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Directed by: Dr. Gail Hennis.

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The purpose of this study was to determine the effect of a coeducational environment on the skill development of ninth grade girls in volleyball.

The subjects were sixty-six ninth grade girls attending Perry Tipler Junior High School, Oshkosh, Wisconsin, during the academic year 1971-1972. The subjects were enrolled in three ninth grade classes one of which was taught in a class of all girls. The other two classes were divided, at random, into four coed classes. Two of these coed classes were used in the study.

The volleyball unit lasted for three weeks. Classes met five days a week for approximately 35-minute instructional sessions.

The subjects were tested at the beginning and end of the unit to determine volleyball playing ability. The Cunningham-Garrison High Wall Volley Test was the instrument used.

The statistic used to determine if there were a difference between the groups was the Fisher's "t" for significant difference between means.

No significant difference was evidenced between the control (all girls) and the experimental (coed) groups. It was, therefore, concluded that the students did develop approximately the same skill level in either a coeducational environment or in the class of all girls.

THE EFFECTS OF A COEDUCATIONAL ENVIRONMENT  
" "  
ON THE SKILL DEVELOPMENT OF  
NINTH GRADE GIRLS

by

C. Suzanne Wasmuth  
" "

A Thesis Submitted to  
the Faculty of the Graduate School at  
The University of North Carolina at Greensboro  
in Partial Fulfillment  
of the Requirements for the Degree  
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Approved by

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## CHAPTER I

### INTRODUCTION

The increasing complexity of our society necessitates a program planned to provide physical education in it's complete sense. (16:31)

This study concerns itself with two different classroom environments and their contribution to the learning and development of motor skills. The two environments are an all girls' class and a coeducational class. The motor skills are those necessary for successful volleyball play.

The study was prompted by the following questions. Why is physical education taught in the elementary school in a coeducational environment while in the junior high school the boys and girls are separated? Why are some high schools and colleges including coeducational activities in their programs? Why not have coed activities at all grade levels?

There is presently much controversy about equal rights for all students and included is the discussion of coeducational classes in all areas. Many physical educators and women's groups argue that there is no justification for single-sex non-competitive or instructional programs.

The anti-sex discrimination in education law, known as Title IX of the Education Amendments Act of 1972, applies to virtually all the nation's public school systems and

colleges and most private colleges and universities that receive federal funds. Under this law, classes for physical education, among others, would be required, under tentative regulations, to bar sex discrimination in the nation's schools from kindergarten through college.

Does a law make coeducational classes a profitable experience for students? Will it help or hinder the students' progress? Will the skill development be any different in a coed situation than in a class of all girls? These are questions that needed to be answered.

The studies found in the literature have been primarily involved at the college level. However, as Gloss (11:31) cites "... the art of getting along with others, like any other technique, requires years of talking with others and years of cooperating and sharing experiences." He continues by saying that "it is not the academic curriculum but rather the activities known as 'extracurricular' which offer the richest opportunities for young people of opposite sexes to meet each other under favorable circumstances." "Boys and girls work together in other phases of their high school life. Shouldn't they play together for their present good and future happiness?" (16:31)

As McIntyre says "attention must be given to the social and emotional needs as well as the physical needs of our secondary school students." (16:31) Young people will meet, and if favorable conditions are not convenient, their social

contacts may be in undesirable circumstances. (11:31) Is providing favorable conditions a part of the physical educator's responsibility in educating students?

Evaul (24) cites Bookwalter who listed several objectives of coeducational physical education at the college level. These objectives were the result of a questionnaire given to both males and females, with B.A. and M.A. degrees. Sixty percent were from public schools of under 500 enrollment.

1. worthy use of leisure furthered.
2. companionship with opposite sex increased.
3. provided wholesome social recreation.
4. development of student leadership.
5. sexes mixed in recreational activities.
6. understanding opposite sex bettered.
7. poise and self-confidence improved.
8. eased adjustment in mixed groups.
9. normal desires to play together met.
10. vital part of school life provided.

Are existing segregated classes in physical education meeting these objectives?

Many pros and cons to coeducational physical education have been noted.

McIntyre (16) suggested that students are more careful of their appearance and their speech in a coed situation. They show more desire to perfect their skills and they demonstrate more self-control, appropriate manners, and good

sportsmanship. Because they have an opportunity to associate regularly in a play situation, their boy-girl relationship is healthier and this eliminates the need for objectional attention-getting behavior.

Pitchford (19) adds that each student learns much about limitations and abilities of the other and learns to respect these abilities and limitations. Real learning in the classroom is also increased, for students feel more comfortable in each other's presence and enter into discussions and learn through good group dynamics and committee work. (16:31)

There have been suggestions that in a coed situation the type of activities should be limited. It is noted, however, that games such as volleyball, tennis or badminton provide an excellent opportunity to teach socially desirable attitudes between sexes. (18)

On the other hand, other writers have expressed opposing ideas in the area of coeducational physical education.

Kretchmar (12) and Lawnick (25) both used a questionnaire or opinionnaire to find that there is a limitation of physical education facilities to accommodate the coeducational classes. In addition, they found that the tradition of separating boys and girls is very strong in some areas and thus hinders the coeducational program. There are differences in athletic abilities of boys and girls and, therefore, different progressions have to be set for the female students.



Pitchford (19) stated that boys are hard to control in classes where there are girls.

Another problem is the indifference of the physical educator himself/herself. Either a male or female instructor may handle a coeducational class, providing he/she is professionally qualified, socially well adjusted, and in sympathy with this type of program. (12)

Sleight (21:208) has written on coeducational Physical Education in the Junior High School. In support of such a program, he states that "it (coeducation) has improved the morale of students and teachers; it has given the men and women an opportunity to work together for common good of the children, and it has developed a cooperative spirit in the physical education staff."

Only a few studies have been done concerning the skill differences between those taught in a coed class and those taught in a single-sex class. Those studies that have been done were conducted on the college level. They have also been stated generally regarding the classes as a whole. The concern of this study is the junior high school level. How does a coed situation affect a student with a low level of skill? a high skill level? Do coed classes improve the skill development of all junior high school students? If so, why not include them in the curriculum? This study resolved to determine if one environment facilitated physical skill learning better than the other.

## CHAPTER II

### STATEMENT OF PROBLEM

The primary purpose of this study was to determine the effect of a coeducational environment on the skill development of ninth grade girls in volleyball. The hypothesis tested was that there is no difference between the skill development of students taught in a coeducational environment and those taught in a segregated environment. Of additional concern were the following hypotheses:

1. There is no difference in the skill development of low skilled students in the coeducational group and the segregated group.

2. There is no difference in the skill development of the more highly skilled students in the coed group and those in the all girls' group.

The skill achieved by the girls in the coed group was compared to the skill achieved by those in the all girl group. Each group was given an initial test and a final test to assess their skill level. The Cunningham-Garrison High Wall Volley Test was the instrument used.

### DEFINITIONS

For the purpose of this study, the following definitions were accepted:

1. coeducational environment - two girls' classes and two boys' classes, randomly divided and combined into four coed classes of approximately thirty-five students each. The two classes used as the experimental groups for this study were taught by the investigator. The other two classes, not involved in the study, were taught by a male colleague.

2. experimental group - coeducational classes.

3. control group - all girls' class.

4. skill development - an improvement in skill as measured by differences between pretest and posttest scores on the Cunningham-Garrison High Wall Volley Test.

5. low skilled - a bottom percentage of the class as determined by the scores on the pretest ( $1\sigma$  below  $\bar{X}$ ).

6. high skilled - a top percentage of the class as determined by the scores on the pretest ( $1\sigma$  above  $\bar{X}$ ).

#### LIMITATIONS

The sample was limited to the female students enrolled in three classes -- one girl's class and two coeducational classes at Perry Tipler Junior High School, Oshkosh, Wisconsin. It was not administratively feasible for the investigator to teach a class of all boys. Therefore, the study was limited to the skill development of girls. The instructional unit was limited to three weeks but because of an unforeseen snow day, the classes met fourteen times instead of fifteen as originally planned.



### ASSUMPTIONS

It was assumed that the instructor was equally proficient in teaching all three classes. The instructor had had experience teaching volleyball on many occasions and also had experience in teaching girls' and coeducational physical education classes. Therefore, it is believed that this assumption was met.

