of the court. Five trials are allowed.

Scoring: The number of successful digs of the five trials are recorded.

The Spike

Purpose: To measure the student's ability to spike the ball over the net within bounds.

Equipment: A net set up according to regulation size and a properly inflated volleyball.

Directions: The student will stand six to eight inches away from and sideways to the net, facing the instructor. The instructor will toss the ball above the net within the reach of the student. The student will attempt to spike the ball within the boundaries of the court. Only legal spikes count. Five trials are allowed.

Scoring: The number of successful spikes of the five trials are recorded as the score.
DESCRIPTION OF THE BOWLING SKILL TEST

Since bowling is a skill in itself, the scores of every game were recorded. To find out whether any improvement was made, the average of the scores of the second week were compared with the average of the scores of the last (sixth) week.
APPENDIX D (Continued)

FIELD MARKINGS FOR THE FIELD HOCKEY SKILL TEST

Fig. I. Field Marking for Test One.
FIELD MARKINGS FOR THE FIELD HOCKEY SKILL TEST

APPENDIX D (Continued)

Fig. II. Field Markings for Test Two.
FIELD MARKINGS FOR THE FIELD HOCKEY SKILL TEST

Key:
- Rolled ball
- Stop
- Tap
- Drive

Fig. III. Field Markings for Test Three.
# APPENDIX E

## TABLE I

RAW SCORES FOR THE SKILLS IN FIELD HOCKEY FOR THE STABILIZED GROUP.

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Fastest Time Out of Five Trials (sec.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dribble, Dodge, Circular Tackle, and Drive</td>
</tr>
<tr>
<td></td>
<td>S</td>
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<tr>
<td>AS</td>
<td>7.5</td>
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<tr>
<td>GW</td>
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<tr>
<td>LL</td>
<td>-</td>
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</table>

Mean | 17.25 | 5.17 | 5.10 | 5.14 | 5.98 |
APPENDIX E (Continued)

TABLE II

RAW SCORES FOR THE SKILLS IN FIELD HOCKEY FOR THE FLEXIBLE GROUP

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Fastest Time Out of Five Trials (sec.)</th>
<th>Dribble, Dodge, Circular Tackle, and Drive</th>
<th>Goal Shooting</th>
<th>Fielding and Driving</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>S</td>
<td>L</td>
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APPENDIX E (Continued)

TABLE III

RAW SCORES FOR THE SKILLS IN VOLLEYBALL FOR THE STABILIZED GROUP

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Best Score Out of Five Trials</th>
<th></th>
<th>Best Score Out of Two Trials</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Service at 30'</td>
<td>Service at 25'</td>
<td>Two-Handed Spike</td>
<td>Wall Volley</td>
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</table>
### APPENDIX E (Continued)

### TABLE IV

**RAW SCORES FOR THE SKILLS IN VOLLEYBALL FOR THE FLEXIBLE GROUP**

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Service at 30'</th>
<th>Service at 25'</th>
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**Mean** | 1.09 | 1.95 | 3.05 | 3.05 | 7.14
APPENDIX E (Continued)

TABLE V
BOWLING AVERAGES FOR THE STABILIZED GROUP

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| Mean     | 93                               | 104                              |
### TABLE VI

BOWLING AVERAGES FOR THE FLEXIBLE GROUP

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Mean             | 85                               | 92                               |
DIRECTIONS FOR ADMINISTERING THE AAHPER YOUTH FITNESS TEST*

The following is a description of each of the seven test items with a description of the necessary equipment needed for the test, the rules for the test item, and the method of scoring the test item:

I. FLEXED-ARM HANG (all girls except college girls)

Equipment: A horizontal bar approximately 1½ inches in diameter is preferred. A doorway gym bar is good to use; if no regular equipment is available, a piece of pipe can serve the purpose. A stop watch is needed.

Description: The height of the bar should be adjusted so it is approximately equal to the pupil's standing height. The pupil should use the overhand grasp. With the assistance of two spotters, one in front and one in back of the pupil, the pupil raises her body off the floor to a position where the chin is above the bar, the elbows are flexed, and the chest is close to the bar. The pupil holds this position as long as possible.

Rules: 1. The stop watch is started as soon as the subject takes the hanging position.
2. The watch is stopped when a) pupil's chin touches the bar, b) pupil's head tilts backward to keep chin above the bar, c) pupil's chin falls below the level of the bar.

Scoring: Record in seconds to the nearest second the length of time the subject holds the hanging position.

II. SIT-UP

Equipment: Mat or floor.

Description: The pupil lies on his back, either on the floor or on a mat, with legs extended and feet about two feet apart. His hands are placed on the back of the neck with the fingers interlaced. Elbows are held out. A partner holds the ankles.

*The directions for the AAHPER Fitness Test are taken from the American Association for Health, Physical Education and Recreation Youth Fitness Test Manual, revised edition, 1965.
DIRECTIONS FOR ADMINISTERING THE AAHPER YOUTH FITNESS TEST

down, the heels being in contact with the mat or floor at all times. The pupil sits up, turning the trunk to the left and touching the right elbow to the left knee, returns to starting position, then sits up, turning the trunk to the right and touching the left elbow to the right knee. The exercise is repeated, alternating sides.

Rules:
1. The fingers must remain in contact behind the neck throughout the exercise.
2. The knees must be on the floor during the sit-up but may be bent slightly when touching elbow to knee.
3. The back should be rounded and the head and elbows brought forward when sitting up as a "curl" up.
4. When returning to starting position, elbows must be flat on the mat before sitting up again.

Scoring: One point is given for each complete movement of touching elbow to knee. No score should be counted if the fingertips do not maintain contact behind the head, if knees are bent when the pupil lies on his back or when he begins to sit up, or if the pupil pushes up off the floor from an elbow. The maximum number of sit-ups is 50 for girls and 100 for boys.

III. SHUTTLE RUN

Equipment: Two blocks of wood, 2"x2"x4", and stop watch. Pupils should wear sneakers or run barefooted.

Description: Two parallel lines are marked on the floor thirty feet apart. The width of a regulation volleyball court serves as a suitable area. Place the blocks of wood behind one of the lines as indicated in the manual. The pupil starts behind the other line. On the signal "Ready? Go!" the pupil runs to the blocks, picks one up, runs back to the starting line, and places the block behind the line; he then runs back and picks up the second block, which he carries across the starting line. If the scorer has two stop watches or one with a split-second timer, it is preferable to have two pupils running at the same time. To eliminate the necessity of returning the blocks after each race, start the races alternately, first from behind one line and then from behind the other.
APPENDIX F (Continued)

DIRECTIONS FOR ADMINISTERING THE AAHPER YOUTH FITNESS TEST

Rules: Allow two trials with some rest between.

Scoring: Record the time of the better of the two trials to the nearest tenth of a second.

IV. STANDING BROAD JUMP

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

Description: Pupil stands as instructed with the feet several inches apart and the toes just behind the take-off line. Preparatory to jumping, the pupil swings with the arm backward and bends the knees. The jump is accomplished by simultaneously extending the knees and swinging forward the arms.

Rules: 1. Allow three trials.
       2. Measure from the take-off line to the heel or other part of the body that touches the floor nearest the take-off line.
       3. When the test is given indoors, it is convenient to tape the tape measure to the floor and have the pupils jump along the tape. The scorer stands to the side and observes the mark to the nearest inch.

Scoring: Record the best of the three trials in feet and inches to the nearest inch.

V. 50-YARD DASH

Equipment: Two stop watches or one with a split-second timer.

Description: It is preferable to administer this test to two pupils at a time. Have both take positions behind the starting line. The starter will use the commands "Are you ready?" and "Go!" The latter will be accompanied by a downward sweep of the starter's arm to give a visual signal to the timer, who stands at the finish line.

Rules: The score is the amount of time between the starter's signal and the instant the pupil crosses the finish line.

Scoring: Record in seconds to the nearest tenth of a second.
APPENDIX F (Continued)

DIRECTIONS FOR ADMINISTERING THE AAHPER YOUTH FITNESS TEST

VI. 600-YARD RUN-WALK

Equipment: Track or area marked accordingly so that 600 yards are known, and stop watch.

Description: Pupil uses a standing start. At the signal "Ready? Go!" the pupil starts running the 600-yard distance. The running may be interspersed with walking. It is possible to have a dozen pupils 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. The timer merely calls out the times as the pupils cross the finish.

Rules: Walking is permitted, but the object is to cover the distance in the shortest time.

Scoring: Record in minutes and seconds.
APPENDIX G

RAW SCORES ON THE WEAR ATTITUDE INVENTORIES FORMS A AND B FOR THE STABILIZED GROUP

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Mean         115.82       119.17
APPENDIX G (Continued)

RAW SCORES FOR THE WEAR ATTITUDE INVENTORIES
FORMS A AND B FOR THE FLEXIBLE GROUP

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Mean: 117.41 110.27
APPENDIX G (Continued)

RAW SCORES OF KNOWLEDGE IN FIELD HOCKEY, VOLLEYBALL, AND BOWLING FOR STABILIZED GROUP

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Mean: 30.39, 27.61, 26.60
APPENDIX G (Continued)

RAW SCORES OF KNOWLEDGE IN FIELD HOCKEY, VOLLEYBALL, AND BOWLING FOR FLEXIBLE GROUP

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APPENDIX G (Continued)

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ATTITUDES, KNOWLEDGE, SKILL, AND PHYSICAL FITNESS 
of girls as affected by two different methods 
of class scheduling

BY

SISTER MARY JANICE IVerson, O.S.B.

A thesis submitted 
in partial fulfillment of the requirements for the 
degree Master of Science, Major in 
Physical Education, South Dakota 
State University

1972
ATTITUDES, KNOWLEDGE, SKILL, AND PHYSICAL FITNESS
OF GIRLS AS AFFECTED BY TWO DIFFERENT METHODS
OF CLASS SCHEDULING

This thesis is approved as a creditable and independent investigation by a candidate for the degree, Master of Science, and is acceptable as meeting the thesis requirements for this degree. Acceptance of this thesis does not imply that the conclusions reached by the candidate are necessarily the conclusions of the major department.

Thesis Advisor

Date

Head, Health, Physical Education, and Recreation Department

Date
ACKNOWLEDGEMENTS

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SJI
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<td>27</td>
</tr>
<tr>
<td>Administration of the Treatment</td>
<td>28</td>
</tr>
<tr>
<td>Collection of Data</td>
<td>30</td>
</tr>
<tr>
<td>Wear Physical Education Attitude Inventory Test, Forms A and B</td>
<td>30</td>
</tr>
<tr>
<td>Knowledge Tests</td>
<td>31</td>
</tr>
<tr>
<td>Skills Tests--Field Hockey</td>
<td>31</td>
</tr>
<tr>
<td>Volleyball</td>
<td>32</td>
</tr>
<tr>
<td>Bowling</td>
<td>33</td>
</tr>
<tr>
<td>AAHPER Youth Fitness Test</td>
<td>33</td>
</tr>
<tr>
<td>IV. ANALYSIS AND DISCUSSION OF RESULTS</td>
<td>34</td>
</tr>
<tr>
<td>Organization of Data for Analysis</td>
<td>34</td>
</tr>
<tr>
<td>Analysis of the Data</td>
<td>38</td>
</tr>
<tr>
<td>Discussion of Results</td>
<td>53</td>
</tr>
<tr>
<td>CHAPTER</td>
<td>PAGE</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS</td>
<td>60</td>
</tr>
<tr>
<td>Summary of the Study</td>
<td>60</td>
</tr>
<tr>
<td>Conclusions</td>
<td>62</td>
</tr>
<tr>
<td>Implications</td>
<td>62</td>
</tr>
<tr>
<td>Recommendations for Further Research</td>
<td>63</td>
</tr>
<tr>
<td>BIBLIOGRAPHY</td>
<td>65</td>
</tr>
<tr>
<td>APPENDIX A</td>
<td>71</td>
</tr>
<tr>
<td>APPENDIX B</td>
<td>75</td>
</tr>
<tr>
<td>APPENDIX C</td>
<td>80</td>
</tr>
<tr>
<td>APPENDIX D</td>
<td>89</td>
</tr>
<tr>
<td>APPENDIX E</td>
<td>99</td>
</tr>
<tr>
<td>APPENDIX F</td>
<td>105</td>
</tr>
<tr>
<td>APPENDIX G</td>
<td>109</td>
</tr>
</tbody>
</table>
# LIST OF TABLES

<table>
<thead>
<tr>
<th>TABLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Group Means of the Variables</td>
<td>36</td>
</tr>
<tr>
<td>II. The Significance of Change Between Group Means in Attitudes</td>
<td>38</td>
</tr>
<tr>
<td>III. The Significance of the Changes in Attitudes Within Groups from Pre to Post Test</td>
<td>38</td>
</tr>
<tr>
<td>IV. The Significance of the Difference Between Means of the Two Groups in the Knowledge of Field Hockey, Volleyball, and Bowling</td>
<td>39</td>
</tr>
<tr>
<td>V. The Significance of the Difference Between the Means for Both Groups in the Skills of Field Hockey, Volleyball, and Bowling</td>
<td>40</td>
</tr>
<tr>
<td>VI. The Significance of the Change Between Both Groups in Physical Fitness</td>
<td>42</td>
</tr>
<tr>
<td>VII. The Significance of the Change in Physical Fitness Within the Stabilized Group</td>
<td>43</td>
</tr>
<tr>
<td>VIII. The Significance of the Change in Physical Fitness Within the Flexible Group</td>
<td>45</td>
</tr>
</tbody>
</table>
## LIST OF FIGURES

<table>
<thead>
<tr>
<th>FIGURE</th>
<th>Description</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>A comparison of percentile ranks of the flexed-arm hang test item as achieved by the Harmony Hill High School Girls at Watertown with the National AAHPER Norms</td>
<td>47</td>
</tr>
<tr>
<td>2.</td>
<td>A comparison of percentile ranks of the sit-up test item as achieved by the Harmony Hill High School Girls at Watertown with the National AAHPER Norms</td>
<td>48</td>
</tr>
<tr>
<td>3.</td>
<td>A comparison of percentile ranks of the shuttle run test item as achieved by the Harmony Hill High School Girls at Watertown with the National AAHPER Norms</td>
<td>49</td>
</tr>
<tr>
<td>4.</td>
<td>A comparison of percentile ranks of the standing broad jump test item as achieved by the Harmony Hill High School Girls at Watertown with the National AAHPER Norms</td>
<td>50</td>
</tr>
<tr>
<td>5.</td>
<td>A comparison of percentile ranks of the 50-yard dash test item as achieved by the Harmony Hill High School Girls at Watertown with the National AAHPER Norms</td>
<td>51</td>
</tr>
<tr>
<td>6.</td>
<td>A comparison of percentile ranks of the 600-yard run-walk test item as achieved by the Harmony Hill High School Girls at Watertown with the National AAHPER Norms</td>
<td>52</td>
</tr>
</tbody>
</table>
CHAPTER I

INTRODUCTION

Significance of the Study

In recent years traditional educational systems in some areas of the country have been replaced by many new trends and innovations. One such innovation is the adoption of the daily flexible modular schedule which advocates a personalized program where the curriculum could better meet the needs of the student.\(^1\)

The daily flexible smorgasbord modular schedule was accepted by the faculty at Harmony Hill High School, Watertown, South Dakota, a private girls' boarding school, in the fall of 1967. In planning the scheduling, the faculty of Harmony Hill considered and adopted the following assumptions as recommended by Glines:

1. Not all teaching jobs need be the same.
2. All classes in all subjects need not meet every day.
3. All classes need not meet the same number of periods per week or the same amount of time each day.
4. Students are capable of assuming responsibilities.
5. Learning is more important than teaching, and learning can take place without the teacher.
6. Substantial improvement must take place in the instructional program, and the teacher has the obligation to try and to invent and to experiment with ways to improve instruction.\(^2\)

\(^1\)Don E. Glines, Implementing Different and Better Schools (Mankato, Minnesota: Campus Publishers, 1969), p. 110.