It was further assumed that the coeducational environment of the experimental group was not experienced by the control group.

## CHAPTER III

### REVIEW OF LITERATURE

The literature reviewed for this study consisted of two major categories. In the first section the research is concerned with coeducational teaching. Few studies have been done on this subject. Therefore, material is limited. The second section is concerned with volleyball skill tests.

#### LITERATURE RELATED TO COEDUCATIONAL TEACHING

The studies found in the literature have been primarily involved with students at the college level.

Evaul (24) studied college students in a badminton unit. Students elected and were selected to take part in four experimental classes. There was one class of all men, one of all women and two coeducational classes. None had had previous formal instruction and little or no experience in badminton.

The unit consisted of sixteen lessons of fifty minutes each. Eight lessons were devoted to actual skill instruction. All students were given an initial test for badminton skill and after the unit were given a final test. No significant difference was found in mean achievement of badminton skills of men taught with women and men taught

alone. Likewise, there was no significant difference of women taught with men and women taught alone.

Brightwell (5) did a similar study with sixty-two college students in a beginning tennis unit. None had had any previous tennis experience. These sixty-two students were divided into four groups: two coeducational, one men and one women. They were given an initial wall board test to determine their skill in tennis. The wall board test had previously been proven reliable and valid. They then met for fourteen weeks of instruction, two periods per week. The class time was spent on skills and the same teaching methods, facilities, and equipment were used in all classes. The students were instructed not to practice outside of class. The coed classes were organized to assure maximum coed relationships. At the end of the fourteen weeks, the classes were given a final test to determine their tennis skill.

Brightwell found no significant difference in the skill development of women who were taught with men or alone. Also, the men's skill was not significantly different whether taught with the women or alone. There was no significant difference in the initial and final mean score in the men's group and none in the women's group. The initial and final mean scores of either the coed women or coed men groups did not show a significant difference.

## LITERATURE RELATED TO VOLLEYBALL SKILL TESTS

In 1937, French and Cooper (10) constructed tests in the following skills: Repeated Volleys, Serve, Set Up and Pass, and Recovery from the Net. They used 227 ninth to twelfth grade girls in their study. The girls were divided into two groups. Group A was smaller and consisted of girls who had had considerable volleyball experience. Group B was larger and the girls had had very little previous volleyball experience.

Judges ratings were used as the criterion for test validation and the girls were rated on playing ability in an actual game situation. The reliability of the ratings was computed by correlating the sum of the ratings of two judges against the sum of the ratings of the other two for each subject. Based on the data from Group A, the correlation coefficient was  $r=.8814$  which was raised to  $r=.9375$  when corrected by the Spearman-Brown prophecy formula. Data from Group B subjects yielded a correlation coefficient of  $r=.9141$  and the corrected reliability was  $r=.9552$ . The investigators concluded that the reliabilities were sufficiently high to warrant a feeling of confidence in the validity of the ratings.

When validity coefficients were computed, the best test for Group A was the Repeated Volleys Test while the Serve test ranked second. The best combination of tests for classification was the repeated Volleys and the Serve test which yielded a validity coefficient equal to  $R=.8111$ .

The most valid single test for Group B was the Serve Test while Recovery from the Net was second. The best combination was the Serve and Recovery from the Net which yielded an  $R = .6064$ .

French and Cooper concluded that the best combination of measures for practical purposes appeared to be the Serve Test with Repeated Volleys Test. This combination gave a higher degree of correlation with the criterion than did either item alone. They decided to eliminate the Set Up and Pass and the Recovery from the Net. These two items lacked objectivity, since they involved a player other than the one tested. They also had lower reliability coefficients and added little to the validity of the battery. (10)

Three years later, Russell and Lange (20) used French and Cooper's Serve Test and Repeated Volleys Test and determined the reliability of each test using the test-retest method. However, since the number of class periods which could be devoted to testing was limited, it was impossible to use the same group of girls for both the Repeated Volleys Test and the Serve Test. Consequently, data were not obtained for the reliability of the battery.

The validity study divided itself into three parts:  
a) subjective rating of players by seven judges; b) rank order rating of players by best qualified judges; and c) multiple correlation coefficients between criteria and the test battery and multiple regression equations.



The results of the tests indicated that the best possible estimate of a player's ability in volleyball (as she would be judged by the judges in this study) would be obtained by simply adding her best score in the Repeated Volleys to her best score in the Serve Test.

Crogen (7) devised a wall volley test that had a restraining line six feet from the wall and a line twelve feet long at net height and parallel to the floor. After the ball was thrown to the wall the first time, the player could move anywhere during the volleying process. The validity of the test was based upon the ability to play volleyball in competition and not on judges ratings. The 129 ninth to twelfth grade girls were classified into five groups according to skill test scores. These teams played a round robin of sixty games. The data showed that when the groupings were made pure or analogous, the significant difference between the percentages of games won became progressively greater. The test was given four times to four classes. Two of the tests were given the same day. It was found that the test is a reliable and valid measure of volleyball playing ability.

Brady (4) attempted to measure the volleyball playing ability of men in college physical education classes. Subjective ratings of players in actual game situations by four experienced teachers of volleyball were given. In addition, a volley test was administered to each student. A horizontal

line five feet long and eleven feet six inches from the floor with vertical lines extending upward toward the ceiling at each end of the horizontal line was put on the wall. The restraining line was eliminated so the player stood where he wished, threw the ball against the wall and then volleyed thereafter. Only legal volleys counted. If the ball was caught or went out of control, it was started as at the beginning of the test. The player was timed for one minute and the number of successful legal volleys that hit above the wall line were recorded.

The validity of the test was determined by correlating the combined subjective judgment of four judges with scores made on the test. Validity was found to be  $r = .86$ . The reliability was determined by the method of test-retest. The data yielded an  $r = .925$ .

Mohr and Haverstick (19) used the Russell and Lange repeated volleys test. They, however, used a restraining line at three feet, one at five feet and one at seven feet. The subjects took the volley test and then were rated subjectively in a game situation by three experienced judges. Each of the judges' scores were correlated with each of the others. Correlations were sufficiently high so the total of the judges scores were used for validity computations.

Reliability of the repeated volleys test was almost the same using three trials at each the three foot, five foot and seven foot restraining lines. The predicted

reliabilities for three trials were  $r = .93$  or  $r = .94$ . Both the obtained validity for one trial and the estimated validity for three trials at the seven foot line were significantly greater than those at the three foot line, respectively. The estimated validity for three trials at the seven foot line was also significantly greater than the validity for the sum of the scores for one trial at each the three foot, five foot and seven foot lines. On the basis of these findings, the authors recommended including three trials from the seven foot line.

Liba and Stauff (13) devised a skill test to measure the ability to perform the volleyball chest pass. It was their idea that a pass should be high and in a forward direction to allow the receiver enough time to get under the ball in order to handle it easily. In order to determine whether or not this purpose was achieved, the concept of logical or face validity was applied as a criterion.

A similar test was given to both college women and to junior high school girls. Good reliability estimates were obtained for both age levels when ten trials were recorded on each of two days.

One hundred and eleven freshmen and sophomore university women were given the Liba and Stauff volleyball passing test and a test developed by Cunningham and Garrison (7). The women involved in the study ranged in skill from extremely low to very high. Cunningham and Garrison developed a test



that would minimize, but not eliminate the height factor. It eliminated the restraining line, which usually is not a very important factor in the game. It required the player to use footwork and judgment in playing a ball coming toward her and required accurate placement of the volley. It also required the player to use a high volley. A target ten feet high and three feet wide was put on the wall. There was no floor restraining line. The player had two 30-second trials in which to hit as many legal volleys as possible. The best of the three scores was used in the study. The reliability of the test was found to be  $r = .87$  and valid when the better of two 30-second trials was used. The validity of the high wall volley test as a measure of volleyball playing ability with these subjects was significantly greater than that for the Liba and Stauff passing test.

In order to study the validity of the tests, the same students were rated by three experienced judges. The high wall volley test, using the better of trials one and two showed a higher correlation ( $r = .72$ ) with the judges ratings than the Liba and Stauff passing test ( $r = .60$ ).

### Summary

Most of the volleyball skill tests are concerned with testing a single skill instead of the overall volleyball playing ability. Also, the majority of the skill tests were constructed prior to the change in the volleyball rules that no longer permits the set-up to the player herself before passing. The Liba and Stauff test and the Cunningham and Garrison are the two most recent tests and the Cunningham and Garrison test shows a higher degree of correlation for volleyball playing ability than the Liba and Stauff test.

## CHAPTER IV

## PROCEDURES

The purpose of this study was to determine the effects of a coeducational environment on the skill development of ninth grade girls. Two groups of subjects were used: an experimental group which received volleyball instruction in a coeducational environment, and a control group which received instruction in a class in which only girls were enrolled.

## SELECTION OF TEST

After a review of skill tests measuring volleyball playing ability, the selected criterion measure of total volleyball playing ability for this study was the Cunningham-Garrison High Wall Volley Test.

The reliability of this test at the college level, computed by the Pearson-product moment method, correlating trial 1 with trial 2 for 111 cases, was  $r = .87$ . In a follow-up study with forty-seven cases, the coefficient was  $r = .85$ . (8)

Judges ratings were used as the criterion for objectivity and validity. Objectivity was obtained by computing correlation coefficients between the scores of pairs of judges. The results are as follows: judge 1 with judge 2,

$r = .89$ ; judge 1 with judge 3,  $r = .83$ ; judge 2 with judge 3,  $r = .87$ .

The totals of the judges' scores were used for obtaining the validity of the test. The better of trials 1 and 2 of the high wall volley test yielded the highest correlation with the criterion. The obtained validity coefficient was  $r = .72$  for the high wall volley test. (8)

On the basis of the high reliability, objectivity, and validity, the writer chose to utilize the Cunningham-Garrison High Wall Volley Test to ascertain initial and final playing ability of ninth grade girls in volleyball.

The test consists of two 30-second trials. A target, marked on the wall with masking tape, was formed by three lines, a horizontal line three feet long and ten feet from the floor with vertical lines three feet long (at each end of the horizontal line) extending upward at right angles to the horizontal line.

There was no floor restraining line. Therefore, subjects stood anywhere in front of the target. On the signal "ready, go" the subject used any type of toss or hit to send the ball initially into the target prior to continuous volleying. Each time the ball landed in the target, on a line or on an extension of the vertical lines from a legal volley, a point was scored. If the student lost control of the ball, she recovered it and started again. Scoring continued with the next legal hit.

The detailed test description and directions for administering the test are included in Appendix (A).

### PILOT STUDY

Since the Cunningham-Garrison test was constructed for college women, it was deemed desirable to check the test's reliability at the junior high school (ninth grade) level.

On October 22, 1971, the writer administered the Cunningham-Garrison High Wall Volley Test to 120 ninth grade girls in her regular physical education classes and on October 26, 1971, the test was readministered. On the basis of these data, the obtained coefficient of correlation of  $r = .83$  indicated that this test was also reliable for ninth grade girls and was, therefore, deemed suitable for use in this study.

### THE STUDY

#### Selection of Subjects

The subjects used in this study were ninth grade girls enrolled in physical education classes at Perry Tipler Junior High School, Oshkosh, Wisconsin. The sample consisted of sixty-six girls, thirty-four of whom were in the control group and thirty-two in the experimental group.

The control group consisted of all girls enrolled in a physical education class which met during the fifth hour

each day. The experimental group was made up of fifteen girls from the sixth hour class and seventeen girls from the seventh hour class. The girls for the experimental group were selected at random from all the girls enrolled at a given hour. The boys in the coeducational classes were also selected at random from the sixth and seventh hour classes. There were eighteen boys in the sixth hour and nineteen boys in the seventh hour groups. Data from these two newly formulated classes were combined and treated as one experimental group.

The sixth and seventh hour classes were used to formulate the experimental group because those classes were taught by the same male teacher who was willing to cooperate in the study.

Only ninth grade classes which met in the afternoon were used for this study in order to try to eliminate differences which might occur due to the time span variable.

#### Administration of Test

The Cunningham-Garrison Wall Volley Test was administered during the first and last class sessions to students in both the experimental and control groups. The investigator gave all instructions and served as the official timer. Student assistants served as scorers. Each class was randomly divided into four groups each of which was assigned to a testing station. In the experimental classes the groups



consisted of an equal number of boys and girls. There were seven to nine students in each group.

Instructions were given to the total class. At each station there was a student assistant who had had previous experience in the test administration during the pilot study. He/she watched the target on the wall and counted, out loud, the number of good volleys made in the thirty seconds allotted. As soon as a subject had completed one thirty second trial, he/she reported the score made to the student teacher who was recording results. Scores were recorded on score sheets where the name of each student in the class was listed. Beside the student's name was space for recording scores for the two trials of both the pretest and the posttest of the high wall volley test. A sample score sheet may be found in Appendix (B). Each subject in the group completed trial 1 before proceeding to trial 2. Therefore, each student had at least four minutes of rest between trials.

The initial and final testing sessions were conducted in a like manner.

#### Class Procedure

It is impossible to estimate errors that may occur as a result of conditions varying from group to group. Therefore, every effort was made to control intergroup variables. In so far as possible, the only thing that varied from group to group was the sex make-up.

Classes met for fifty minutes, less approximately fifteen minutes for uniform change and showering, daily Monday through Friday. All classes met for three weeks for a total of fourteen class sessions. The same equipment and facilities were used by all classes and the investigator instructed all groups.

In an attempt to ascertain whether lessons were identically taught to each group, the investigator taped three lessons in each class during the three week unit. The tapes were checked to determine the degree to which the lessons varied. The same lesson plans, developed by the instructor, were followed rigidly in each class. A summary of material covered in each lesson may be found in Appendix (D).

In the coeducational classes, groups were selected at random, each consisting of an equal number of girls and boys. In most situations, the boys and girls were lined up separately according to height, weight, birthdays, etc. and counted off by the number of groups needed. There was never a situation in which boys and girls were separated. The purpose of this was to provide for maximum interaction of the sexes. All activity in the control class, naturally, was with the same sex.

#### Treatment of Data

The statistical techniques used to analyze the data obtained from this experiment were the t-test for correlated



samples (pretest and posttest of the same sample) and the t-test for independent samples. These techniques tested for the significance of difference between the volleyball skill of ninth grade girls in a segregated class and those in coeducational groups.

Subgroups were formed within the experimental and control groups consisting of the high and low-skilled students to determine if there were differences in the skill development between groups of differing skill levels. The same t-test for correlated samples was used to analyze the skill development of these subgroups.

In all cases the .05 level was used to test significance.

## CHAPTER V

### ANALYSIS OF DATA

The analysis of data for this study can be divided into six categories: (1) pilot study, (2) difference between groups initially and at the end of the instructional period, (3) difference within each group from initial test to final test, (4) differences within low skilled groups from initial test to final test, (5) differences within highly skilled groups from initial test to final test, and (6) teacher observations.

#### PILOT STUDY

The Cunningham-Garrison High Wall Volley Test was constructed for use with college women. Therefore, it was deemed necessary to test the reliability of this test with ninth grade level girls.

Prior to the study, the investigator administered the Cunningham-Garrison Wall Volley Test to all of the ninth grade girls at Perry Tipler Junior High School in Oshkosh, Wisconsin. This included 120 girls who were tested on two different occasions. At each administration they were given two 30-second trials of the test and the best of the two scores was recorded as the score for that administration.

The Pearson-Product moment method was used to correlate the two administrations and to determine the reliability of the test for girls at the ninth grade level. The obtained reliability coefficient of  $r = .83$  was considered to be sufficiently high to permit use of this wall volley test to determine the volleyball playing ability of ninth grade girls.

#### THE STUDY

Initial and final volleyball playing ability was assessed by the Cunningham-Garrison High Wall Volley Test. The best of two trials in the initial and in the final tests constituted each subject's scores.

The following hypotheses were tested at the .05 level of significance:

1. There is no difference between the initial test or the final test scores of the experimental and control groups.
2. There is no difference in the skill development of the experimental and control groups.
3. There is no difference in the skill development of the low skilled students in the experimental group and those in the control group.
4. There is no difference in the skill development of the highly skilled students in the experimental and the control groups.

The mean and standard deviation of each set of scores on each test for the two groups were computed and "t" was obtained to analyze the significance of difference between the initial and final tests.