\(^2\)Ibid., p. 90.
Glines mentioned seven methods of scheduling and he considers the seventh method the best, the daily flexible smorgasbord scheduling.\textsuperscript{3} Harmony Hill had initiated and was employing this method at the time the investigator began teaching at the school. The daily flexible smorgasbord method of scheduling allowed the teacher to request on a daily basis large groups, small groups, or individuals for the amount of time so desired. Also, the teacher might request one mod of fifteen minutes, or two, three, or more mods of fifteen minutes each, depending upon what had to be taught and how the class was to be conducted. Not only could the teacher request time in the daily flexible smorgasbord schedule, but also the student could request any help or class he felt necessary.\textsuperscript{4}

In order to have a successful daily flexible smorgasbord schedule, it was necessary to have very few large classes.\textsuperscript{5} However, at Harmony Hill, the "must" classes or requests are interpreted as a class which must meet at and for a specific time on a particular day or days due to external circumstances. For example, physical education at Harmony Hill is a "must" in the schedule due to the availability of a gymnasium and bowling alley at specific times for use. Or, if some other academic class invites a guest speaker, such a class would have to be scheduled on that day and at the time the speaker could come. Also, if a teacher were employed on a half day basis, his/her classes would have

\textsuperscript{3}Ibid., p. 110.

\textsuperscript{4}Ibid.

\textsuperscript{5}Ibid.
to be held at the time that teacher was in the school.

Theoretically, the daily flexible smorgasbord schedule should allow the student to meet his class without conflicts, that is, no student should be scheduled in two classes at the same time. Actually, the class would meet and the individual causing the conflict would be scheduled individually in her and the teacher's unscheduled mods or the student and the teacher would resolve the conflict independently of the schedulers.

As indicated by Sister Judith Fischer, Curriculum Director at Harmony Hill, it seemed that the daily flexible smorgasbord schedule required a great amount of time spent in the mechanics of preparing the daily schedule. As a result in 1971-72, the faculty at Harmony Hill High School initiated a schedule that was referred to as a "daily stabilized partial master schedule" along with a daily flexible smorgasbord modular schedule. The stabilized partial master schedule changes at the end of nine weeks. On this schedule were placed all the minimum requests each teacher felt were needed. With the minimum requests placed on the daily stabilized partial master schedule, the teachers' needs were met and the meetings of classes were assured. If for any reason, such as early dismissal or an assembly program, the classes on the daily stabilized partial master schedule could not meet, they were scheduled into the daily flexible schedule's unscheduled mods.6 On the daily flexible smorgasbord schedule were placed those classes that changed

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from day to day as the need arose, by the students and teachers and as such requests fitted back-to-back with the other teachers' classes.

The investigator believes that the daily flexible smorgasbord modular schedule produces excellent results in some areas of learning. However, in physical education, it was felt that because physical education was placed in the daily flexible smorgasbord schedule it could not meet as often as desired or as regularly due to conflicts that developed in scheduling. It was felt that conflicts developed with physical education classes which went back-to-back with other classes meeting less frequently and as a result there was less time for physical education classes. For those physical education classes that went back-to-back with many other classes that could meet more frequently, more time was scheduled for physical education. The investigator felt that the variation in the amount of time spent in physical education due to the two methods of scheduling would affect attitudes toward physical education and of knowledge, skill, and physical fitness of the students.

Statement of the Problem

The purpose of this study was to determine the difference in attitudes toward physical education and of knowledge, skill, and physical fitness of those students taking physical education in the daily flexible modular schedule and of those taking physical education in the daily stabilized partial master schedule.

Hypothesis

There will be no change in attitudes toward physical education and the knowledge, skill, and fitness of the students taking physical
education in the two methods of scheduling class.

Limitations and Delimitations

1. The subjects involved in this study were forty-five girls enrolled in physical education at Harmony Hill High School, Watertown, South Dakota.

2. The duration of this study was from September 7, 1971, to March 18, 1972.

3. Due to the lack of facilities at Harmony Hill High School, the students had to travel to town—to a gymnasium for volleyball and to a bowling alley for bowling. Such travel time was included in class time.

4. The grouping of the stabilized group and the flexible group depended upon (1) whether or not the student lived in the dorm as a resident, and (2) how the groups could be arranged to fit back-to-back with other classes.

5. Christmas vacation and a four-week interim necessitated a physical fitness test at the end of the second activity, volleyball.

6. The equivalent forms A and B of the Wear Physical Education Attitude Test were used to determine attitudes in this study.

7. No effort was made to control participation in activity or exercise outside of the class time.

Definition of Terms

AAHPER Youth Fitness Test. The American Association of Health, Physical Education, and Recreation Youth Fitness Test is a battery of seven test items designed to give a measure of physical fitness for both
boys and girls in grades five through twelve. The seven test items are pull-ups (with flexed-arm hang for girls) for judging arm and shoulder girdle strength; sit-ups for judging efficiency of abdominal and hip flexor muscles; shuttle run for judging explosive muscle power of leg extensors; 50-yard dash for judging speed; softball throw for distance for judging skill and coordination; and 600-yard run-walk for judging cardiovascular efficiency.

**Attitude.** An attitude as defined by Allport is "the mental and neural state of readiness, organized through experience, which exerts a directive or dynamic influence upon the individual's response to all objectives and situations with which it is related." 

**Knowledge.** Knowledge is the amount of content learned about the activity as demonstrated on the knowledge test.

**Daily flexible smorgasbord schedule.** The daily flexible smorgasbord schedule as used in this study refers to the requests that change from day to day.

**Daily stabilized partial master schedule.** The daily stabilized schedule as used in this study refers to the minimum "must" requests of one hour in length for physical education.

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8 Ibid.

"Must" class or request. A "must" class or request as used in this study and by the faculty of Harmony Hill High School means a class that must be met at a specific time on a particular day because of external circumstances.

Mod. A mod is a designated length of time for a class meeting.

Back-to-backs. Back-to-backs are the result of matching class lists in order that scheduled classes meet at the same time.

Conflict. A conflict develops when one or more students are scheduled to meet two classes that are being held at the same time.
CHAPTER II

REVIEW OF RELATED LITERATURE

This chapter contains the review of related literature pertaining to this study and is divided into the following categories:

1. Literature related to attitudes in physical education
2. Literature related to Wear's Attitude Inventory
3. Literature related to knowledge of and skill in the selected activities
4. Literature related to the AAHPER Youth Fitness Test.

Literature Related to Attitudes in Physical Education

In the teaching of physical education, educators are concerned with the attitudes of students toward the physical education activity program as well as the attitudes toward individual activities.¹ Bullock, in her study of some factors determining attitudes of freshman women at the University of Oregon, dealt with the home life, early play experiences, high school experiences, and the University physical education situation. Her study indicated that the prevalence of an attitude of distaste toward required physical education was not as great as many have thought.²


Attitudes toward physical activity and physical activity of selected groups of college students as concluded by Hickman were that both men and women majoring in physical education have high positive attitudes toward physical fitness and exercise. The students in education and the liberal arts have like attitudes toward physical fitness and exercise.3

Lemen found that the degree to which a person enjoys her physical education program in high school is related to her attitudes toward physical education and activities, to her ability in sports, and to leisure time participation in sports.4

Carr analyzed the relationship between success in physical education as represented by performances on a battery of athletic events and expressed attitudes by 335 freshman high school girls. Carr concluded that attitudes held by entering freshman girls do influence their success in physical education and indicated that if undesirable attitudes are obstacles to learning, they should be removed.5

Baker, in her investigation of women between the ages of 15 and 25 years of age, concluded that attitudes concerning participation in

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5 Martha Carr, "Relationship Between Success in Physical Education and Selected Attitudes Expressed by High School Freshmen Girls," The Research Quarterly, 16:176-91, May, 1940.
physical education do not regulate participation so much as they reflect the influence of other causes that do. 6

Moore, at the University of California at Los Angeles, found that college women have a highly favorable attitude toward physical activity as a means of recreation, but the amount of time spent in activity was low due to lack of time needed for study, lack of companions, and outside work. 7

Mista's study was conducted to determine attitudes of college women toward their high school physical education programs and found that significant differences in attitude toward physical education did exist between:

1. Those earning interscholastic athletic letters in high school had more favorable attitudes than those who did not earn letters.

2. Those who participated in organized extra-school physical activity programs had more favorable attitudes than those not participating in organized extra-school physical activity programs.

3. Those who lived on farms had more favorable attitudes than those who did not.

4. Those who chose teaching careers had a more favorable attitude than those who did not.

5. Those whose high school graduate class was less than 75 had more favorable attitudes than those from classes larger than 140.

6. Those rating themselves above average in physical skills had a more favorable attitude than those who rated themselves below average.


7. Those who enjoyed high school physical education had a more favorable attitude than those who did not enjoy high school physical education.8

Graybeal used two groups of college freshmen women at the University of Minnesota and determined a greater improvement in attitudes, motor ability, knowledge of a subject, and posture of those enrolled in physical education than those not enrolled. Over a two year period, however, there was a decline in expressed attitudes by those not participating in class activity.9

Hunter studied attitudes of women students toward college physical education and concluded that learning skill early and parents interested in including their children in recreational activities promoted a favorable attitude toward these activities.10

At Wellesley College, Wiedamann and Howe investigated undergraduate attitudes and interest with regard to physical activities. Their study confirmed the favorable attitude of college women toward a requirement in physical education and a preponderance of opinion in favor of rhythmic activities and individual sports.11

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Alden chose three schools, each representing different sections of the country, to secure data on the trend in unfavorable attitudes of college girls in regard to the required physical education programs. Her findings seemed to indicate that the trend in unfavorable influences may be somewhat similar regardless of whether the college is a liberal arts or teacher-training institution.12

Anderson used an attitude questionnaire and a five point rating scale for indicating interest in various activities of junior high girls. She found that girls preferred a progressively planned program which stressed skill.13

Literature Relating to the Wear Attitude Inventory

Wear constructed an effective instrument for the evaluation of attitudes toward physical education as an activity course. Wear's original inventory consisted of 120 items of which 40 items were statistically analyzed. These 40 items, called the Short Form of the Inventory, were placed on a numerical scoring scale ranging from five to one for reactions of "strongly for" to "strongly against" with each item phrased in support of physical education. For those items phrased negatively, an inverted scoring scale of one to five was used. The split-halves technique was employed to determine reliability. The reliability


measured 0.96 for 472 cases and became 0.96 when raised by the Spearman-Brown formula.  

In 1955, Wear constructed two equivalent forms, Short Form A and Short Form B. The items for the two equivalent forms were taken from Wear's original inventory of 120 items. The reliability of Form A as calculated by the use of the split-halves technique and the Spearman-Brown formula was 0.94. The reliability of Form B was 0.96. The product-moment correlation between scores on the two forms was 0.96.  

Broer, Fox, and Way used the original form of Wear's inventory. The freshman and sophomore women enrolled in physical education activity classes at the University of Washington indicated very favorable attitudes toward physical education.  

At the University of Oregon, Brumbach employed the Short Form A of the Wear Inventory to measure attitudes of lower division male students. He found that athletes had better attitudes toward physical education than did non-athletes. It was also found that the more years of physical education a student had had in high school, the better his attitude was likely to be toward physical education. Students who had

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attended smaller high schools had better attitudes toward physical education than those who attended larger schools.\textsuperscript{17}

Campbell administered the Short Form A to 199 lower division male students enrolled in the required physical education program at the University of Texas. He classified his subjects according to the size of high school attended, the college of matriculation, and the physical education class in which they were currently enrolled. Campbell concluded that no significant variations in attitudes concerning physical education could be predicted by the size of the high school attended, the college of matriculation, and the physical education class in which they were presently enrolled.\textsuperscript{18}

In another study, Campbell used the Short Form A, the 50-yard dash and the 600-yard run-walk, to determine relationship between scores on the Wear attitude inventory and selected physical fitness scores. No significant relationship existed between attitudes toward physical education as measured by the Wear Short Form A and the ability to perform the 50-yard dash and the 600-yard run-walk.\textsuperscript{19}

Campbell also applied the Wear Short Form A to junior high school boys in Austin, Texas. Campbell found that the Wear Physical

\textsuperscript{17}Wayne B. Brumbach and John A. Cross, "Attitudes Toward Physical Education of Male Students Entering the University of Oregon," \textit{The Research Quarterly}, 36:10-16, March, 1965.


\textsuperscript{19}, "Relationship Between Scores on the Wear Attitude Inventory and Selected Physical Fitness Scores," \textit{The Research Quarterly}, 40:470-74, October, 1969.
Education Attitude Inventory could be used effectively to evaluate attitudes of junior high school boys toward physical education.\textsuperscript{20}

Bell, Walter, and Staff studied the attitudes of all freshman women taking physical education and senior women who had taken required physical education at the University of Michigan. Having used Wear's attitude scale of 40 items, plus questions dealing with the objectives of physical education and the background of the students, it was concluded that the freshmen had a more favorable attitude toward physical education than did the seniors regardless of whether they had had physical education in high school.\textsuperscript{21}

Keogh analyzed the general attitudes toward physical education of 136 men and 130 women at the University of California at Los Angeles to determine whether men and women differed in this respect. The result of his study was that men and women do not differ in their stated attitudes toward physical education.\textsuperscript{22}

Miller administered the Wear Short Form A to the students enrolled in the basic physical education program at South Dakota State University. He found that the students had had a favorable


\textsuperscript{21}Margaret Bell et al., "Attitudes of Women at the University of Michigan Toward Physical Education," \textit{The Research Quarterly}, 24:379-91, December, 1953.

attitude toward physical education. As Miller, Wessel and Nelson found that the women students at Michigan State University expressed a very favorable attitude toward physical education as an activity course as measured by the Wear Inventory.

Allerdice employed the Kneer adaptation of the Wear Attitude Inventory in her study to discover the relationship between attitudes toward physical education and the sociometric status of subjects within a physical education class. The results of studying 202 eighth and ninth grade girls did not demonstrate any substantial relationship between attitudes toward physical education and a degree of physical fitness.