Difference between groups on pretest and posttest.

In order to compare mean scores of the two groups on the initial test and on the final test, the formula for "t" scores for uncorrelated data was applied.

Comparing the initial wall volley tests, Table I, "t" was found to be  $-.06$ . This did not exceed  $2.000$  which is needed to reject the hypothesis of no difference at the  $.05$  level of confidence. Therefore, it was considered that there was no significant difference between the two groups initially.

The final wall volley test scores were also compared for the two groups and "t" was found to be  $-.61$ . This did not exceed  $2.000$  which was needed for significance at the  $.05$  level of confidence. Therefore, like the initial test, this showed that there was no significant difference in the final test scores for the two groups.

TABLE I

TEST TO DETERMINE DIFFERENCE BETWEEN GROUPS  
ON THE PRETEST AND POSTTEST

TEST	GROUP	N	MEAN	STANDARD DEVIATION	"t"
Pretest	Experimental	32	7.75	5.04	$-.06$
	Control	34	7.67	5.52	
Posttest	Experimental	32	9.46	4.94	$-.61$
	Control	34	8.73	4.62	

In addition to determining whether or not there was a significant difference between groups before and after the unit was taught, it was also desirable to determine the degree of change from the pretest to the posttest within each. To make this determination, the "t" test for correlated data (pretest and posttest) was used. When comparing the initial test and the final test of the experimental group, "t" was found to be 2.685. This score exceeded 2.042 which was needed for significance at the .05 level of confidence. Therefore, a significant difference was found in the skill development of the experimental group, Table II.

TABLE II

TEST TO DETERMINE DIFFERENCE WITHIN GROUPS  
FROM INITIAL TEST TO FINAL TEST

GROUP	TEST	N	MEAN DIFF.	STANDARD DEVIATION	"t"
Experimental	Initial	32	1.71	3.6031	2.685*
	Final				
Control	Initial	34	1.05	4.1556	1.473
	Final				

\*Significant at .05 level of confidence.

The control group, on the other hand, did not show a significant difference when comparing the initial and final tests. The "t" ratio was found to be 1.473 which fell short of the 2.042 needed for significance.

Low skilled. The low skilled group was defined as consisting of those students whose scores fell one standard deviation

below the mean on the pretest. Therefore, in the control group, all scores of two or below constituted the low skilled group. In the experimental group, all scores of three or below made up the low skilled group. The control group involved six students while in the experimental group seven students had scores which fell one standard deviation below the mean.

The same statistical procedure that was applied to the pre- and posttest data for correlated samples was applied to the low skilled group.

The experimental group did not show a significant difference when comparing the initial and final tests, Table III. The "t" score was found to be 2.3444 which fell slightly below the 2.447 needed at the .05 level of confidence.

However, the control group showed a significant improvement. The "t" which was found to be 2.992 exceeded the 2.571 needed for a significant "t".

TABLE III

TEST TO DETERMINE DIFFERENCE WITHIN LOW SKILLED GROUP FROM PRETEST TO POSTTEST

GROUP	TEST	N	MEAN DIFF.	STANDARD DEVIATION	"t"
Experimental	Initial	7	3.7143	4.1918	2.3444
	Final				
Control	Initial	6	1.667	1.3662	2.992*
	Final				

\*Significant at .05 level of confidence.



Highly skilled. The highly skilled group was represented by scores that were one standard deviation above the mean. All students whose scores were thirteen or above on the pretest in the control group and the experimental group were considered as highly skilled. This involved six students in the control group and seven in the experimental group.

When applying the "t" test for correlated samples (pre- and posttest), the experimental group's "t" was .2078 which was far below the 2.447 needed for a significant difference, Table IV.

TABLE IV

TEST TO DETERMINE DIFFERENCE WITHIN HIGH SKILLED GROUP FROM PRETEST TO POSTTEST

GROUP	TEST	N	MEAN DIFF.	STANDARD DEVIATION	"t"
Experimental	Initial	7	.2857	3.6384	.2078
	Final				
Control	Initial	6	-3.167	3.3114	-2.344
	Final				

The control group also showed no significant difference at the .05 level of confidence. A "t" of -2.3459 was found which did not exceed the 2.571 needed.

Difference between low skilled groups on pre- and posttest.

Again the formula for "t" for uncorrelated data was applied to determine the difference between the control and experimental low skilled subgroups, Table V.

When comparing the initial wall volley tests, "t" was found to be .970. This did not exceed 2.201 needed for a significant "t" at the .05 level of confidence. Therefore, it was considered that there was no significant difference between the two groups initially.

The final wall volley tests were also compared and "t" was found to be .392. This did not exceed the 2.201 needed. Therefore, like the initial test, there was no significant difference in the final test of the two low skilled groups.

TABLE V

TEST TO DETERMINE DIFFERENCE BETWEEN LOW SKILLED GROUPS ON THE PRETEST AND POSTTEST

TEST	GROUP	N	MEAN	STANDARD DEVIATION	"t"
Pretest	Experimental	7	2.00	1.15	.9433
	Control	6	1.50	.55	
Posttest	Experimental	7	5.71	4.61	-1.2469
	Control	6	3.17	1.72	

Difference between high skilled groups on pre- and posttest.

The initial and final tests of the high skilled subgroup in the control and experimental classes were also compared.

On the initial test "t" was found to be 1.01 which did not meet the 2.201 needed for a significant difference. Therefore, the groups were not considered to be significantly different initially.



When the final tests were compared, "t" was .364 which did not indicate a significant difference at the .05 level of confidence, Table VI.

TABLE VI  
TEST TO DETERMINE DIFFERENCE BETWEEN HIGH SKILLED  
GROUPS ON PRETEST AND POSTTEST

TEST	GROUP	N	MEAN	STANDARD DEVIATION	"t"
Pretest	Experimental	7	15.0	2.45	.8806
	Control	6	17.0	4.56	
Posttest	Experimental	7	14.71	4.499	-.3361
	Control	6	13.83	4.17	

Based on the results of this analysis, it must be concluded that there was no real difference between girls taught alone and girls taught with boys as far as skill development in volleyball is concerned.

The findings in this study paralleled those of Evaul (24) and Brightwell (5). In all three studies there was no significant difference in the skill development of students taught in a coed class and those taught in a single-sex class.

## OBSERVATIONS MADE DURING EXPERIMENT

Not all the data obtained from this study can be presented statistically. The writer had had the opportunity to observe, on several occasions, the attitude, the skill and quality of play, and the interaction of both the girls and the boys in their regular physical education classes. Therefore, there are several observations that were made in both the coeducational classes and the all girls' class. It is the writer's contention that the conditions observed may have affected the outcome of this study.

This study provided a unique situation for the ninth grade student at Perry Tipler Junior High School, Oshkosh, Wisconsin. It was the first time since elementary school that the students in the experimental group had been taught physical education in a coeducational atmosphere. This environment, in itself, may have required a considerable measure of adjustment for most students.

At the outset, the skill level of the girls was superior to that of the boys in terms of control and placement. In their past volleyball experience in junior high school, the boys were allowed to lift and throw the ball and to execute low set ups. Therefore, when rules were enforced to insist on proper playing techniques, they were quite frustrated.

The girls, on the other hand, had been using the bump and set throughout junior high school. The boys' frustration

in trying to use the bump and set successfully appeared to have some influence on the girls and their playing deteriorated somewhat.

However, the boys' superior strength and ability to jump and reach proved to be an asset to their game. And as the boys' skill and confidence developed and their frustration subsided, the girls settled down and regained their skill.

There were more discipline problems with the boys, but they were more responsive to constructive criticism than the girls. This may have been due to the fact that the girls became embarrassed more easily than the boys.

This embarrassment showed up in other instances. The boys were much more aggressive than the girls. It was not uncommon to find a boy leave his position to play a ball that should have been volleyed by a girl, which may have been embarrassing and/or frustrating to her.

The girls reacted differently in this situation. Some were apathetic while others became quite angry. In each of these cases, the girl was distracted from the game tempo which often caused her to miss when she finally did play the ball. This situation led to more embarrassment.

It is difficult to make general statements when speaking about the coeducational class because of the difference in the temperament of the two sections. In coed section A both the boys and the girls were very outspoken and

argumentative whereas in coed section B students of both sexes were more considerate.