Moyer, Mitchem, and Bell administered the modified Wear Attitude Inventory to measure women's attitudes toward physical education in the general education program at Northern Illinois University. Their findings indicated a highly favorable attitude toward physical education on the part of both freshmen and juniors.


Harrington re-worded sixteen items of the Wear Attitude Inventory to determine attitudes of later elementary children toward physical education and their physical fitness status. No relationship was found between a student's expressed attitude toward physical education and his physical fitness status.\(^{27}\)

**Literature Relating to Knowledge and Skills**

Knowledge testing is important and vital to the learning process in physical education. The tools employed in the measurement of knowledge should be so designed that the teacher can easily determine what the students have learned in participation and from facts and materials presented within the unit.\(^{28}\) Any knowledge test should measure the student's ability to use her knowledge, to generalize, to make applications; therefore, they should not be built as learning-teaching devices.\(^{29}\)

Knowledge tests consist of several types. The most common and practical type used in the classroom is the teacher-made test which may be either objective or subjective in nature since standardized tests have not had widespread use in physical education on the national level.\(^{30}\)

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\(^{28}\) Johnson, loc. cit.


\(^{30}\) Johnson, op. cit., p. 410.
Johnson writes that in any sport there are many skills and abilities involved which make for successful performances. Although the fundamental skills can be identified, they can never be measured separately and then summed up to represent actual performance. The successful teacher must recognize that the total performance is greater than its individual components and strive to select those tests which will provide the student and teacher with the most accurate information of the student's progress and achievement.31

For women's volleyball, Clifton devised a single hit volley test to evaluate the volleying ability of college women students in volleyball. Clifton found her test to be most valid and reliable when administered from behind a seven foot restricting line, using the sum of scores from the first and second trial. She allowed thirty seconds for each trial with a two minute rest between trials.32

Liba and Stauff constructed a test for the overhead volleyball pass for college women and for junior high school girls with modifications. A good performance was considered as having the ability to pass the ball to a desired height and desired distance.33

Crogen felt that validity of volleyball skills should be based upon playing competition and not upon judges' ratings. Crogen

31Johnson, op. cit., p. 368.
constructed a test having a validity based upon playing ability as demonstrated in competition. 34

The search of the literature revealed only one study in the area of skills testing for field hockey. The test examined was a test constructed in 1938-39 and published in 1940. Schmithals and French used fifty-one college women students at the University of Iowa and from the Iowa City Hockey Club. Three national rated umpires were asked to rate the players on general hockey playing ability during two consecutive class periods and classify them into five groups: (1) superior, (2) above average, (3) average, (4) below average, (5) inferior. An effort was made to determine a single test which was statistically best and which was most economical in time and the best combination of tests as determined by the results of multiple correlations. The items tested were fielding and drive; straight, right, left, goal shooting; push pass; goal shooting left; dribble, dodge, circular tackle, and drive; and drive for distance. Statistically the best single test were the fielding and drive with a reliability of .9010 and the combined goal shooting with a reliability of .9189. The most all-around and economical test was the dribble, dodge, circular tackle, and drive with a reliability of .9238. 35

Johnson states that the game of bowling is, in itself, an objective measurement. 36 The literature related to bowling was concerned with


36 Johnson, op. cit., p. 348.
establishing bowling norms for men and women. Phillips and Summers have established ratings for different levels of ability as to progress at various stages up through twenty-five lines of bowling. Norms of superior, good, average, poor, and inferior performance were constructed for men and women, for experienced and non-experienced bowlers in the study done by Martin and Keogh.

Literature Relating to the AAHPER Youth Fitness Test

The measurement of physical fitness and methods of developing fitness have been the concern of physical educators as well as of the entire nation. The youth fitness test manual indicates that this concern was met with the development of the AAHPER Youth Fitness Test. The items selected for testing were: pull-up (with modified pull-up for girls), sit-up, shuttle run, 50-yard dash, softball throw for distance, and the 600-yard run-walk. This test was administered to a sampling of 8,500 boys and girls in grades five through twelve under the direction of Hunsicker of the University of Michigan with the assistance of the University's Survey Research Center. The data for the national

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39 Johnson, op. cit., p. 396.

testing was collected and analyzed during the school year of 1957-58. The national norms were published in September of 1958 by the AAHPER.\textsuperscript{41} Even though this first testing of American youth in 1957 demonstrated that the American boys and girls were not as physically fit as the youth in other countries, the AAHPER fitness test was met with great enthusiasm and was adopted and used by many school and youth-serving agencies.\textsuperscript{42}

Having been used for some five years, the AAHPER believed it was desirable to develop new norms to determine whether increased emphasis on testing and improvements in physical education were helping to increase fitness levels.\textsuperscript{43} Again, under the direction of Hunsicker and with the assistance of the Survey Research Center at the University of Michigan, a second national testing was undertaken to update the norms.\textsuperscript{44}

The identical test items as in the first test, with the exception of one item, were administered to 9,200 boys and girls in the second testing. The flex-arm hang replaced the modified pull-up for girls because it gave a more efficient and reliable measure for the quality tested.\textsuperscript{45}

The norms of the second national testing were indicative of the fact that boys and girls from the ages 10 to 17 are generally more fit today, as measured by the revised AAHPER Youth Fitness Test.\textsuperscript{46}

\textsuperscript{41}Ibid., p. 9.
\textsuperscript{42}Ibid.
\textsuperscript{43}Ibid.
\textsuperscript{44}Ibid.
\textsuperscript{45}Ibid.
\textsuperscript{46}Ibid.
Klesius conducted a study to consider the effect of correlating various combinations of measures collected in the administration of the AAHPER Youth Fitness Test to determine the reliability of the selected test items and the relative efficiency of performance measures. Acting upon his research, Klesius concluded that the best test items were in general judged reliable, with sit-up being a possible exception. The test items selected produced satisfactory indexes of performance with the exception of the shuttle run; and the mean on each of the test items when compared to trials 1, 2, and 3, on each item, yielded different from any other measure, based on more than one trial.47

Franks and Moore's study was to determine the effects of different amounts of calisthenics and volleyball, calisthenics, and volleyball on physical fitness. After a five week period, it was concluded that a daily calisthenics class or a combination of calisthenics and volleyball class caused greater improvements in muscular endurance, as measured by sit-ups and pull-ups, than an all-volleyball class. The combination class also caused greater improvement in speed as measured by the 5-yard dash, than the volleyball class.48

A study similar to Franks and Moore's was that of Marmis et al. which investigated the test-retest reliability of those items in which


more than a single trial was employed with a view to obtaining evidence concerning the appropriateness of the prescribed trials. Their results indicated that the number of trials in most of the items should be changed. 49

Rothermel et al. conducted a study to determine the effects on the physical fitness of boys at the University of Illinois Sport-Fitness Summer Day School for Boys in 1950. They found that the changes that took place in items which were designed to measure muscular strength and endurance, power, and cardiorespiratory endurance were significantly greater for boys in the organized program and that no changes appeared for either group in the items which were designed to measure speed, agility, and coordination. 50

Yeatts and Gordon administered the AAHPER Youth Fitness Test and Gordon's "How I See Myself" scale to seventy-five seventh graders. Those students who had participated in an elementary program with the resources of a physical education specialist performed a higher degree of proficiency on the AAHPER physical fitness test and they were more accurate in self-estimates. 51


Zimmerman studied the physical performances of boys and girls taught by special physical education teachers and classroom teachers. She administered the AAHPER fitness test to boys and girls taught by each teacher. Zimmerman found that those students taught by a special physical education teacher exceeded the physical performance of those students taught by the classroom teacher. 52

Using the AAHPER Youth Fitness Test, the New York State Fitness Test, and the Kraus-Weber Test, Anderson studied the relationships between physical performances of the seventh grade girls and a classification index based on age, height, and weight. The results indicated that these factors do not provide a reliable index for the grouping of the students and for establishing norms of test performance. 53

Busch, in establishing AAHPER physical fitness norms for the state of South Dakota, selected one school to represent each region of the South Dakota High School Activities Association. The subjects chosen for study included one thousand South Dakota girls in grades seven to ten. In comparing the norms of the South Dakota girls to the national norms, it was found that the medians for the South Dakota girls were higher than the medians of the national girls on all items except the flexed-arm hang. 54


Lilevjen and Schlekeway conducted a study utilizing the AAHPER Youth Fitness Test to compare the physical fitness of junior high school boys, Watertown, South Dakota, to the national norms. The authors found that on the initial test given, the subjects were well above the fiftieth percentile on the national norms in all test items except the 50-yard dash. On the final testing, all subjects were well above the fiftieth percentile on all test items.\(^{55}\)

Howlin compared the physical fitness of selected elementary schools in Sioux Falls, South Dakota, with the national fitness norms. His study revealed that the girls fell below the national average on the shuttle run, the broad jump, and the softball throw test items. The boys fell below the national average on the shuttle run and the standing broad jump.\(^{56}\)

**Literature Relating to Other Fitness Tests**

Keough studied the effects of a daily and two day per week physical education program upon motor fitness of children. Keough used the Iowa Test of Motor Fitness to measure the fitness of her third and fifth grade subjects. Keough's conclusion revealed that the two

\(^{55}\)Clar Lilevjen and Eugene Schlekeway, "The Effects of a Physical Education Program of 150 Minutes Per Week at Watertown, South Dakota, on Physical Fitness as Compared to the National Norms Established by the AAHPER Fitness Test" (unpublished Research report, South Dakota State University, 1962), pp. 1-43.

\(^{56}\)James Howlin, "Comparing Physical Fitness in Selected Areas in Sioux Falls, South Dakota, with the National Norms and La Port Score Card" (unpublished Master's thesis, South Dakota State University, 1959), pp. 1-86.
day per week program of physical education, as presented in her study, was as effective for developing fitness as measured by the Iowa fitness test as a program of physical education that met daily when the total time spent in activity was the same.57

In England, Sutcliff and Canham applied varying periods of physical education work to three different groups of boys. Two groups had two physical education periods a week and one group had physical education daily. The groups were tested on fitness items of suppleness, strength, skill, and endurance. The authors found that the daily physical education class performed significantly better in suppleness and strength than did the two groups that met two times a week.58

Rosenstein and Frost undertook a study to determine whether it could be demonstrated that the quality of the physical education program affected the amount of improvement in physical fitness among pupils of high school age in selected schools in New York State. They used the New York State Physical Fitness Test that measured posture, strength, agility, speed, balance, and endurance. Rosenstein and Frost indicated strongly that greater physical fitness results where facilities, personnel, and programs are of high quality.59


CHAPTER III

METHODS AND PROCEDURES

Organization of the Study

This study was completed over a period of eighteen weeks, September 7, 1971, to March 18, 1972. The subjects included in this study were all those students enrolled in physical education at Harmony Hill High School, Watertown, South Dakota. The subjects were placed in physical education through two types of scheduling, the daily flexible smorgasbord schedule and the daily stabilized partial master schedule. Thus, two groups of subjects were established. All subjects were tested on attitudes toward physical education, knowledge, skill, and physical fitness. On September 7 and 8, 1971, a pretest on attitudes toward physical education was administered. On March 18, a post test on attitudes toward physical education was administered. Knowledge and skill tests were administered at the conclusion of each activity. The physical fitness testing was given three different times, (1) as a pretest, (2) before Christmas vacation, and (3) as a post test. The physical fitness testing occurred during the weeks of September 7-10, 1971, November 29 through December 10, 1971, and March 14-18, 1972. Test descriptions in this study appear in Appendixes A, B, C, D, E, and F.

Source of Data

Forty-five girls enrolled in physical education at Harmony Hill High School participated in this study. Twenty-two were scheduled in physical education by the daily flexible smorgasbord schedule and
twenty-three girls were scheduled to participate in physical education by the daily stabilized partial master schedule. Those girls placed in the two types of scheduling depended upon (1) whether they were residents living at Harmony Hill, thus being available to be scheduled for class before or after the regular school day because of conflicts in scheduling, and (2) how the students could be arranged in class lists to fit back-to-back with other academic classes. Once the class lists were made, the same students remained in either the daily flexible or the daily stabilized schedule throughout the entire study. Since other academic classes were small in number, the physical education classes were again divided into more classes with fewer in each class. However, twenty-two girls remained in the daily flexible schedule, not meeting as one class in each schedule but as two or three classes.

Administration of the Treatment

The two types of scheduling necessitated two groups of students; one group to function in the daily flexible smorgasbord schedule referred to as the flexible group, and one group to function in the daily stabilized partial master schedule referred to as the stabilized group.

Each group participated in three activities, field hockey, volleyball, and bowling. Field hockey and volleyball were taught by the investigator, and bowling was taught by the bowling alley personnel with the assistance of the investigator.

The stabilized group in field hockey was divided into two groups called PE ca and PE cb for identification purposes in scheduling. PE ca consisted of twelve girls and PE cb consisted of eleven girls. These two
groups met as individual classes four days a week for one hour. Then
the two groups met together one day of the week for one hour in order to
have participation.

The flexible group was also divided into two groups, PE 2a and
PE 2b, for identification purposes in scheduling. Each group, PE 2a and
PE 2b, consisted of eleven girls. PE 2a and PE 2b met twice a week, each
meeting on one day for three mods or 45 minutes and each meeting on the
other day for four mods or 60 minutes. These groups did not meet to-
gether for full team playing experience due to scheduling conflicts.

For volleyball, the stabilized groups remained the same as in
field hockey. PE ca met every day from 7:45 until 8:45 a.m. PE cb met
each day from 10:15 until 11:15 a.m. The actual playing time for each
class was thirty minutes since traveling to the gymnasium was included
in the scheduled hour.

Since the gymnasium was available for only three afternoons of
the week for an hour, the investigator wanted each student in the flex-
ible group to have the opportunity to play volleyball; hence, it was
necessary to divide the flexible group into three classes, PE 2a, PE 2b,
and PE 2c. Each class met in the classroom twice a week for a thirty
minute lecture twice a week. PE 2a consisted of eight girls and met at
the gymnasium on Tuesday from 1:45 to 2:45 p.m. PE 2b and PE 2c each had
seven girls and met at the gymnasium from 1:45 to 2:45 p.m. on Thursday
and Friday, respectively.

For bowling, the stabilized group consisted of one large class
of 23 girls. The class was referred to as PE ca. It met from 2:30 to
4:30 p.m. on Monday and Tuesday and from 2:30 to 3:30 p.m. on Thursday.
The flexible group also met as one and it consisted of 22 girls. It was referred to as PE 2a and met on Monday and Tuesday from 1:00 to 2:00 p.m. A brief description of materials taught in each activity appears in Appendix A. The description includes the classroom instruction which was employed for the flexible and stabilized groups.

Collection of Data

The data collected in this study were the measurements taken from the following:

Wear Physical Education Attitude Inventory Test, Forms A and B. Based upon the examination of attitude scales, Wear's Inventory, Form A and Form B, was found to satisfy the needs of this study. In 1955, Wear constructed two equivalent attitude forms for the purpose of measuring changes in attitude toward physical education as a result of special experiences in which students might be involved. Since there are two equivalent forms of Wear's Inventory, Form A was used as a pre test and Form B as a post test. Description of the tests appears in Appendix B. Data appear in Appendix G.

Although Wear's Inventory was designed for college men, the difficulty of the vocabulary was not such that could not be used for high-school classes. The reliability proved to be .94 for Form A and .96 for Form B. The product correlation for both forms was .96. Face validity has been accepted for the two equivalent scales.


2Ibid.
Form A was given on September 7 and 8, 1971. Form B was administered on March 18, 1972.

Knowledge Tests. Field hockey knowledge tests consisted of items taken from the test manual designed for use with field hockey and volleyball, published by the William C. Brown Publishers to accompany their books of instruction. The bowling knowledge test was prepared by the investigator.

Skills Tests--Field Hockey. In searching for skills tests in field hockey, the investigator found a field hockey test developed for college women in 1938-39 by Schmithals and French and published in 1940. Their study consisted of constructing three tests: test one measured the skills of the dribble, dodge, circular tackle, and drive; test two measured the skills of goal shooting--straight, right, and left; test three measured the skills of fielding and driving. The investigator used only the skills of the three tests but allowed only five trials on each test for each subject being tested. The investigator felt that five trials were sufficient to measure the skill of her subjects. If there was a wrong technique employed by the one being tested, a dash was recorded. All trials of the field hockey test battery were timed and the best score recorded. Complete description of the test appears in Appendix D. Data appear in Appendix E, Tables I and II.

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Power Volleyball. Since power volleyball was taught to the students participating in this study and is a relatively "new" sport, the investigator devised a skill test employing the skills of power volleyball. Ideas were borrowed from other volleyball tests constructed by Brady, Clifton, and Brumbach.\(^5\)

The investigator's volleyball skill test included the overhand service, the standing spike, the wall volley, and the two-handed dig. The overhanded service was administered from a distance of 30 feet and a distance of 25 feet, and could land anywhere in the opponent's court as long as the ball cleared the net. The distance of 30 feet was chosen because of the regulation service line. The distance of 25 feet was chosen to find out whether the subject lacked skill or just did not have the strength to hit the ball over the net from 30 feet. Five trials were allowed for each distance, with the best score recorded.

The wall volley was selected as a skill to be tested because power volleyball demands the use of high passes. Each subject was allowed two trials, the better trial being recorded. No restraining line was used and each subject was instructed to throw the ball against the wall above a ten foot marker and volley the ball against the wall consecutively for thirty seconds. If the ball did not go above the ten foot mark or hit the wall, the subject began again, and each time the subject began counting over. The highest score of consecutive counts

was recorded. Two trials of thirty seconds were given to each subject with a rest period of one minute between trials.

The ability to spike was tested because it is considered to be an offensive weapon used in scoring points. The two-handed dig was given to determine whether the subject could play the low ball effectively. Description of the tests appears in Appendix D. Data appear in Appendix E, Tables III and IV.

Bowling. Bowling is considered in itself an objective measurement of skill. Therefore, the investigator felt no need to administer a bowling skill test. To determine the amount of skill acquired by the subjects, a record of their bowling scores was kept. The bowling scores of the second week and of the sixth week were compared to measure the amount of improvement of each student in her bowling skill. Data appear in Appendix E, Tables V and VI.

AAHPER Youth Fitness Test. The AAHPER Youth Fitness Test was selected for this study because (1) national norms have been established by which the students at Harmony Hill High School could be compared with other students in the nation and (2) the test can be easily administered, requiring little equipment.

The AAHPER test was administered September 7 to 10, 1971; November 29 to December 10, 1971; and March 14 to 18, 1972. The softball throw test item for distance was eliminated because of weather conditions and the lack of indoor facilities. All data were recorded in inches and/or seconds for statistical purposes. Description of the test items appears in Appendix F. Data appear in Appendix G.

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6Ibid.
CHAPTER IV

ANALYSIS AND DISCUSSION OF RESULTS

Organization of Data for Analysis

The purpose of this study was to determine the difference in attitudes toward physical education, knowledge, skill, and physical fitness of those students taking physical education in the flexible modular schedule and of those students taking physical education in the daily stabilized "partial master" schedule.

A total of forty-five girls who were enrolled in the physical education program at Harmony Hill High School participated in the study. The stabilized group consisted of twenty-three girls and met physical education classes five times a week. The flexible group consisted of twenty-two girls and met twice a week.

In order to statistically test the null hypothesis in regard to attitudes, Garrett's procedures were employed and $t$ ratios were computed. The first $t$ ratio was computed to compare the changes in attitudes from the beginning of the physical education program in September to the end of the program in March between the two groups. The last two $t$ ratios were computed to determine within group attitude changes from the beginning to the end of the program within each individual group.

The same statistical procedures were followed to test the null hypothesis in regard to physical fitness. Comparisons within groups and

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between groups were made for the six physical fitness variables from trial one to trial two, and from trial one to trial three.

The statistical procedure used to analyze knowledge and skill differences between the groups was a t test for independent groups comparing the results on the tests at the end of each activity. This procedure was followed for knowledge in field hockey, volleyball, and bowling, and for skill level analysis in field hockey and volleyball. Bowling was treated in a somewhat different fashion because a pre unit skill test was possible in this case. The t test comparing the two groups analyzed the changes in bowling scores from the second week of the bowling unit to the sixth week of each group.

The .05 level of confidence was accepted as the minimum level for the t ratio to be considered significant. The group means for the variables tested appear in Table I. The raw data for all tests except the skill tests in field hockey, volleyball, and bowling in Appendix G.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Stabilized Group</th>
<th>Flexible Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wear Attitude Inventory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre Test</td>
<td>115.82</td>
<td>117.41</td>
</tr>
<tr>
<td>Post Test</td>
<td>119.17</td>
<td>110.27</td>
</tr>
<tr>
<td>Flexed-Arm Hang (sec.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trial 1</td>
<td>6.0</td>
<td>.6</td>
</tr>
<tr>
<td>Trial 2</td>
<td>5.2</td>
<td>2.0</td>
</tr>
<tr>
<td>Trial 3</td>
<td>7.2</td>
<td>2.4</td>
</tr>
<tr>
<td>Sit-ups</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trial 1</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Trial 2</td>
<td>28</td>
<td>31</td>
</tr>
<tr>
<td>Trial 3</td>
<td>31</td>
<td>38</td>
</tr>
<tr>
<td>Shuttle Run (sec.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trial 1</td>
<td>11.9</td>
<td>12.2</td>
</tr>
<tr>
<td>Trial 2</td>
<td>11.8</td>
<td>12.1</td>
</tr>
<tr>
<td>Trial 3</td>
<td>11.2</td>
<td>11.4</td>
</tr>
<tr>
<td>Standing Broad Jump (in.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trial 1</td>
<td>62</td>
<td>61</td>
</tr>
<tr>
<td>Trial 2</td>
<td>61</td>
<td>60</td>
</tr>
<tr>
<td>Trial 3</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>50-Yard Dash (sec.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trial 1</td>
<td>9.1</td>
<td>9.5</td>
</tr>
<tr>
<td>Trial 2</td>
<td>8.3</td>
<td>8.5</td>
</tr>
<tr>
<td>Trial 3</td>
<td>8.6</td>
<td>8.2</td>
</tr>
<tr>
<td>600-Yard Run-Walk (sec.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trial 1</td>
<td>190</td>
<td>218</td>
</tr>
<tr>
<td>Trial 2</td>
<td>152</td>
<td>179</td>
</tr>
<tr>
<td>Trial 3</td>
<td>144</td>
<td>189</td>
</tr>
</tbody>
</table>
TABLE I (Continued)

GROUP MEANS OF THE VARIABLES

<table>
<thead>
<tr>
<th>Variable</th>
<th>Stabilized Group</th>
<th>Flexible Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field Hockey Knowledge</td>
<td>30.39</td>
<td>30.90</td>
</tr>
<tr>
<td>Volleyball Knowledge</td>
<td>27.61</td>
<td>19.45</td>
</tr>
<tr>
<td>Bowling Knowledge</td>
<td>26.60</td>
<td>19.00</td>
</tr>
<tr>
<td><strong>Field Hockey</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dribble, Dodge, Circular</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tackle, and Drive (sec.)</td>
<td>17.25</td>
<td>15.76</td>
</tr>
<tr>
<td>Goal Shooting Straight (sec.)</td>
<td>5.17</td>
<td>5.19</td>
</tr>
<tr>
<td>Goal Shooting Left (sec.)</td>
<td>5.10</td>
<td>6.45</td>
</tr>
<tr>
<td>Goal Shooting Right (sec.)</td>
<td>5.14</td>
<td>6.05</td>
</tr>
<tr>
<td>Fielding and Driving (sec.)</td>
<td>5.98</td>
<td>4.84</td>
</tr>
<tr>
<td><strong>Volleyball</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service at 30' (best score out of 5 trials)</td>
<td>1.43</td>
<td>1.09</td>
</tr>
<tr>
<td>Service at 25' (best score out of 5 trials)</td>
<td>2.17</td>
<td>1.95</td>
</tr>
<tr>
<td>Wall Volley (better score out of 2 trials)</td>
<td>3.26</td>
<td>7.14</td>
</tr>
<tr>
<td>Two-handed Dig (best score out of 5 trials)</td>
<td>2.70</td>
<td>3.09</td>
</tr>
<tr>
<td>Spike (best score out of 5 trials)</td>
<td>2.74</td>
<td>3.05</td>
</tr>
<tr>
<td><strong>Bowling</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2nd Week (ave.)</td>
<td>93</td>
<td>85</td>
</tr>
<tr>
<td>6th Week (ave.)</td>
<td>104</td>
<td>92</td>
</tr>
</tbody>
</table>
Analysis of the Data

Table II shows the statistical comparison of the attitude mean changes between the stabilized group and the flexible group.

**TABLE II**

THE SIGNIFICANCE OF CHANGE BETWEEN GROUP MEANS IN ATTITUDES

<table>
<thead>
<tr>
<th>Variable</th>
<th>Stabilized Group</th>
<th>Flexible Group</th>
<th>Mean Difference</th>
<th>SE_d</th>
<th>df</th>
<th>t*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude</td>
<td>3.35</td>
<td>-7.14</td>
<td>10.49</td>
<td>4.43</td>
<td>43</td>
<td>2.37</td>
</tr>
</tbody>
</table>

*_{t,.05}^{(43)} = 2.02

The mean change for the stabilized group on the attitude pre test to post test was 3.35 as compared to a -7.14 mean change for the flexible group. The results revealed a significant difference at the .05 level of confidence as indicated by a t 3.27 compared to a required t of 2.02.

Table III shows the statistical analysis of the changes in attitudes from pre test to post test within the stabilized and flexible group.

**TABLE III**

THE SIGNIFICANCE OF THE CHANGES IN ATTITUDES WITHIN GROUPS FROM PRE TO POST TEST

<table>
<thead>
<tr>
<th>Variable</th>
<th>Groups</th>
<th>Md</th>
<th>SE_{MD}</th>
<th>df</th>
<th>t*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude Changes from Pre to Post Test</td>
<td>Stabilized</td>
<td>3.35</td>
<td>1.66</td>
<td>22</td>
<td>2.01</td>
</tr>
<tr>
<td></td>
<td>Flexible</td>
<td>-7.14</td>
<td>3.62</td>
<td>21</td>
<td>1.97</td>
</tr>
</tbody>
</table>

*_{t,.05}^{(22)} = 2.07,  _{t,.05}^{(21)} = 2.08
The mean difference for the stabilized group from pre test to post test was 3.35 as compared to the flexible group's group mean score of -7.14. The results revealed no significant difference within either group at the .05 level of confidence as indicated by a $t$ of 2.01 and 1.97, respectively, compared to a required $t$ of 2.07 and 2.08. Both groups, however, approached significance.

Table IV shows the statistical comparison of group means in the knowledge of field hockey, volleyball, and bowling.

**TABLE IV**

THE SIGNIFICANCE OF THE DIFFERENCE BETWEEN MEANS OF THE TWO GROUPS IN THE KNOWLEDGE OF FIELD HOCKEY, VOLLEYBALL, AND BOWLING

<table>
<thead>
<tr>
<th>Variables</th>
<th>Stabilized Group Mean</th>
<th>Flexible Group Mean</th>
<th>D</th>
<th>SE$_{D}$</th>
<th>df</th>
<th>$t^*$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field Hockey</td>
<td>30.39</td>
<td>30.03</td>
<td>.30</td>
<td>1.36</td>
<td>43</td>
<td>.22</td>
</tr>
<tr>
<td>Volleyball</td>
<td>27.61</td>
<td>19.45</td>
<td>8.16</td>
<td>1.62</td>
<td>43</td>
<td>5.04</td>
</tr>
<tr>
<td>Bowling</td>
<td>26.60</td>
<td>19.00</td>
<td>7.60</td>
<td>1.62</td>
<td>43</td>
<td>4.69</td>
</tr>
</tbody>
</table>

$t_{.05}^{(43)} = 2.02, \quad t_{.01}^{(43)} = 2.70$

In the knowledge of field hockey, the stabilized group had a group mean of 30.39 as compared to the group mean of 30.09 for the flexible group. The results revealed no significant difference at the .05 level of confidence as indicated by a $t$ of .22 compared to a required $t$ of 2.02. The group mean for the stabilized group in the knowledge of volleyball was 27.61 as compared to the flexible group's group mean score of 19.45. In the knowledge of bowling, the stabilized group had a group mean of 26.60 as compared to the flexible group's group mean score of 19.00. Both mean scores were significantly different beyond the .01 level of confidence as indicated by a $t$ ration of 5.04 and 4.69,
respectively, compared to a required $t$ of 2.70. Both differences were in favor of the stabilized group which met five times per week.

Table V shows the statistical comparison of the groups means in the skills of field hockey, volleyball, and bowling between the stabilized and the flexible groups.