The students in all three classes were highly competitive but their actions in questionable situations, such as determining whether the ball was in or out when landing near a line, were more tempered in coed section B. In the all girls' class and in coed section A, an argument was a very typical event.

In the experimental classes there was a difference between boys' and girls' way of showing their displeasure of the skill of the opposite sex. The boys would sigh and have a disgusted expression on their face while the girls would yell at the boys. This display of disgust tended to affect the enthusiasm of all students involved.

The investigator believes that there was significant improvement in the low skilled girls in the control group because they could participate without having to be embarrassed in front of the boys.

A difference was also found within the experimental group from the pretest to the posttest. This, in the investigator's opinion, may have been due to the fact that the students in the coed classes did not want to appear to have an inferior skill level in a situation which involved boys.

It is the investigator's opinion that even though there was not a significant difference in the skill development of either group, the social interaction in the classes was beneficial.

## CHAPTER VI

## SUMMARY AND CONCLUSIONS

The purpose of this study was to determine the effects of a coeducational environment on the skill development of ninth grade girls.

The subjects were sixty-six ninth grade girls enrolled in the regular physical education classes at Perry Tipler Junior High School, Oshkosh, Wisconsin. One class was a control group and consisted of all girls. Two classes constituted the experimental group. Each class had approximately the same number of boys and girls. The students who were included in the experimental group were selected at random from all the girls enrolled in the girls' classes. The boys also were selected at random from the two boys' classes. The data from these two newly formulated classes were combined and treated as one experimental group.

Classes met each day of the week for fifty minutes (approximately thirty-five minutes of activity).

At the beginning of the unit all students were given the Cunningham-Garrison Wall Volley Test to determine volleyball skill level. All classes were taught by the investigator using the same lesson plans and same method of teaching.

After a three week, fourteen class session, unit of volleyball, the students were retested using the same wall



volley test. The data from the skill test were treated statistically using Fisher's "t" formula.

There was no significant difference evidenced between the control and experimental groups on the pre- or posttest. No significant difference was found within the control group from the pre- to posttest, within the low skilled experimental group or from either high skilled group from pre- to posttest. No significant difference was found between the low skilled groups and the high skilled groups from the pre- to the posttest. However, a significant difference was evidenced within the experimental group and within the low skilled control group from the pre- to the posttest.

Any difference observed by the investigator was thought to have social implications.

From this study it was concluded that students will develop approximately the same skill level in either a coed environment or in a class of all girls.

Recommendations for further study:

1. A study could be done with seventh grade girls who have a lower level of skill and muscle strength at the outset.
2. A study could be done with high school students who have more skill and who are more mature.
3. A study could be done to evaluate the skill development of the boys in this situation.
4. Other skills could be tested other than volleyball.
5. A study could be done with concentration on behavior and social attitudes of the students and their effect on skill development.



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**APPENDIXES**

DESCRIPTION OF CUNNINGHAM-GARRISON  
HIGH WALL VOLLEY TEST  
AND DIRECTIONS FOR  
ADMINISTERING (B)

**EQUIPMENT**

An official leather volleyball, properly inflated, and a net. Also needed was a flat, unobstructed wall space six feet wide and fifteen feet high, and a stopwatch.

**SETTING**

A target area was formed on the wall by three lines consisting of a horizontal line three feet long and two vertical lines three feet long and three feet apart from the floor with the right angle of the

**APPENDIX A**

**Description of Cunningham-Garrison  
High Wall Volley Test  
and Directions for  
Administering**

The test consists of two 15-second trials. The player stands opposite to front of the target (no restraining lines). When the signal "ready, go" she uses any type of pass or hit to send the ball into the target area or on above the top- part line and on or between the two vertical lines of the target area. When the ball returns, she volleys it repeatedly into the target area, only one contact of the ball is allowed on each volley.

If the player loses control of the ball, she returns to the start again as before. She may not use the response "pass, volley, set, pass, volley, set" but must use an attempt to perform a repeated volley. Following the first



DESCRIPTION OF CUNNINGHAM-GARRISON  
HIGH WALL VOLLEY TEST  
AND DIRECTIONS FOR  
ADMINISTERING (8)

EQUIPMENT

An official leather volleyball, properly inflated, was used. Also needed was a flat, unobstructed wall space nine feet wide and fifteen feet high, and a stopwatch.

MARKINGS

A target area was formed on the wall by three lines consisting of a horizontal line three feet long and ten feet from the floor with vertical lines three feet long (at each end of the horizontal line) extending upward at right angles to the horizontal line.

TEST & DIRECTIONS

The test consists of two 30-second trials. The player stands anywhere in front of the target (no restraining line). With the signal "ready, go" she uses any type of toss or hit to send the ball into the target area on or above the ten-foot line and on or between the two vertical lines or their extensions. When the ball returns, she volleys it repeatedly into the target area. Only one contact of the ball is allowed on each volley.

If the player loses control of the ball, she recovers it and starts again as before. She may not use the sequence "toss, volley, catch; toss, volley, catch" but must make an attempt to perform a repeated volley. Following the first

trial the player rests while the other members of her group (six to eight players) take their first trials. A second trial is given as before.

#### SCORING

One point is scored each time the ball hits in the target area or on the lines bounding it (including imaginary extensions of the vertical lines), following a legal volley of a ball rebounding from the wall. The toss or hit to start the ball does not count. If the player loses control of the ball, scoring continues with the next legal hit.



## SAMPLE SCORE SHEET

Subjects	<u>February 21, 1972</u>		<u>March 14, 1972</u>	
	First Trial	Second Trial	First Trial	Second Trial
1				
2				
3				
4				
5				
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31				
32				
33				
34				

## Raw scores

CONTINUOUS CURRICULUM HIGH WIRE TIGHT ROPE

## CONTROL GROUP

Subject	February 22, 1972		March 22, 1972	
	Pretest Total	Second Total	Pretest Total	Second Total
1				
2				
3				
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5				
6				
7				
8				
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10				
11				
12				
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## APPENDIX C

Raw Scores on  
Pretest and Posttest

RAW SCORES  
 CUNNINGHAM-GARRISON HIGH WALL VOLLEY TEST  
 CONTROL GROUP

Subject	<u>February 21, 1972</u>		<u>March 14, 1972</u>	
	First Trial	Second Trial	First Trial	Second Trial
1	2	8	8	10
2	0	4	3	10
3	10	6	12	7
4	9	16	5	10
5	10	7	9	11
6	5	6	11	11
7	1	1	2	0
8	3	2	6	7
9	5	14	10	12
10	7	11	5	3
11	4	1	2	4
12	7	4	6	5
13	5	0	4	3
14	1	3	4	9
15	4	7	9	14
16	4	8	5	7
17	14	15	11	15
18	7	7	4	10
19	1	2	3	2
20	7	8	1	1
21	1	2	2	6
22	2	3	3	7
23	6	3	12	2
24	2	4	8	16
25	1	2	4	4
26	8	3	8	7
27	0	1	0	1
28	8	4	9	3
29	8	14	9	6
30	1	0	2	3
31	10	17	16	18
32	10	6	7	11
33	10	9	9	11
34	26	15	15	19



RAW SCORES  
 CUNNINGHAM-GARRISON HIGH WALL VOLLEY TEST  
 EXPERIMENTAL GROUP

Subject	<u>February 21, 1972</u>		<u>March 14, 1972</u>	
	First Trial	Second Trial	First Trial	Second Trial
1	0	1	1	1
2	9	12	9	9
3	4	15	10	13
4	2	3	4	0
5	18	20	18	19
6	3	4	4	5
7	9	6	6	5
8	14	12	11	4
9	9	13	10	4
10	5	2	5	8
11	1	4	2	8
12	9	12	3	13
13	2	3	9	13
14	8	6	5	8
15	7	8	5	5
16	3	5	2	6
17	3	2	5	11
18	0	2	3	3
19	7	3	5	9
20	4	2	2	3
21	12	10	12	19
22	4	5	4	10
23	9	14	18	21
24	11	16	18	14
25	13	13	11	9
26	6	9	9	11
27	6	6	6	9
28	2	2	1	2
29	4	3	6	10
30	3	6	12	8
31	0	0	4	6
32	5	9	5	7

LEACH CENTER FOR VOLLEYBALL UNIT

February 21, 1972 through March 14, 1972

Miss Helen Gasser

Leach Center Junior High School, Oshkosh, Wisconsin

Monday, February 21, 1972

Introduction to Volleyball - High wall Volley Ball.