**TABLE V**

THE SIGNIFICANCE OF THE DIFFERENCE BETWEEN THE MEANS FOR BOTH GROUPS IN THE SKILLS OF FIELD HOCKEY, VOLLEYBALL, AND BOWLING

<table>
<thead>
<tr>
<th>Variable</th>
<th>Stabilized Group Mean</th>
<th>Flexible Group Mean</th>
<th>$D$</th>
<th>$SE_D$</th>
<th>df</th>
<th>$t^*$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Field Hockey</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dribble, Dodge,</td>
<td>17.25</td>
<td>15.76</td>
<td>1.49</td>
<td>1.99</td>
<td>41</td>
<td>.75</td>
</tr>
<tr>
<td>Circular Tackle, and Drive (sec.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goal Shooting Straight (sec.)</td>
<td>5.17</td>
<td>5.19</td>
<td>.02</td>
<td>.34</td>
<td>40</td>
<td>.06</td>
</tr>
<tr>
<td>Goal Shooting Left (sec.)</td>
<td>5.10</td>
<td>6.45</td>
<td>1.35</td>
<td>.32</td>
<td>40</td>
<td>4.19</td>
</tr>
<tr>
<td>Goal Shooting Right (sec.)</td>
<td>5.14</td>
<td>6.05</td>
<td>.91</td>
<td>.44</td>
<td>40</td>
<td>2.09</td>
</tr>
<tr>
<td>Fielding and Driving (sec.)</td>
<td>5.98</td>
<td>4.84</td>
<td>1.41</td>
<td>.37</td>
<td>43</td>
<td>3.08</td>
</tr>
<tr>
<td>Volleyball</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service at 30'</td>
<td>1.43</td>
<td>1.09</td>
<td>.34</td>
<td>.44</td>
<td>43</td>
<td>.78</td>
</tr>
<tr>
<td>Service at 25'</td>
<td>2.17</td>
<td>1.95</td>
<td>.22</td>
<td>.53</td>
<td>43</td>
<td>.41</td>
</tr>
<tr>
<td>Wall Volley</td>
<td>3.26</td>
<td>7.14</td>
<td>3.88</td>
<td>1.15</td>
<td>43</td>
<td>3.37</td>
</tr>
<tr>
<td>Two-handled Dig</td>
<td>2.70</td>
<td>3.09</td>
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<td>.40</td>
<td>43</td>
<td>.97</td>
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<tr>
<td>Spike</td>
<td>2.74</td>
<td>3.05</td>
<td>.31</td>
<td>.40</td>
<td>43</td>
<td>.78</td>
</tr>
<tr>
<td>Bowling</td>
<td>11.78</td>
<td>6.32</td>
<td>5.46</td>
<td>.42</td>
<td>43</td>
<td>12.99</td>
</tr>
</tbody>
</table>

$t_{.05(43)} = 2.02, \quad t_{.01(43)} = 2.70, \quad t_{.05(41)} = 2.01, \quad t_{.05(40)} = 2.01, \quad t_{.01(40)} = 2.71$
The results of the skills tests administered for field hockey revealed that three of the five tests given differed significantly in their results. Goal shooting left, right, and fielding and driving resulted in t ratios of 4.19, 2.09, and 3.08, respectively. The difference was in favor of the stabilized group in the first two variables, but in favor of the flexible group in the last variable.

The difference in bowling skill improvement between the two groups revealed a significant difference in results. The stabilized group improved to a significant degree over the flexible group as indicated by a t of 12.99 compared to a required t of 2.70 needed for the .01 level of confidence.

Table VI shows the statistical comparison of group change in physical fitness.
**TABLE VI**

THE SIGNIFICANCE OF THE CHANGE BETWEEN BOTH GROUPS IN PHYSICAL FITNESS

<table>
<thead>
<tr>
<th>Variable</th>
<th>Stabilized Group Mean</th>
<th>Flexible Group Mean</th>
<th>D</th>
<th>SE_D</th>
<th>df</th>
<th>t*</th>
</tr>
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<tbody>
<tr>
<td>Flexed-arm Hang (sec.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trial 1-2</td>
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<td>1.67</td>
<td>1.59</td>
<td>43</td>
<td>1.05</td>
</tr>
<tr>
<td>Trial 1-3</td>
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<td>1.67</td>
<td>.31</td>
<td>1.38</td>
<td>43</td>
<td>.22</td>
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<tr>
<td>Sit-ups</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Trial 1-2</td>
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<td>10.11</td>
<td>3.96</td>
<td>3.64</td>
<td>43</td>
<td>1.12</td>
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<tr>
<td>Trial 1-3</td>
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<td>18.21</td>
<td>9.25</td>
<td>4.74</td>
<td>43</td>
<td>1.95</td>
</tr>
<tr>
<td>Shuttle Run (sec)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trial 1-2</td>
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<td>-.10</td>
<td>.04</td>
<td>.39</td>
<td>43</td>
<td>.10</td>
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<td>-.89</td>
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<td>43</td>
<td>.46</td>
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<td>Standing Br. Jump (in.)</td>
<td></td>
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<td>.47</td>
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<td>-.82</td>
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<td>50-Yard Dash (sec.)</td>
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<tr>
<td>Trial 1-2</td>
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<td>.47</td>
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<td>.79</td>
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<td>-1.29</td>
<td>.86</td>
<td>.32</td>
<td>43</td>
<td>2.66</td>
</tr>
<tr>
<td>600-Yard Run-Walk (sec.)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trial 1-2</td>
<td>-38.04</td>
<td>-40.64</td>
<td>2.60</td>
<td>14.69</td>
<td>43</td>
<td>.18</td>
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<tr>
<td>Trial 1-3</td>
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<td>14.73</td>
<td>43</td>
<td>.88</td>
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</table>

*_{.05}^{(43)} = 2.02,  _{.01}^{(43)} = 2.70*

Comparisons between groups in the physical fitness test items found no significant difference except for the 50-yard dash test item in which trial one to trial three resulted in a t ratio of 2.66. The difference was in favor of the flexible group.
Table VII shows the statistical comparison of mean change within the stabilized group on the physical fitness test items from trial one to trial two and from trial one to trial three.

**TABLE VII**

THE SIGNIFICANCE OF THE CHANGE IN PHYSICAL FITNESS WITHIN THE STABILIZED GROUP

<table>
<thead>
<tr>
<th>Variable</th>
<th>( M_D )</th>
<th>( SE_{MD} )</th>
<th>df</th>
<th>( t^* )</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Flexed-arm Hang (sec.)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trial 1-2</td>
<td>-.67</td>
<td>.71</td>
<td>22</td>
<td>1.41</td>
</tr>
<tr>
<td>Trial 1-3</td>
<td>1.36</td>
<td>1.17</td>
<td>22</td>
<td>1.16</td>
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<tr>
<td><strong>Sit-ups</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trial 1-2</td>
<td>6.15</td>
<td>1.92</td>
<td>19</td>
<td>3.20</td>
</tr>
<tr>
<td>Trial 1-3</td>
<td>8.96</td>
<td>2.91</td>
<td>20</td>
<td>3.07</td>
</tr>
<tr>
<td><strong>Shuttle Run (sec.)</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trial 1-2</td>
<td>-.14</td>
<td>.17</td>
<td>22</td>
<td>.82</td>
</tr>
<tr>
<td>Trial 1-3</td>
<td>-.69</td>
<td>.26</td>
<td>22</td>
<td>2.65</td>
</tr>
<tr>
<td><strong>Standing Broad Jump (in.)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trial 1-2</td>
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<td>.90</td>
<td>22</td>
<td>1.01</td>
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<tr>
<td>Trial 1-3</td>
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<td>1.35</td>
<td>22</td>
<td>1.60</td>
</tr>
<tr>
<td><strong>50-Yard Dash (sec.)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trial 1-2</td>
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<td>.38</td>
<td>22</td>
<td>1.71</td>
</tr>
<tr>
<td>Trial 1-3</td>
<td>-.43</td>
<td>.27</td>
<td>22</td>
<td>1.59</td>
</tr>
<tr>
<td><strong>600-Yard Run-Walk (sec.)</strong></td>
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<td></td>
</tr>
<tr>
<td>Trial 1-2</td>
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<td>8.31</td>
<td>22</td>
<td>4.74</td>
</tr>
<tr>
<td>Trial 1-3</td>
<td>-43.96</td>
<td>8.79</td>
<td>22</td>
<td>5.00</td>
</tr>
</tbody>
</table>

\( t_{.05}(22) = 2.07, \ t_{.01}(22) = 2.82, \ t_{.05}(20) = 2.08, \ t_{.01}(20) = 2.84, \ t_{.05}(19) = 2.09, \ t_{.01}(19) = 2.86 \)
Analyses within the stabilized group indicated five significant changes. From trial one to trial two, two of the six test items administered changed significantly. Sit-ups and the 600-yard run-walk resulted in t ratios of 3.20 and 4.74, respectively. Both the sit-ups and the 600-yard run-walk showed a significant improvement at the .01 level of confidence. The results of the physical fitness test items within the stabilized group from trial one to trial three revealed that three of the six items given changed significantly. Sit-ups, the shuttle run, and the 600-yard run-walk resulted in t ratios of 3.07, 2.65, and 5.00, respectively. The sit-ups and the 600-yard run-walk showed significant improvement at the .01 level of confidence, and the shuttle run showed a significant improvement at the .05 level of confidence.
Table VII shows the statistical comparison of mean change within the flexible group on the physical fitness test items from trial one to trial two and from trial one to trial three.

**TABLE VIII**

THE SIGNIFICANCE OF THE CHANGE IN PHYSICAL FITNESS WITHIN THE FLEXIBLE GROUP

<table>
<thead>
<tr>
<th>Variable</th>
<th>$M_D$</th>
<th>$SE_{MD}$</th>
<th>$df$</th>
<th>$t^*$</th>
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<tbody>
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<td>2.60</td>
</tr>
<tr>
<td>Sit-ups</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trial 1-2</td>
<td>10.11</td>
<td>3.01</td>
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<td>3.36</td>
</tr>
<tr>
<td>Trial 1-3</td>
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<td>3.64</td>
<td>18</td>
<td>5.00</td>
</tr>
<tr>
<td>Shuttle Run (sec.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trial 1-2</td>
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<td>.18</td>
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<td>.56</td>
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<td>Standing Broad Jump (in.)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>.03</td>
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<td>.41</td>
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<td>50-Yard Dash (sec.)</td>
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<td>4.25</td>
</tr>
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<td>8.60</td>
</tr>
<tr>
<td>600-Yard Run-Walk (sec.)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trial 1-2</td>
<td>-40.64</td>
<td>11.85</td>
<td>21</td>
<td>3.42</td>
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<tr>
<td>Trial 1-3</td>
<td>-30.95</td>
<td>11.51</td>
<td>21</td>
<td>2.68</td>
</tr>
</tbody>
</table>

$t_{.05(21)} = 2.08$, $t_{.01(21)} = 2.83$, $t_{.05(18)} = 2.10$, $t_{.01(18)} = 2.88$
The results of the physical fitness test items from trial one to trial two within the flexible group revealed that three of the six test items administered changed significantly. The sit-ups, the 50-yard dash, and the 600-yard run-walk resulted in $t$ ratios of 3.36, 4.25, and 3.42, respectively. All test item changes represented an improvement. The results of the physical fitness test items from trial one to trial three within the flexible group revealed that five of the six test items administered changed significantly. The flexed-arm hang, the sit-ups, the shuttle run, the 50-yard dash, and the 600-yard run-walk resulted in $t$ ratios of 2.60, 5.00, 2.62, 8.60, and 2.68, respectively. All test item changes represented an improvement.

Figures I through VI show a comparison of the percentile ranks of the six physical fitness test items as achieved by the Harmony Hill High School girls of Watertown to the National AAHPER Norms.

The girls from both groups scored above the fiftieth percentile on the national norms on the sit-ups and the shuttle run. The stabilized group equaled the fiftieth percentile on the standing broad jump for trial one, above the fiftieth percentile on the 50-yard dash for trial two, and the 600-yard run-walk for trials two and three. The flexible group scored above the fiftieth percentile on the sit-ups for trials two and three, the shuttle run for trial three, and the 50-yard dash for trial three. The Harmony Hill girls fell below the national average on the remaining AAHPER test items.
FLEXED-ARM HANG

<table>
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<th>Median</th>
</tr>
</thead>
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</tr>
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<td></td>
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<tr>
<td>60th</td>
<td></td>
<td></td>
</tr>
<tr>
<td>50th</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40th</td>
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</tr>
<tr>
<td>30th</td>
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<tr>
<td>20th</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10th</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Stabilized Group
- Flexible Group
- National

Figure 1. A comparison of percentile ranks of the flexed-arm hang test item as achieved by the Harmony Hill High School Girls at Watertown with the National AAHPER Norms.
SIT-UPS

Classification Index for HSG

<table>
<thead>
<tr>
<th>Percentile</th>
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<th>Trial 3</th>
<th>Median</th>
</tr>
</thead>
<tbody>
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<td>Stabilized Group</td>
<td>Flexible Group</td>
<td>National</td>
<td></td>
</tr>
<tr>
<td>90th</td>
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</table>

Figure 2. A comparison of percentile ranks of the sit-up test item as achieved by the Harmony Hill High School Girls at Watertown with the National AAHPER Norms
### Classification Index for HSG

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<th>Trial 3</th>
<th>Median</th>
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<td>10.2</td>
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<td></td>
<td></td>
<td>13.0</td>
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</table>

**Figure 3.** A comparison of percentile ranks of the shuttle run test item as achieved by the Harmony Hill High School Girls at Watertown with the National AAHPER Norms.
### Classification Index for HSG

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<th>Trial 3</th>
<th>Median</th>
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</thead>
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<td></td>
<td></td>
<td>6'4&quot;</td>
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<tr>
<td>80th</td>
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<td>6'0&quot;</td>
</tr>
<tr>
<td>70th</td>
<td></td>
<td></td>
<td></td>
<td>5'9&quot;</td>
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<td>60th</td>
<td></td>
<td></td>
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<td>5'7&quot;</td>
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<tr>
<td>50th</td>
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<td>5'4&quot;</td>
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<tr>
<td>40th</td>
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<td></td>
<td></td>
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<td>10th</td>
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<td></td>
<td></td>
<td>4'4&quot;</td>
</tr>
</tbody>
</table>

Figure 4. A comparison of percentile ranks of the standing broad jump test item as achieved by the Harmony Hill High School Girls at Watertown with the National AAHPER Norms
Figure 5. A comparison of percentile ranks of the 50-yard dash test item as achieved by the Harmony Hill High School Girls at Watertown with the National AAHPER Norms
### 600-YARD RUN-WALK

#### Classification Index for HSG

<table>
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<tr>
<th>Percentile</th>
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<th>Trial 2</th>
<th>Trial 3</th>
<th>Median</th>
</tr>
</thead>
<tbody>
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<td>Flexible Group</td>
<td>National</td>
<td></td>
</tr>
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<tr>
<td>80th</td>
<td>2'27&quot;</td>
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<tr>
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<td></td>
<td>3'15&quot;</td>
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Figure 6. A comparison of percentile ranks of the 600-yard run-walk as achieved by the Harmony Hill High School Girls at Watertown with the National AAHPER Norms.
Discussion of Results

Campbell reported that a score of ninety on the Wear Attitude Inventory indicated a favorable attitude toward physical education.\(^2\) Miller also used the same form and considered a score of ninety to indicate a favorable attitude toward physical education, and the score of 120 to indicate a most favorable attitude.\(^3\)

The results of the present study revealed that the girls at Harmony Hill High School had a favorable attitude toward physical education. The stabilized group had a group mean score of 115.82 on the pre test and a group mean score of 119.17 on the post test. The flexible group had a group mean score of 117.41 on the pre test and a group mean score of 110.27 on the post test.

This study revealed that the attitude of the stabilized group toward physical education improved from pre test to post test, whereas, the flexible group retrogressed from pre test to post test. It seemed that the stabilized group regarded physical education as important as any other class and came prepared, whereas, the flexible group did not regard physical education as important as any other class and felt little need to come prepared for the physical education class. However, the review of literature investigated revealed that the present subjects tested on attitudes toward physical education was favorable.


\(^3\)Jerry Miller, "Attitudes Toward Physical Education of Students Enrolled in the Basic Instruction Program in Physical Education at South Dakota State University, 1966), pp. 1-53.
Campbell found favorable attitudes among male college students and found his subjects to have a group mean score of 115.50. Campbell also reported that a sample of seventh grade boys had a group mean score of 115.35, eighth grade boys had a group mean score of 120.25, and ninth grade boys had a group mean score of 115.06. Miller studied the attitudes of college students toward physical education and used Wear Inventory. His study revealed a group mean score of 121.76 for the male subjects and a group mean score of 123.32 for the female subjects. Wear constructed the two inventories and administered both Form A and Form B to college freshmen. Wear found the mean score of Form A to be 114.59 and the group mean score for Form B to be 114.45. The statistical results in knowledge of field hockey, volleyball, and bowling showed a significant difference between the stabilized group and the flexible group in volleyball and bowling in favor of the stabilized group which met 5 times per week. This would seem to indicate that being in activity 5 times a week, more knowledge is gained and retained because of repetition. However, in field hockey there was no significant difference in knowledge between groups. It was the feeling of the investigator that because field hockey was a "new" sport to the girls, all

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4 Campbell, loc. cit.
6 Miller, loc. cit.
subjects were receptive and interested enough in the "newness" of the sport to investigate by reading and studying outside of class time. This would indicate that knowledge gained in a new activity does not necessarily depend upon how much time was spent in activity.

Comparing the two groups in skills, it was found in this study that the stabilized group did significantly better in the field hockey test items of dribble, dodge, circular tackle, and drive; goal shooting left and right, and in bowling skill. The flexible group did significantly better on the fielding and driving test item of field hockey and also on the wall volley in the volleyball test item. It would seem logical that the more time spent in skill activity, the more proficient one group would become. However, the results of the skills tested in this study indicated that such was not the case. The investigator cannot explain the reason why the flexible group meeting twice a week performed significantly better than the stabilized group in the skills of fielding and driving in field hockey, and the wall volley skill in volleyball.

For bowling, the groups were not divided as in field hockey and volleyball because of the schedule at the bowling alley and the wishes of the bowling alley personnel. Therefore, the stabilized group had to be scheduled for bowling as one large group as did the flexible group. The stabilized group, meeting 5 hours a week, performed significantly better on bowling skills than the flexible group, meeting two hours a week. In a skill such as bowling, it would seem to indicate that the more time spent in instruction and practice, the group meeting more times per week would show greater improvement.
Between the two groups in this study, there were no significant differences on the physical fitness test items except in the 50-yard dash from trial one to trial three. In this item, the flexible group made a significant gain over the stabilized group. The results of this study indicate that overall physical fitness improvement between the two groups was not dependent upon the number of times per week each group met for physical education. The results of this study were not in agreement with a study completed by Rothermel et al. who investigated the effects of an eight-week organized program of activity and physical fitness on boys, ages 7-13, and those not in an organized program. The authors found that the test items that measured muscular strength and endurance, power, and cardiorespiratory endurance (pull-ups, sit-ups, standing broad jump, and 600-yard run-walk) were significantly greater in the organized program. Sutcliff and Canham measured fitness by testing flexibility, strength, and endurance on one group of boys participating daily in physical education and two groups of boys participating in physical education two times a week. Those boys participating daily in physical education had a significantly higher means on the items tested than did those boys participating twice a week. The present study would agree with Sutcliff and Canham in that the stabilized group meeting daily had

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9 Ibid.

a higher mean score on the items that measured strength and endurance (the flexed-arm hang and the 600-yard run-walk) than the flexible group meeting twice a week. Keough used the Iowa Test of Motor Fitness to measure the strength and endurance, power, coordination, flexibility, endurance, and arm strength among third and fifth grade students participating in physical education daily and twice a week. Keough found significant gains in composite motor fitness of both third and fifth grade children regardless of the frequency of physical education classes. The present study would not be in agreement with Keough on the test items measuring strength and endurance between the two groups.

However, within the groups, there were significant changes. The flexible group meeting only twice a week improved significantly on the flexed-arm hang (trials 1-2), the sit-ups (trials 1-2 and 1-3), the shuttle run (trials 1-3), the 50-yard dash (trials 1-2 and 1-3), and the 600-yard run-walk (trials 1-2 and 1-3). The stabilized group meeting five times a week improved significantly on the sit-ups (trials 1-2 and 1-3), the shuttle run (trials 1-3), and the 600-yard run-walk (trials 1-2 and 1-3). Within the flexible and stabilized groups, the improvement of the physical fitness would agree with Rothermel et al. on the test items that measured strength and endurance (flexed-arm hang, sit-ups, and 600-yard run-walk). Also, with the groups, the improvement of physical

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12 Ibid.
fitness would agree with Keough on the test items that measured strength and endurance.

In comparing the physical fitness of the Harmony Hill High School girls to the National AAHPER Norms, this study showed the girls of both groups to be above the fiftieth percentile on the national norms of the final trials on the test items of sit-ups and shuttle run. The stabilized group was above the national norms in the 600-yard run-walk, and the flexible group was above the national norm on the 50-yard dash on the final trial. On the first trial of the standing broad jump test item, the stabilized group equaled the fiftieth percentile. The results of this study would agree with Lilevjen and Schlekeway on only four of the six physical fitness test items. Lilevjen and Schlekeway reported that the Watertown Junior High boys were above the fiftieth percentile on the national norms in all test items on the final testing. Howlin reported that the girls from selected elementary school in Sioux Falls fell below the national norms on the shuttle run, standing broad jump, and softball throw. The result of this study is in agreement with the standing broad jump test item as found by Howlin. Busch constructed physical fitness

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13 Clar Lilevjen and Eugene Schlekeway, "The Effects of a Physical Education Program of 150 Minutes Per Week at Watertown, South Dakota, on Physical Fitness as Compared to the National Norms Established by the AAHPER Fitness Test," (unpublished Research report, South Dakota State University, 1962), pp. 1-43.

norms for the girls in South Dakota, grades 7-10, and found that her subjects were equal to, or well above, the national AAHPER Youth Fitness Test medians on all test items. According to the South Dakota norms, the girls at Harmony Hill would be below the norms in the physical fitness test items except in the sit-ups and shuttle run.

The physical fitness of the Harmony Hill High School girls was not necessarily accredited to the physical education program since it would seem that such factors as the lack of physical education and physical fitness in previous years would indicate low fitness scores. Also, physical fitness was not a major objective of the physical education program. At the time this study was conducted, the activities offered in the physical education program were field hockey, volleyball, and bowling. Background information on the students indicated a lack of organized participation in physical activity. Also, the history of physical education at Harmony Hill indicated a lack of an organized activity programs. Thus, the investigator's major objective was to create a liking for and an appreciation of physical activity. The overall physical fitness scores indicate that such activities did not significantly increase physical fitness, whether the subjects participated in the stabilized group or in the flexible group schedule. The low physical fitness scores possibly indicate to the investigator that physical fitness activities should become one of the major goals of the physical education program.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary of the Study

The purpose of this study was to determine the difference in attitudes toward physical education, knowledge, skill, and physical fitness of those students taking physical education in the daily flexible modular schedule and of those students taking physical education in the daily stabilized partial master schedule.

The subjects were forty-five girls who were enrolled in the physical education program at Harmony Hill High School during the 1971-72 school year. The study was limited to eighteen weeks. Subjects were assigned to stabilized and flexible groups according to how they fit back-to-back with other academic class lists. The same girls remained in the stabilized and flexible groups throughout the entire study. The stabilized scheduled group met physical education classes five times a week and the flexible group met two times a week.

The following hypothesis was investigated: There will be no change in the attitudes toward physical education, knowledge, skill, and physical fitness of the students taking physical education in the two methods of scheduling.

All subjects were tested on attitudes toward physical education, knowledge, skill, and physical fitness. The subjects were pre-tested, re-tested at the end of twelve weeks, and post-tested on physical fitness. The subjects were tested on knowledge and on skills of field hockey, volleyball, and bowling at the end of each activity.
The t ratio was employed to determine the significance of the difference between the means of the stabilized group and the flexible group. The .05 level of confidence was accepted as the minimum level necessary for t ratio to be considered significant. Also, the physical fitness scores as obtained by the girls of Harmony Hill High School were compared to the norms established by the AAHPER Youth Physical Fitness Test.

The analysis of the results indicated that:

1. Both groups had a favorable attitude toward physical education as determined by accepted rating scales

2. The stabilized group did significantly better on the volleyball and bowling knowledge test than did the flexible group

3. The stabilized group performed significantly better on goal shooting to the left and right in field hockey skills

4. The flexible group performed significantly better on the fielding and driving skill in field hockey

5. The flexible group performed significantly better on the wall volley test item

6. The stabilized group performed significantly better in bowling

7. There was no significant difference between the two groups on the physical fitness test items except from trial one to trial three on the 50-yard dash

8. There was significant improvement on the sit-up test item from trial one to trial two and from trial one to trial three, and on the 600-yard run-walk test item from trial one to trial three within the
stabilized group

9. There was significant improvement on the sit-up test item from trial one to trial three, the shuttle run test item from trial one to trial three, the 50-yard dash test item from trial one to trial two and from trial one to trial three, within the flexible group.

Conclusions

Under the conditions of this present study, and within the limitations described, the following conclusions were drawn:

1. That the students taking physical education at Harmony Hill High School have a favorable attitude toward physical education

2. That the stabilized scheduling of physical education promoted more conducive attitudes toward physical education than did the flexible scheduling

3. That activities of the physical education program did not improve the overall physical fitness between the two groups

4. That, on the final testing of physical fitness, both groups were above the national norms on three of the test items and fell below the national norms on three of the test items

5. That the amount of time spent in activity does not necessarily account for more knowledge acquired about the activity.

Implications

Based upon the findings of this study, the following implications were indicated:

1. That the physical education program at Harmony Hill High School should include a physical fitness program.
2. The improvement of favorable attitudes toward physical education by the stabilized group meeting five times per week seemingly indicated that a better teacher-student relationship developed, a better learning situation was present, and more enjoyment of activity was evident.

In the investigator's subjective opinion, it appears that the five-day physical education program created more student eagerness and interest than the physical education program conducted two days a week. The students scheduled for five days a week for physical education seemed to accept physical education as a regular academic class more so than did those in the two-day per week scheduling plan.

Recommendations for Further Research

The following recommendations are made for further study:

1. That a similar study be completed comparing a physical fitness program in a stabilized schedule to the physical fitness in a flexible modular schedule

2. That a similar study be completed comparing a physical fitness program of a public school to the one at Harmony Hill High School

3. That a similar study be completed employing activities other than field hockey, volleyball, and bowling.
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BIBLIOGRAPHY

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APPENDIXES
APPENDIX A

COURSE OUTLINE FOR FIELD HOCKEY

I. Objectives
   A. To learn the skills of field hockey
   B. To have a knowledge of the game of field hockey
   C. To have social contact
   D. To become more physically fit
   E. To become more mentally alert
   F. To become more aware of moral values of right and wrong
   G. To be able to play field hockey adequately
   H. To enjoy oneself and have fun participating in field hockey
   I. To be tested over the knowledge and skills of field hockey

II. History of the game of field hockey

III. Nature of the game of field hockey

IV. Techniques and fundamentals of field hockey
   A. Holding and carrying the stick
   B. Dribble
   C. Drive
      1. Straight
      2. Left
      3. Right
   D. Push-pass
   E. Flick
   F. Jab
   G. Fielding-passing
   H. Tackle
      1. Straight
      2. Lunge
      3. Circular
   I. Dodge
      1. Right
      2. Left
   J. Scoop
   K. Triangular pass
   L. Corner
   M. Free hit
   N. Roll-in
   O. Goalkeeping

V. Playing strategy
   A. Attacking
   B. Defending

VI. Rules of field hockey

VII. Courtesies in field hockey
APPENDIX A (Continued)

COURSE OUTLINE FOR POWER VOLLEYBALL

I. Objectives
A. To learn the skills of power volleyball
B. To have a knowledge of power volleyball
C. To have social contact
D. To become more physically fit
E. To become more mentally alert
F. To become more aware of the moral values of right and wrong
G. To be able to play volleyball more competently
H. To enjoy oneself and have fun participating in volleyball
I. To be tested over the knowledge and skills of volleyball

II. History of volleyball

III. Nature of the game of volleyball

IV. Techniques and fundamentals of volleyball
A. High pass
B. Low pass
C. Overhead hit
D. Overhand serve
E. Dig pass
F. Set-up
G. Placement of serve
H. Spiking
   1. Standing
   2. Running
I. Blocking
J. Net recovery

V. Strategy
A. Offensive
D. Defensive

VI. Rules of power volleyball

VII. Courtesies of volleyball
APPENDIX A (Continued)

COURSE OUTLINE FOR BOWLING

I. Objectives
   A. To learn the skills of bowling
   B. To have a knowledge of bowling
   C. To have social contact
   D. To become more physically fit
   E. To become more mentally alert
   F. To become aware of the courtesies of bowling
   G. To become a better bowler
   H. To enjoy and have fun bowling
   I. To be tested over the knowledge and skill of bowling

II. History of bowling

III. Nature of bowling

IV. Basic skills of bowling
   A. Ball selection and grip
   B. Stance and approach
   C. The four-step approach
   D. Delivery
      1. Straight
      2. Back-up
      3. Hook
      4. Curve
   E. Aim
      1. Spot
      2. Pin
   F. Scoring

V. Strategy
   A. Getting the strike
   B. Picking up spares

VI. Courtesies in bowling

References


APPENDIX A (Continued)

COURSE OUTLINE FOR BOWLING


APPENDIX B

WEAR PHYSICAL EDUCATION ATTITUDE INVENTORY FORM A AND FORM B*

DIRECTIONS: PLEASE READ CAREFULLY. On pages one and part of two you will find 30 statements about physical education. I am interested to know how you feel about these statements. Each one of you will probably feel differently about each statement. There are no right or wrong answers. Before each statement there is a blank line for marking your reaction to the statement. (1) Read each statement carefully, and (2) select the initials "SA" (strongly agree), "A" (agree), "U" (undecided), "D" (disagree), and "SD" (strongly disagree) and mark your response on the blank line. Try to avoid marking "U" in most instances. Whenever possible, let your experience determine your answer. Do not spend too much time on any one statement. This is not a test, but a survey to determine how one feels toward physical education. In no way will your response to the 30 statements affect your physical education grade.

* Form A and Form B were sent to the investigator by Carlos Wear to be used in this study.
WEAR ATTITUDE INVENTORY FORM A

1. If for any reasons a few subjects have to be dropped from the school program, physical education should be one of the subjects dropped.

2. Physical education activities provide no opportunities for learning to control the emotions.

3. Physical education is one of the more important subjects in helping to establish and maintain desirable social standards.