Start set-up -- in line and circle.

Tuesday, February 22, 1972

Review this class.

Continue line and circle set-up drills.

Start pass.

**APPENDIX D**

**Volleyball Unit Plan**

Wednesday, February 23, 1972

Continue pass.

Start overhead serve.

Serve and pass.

Practice rotation for 2, 3, 4, and 5 passes.

Thursday, February 24, 1972

Practice rotation with player coming in from side.

Play game. Insert rules and suggestions.

Friday, February 25, 1972

BY CLASS -- Sports Day

Saturday, February 26, 1972

Review volley

1. Set foot
2. Center line violation
3. Hand/shoulder contact
4. Change of hands during match

Play game.

## LESSON CONTENT FOR VOLLEYBALL UNIT

February 21, 1972 through March 14, 1972

Ninth Grade Classes

Perry Tipler Junior High School, Oshkosh, Wisconsin

MONDAY, February 21, 1972

Administer Cunningham-Garrison High Wall Volley Test.

Start set-up -- in line and circle.

TUESDAY, February 22, 1972

Tape this class.

Continue line and circle set-up drills.

Start bump.

WEDNESDAY, February 23, 1972

Continue bump.

Start underhand serve.

Serve and bump.

Explain rotation for 6,7,8, and 9 players.

THURSDAY, February 24, 1972

Explain rotation with player coming in from side.

Play game. Insert rules and suggestions.

FRIDAY, February 25, 1972

NO CLASS -- Sports Day

MONDAY, February 28, 1972

Explain rules:

1. Net foul
2. Center line violation
3. Simultaneous contact
4. Change of courts during match.

Play game.

TUESDAY, February 29, 1972

Explain rules:

1. Double foul
2. Play out of position
3. Rearranging serving order
4. Body foul

Play game.

WEDNESDAY, March 1, 1972

NO CLASS -- Snow Day

THURSDAY, March 2, 1972

Tape this class.

Spike and block.

Play game - try to use spike and block

FRIDAY, March 3, 1972

Introduce overhand serve.

Play game using only overhand serve.

MONDAY, March 6, 1972

Choose teams by height and count off by 4's.

Play game.

TUESDAY, March 7, 1972

Play games in same teams as day before.

Give individual help and suggestions.

WEDNESDAY, March 8, 1972

Team 1 vs Team 2

Team 3 vs Team 4

THURSDAY, March 9, 1972

Winners from day before play and losers play.

FRIDAY, March 10, 1972

NO CLASS -- In-service

MONDAY, March 13, 1972

5th Hour - Play game, choose own teams.

6th and 7th Hours - Finish playoff games.

TUESDAY, March 14, 1972

Tape this class.

Skill Test (Cunningham-Garrison High Wall Volley Test).

Written Test.

FIFTH HOUR

CONTROL CLASS

February 22, 1972

line to get control off by 3's.

It's like the man's in a grass field now. 2'0, 1'0, 2'0, 5'0,  
2'0, 1'0, and 2'0.

Walk out to your area for warm-up.

on person in each group to get a ball.

Get in a line or what you have two or three people on  
one line and the leader out in front like you did yesterday.

Leader you have it on the side of the court.

Leader by the wall.

**APPENDIX E**

**Transcribed Lessons**

Now, you people close to the tape recording please be  
available. Don't let the ball bounce into the overhead.

O.K. Let's see those set-ups, high. Now you are to  
get them high yesterday. You were forced to for the ball  
low. That ball should never go any lower than that or set-  
up. That's the very lowest it should go.

I want to see you have to get that ball. When you  
get it's gone, but you don't like the feeling just last winter  
when to you, you don't catch it and say, "here, try again,  
I don't like that one." You have to work to go get it.  
Let's give now. Make them high. Ball

Practice and individual comments.

Anything else comes to you so that it is necessary for  
you to hit underneath, please catch it and start it again.



FIFTH HOUR  
CONTROL CLASS  
February 22, 1972

Line up and count off by 8's.

I'd like the one's in a group right here. 2's, 3's, 4's, 5's,  
6's, 7's, and 8's.

Spread out in your area for warm-up.

One person in each group go get a ball.

Get in a line so that you have two or three people on one line and the leader out in front like you did yesterday. Leader over here if you are on this side of the court. Leader by the wall on the other side of the court.

Now, you people close to the tape recorder please be careful. Don't let the ball bounce into the recorder.

O.K. Let's see those set-ups, high. Now you had to get them high yesterday. You were forced to for the skill test. That ball should never go any lower than that on set-ups. That's the very lowest it should go.

I want to see you move to get that ball. When you get in a game and you don't like the set-up your team member gives to you, you don't catch it and say, "here, try again, I didn't like that one." You have to move to go get it. Let's move now. Make them high. Go!

PRACTICE and individual comments.

Anything that comes to you so that it is necessary for you to hit underhand, please catch it and start it again.

All I want to see are your overhead passes. When you contact that ball, your index finger and thumb should make a little triangular shaped window, right here. And you should hit the ball in front of your face, just above your head and slightly in front of your. You must move to get in that position. If you don't, and you hit it clear back here and then the ball goes behind you, that could be why.

Bend your knees to get the ball up there. Some of you people aren't very big and you're going to have to use everything you've got, your whole body, to get that ball up in the air. O.K. Continue.

If you hear a slap on that ball with your hands, you are hitting it with the palm of your hand. Use your fingertips. PRACTICE. Individual help.

Will you look right over here, please?

I want you to do the same thing but so many of you are slapping that ball with the palms of your hands. In the first place, it's not as easy to control, and in the second place, it's so slappy and bangy and that's not volleyball.

Use your fingertips and do this. Stand close to the person that you're working with and just volley the ball very easily back and forth, fingertips only. If you make a cup with your fingers, like this, it is impossible for you to hit the ball with the palm of your hand. That is, if you make a cup and then don't let your fingers wimp like a bunch of wet spaghetti. Hold them firm. PRACTICE and individual help.

Use two hands on a set. Don't hit it right in her face. Get it up in the air. After you've worked with one person for a while, change.

There are two groups on each side of each net, right? You'll need one ball, no, two balls. Those two groups form a circle on your side of the net. Then will you give your attention to this circle right here, please? And, Joan, come right in here and stand behind me and take the ball, please, and the rest of you fill in the circle there. Joan and I are going to be setting up the balls. I am going to be setting them in this direction and she's going to be setting them over there. You people around the circle are going to move to get the ball. For example, I'm going to set it up to Lynn, Lynn sets back to me and as soon as she does, she moves that way and Anagene moves over because that's where I'm going to set the ball next. In other words, the whole circle is going to keep moving. It'll look something like this. DEMONSTRATION.

Got the idea? Let's change it now and start with one person in the middle. Then we'll add another one, maybe. Here we go. Take the best ball you've got. PRACTICE

After you've done that put somebody new in the middle. Hey, how come everybody is on one side of the circle? Make that circle a circle. Don't hit it underhand. If it comes to you that way, catch it and start it again. Good! All right. Keep it going.

Will you stop, please? As I was standing here watching all four groups, the groups that are doing the best job and the ones that are having the least trouble having to run after the ball are the ones who are having high set-ups. The ones who just push the ball right in the face of the people who are coming up are having an awful time. They're chasing the ball all over everything. Get those balls up in the air, high. To do that you must push them up. You can't shove them forward.

All right. If you have not changed center people for a while, do so. PRACTICE. Individual help.

Get back into your lines, please, where you started for the set. And, does everybody have a ball?

It is not legal to hit the ball underhand with an open palm. If you're going to hit an underhand shot, those hands must be in a fist or they must be, well, here are the two positions. Do it with me. All right, make a fist with one hand, point that thumb right down to the floor and with the other hand, close it around the fist and point the other thumb down to the floor. If you point those thumbs down to the floor, and make them point there, then it's impossible to bend your arms. Arms are straight. And you hit the ball, contact the ball, on this part of your arm, your forearm. Another way, which some people like better, is to cock one wrist and point your fingers down to the floor and put the palm of your hand on the back of the other hand so that your

thumbs are parallel, pointing right down to the floor, and you hit the ball again right here on your forearms. All right? Now this, if you don't do it right, can make you lift because if your hands are not down this way, they're up this way, sometimes the ball hits your hands accidentally and you have trouble lifting that ball.