4. Vigorous physical activity works off harmful emotional tensions.

5. I would take physical education only if it were required.

6. Participation in physical education makes no contribution to the development of poise.

7. Because physical skills loom large in importance in youth, it is essential that a person be helped to acquire and improve such skills.

8. Calisthenics taken regularly are good for one's general health.

9. Skill in active games or sports is not necessary for leading the fullest kind of life.

10. Physical education does more harm than it does good.

11. Associating with others in some physical education activity is fun.

12. Physical education classes provide situations for the formation of attitudes which will make one a better citizen.

13. Physical education situations are among the poorest for making friends.

14. There is not enough value coming from physical education to justify the time consumed.

15. Physical education skills make worthwhile contributions to the enrichment of living.

16. People get all the physical exercise they need in just taking care of their daily work.
APPENDIX B (Continued)

WEAR ATTITUDE INVENTORY FORM A

_17. All who are physically able will profit from an hour of physical education each day.

_18. Physical education makes a valuable contribution toward building up an adequate reserve of strength and endurance for everyday living.

_19. Physical education tears down sociability by encouraging people to attempt to surpass each other in many of the activities.

_20. Participation in physical education makes for a more wholesome outlook on life.

_21. Physical education adds nothing to the improvement of social behavior.

_22. Physical education class activities will help to relieve and relax physical tensions.

_23. Participation in physical education activities helps a person to maintain a healthful emotional life.

_24. Physical education is one of the more important subjects in the school program.

_25. There is little value in physical education as far as physical well-being is concerned.

_26. Physical education should be included in the program of every school.

_27. Skills learned in a physical education class do not benefit a person.

_28. Physical education provides situations for developing desirable character qualities.

_29. Physical education makes for more enjoyable living.

_30. Physical education has no place in modern education.
APPENDIX B (Continued)

WEAR ATTITUDE INVENTORY FORM B

1. Association in physical education activities give people a better understanding of each other.

2. Engaging in vigorous physical activity gets one interested in practicing good health habits.

3. The time spent in getting ready for and engaging in a physical education class could be more profitably spent in other ways.

4. A person's body usually has all the strength it needs without participation in physical education activities.

5. Participation in physical education activities tends to make one a more socially desirable person.

6. Physical education in schools does not receive the emphasis that it should.

7. Physical education classes are poor in opportunities for worthwhile social experiences.

8. A person would be better off emotionally if he did not participate in physical education.

9. It is possible to make physical education a valuable subject by proper selection of activities.

10. Developing a physical skill brings mental relaxation and relief.

11. Physical education classes provide nothing which will be of value.

12. There should not be over two one-hour periods per week devoted to physical education in schools.

13. Belonging to a group, for which opportunity is provided in team activities, is a desirable experience for a person.

14. Physical education is an important subject in helping a person gain and maintain all-around good health.

15. No definite beneficial results come from participation in physical education activities.
WEAR ATTITUDE INVENTORY FORM B

16. Engaging in group physical education activities is desirable for proper personality development.

17. Physical education activities tend to upset a person emotionally.

18. For its contribution to mental and emotional well-being physical education should be included in the program of every school.

19. I would advise anyone who is physically able to take physical education.

20. As far as improving physical health is concerned, a physical education is a waste of time.

21. Participation in physical education class activities tends to develop a wholesome interest in the functioning of one's body.

22. Physical education classes give a person an opportunity to have a good time.

23. The final mastering of a certain movement of skill in a physical education class brings a pleasurable feeling that one seldom experiences elsewhere.

24. Physical education contributes little toward the improvement of social behavior.

25. Physical education classes provide values which are useful in other parts of daily living.

26. By the time a person has acquired a skill he has less emotional control than before.

27. Physical education should be required of all who are physically able to participate.

28. The time devoted to physical education in schools could be more profitably used in study.

29. The skills learned in a physical education class do not add anything of value to a person's life.

30. Physical education does more harm socially than good.
APPENDIX C

FIELD HOCKEY KNOWLEDGE TEST

Field Hockey Test

NAME_______________________

DIRECTIONS: For each statement that is true place a (+) on the blank, and for each statement that is false place a (0) on the blank.

1. Field hockey is a game for women only.
2. The wing must take the corner hit.
3. The recommended size for a hockey field is 60 x 100.
4. A goal can be scored only when the ball is hit by an attacking player within the circle.
5. The center-half should mark the inners.
6. If you have been passed by an opponent or have missed a tackle, you should tackle back immediately.
7. When dribbling, the ball should be kept close to the stick.
8. A player's stick should always be kept close to the ground.
9. When driving, the hands should be close together at the top of the stick.
10. Only forwards may score goals.
11. It is easier to run fast with the ball than without it.
12. Poor judgment, poor footwork, poor ball control, and lack of consideration can make hockey a rough game.
13. Both players must have their feet still while taking a bully.
14. Two players are enough to be on the ball at one time.
15. If a player stays in line with the ball, she cannot be offside.
16. The three inside forwards do most of the shooting in a hockey game.
FIELD HOCKEY KNOWLEDGE TEST

DIRECTIONS: Match the definitions on the right side with the terms on the left side by placing the letter of the definition on the blank before the term.

__31. Bully
a. keeping watch of a specific opponent

__32. Dribble
b. breaking of the rules

__33. Marking
c. used to put the ball into play at the beginning of the game

__34. Free hit
d. Broken line the length of the field 5 yds. in from the side line

__35. Roll-in
e. series of short strokes used to move the ball downfield

__36. Striking circle
f. put the ball back into play after going out-of-bounds over the side line

__37. Foul
g. stopping the ball so it can be played immediately

__38. Alley
h. hit taken because of a foul outside the circle

__39. Fielding
i. getting in the way of a player and the ball so the player is hindered and can't play the ball

__40. Obstruction
j. area from where the ball must be hit in order to score a goal
FIELD HOCKEY KNOWLEDGE TEST

17. A tackle and a spoil are the same stroke.

18. The best defense is a good defense.

19. All players should be responsible for distributing the play.

20. In a push-pass the ball never leaves the stick.

21. If you only touch the ball when taking a free hit, you may touch it again.

22. The backswing and follow through in a drive should be quick and low.

23. The player taking a roll-in must have her feet and stick behind the line.

24. A penalty bully is awarded when the ball goes over the line off the foot of the defense.

25. Forwards should always receive the ball with their feet facing the goal they are attacking.

DIRECTIONS: Choose the correct statement and place the letter of the statement on the line.

26. In driving, it is necessary to (A) keep control of the body (B) bring hands together at the top of the stick (C) keep head steady and over the ball.

27. For a foul within the circle by the defending team, (A) a long corner is taken (B) a free fit is taken (C) a penalty corner is taken.

28. When a foul occurs outside the circle, the free hit must be (A) where the ball is (B) where the foul occurred.

29. When a free hit is taken, all players must be (A) 3 yd. away (B) 3 ft. away (C) 5 yd. away.

30. A roll-in is taken when (A) the ball is kicked over the side line (B) the ball is hit over the side line (C) a player's feet are over the side line while playing the ball within the side line.
VOLLEYBALL KNOWLEDGE TEST

Volleyball Test

NAME

DIRECTIONS: For each statement that is true place a (+) on the blank, and for each statement that is false place a (0) on the blank.

1. Even though it appears to be a clean hit, playing a ball below the waist with an open is usually considered bad form.

2. You may step on but not over the side lines while serving.

3. You may step on but not over the service line during a rally.

4. The ball is good if it lands on the back lines in a serve.

5. A point is scored if the served ball touches any part of the side line on the receivers' side.

6. If you cannot reach the ball with your hand you may field it with your foot.

7. Each team is allowed two time outs per game.

8. Simultaneous contact of the ball by two teammates constitutes two hits.

9. A server hitting the ball into the net commits a foul.

10. A team match consists of best three out of five games.

11. "Side out" and "rotate" are synonymous. They result in the same action but terms do not mean the same thing.

12. A back court player who moves to the front court to participate in a block may spike the ball if it has come over the net.

13. If a player desires to make a net recovery, he should drop down low toward the floor under the ball even though the ball is in the net.

14. A spike should be executed by driving the heel of the hand directly behind the center of mass of the ball.

15. Defensive players can relax and rest a little when the play is away from their area.
APPENDIX C (Continued)

VOLLEYBALL KNOWLEDGE TEST

16. It is rarely worthwhile to hit the ball over the net on the first or second hit.

17. A spike which hits a receiver's hands and then bounces off his chest can be set and spiked.

18. A regulation game could finish with a score of 5-3.

19. The team which loses the first game in a match is given the opening serve in the second.

20. Team rotation always takes place after the team loses its service.

21. It is legal to reach over or under the net during play.

22. A player may not play the ball twice during the time it is on his side of the net.

23. A player may not stand anywhere behind the back line and serve.

DIRECTIONS: Choose the correct statement and place the letter of the correct statement on the blank.

24. The serve is determined by: (A) toss of a coin (B) visiting team (C) referee's choice

25. A game is complete when one team scores: (A) 15 points (B) 7 points more than the opponent (C) 15 points to opponents' 13 points

26. Net height for women's play is: (A) 7 ft. (B) 7 ft. 4 in. (C) 8 ft.

27. The most difficult serve to return is a well hit: (A) overhand (B) underhand (C) roundhouse

28. The best spot to contact the ball in an overhand serve is: (A) behind and slightly below the center of mass (B) behind and directly even with the center of mass (C) slightly to the right side below the center of mass

29. Volleyball originated: (A) USA (B) Russia (C) Japan
VOLLEYBALL KNOWLEDGE TEST

DIRECTIONS: Match the definitions on the right side with the terms on the left side by placing the letter of the definition on the blank before the term.

30. DGWS
   a. rebound from arms

31. Key offensive weapon in volleyball
   b. Division of Girls and Women's Sport

32. Center front player is usually the
   c. originator of volleyball

33. Left and right front players
   d. the spike

34. Received serve should be passed to
   e. spikers

35. Regulation volleyball team
   f. setter

36. Service area
   g. hard-driven drive

37. William Morgan
   h. six players

38. Bump
   i. mishandled balls

39. Spike
   j. six feet behind the back line

40. Jungle ball
   k. the setter
APPENDIX C (Continued)

BOWLING KNOWLEDGE TEST

Bowling Test

DIRECTIONS: For each statement that is true place a (+) on the blank, and for each statement that is false place a (0) on the blank.

1. Timing is the coordination of footwork and armswing.
2. The spot bowler should look at the spot until the ball rolls past it.
3. There are thirteen strikes in a perfect game.
4. The pocket for a right-handed bowler is the 1-2.
5. The maximum weight for both a man’s and a woman’s bowling ball is 18 lb.
6. A set of pins consists of twenty-one pins.
7. Handicap is given to all bowlers regardless of their average.
8. The weight that is allowed for variation in a given set of pins is four ounces.
9. Scratch bowling is bowling with handicap.
10. Standard pins must weigh 4 lbs.
11. If a bowler fouls on his second ball, he receives a zero for the pin or pins knocked down with that ball.
12. The right-handed bowlers should have a leather brake on the right shoe sole.
13. For beginning bowlers, the curve ball is recommended over the straight ball.
14. ABC means "American Bowling Congress."
15. The slide foot should be pointed straight ahead at the target.
16. The bowling ball should be released behind the bowler’s body.
BOWLING KNOWLEDGE TEST

17. Long steps are taken with each of the steps.

18. The pins should be hit as hard as possible.

19. Kegler is a synonym for bowler.

20. A foul can be changed even though the detector light and buzzer do not go off.

DIRECTIONS: Match the definitions on the right side with the terms on the left side by placing the letter of the definition on the blank before the term.

21. Turkey
   a. A ball that settles into one of the two channels on the side of the alley.

22. Strike
   b. The area between the one and three pins and the one and two pins.

23. Frame
   c. Three consecutive strikes.

24. Foul
   d. When the first ball rolled leaves two or more pins standing.

25. Gutter ball
   e. An infraction of the rules involving any part of the foot, hand, or arm coming in contact with or crossing the foul line.

26. 300
   f. The highest score that is possible for one game.

27. Spare
   g. Knocking all the pins down with one ball.

28. Split
   h. Knocking all the pins down with two balls.

29. Set-up
   i. One-tenth of the total game involving the delivery of either one or two balls.

30. Pocket
   j. All ten pins standing on their triangular pattern.
APPENDIX C (Continued)

BOWLING KNOWLEDGE TEST

DIRECTIONS: Score the following lines of bowling. (9 pt.)

```
1 2 3 4 5 6 7 8 9 10 Total
X/ 2 6 X/ 6 3 X/ 8 / 4 / X/ -F 9 - X X X
```

DIRECTIONS: Label by number the position of the pins. (1 pt.)

```
1 2 3 4 5 6 7 8 9 10 Total
X/ 6 2 X/ 7 2 X/ 3 4 X/ 3 / X/ X/ 8 / 7 / X X X
```

This test was administered to the Schmid and French achievement
APPENDIX D

DESCRIPTION OF THE FIELD HOCKEY SKILL TEST*

Dribble, Dodge, Circular Tackle, and Drive

Equipment:
1. Hockey stick for each participant.
2. Stop watch.
3. One ball necessary; two balls convenient.
4. High jump standards.
5. Field markings (see Figure I, page 96).
   a) A line 20 feet long to be used for a starting line.
   b) A line perpendicular to the midpoint of the starting line and extending 35 feet from it. This is the foul line.
   c) A line 10 feet long, perpendicular to and being bisected by the foul line at a point 30 feet from the starting line. This is the restraining line.
   d) A line 1 foot long, perpendicular to and being bisected by the foul line at a point 35 feet from the starting line.
   e) Two lines, each 1 foot long, bisecting each other at a point which is 45 feet from the starting line and in a straight line with the foul line.
6. Position of the standards:
   a) One standard is placed so that the middle of the base of the standard is directly over the point where the foul line and the line described in 5d bisect each other.
   b) The other standard is placed in similar fashion over the point formed by the two lines described in 5c.

Test: The player being tested shall stand behind the starting line with the hockey ball placed on the starting line at any point to the left of the foul line. At the signal "Ready? Go!" the player shall dribble the ball forward to the left of and parallel to the foul line. As soon as the restraining line is reached, the ball shall be sent from the left side of the foul line to the right of the first obstacle (from the player's point of view), and the player shall run around the left side of the obstacle and recover the ball. (This is analogous to a dodge.) Next, the player shall execute a turn toward her right around the second obstacle, still keeping control of the ball. (This is analogous to a circular tackle.) As soon as possible after that, the ball shall be driven toward the starting line. If the drive is not hard enough to reach the starting line, the player may follow it up and hit the ball again. This procedure shall be repeated until the five trials have been given.

*This test was the instructor's adaptation of the Schmithals and French "Achievement Tests in Field Hockey."
DESCRIPTION OF THE FIELD HOCKEY SKILL TEST

Scoring: The score for one trial shall be the time it takes from the signal "Go" until the player's ball has again crossed the starting line. The score for the entire test is the best time of the five trials. It is considered a foul and the trial does not count if:
1) the ball or player crosses the foul line before reaching the restraining line,
2) in executing the dodge, the ball is not sent from the left side of the foul line, and
3) the player makes "sticks."