On the bump, I'm going to use this one because I think it's better. It's not possible to lift a ball when you use this one. When you bump the ball you don't do this. Don't bend your arms. In fact, you hardly have to lift those arms at all. Most of your bumping is done with your legs. You're down this way and you just lift your legs up. Just stand up and the ball will go up in the air. So, it will look something like this. DEMONSTRATION. All right, it's coming to you and you lift your legs up. You don't want that ball to go so high that you knock the lights out and get it caught in the rafters and so forth but you want it high enough that somebody else on your team has time to get under that ball and set it up.

All right, so here's what we'll do. Same thing we did with the set. You people stand up, please. I'm going to use this line as guinea pigs. All right, now move back.

You use a bump when the ball is coming to you low. So if I'm going to throw the ball to the first person in line, I don't stick it clear up in the air or she could use an overhead pass. When I throw a ball to be bumped, throw it low



so it makes Alice bend her knees to get under it. Right, Alice? Right! Ready? DEMONSTRATION. Good. What did Cathy do that time? Did you notice? Yes, you don't have to give it a slam with your hands. Just a little nudge is enough. Oh, nice. All right. If that ball goes behind you, which you don't want it to do, you have done one of two things. You've either bent your arms and hit the ball back behind you or you contacted it too high in the air. If I hit the ball clear up here, obviously, even if I don't bend my arms, it's going to go behind me. I must contact it down here and just lift my arms straight up. Let's see some good bumps.

PRACTICE and individual help.

Will you stop a minute, please? If that ball is low and you're going to bump it, you cannot bend over this way to hit it or it will go into or under the net. You must bend your knees and hit it up because that's the way you want it to go. Secondly, if you bump that ball with two hands and your hands are not together, if they are not like this, you've got them apart, and you accidentally hit the ball harder with one hand than you do with the other, it's going to fly off in a direction that you don't know where it's going to go. So you're better off if you keep your hands together so you don't have to worry about that. I'm seeing some good ones though. Let's continue. PRACTICE.

When you bump a ball, usually it's going to be on a serve. If you stand like this, by the time it registers in



your head that you might have to bump it, it is kind of late to get your hands and feet in the right position. If you get ready for a serve like this, so your hands are already in the right position and your legs are bent so all you have to do is get down a little farther, then you are going to be much better off. It's much easier to stand like this than it is to be already standing up and then have to think about your hands and have to bend down and everything else. Get in the position in the first place. Then if you don't need to use it you don't need to worry about it. Let's see some other good ones. PRACTICE and individual help.

Leave the balls right there and line up, please.

END OF CLASS.

SIXTH HOUR  
EXPERIMENTAL CLASS  
February 22, 1972

Line up and count off by 8's. I want the 1's right here.

2's right here, 3's, 4's down there, 5's over there, 6's here, 7's, and 8's down there. You don't need a ball right now. Spread out in your area and face this way.

I have a tape recorder going over there and I'd appreciate it if you would try not to let the balls land on it or you run into it and don't go over and yell into it.

Warm-ups.

Yesterday, if I'm not mistaken, we had a line facing the wall with one leader. Is that right? Let's do the same thing. Each group get a ball, get in your line, leader is out in front.

Yesterday for the skill test it was necessary that you got that ball as high in the air as that lowest line up there on the wall. That is the lowest that a volleyball should be set up -- ever, in any game. It should never go any lower than that. All right, let's see some set ups and on your set ups make a window, a triangle with your index fingers and your thumbs. And your fingers should be like so, in front of you and spread apart. Have them both in front of your face and push that ball right up in the air. Let's see some good sets. Get them up there.

PRACTICE and individual help.

Stop a minute, please. Some of you people, especially some of you girls, are small enough that you are going to have to put your whole self behind that ball. You can't just stand with your feet planted in the floor and expect to get that ball high enough. Bend your knees and even jump off the floor to get that ball up in the air. Now, I'm not concerned that you get it so far from you as I am the height of it. Get it up there in the air. O.K. Continue.

PRACTICE and individual help.

All right. Stop a minute, please. Don't hit the ball with the palm of your hand. Get it with your fingertips. Curve those fingertips and you keep them firm, not like a bunch of spaghetti. If you keep those fingers firm and curve them, it will be impossible for the ball to get into the palm of your hand. In a game, if you're setting up that ball or someone is setting to you, and you don't like the way it's coming to you, you don't catch the ball and give it back and say, "hey, I didn't like that one, try again." You've got to take what you get. The same thing here. Move to get that ball. Don't stand in one spot. You might have to take a couple steps in one direction or another. Don't stand there and say, "Well, I couldn't get it." Go get it!

PRACTICE and individual help.

There are two groups on each side of each net. I want you to join together and make a circle. A circle on your

side of the net. Now, take the ball in your circle that is the best one and get rid of the other one. All right, there is going to be one person in the middle and that person is going to continuously set the ball up in the same direction. Over there, will you alternate boy, girl, boy, girl and so on? We don't want the boys on one side and the girls on the other. All right, now, one person in the middle and that person is going to continually set the ball in the same direction. The people on the outside are the ones that will be moving. So I set the ball up to Nancy, she sets it back to me. As soon as Nancy has hit it, Ellen moves in and everybody around the circle moves around one. DEMONSTRATION. Got the idea? Go!

PRACTICE and individual help.

Stop a minute, please. Most of you are chasing the ball half the time and not setting it up high enough. I notice this especially with you fellows. This is not a legal set. You can't catch it on your hands and throw it up like that. That's called a catch or a throw. In a game, it's going to be called against you. So don't practice it now. That ball has to be definitely hit. It cannot be thrown at all. Get them up. PRACTICE and individual help. Keep changing people in the middle.

Stop a minute. The object of the set up is to hit the ball with your fingertips and very few of you are. Most of you are slapping it with the palm of your hand. That's not a set up. That's banging it across the net. I want you to

do this. Just make a cup of your hand and very lightly you're going to work with one person at a time. DEMONSTRATION. After you do it a few times with one person, do it with somebody else. Make them good. Use only your fingertips.

PRACTICE and individual help.

That's better. Now, get back in your circles with one person in the middle. Now, let's see you move. Use your fingertips to get that ball high. Curve your fingers forward. Overhand, stop it if you can't hit it overhand.

Let's go on to something else. Get back in your lines, please. One ball per group and have a seat. It is not legal to hit the ball underhand with an open palm. If you do this, it's lifting and you either lose the serve or the other team gets a point, one of the two. So you do what we call a bump. In a bump you make a fist with one hand, point that thumb down to the floor, wrap the other hand around it and point that thumb down to the floor. If both thumbs are pointed down to the floor, you won't bend your elbows. On a bump, usually, not usually, always, the ball is low. That's what the bump is used for. A ball comes over the net low or you're returning a spike. Get down under the ball, bend your knees and the object is to get the ball as high in the air and straight in the air or forward -- not backward. As you stand up, your arms come up. You don't do this with your arms. If you do, the ball will fly in back of you. Start down here, lift up and the ball will go up in the air. It will look



something like this. The ball is hit right here, on your forearms. Or, if you would rather do it this way, point the fingers of one hand down to the floor, palm to the back of your hand and hit the ball on your forearms. However, if you get your hands too much like this, it's real easy to lift. If you make a fist it's not possible to lift the ball. In your line you have a leader. The leader will throw the ball to the person who is going to bump. Now, obviously, a bump is a ball that comes to you low. It is not thrown up like this. If you are going to do that you might as well use an overhead set. So, the leader throws it this way so it makes it necessary for that person to bend his knees and get under the ball. Don't do this and don't contact the ball clear up here. If you do, I don't care how straight you keep your elbows, it will go in back of you. Bend your elbows and the ball will go in back of you. PRACTICE and individual help.

You don't need to kill the ball. Just give it a little nudge. It'll go.

Stop a minute, please, before we knock out the lights here. When the ball is coming to you it's probably coming at a pretty fast clip. And if you bang it as hard as you can it's going to fly up to the ceiling and once it hits the ceiling, it's not in play anymore. All you need to get that ball up in the air is a little nudge with your hands and lifting your legs. That's all it takes. You don't have to kill it. Don't knock the insides out of it. Two other things. One,



if your hands are not together and you accidently hit the ball harder with one hand than you do with the other hand, it's going to fly off to the side and you won't be able to control it. Secondly, when it comes to you and you are anticipating a bump, you know that the ball is going to be low, or you wouldn't bump it in the first place. If you stand here with your knees straight and bend over this way to bump the ball, it's either going to go into or under the net. If you're anticipating a bump, which you usually do on a serve, before that person even serves, get your hands ready, bend your knees so you're right down there ready to go. If you need to use a bump, fine, you're in position already. If you don't, it doesn't take any energy to take your hands apart and stand up.

**PRACTICE** and individual help. Change leaders so everybody gets a chance.

Stop a minute, will you please? When you are playing a game, you can only hit that ball one time. You cannot hit it twice in succession. So if I bump the ball and I do it wrong, maybe I bend my elbows, or for some reason that ball hits my arms and then comes back and hits me in the chest, or the head, or the shoulder, or wherever it is, I have contacted the ball two times and that's an illegal hit. So keep those elbows straight and come up on the ball so that it doesn't come back at you and hits you. O.K. Let's get them up.

**PRACTICE** and individual help.

**Line up and leave the balls.**

SEVENTH HOUR  
EXPERIMENTAL CLASS

February 22, 1972

Line up and count off by 8's. 1's right here. Hurry, quick. 2's right here. 3's, 4's, 5's right here, 6's, 7's, and 8's. Where are the boys who are 4's? 4's belong over by the orange doors. Spread out in your area and face this way, so you have plenty of room.

Warm-ups.

You remember yesterday, near the end of the hour we had a line of people with one person as a leader, standing out away from the rest of the group, facing them? Do the same thing right now and each group get a ball.

Please be careful of the tape recorder over here.

Alternate boys and girls. Stop, please. Yesterday the skill test forced you to get that ball up at least as high as that lowest piece of tape on the wall. That is the lowest set up you should have. Let's see some good set ups using your fingertips, making a triangle out of your index fingers and your thumbs. So your hands are in this position. Don't get one hand in front of the other. If you do, the ball will go cockeyed. If the ball is going to go up in the air, you're going to have to push it up in the air. And some of you, especially some of you girls are small enough that you're going to have to put everything you've got under that ball.

You've got to bend your knees and push your whole body up. In fact, you'll have to jump off your feet in some cases. Push that ball right up in the air and get it as high as you can get it. Now, I'm not concerned with how far you get it, I want to see how high. O.K. Go! PRACTICE and individual help. Get that ball up in the air.

Stop the balls, please. We have two problems. One is especially a problem of the girls' and the other is a problem of the boys'. Girls, most of you are using the palms of your hands to hit the ball. Don't slap the ball. If you hear a sound like that, that's not a good set up. Use your fingertips. Curve those fingers and don't let them be like wet spaghetti. Keep them firm.

Fellows, when you set the ball up, this is called catching. That is not a legal hit. That ball must be directly hit from your fingers. Any time you catch it or even let it rest momentarily on your hands, it is an illegal hit. O.K. Let's see some good sets. PRACTICE and individual help.

Will you turn your attention over to this group? We're going to work with one person as a leader at a time. Al, will you come out here, please? When you stand facing each other, stand closer than you have been in the past. All it's going to be is -- put your fingertips up like this, or your hands cupped -- get them high and just little short taps to each other. All right. Again. DEMONSTRATION.

After you've done that, trade off and let two other people work together. Make it good. Use just your fingertips, not the palm of your hand. Let's have a boy and girl working together. PRACTICE and individual help.

Stop what you are doing, please. There are two groups on each side of each net. Right? Those two groups will please join together. Make a circle and alternate boy, girl, boy, girl, etc. Then turn your attention to this circle right here. We've got to have one person in the center of the circle. Now, in a game when someone sets that ball up to you, you cannot catch it and say to them "here, try again, I didn't like that one." You have got to move so you can get any kind of set up that is given to you. I'm going to start here, I'm going to set the ball to Penny, she sets it back to me and as soon as she is finished, she moves out of the way. Now, I'm going to keep setting the ball in the same direction, back and forth, back and forth. But not always to Penny. Because the circle is going to continuously move. So as soon Penny is gone, Bob is going to be in her place. The circle will move. It'll look like this. DEMONSTRATION. Got the idea? O.K. Let's see it work. PRACTICE and individual help. Not a semi-circle, a circle. Don't bunch up on one side. Get it high in the air. Make your circle go the other way.

Not bad at all. Go back to the groups where you started, please. I don't know whether I said this before, I may have yesterday, but I will right now. Any ball that is

hit underhand, if it is hit with an open palm, is lifting and is an illegal hit. You can't do it -- sorry! So if you must hit the ball underhand, you do what we call a bump. Make a fist with one hand, put your other hand around that fist, point both thumbs to the floor and that will make your elbows straight. Both thumbs are pointed to the floor, you can't bend your elbows easily. A bump is used, probably most of the time for receiving a low serve or any kind of a ball that is low if somebody sets it up to you and it's a low set up and you have to get down low to get the ball. Bend your knees. You want the ball to go up in the air, so somebody else can get it after you're finished. With your elbows straight, go down to the floor and lift up with your knees. Now you notice, I do not do that. If I bend those elbows, the ball is going to go right behind me. If I get my hands too far up in the air and hit it, the ball is going to go behind me. I want it to go up. So I get down, raise up and I give a little nudge with my hands. That's all. I don't try to knock the insides out of the thing or it'll fly up and knock the lights out. All you need is a little nudge and lift with your legs. Much of it is done with your legs. Bend your knees, lift, and hit the ball right here on your forearms. Another way it can be done -- but it's much easier to lift if you do this -- is to point your fingers down to the floor and again, hit it on your forearms. However, if you don't get your hands down far enough, it's real easy to



lift the ball. So you're much wiser if you're going to use that fist because then it's impossible to lift.

Here is what I'd like for you to do. This group, will you stand up, please? I want you to do the same kind of thing you did with the set up, the leader and so forth. Alternate in line, boy, girl, etc. Obviously, the bump, as I said, is a low ball. So if I pass to Gail like this, it's a lousy pass because if I get it that high she can get under it and set it up with an overhead pass. So I want to get it down like this, low, and force her to bend her knees and get under it. All right, Gail, I'll throw the ball to you and you bump it back to me. DEMONSTRATION. Get down, bend your knees. Get a little more lift with your hands. Nice. Pass the ball here, Gail. Here is what I'm looking for. DEMONSTRATION BY INSTRUCTOR. Bend your knees and come up under it. PRACTICE and individual help. Don't kill it, just meet it. Get under it. Bend those knees.

May I have your attention a minute for two things? One, if your hands are not together, and you accidentally hit the ball harder with one hand than you do with the other hand, the ball is going to fly off in one direction or another. That's why it's difficult to control a ball if you only use one hand -- because the surface you are hitting it on is much smaller than when you have both arms and you have a surface maybe that wide. Secondly, when the ball is coming over the net on a serve, it's coming quite rapidly, it's not just



"walking" over. All right. It's going to take you a second to think, "Yes, where do my hands go? maybe I had better bend my knees, and this, that, and the other." And by that time, it's too late. You've lost it. So, when you are getting ready and you expect you will have to bump the serve, get yourself in a ready position. Then if you don't need to use the bump, stand up. It's much easier to get out of that position than it is to get into it. So be ready in the first place.

O.K. Let's do it again. PRACTICE and individual help.

Stop a minute, please. In a game, if you hit the ball so hard that it goes up and into the lights, or rafters or ceiling, it is out of play. It's a dead ball. You don't have to kill the thing. Just meet it. When it comes to you, give it a little nudge. You don't have to knock the ballies out of it. PRACTICE and individual help.

Before we take the nets down, one thing. It is not legal for me to hit the ball two times in succession. Two times in succession also means this: if I bump the ball and bend my elbow and that ball accidentally hits me in the shoulder, chest, head or wherever it is, if it hits on my arm and another part of my body, that is a double hit and it is not legal. So make sure that those elbows are straight and come straight up on the ball.

O.K. Let's take the nets down. The balls go over in the barrel. Now line up.