Goal Shooting--Straight, Right, Left

Equipment:
1. Target, 9 inches wide, 12 feet long, and at least ½ inch thick, made of hard wood. A base made of board at least 3 inches wide, exactly 12 feet long, and at least ½ inch thick, is nailed on the bottom of the target so that two and one-half inches extend beyond the back of the target. The board, in order to stand upright securely, may be anchored with an ice pick or other similar device.
2. Same as 1 and 2 in test one.
3. At least four balls necessary; ten balls convenient.
4. Field markings (see Figure II, page 97). a) A line 6 feet long to be used for a starting line.
b) A rectangle 11 feet long and 6 feet 6 inches wide, 15 feet from the starting line. Point A is the midpoint of the side opposite the starting line.
c) A line 12 feet long, called the center target line, parallel to and 60 feet from the starting line.
d) A line line 12 feet long, called the right inner target line.
e) A line 12 feet long, called the left inner target line.
5. Position of target: The target is placed directly on the specified line with the board facing the starting line. For the straight drive, it is placed on the center target line, for the drive from right and left inners' positions, the right and left inners' target lines, respectively.

Test:
1. Drive from the Center's Position. The player being tested shall stand behind the starting line with the hockey ball placed directly on the starting line. At the signal "Ready? Go!" the ball shall be dribbled to the rectangle, from within which area it must be driven toward the board (placed on the center target line).
APPENDIX D (Continued)

DESCRIPTION OF THE FIELD HOCKEY SKILL TEST

This procedure shall be repeated until five trials have been given.

2. Drive from Right Inner's Position. The same procedure shall be repeated, the only difference being the position of the board, which is placed on the right inner target line.

3. Drive from Left's Inner Position. The same procedure shall be repeated, the only difference being the change in position of the target to the left inner target line.

Scoring: The score for one trial shall constitute the time elapsing from the timer's signal "Go!" until the ball strikes the board. The score for the entire test is the best time out of the five trials. Players will receive no score if:

1) the ball is not driven from within the rectangle,
2) the driven ball fails to reach the board or misses it at either end.

The attempt is not counted as a trial if:

1) "sticks" are made,
2) player raises the ball so that it doesn't touch the ground before it passes over the target.

Fielding and Driving

Equipment:

1. Same as for 1 and 2 in test one.
2. At least three balls necessary; seven or eight balls convenient.
3. Two ice picks with brightly colored tops.
4. Regulation hockey goal, including goal line and striking circle.
5. Special field markings (see Figure III, page 98).
   a) "Goal line" that is referred to is the line between the two goal posts. Midpoint of the goal line is referred to as point B.
   b) Foul line, 12 feet long, parallel to and 10 feet from the goal line.
   c) Restraining line, 30 feet long, parallel to and 10 feet from the foul line.
6. An ice pick is placed on the foul line at a point directly opposite each goal post.

Test: The player being tested shall stand behind the goal line. The examiner shall stand at the edge of the striking circle directly in front of the goal with a hockey ball in one hand and a stop watch in the other. At the examiner's signal "Ready? Go!" the hockey ball is rolled toward the goal. Simultaneously, the player
APPENDIX D (Continued)

DESCRIPTION OF THE FIELD HOCKEY SKILL TEST

shall run forward and attempt to field the ball before it reaches the foul line, tap it once, and drive it out of the striking circle from within the area between the restraining line and the foul line. This procedure shall be repeated until five trials have been given.

Scoring: The score for one trial is the time from the moment the player first touches the hockey ball to the moment the ball reaches the striking circle. The score on the entire test is the best trial of the five.

The attempt does not count as a trial if:

1) the rolled ball does not pass between the two ice picks,
3) the player makes "sticks."

The player receives no score on a particular trial if the ball is advanced illegally.
APPENDIX D (Continued)

DESCRIPTION OF THE VOLLEYBALL SKILL TEST

Overhand Service at 30 feet and 25 feet

Purpose: To measure the ability to serve the volleyball over the net within the boundaries of a regulation volleyball court.

Equipment: The net set up according to volleyball regulations and properly inflated volleyballs.

Directions: Upon the signal "start" the student will serve five volleyballs overhand across the net from behind the 25 foot line or 30 foot line so the ball crosses the net without touching and lands within the boundaries of the court.

Scoring: The number of volleyballs served out of five trials that are served successfully across the net are recorded as the score.

Wall Volley

Purpose: To measure volleyball playing ability of the physical education girls at Harmony Hill for the purposes of classification, measurement of improvement of skill, improvement of teaching, and for evaluation.

Equipment: The equipment needed includes a stop watch, a volleyball, and a smooth wall with the following marking: a horizontal tape line ten feet long and ten feet high.

Directions: The student stands with the ball near the wall, and on the signal "start," the student throws the ball underhanded against the wall. She plays the rebound with a legal volleyball hit and attempts to volley it against the wall above the tape line as many times as possible. Only legal volleys count. If she loses control of the ball or catches it, she starts it again with a throw as at the beginning of the test. A rest period of one minute is given between the two trials.

Scoring: The number of successful consecutive legal volleys that hit the wall above the ten-foot marker in thirty seconds. Two trials are given and the higher number of the two trials is recorded as the score.
DESCRIPTION OF THE VOLLEYBALL SKILL TEST

Two-handed Dig

Purpose: To measure the student's ability to return low hit balls.

Equipment: A net set up to regulation size and a properly inflated ball.

Directions: The student shall stand behind a marked line fifteen feet from the net. The instructor will bounce the ball to the student who attempts to dig the ball over the net within the boundaries of the court. Five trials are allowed.

Scoring: The number of successful digs of the five trials are recorded.

The Spike

Purpose: To measure the student's ability to spike the ball over the net within bounds.

Equipment: A net set up according to regulation size and a properly inflated volleyball.

Directions: The student will stand six to eight inches away from and sideways to the net, facing the instructor. The instructor will toss the ball above the net within the reach of the student. The student will attempt to spike the ball within the boundaries of the court. Only legal spikes count. Five trials are allowed.

Scoring: The number of successful spikes of the five trials are recorded as the score.
APPENDIX D (Continued)

DESCRIPTION OF THE BOWLING SKILL TEST

Since bowling is a skill in itself, the scores of every game were recorded. To find out whether any improvement was made, the average of the scores of the second week were compared with the average of the scores of the last (sixth) week.
FIELD MARKINGS FOR THE FIELD HOCKEY SKILL TEST

Key: A, B, Jumping standards

- Dribble
- Drive

++++ Course of player (in dodge)

.... Course of ball (in dodge)

Fig. I. Field Marking for Test One.
APPENDIX D (Continued)

FIELD MARKINGS FOR THE FIELD HOCKEY SKILL TEST

Fig. II. Field Markings for Test Two.
APPENDIX D (Continued)

FIELD MARKINGS FOR THE FIELD HOCKEY SKILL TEST

End line

Goal posts

x Player

Key:

- Rolled ball
- Stop
- Tap
- Drive

Fig. III. Field Markings for Test Three.
### APPENDIX E

#### TABLE I

RAW SCORES FOR THE SKILLS IN FIELD HOCKEY FOR THE STABILIZED GROUP.

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Dribble, Dodge, Circular Tackle, and Drive</th>
<th>Goal Shooting S</th>
<th>L</th>
<th>R</th>
<th>Fielding and Driving</th>
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**Mean**

17.25  5.17  5.10  5.14  5.98
## APPENDIX E (Continued)

### TABLE II

**RAW SCORES FOR THE SKILLS IN FIELD HOCKEY FOR THE FLEXIBLE GROUP**

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Dribble, Dodge, Circular Tackle, and Drive</th>
<th>Goal Shooting</th>
<th>Fielding and Driving</th>
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| Mean     | 15.76                                     | 5.19 | 6.45 | 6.05 | 4.84         |


### APPENDIX E (Continued)

**TABLE III**

**RAW SCORES FOR THE SKILLS IN VOLLEYBALL FOR THE STABILIZED GROUP**

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| Mean     | 1.43           | 2.17           | 2.74             | 2.74        | 3.26       |
# APPENDIX E (Continued)

## TABLE IV

**RAW SCORES FOR THE SKILLS IN VOLLEYBALL FOR THE FLEXIBLE GROUP**

<table>
<thead>
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### APPENDIX E (Continued)

#### TABLE V

**BOWLING AVERAGES FOR THE STABILIZED GROUP**

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**Bowling Averages for the Flexible Group**

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**Mean**

85

92
DIRECTIONS FOR ADMINISTERING THE AAHPER YOUTH FITNESS TEST

The following is a description of each of the seven test items with a description of the necessary equipment needed for the test, the rules for the test item, and the method of scoring the test item:

I. FLEXED-ARM HANG (all girls except college girls)

Equipment: A horizontal bar approximately 1½ inches in diameter is preferred. A doorway gym bar is good to use; if no regular equipment is available, a piece of pipe can serve the purpose. A stop watch is needed.

Description: The height of the bar should be adjusted so it is approximately equal to the pupil's standing height. The pupil should use the overhand grasp. With the assistance of two spotters, one in front and one in back of the pupil, the pupil raises her body off the floor to a position where the chin is above the bar, the elbows are flexed, and the chest is close to the bar. The pupil holds this position as long as possible.

Rules: 1. The stop watch is started as soon as the subject takes the hanging position.
   2. The watch is stopped when a) pupil's chin touches the bar, b) pupil's head tilts backward to keep chin above the bar, c) pupil's chin falls below the level of the bar.

Scoring: Record in seconds to the nearest second the length of time the subject holds the hanging position.

II. SIT-UP

Equipment: Mat or floor.

Description: The pupil lies on his back, either on the floor or on a mat, with legs extended and feet about two feet apart. His hands are placed on the back of the neck with the fingers interlaced. Elbows are held out. A partner holds the ankles.

*The directions for the AAHPER Fitness Test are taken from the American Association for Health, Physical Education and Recreation Youth Fitness Test Manual, revised edition, 1965.
DIRECTIONS FOR ADMINISTERING THE AAHPER YOUTH FITNESS TEST

down, the heels being in contact with the mat or floor at all times. The pupil sits up, turning the trunk to the left and touching the right elbow to the left knee, returns to starting position, then sits up, turning the trunk to the right and touching the left elbow to the right knee. The exercise is repeated, alternating sides.

Rules: 1. The fingers must remain in contact behind the neck throughout the exercise.
2. The knees must be on the floor during the sit-up but may be bent slightly when touching elbow to knee.
3. The back should be rounded and the head and elbows brought forward when sitting up as a "curl" up.
4. When returning to starting position, elbows must be flat on the mat before sitting up again.

Scoring: One point is given for each complete movement of touching elbow to knee. No score should be counted if the fingers do not maintain contact behind the head, if knees are bent when the pupil lies on his back or when he begins to sit up, or if the pupil pushes up off the floor from an elbow. The maximum number of sit-ups is 50 for girls and 100 for boys.

III. SHUTTLE RUN

Equipment: Two blocks of wood, 2"x2"x4", and stop watch. Pupils should wear sneakers or run barefooted.

Description: Two parallel lines are marked on the floor thirty feet apart. The width of a regulation volleyball court serves as a suitable area. Place the blocks of wood behind one of the lines as indicated in the manual. The pupil starts behind the other line. On the signal "Ready? Go!" the pupil runs to the blocks, picks one up, runs back to the starting line, and places the block behind the line; he then runs back and picks up the second block, which he carries across the starting line. If the scorer has two stop watches or one with a split-second timer, it is preferable to have two pupils running at the same time. To eliminate the necessity of returning the blocks after each race, start the races alternately, first from behind one line and then from behind the other.
APPENDIX F (Continued)

DIRECTIONS FOR ADMINISTERING THE AAHPER YOUTH FITNESS TEST

Rules: Allow two trials with some rest between.

Scoring: Record the time of the better of the two trials to the nearest tenth of a second.

IV. STANDING BROAD JUMP

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

Description: Pupil stands as instructed with the feet several inches apart and the toes just behind the take-off line. Preparatory to jumping, the pupil swings with the arm backward and bends the knees. The jump is accomplished by simultaneously extending the knees and swinging forward the arms.

Rules: 1. Allow three trials.
       2. Measure from the take-off line to the heel or other part of the body that touches the floor nearest the take-off line.
       3. When the test is given indoors, it is convenient to tape the tape measure to the floor and have the pupils jump along the tape. The scorer stands to the side and observes the mark to the nearest inch.

Scoring: Record the best of the three trials in feet and inches to the nearest inch.

V. 50-YARD DASH

Equipment: Two stop watches or one with a split-second timer.

Description: It is preferable to administer this test to two pupils at a time. Have both take positions behind the starting line. The starter will use the commands "Are you ready?" and "Go!" The latter will be accompanied by a downward sweep of the starter's arm to give a visual signal to the timer, who stands at the finish line.

Rules: The score is the amount of time between the starter's signal and the instant the pupil crosses the finish line.

Scoring: Record in seconds to the nearest tenth of a second.
APPENDIX F (Continued)

DIRECTIONS FOR ADMINISTERING THE AAHPER YOUTH FITNESS TEST

VI. 600-YARD RUN-WALK

Equipment: Track or area marked accordingly so that 600 yards are known, and stop watch.

Description: Pupil uses a standing start. At the signal "Ready? Go!" the pupil starts running the 600-yard distance. The running may be interspersed with walking. It is possible to have a dozen pupils 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. The timer merely calls out the times as the pupils cross the finish.

Rules: Walking is permitted, but the object is to cover the distance in the shortest time.

Scoring: Record in minutes and seconds.
APPENDIX G

RAW SCORES ON THE WEAR ATTITUDE INVENTORIES FORMS A AND B FOR THE STABILIZED GROUP

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APPENDIX G (Continued)

RAW SCORES FOR THE WEAR ATTITUDE INVENTORIES
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APPENDIX G (Continued)

RAW SCORES OF KNOWLEDGE IN FIELD HOCKEY, VOLLEYBALL, and BOWLING FOR STABILIZED GROUP

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Mean: 30.39  27.61  26.60
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RAW SCORES OF KNOWLEDGE IN FIELD HOCKEY, VOLLEYBALL, AND BOWLING FOR FLEXIBLE GROUP

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APPENDIX G (Continued)

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- Trial 3: 38
APPENDIX G (Continued)

RAW SCORES FOR THE STANDING BROAD JUMP FOR THE STABILIZED GROUP

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APPENDIX G (Continued)

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Mean     | 61            | 60            | 60            |
APPENDIX G (Continued)

RAW SCORES FOR THE FLEXED-ARM HANG FOR THE STABILIZED GROUP

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RAW SCORES FOR THE 50-YARD DASH FOR THE STABILIZED GROUP

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## APPENDIX G (Continued)

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APPENDIX G (Continued)

RAW SCORES FOR THE 600-YARD RUN-WALK FOR THE FLEXIBLE GROUP

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