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A Comparative Study of Two Physical Education Programs for Male Students at the University of North Dakota

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A COMPARATIVE STUDY OF TWO PHYSICAL EDUCATION PROGRAMS FOR MALE STUDENTS AT THE UNIVERSITY OF NORTH DAKOTA

by

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This thesis submitted by Orlo A. Sundre in partial fulfillment of the requirements for the Degree of Master of Science in the University of North Dakota, is hereby approved by the Committee under whom the work has been done.

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CHAPTER I

INTRODUCTION

Physical education made a comparatively late entrance into the general education program throughout the United States. The two World Wars had a marked effect on the attitude of the public toward the need of physical development. More recently many of the nation's leaders became concerned over the fitness of youth. President Eisenhower's attention was focused on the problem as the result of an article by Hans Kraus, M.D. and Ruth P. Hirschland, "Muscular Fitness and Health", which appeared in the December, 1953, issue of the Journal of Health, Physical Education and Recreation, presenting their findings on the physical deficiencies of American children in contrast with European children. John B. Kelly Sr., Olympic Star, and Senator James Duff were instrumental in calling it to the attention of the President.[1]

President Eisenhower deemed youth fitness so important that he called a special meeting of one-hundred fifty of the leaders in physical education, sports, medicine, and public relations to discuss ways of improving this

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[1]Hans Kraus and Ruth P. Hirschland, "Fitness of American Youth", Journal of Health, Physical Education and Recreation, September, 1956, p. 8.

situation. The meeting was held at the United States Naval Academy, Anapolis, Maryland, on June 18th and 19th, 1956. From this conference the Governors of the various states were delegated to hold similar meetings and to attempt to improve youth fitness in their respective states.

The President's Conference has awakened the nation to the need for a totally fit youth and has pointed the way toward achieving this objective. It is up to the schools to do a major part in carrying out the President's program for total fitness, with emphasis on better programs of health education, physical education, and recreation for all children and youth.[2]

In the state of North Dakota there is lacking, in many schools, the proper facilities, adequate time, and trained physical educators to develop a good physical education program.

Because of the recent stress placed on youth fitness and the lack of good high school program in physical education in many instances, it was thought by the writer that here was a service the introductory physical education program at the University of North Dakota might contribute to the male freshman students who attend this school. All male freshman at the University of North Dakota are required to satisfactorily complete the introductory physical education program which is offered the first semester every year. This is the only course where complete control of

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[2] Ibid., p. 30.

all the activities for the students is possible, and therefore presents an opportunity to reach all of the male students.

Statement of the Problem

At the present time there is in effect at the University of North Dakota a required introductory physical education program which involves the introduction of and participation in six sports. These sports are: golf, bowling, handball, squash, badminton, and volleyball which are primarily recreational in nature. These sports are not normally offered in the high schools and consequently are of value to the students.

Since all male students are required to take three semesters of physical education beyond the introductory course it was thought that less time could be given to each of these sports and supplemented with activities which place greater emphasis on physical conditioning. If one or more of the sports seemed to appeal to a student he would have the opportunity to enroll in a course which emphasized that particular sport in one of the other semesters.

With this in mind the writer revised the present program by limiting the amount of time given to the actual participation in each sport and substituting conditioning type activities. This revised program is explained more fully in Chapter II, Methodology.

The problem then is to determine if one of these two introductory physical education programs is more

valuable than the other. The areas used for comparison are physical fitness, attitude toward physical education, and knowledge of the sports skills involved.

Purposes of the Study

The over-all purpose of this study is to determine if one of the two introductory physical education programs is of more value than the other. There are, however, several areas in this comparative study that should be examined individually. To facilitate easier reading and understanding of these areas, they are listed here:

1. Is one of the two programs more valuable than the other in developing physical fitness in the areas selected for this study?
2. Is one of the two programs more valuable than the other in developing good attitudes toward physical education?
3. Is one of the two programs more valuable than the other in developing knowledge of the sports skills involved?

The Limitations

This study was limited to four sections of male freshman students who were enrolled in the introductory physical education course at the University of North Dakota during the first semester of the 1959-1960 academic year. There were a total of sixteen sections of introductory physical education which means that approximately one-fourth of the male freshmen students were involved in this study.

The reason for limiting this study to four sections was so that the writer would have the opportunity to teach and test all of the students.

Definition of Terms

The regular introductory physical education program refers to the program now in effect at the University of North Dakota.

The revised introductory physical education program refers to the introductory program which was revised by the writer for the purpose of this study.

Control Group refers to the two sections of physical education students who were given the regular introductory physical education program.

Experimental Group refers to the two section of physical education students who were given the revised introductory physical education program.

CHAPTER II

METHODOLOGY

This chapter contains the procedure used in collecting the data for this study. The various areas have been separated under sub-headings to facilitate easier reading and understanding.

Student Subjects Used

The students which took part in this study were taken from the regular introductory physical education classes at the University of North Dakota. The students themselves were not informed that they were being subjected to a research study program. There were sixteen sections of introductory physical education male students in all, four of which were used in this study. Each section contained about thirty students which means that approximately one hundred and twenty were involved in the study. Four sections were selected so that the writer could be the instructor of all the subjects thereby controlling the course content. Some of these students did not complete all phases of the program and testing, therefore their test scores were not used in tabulating the data. A complete explanation of why some student's test scores were not used will be given

in Chapter IV, Analysis of Data.

Time Required for the Study

The study was carried on during the first semester of the academic year of 1959-1960. In this semester there were eighteen weeks of school. The first week was used for registration and the last week for final examinations, leaving sixteen weeks for actual classes. In physical education all activity classes, such as the regular introductory class, met twice a week for a total of thirty-two times. The class period was fifty minutes in length of which fifteen minutes was allowed for taking showers and dressing.

The Regular Introductory Physical Education Program

The regular introductory physical education program has been in effect at the University of North Dakota for approximately the past ten years. This program was conducted in the same manner as always with the exception that a series of tests was given at both the start and the end of the semester.

The following is an outline of the activities of this regular introductory physical education program as it was conducted for this study.

Class Meeting	
1	Check out lockers, purchase uniforms, and a guided tour of the building and facilities.

2	Administer Wear's Attitude Inventory (form A), explanation of the Physical Capacity Test, a guided tour of the test stations.
3	Administer the first half of the Physical Capacity Test: dips, vertical jump, and shuttle run.
4	Administer the second half of the Physical Capacity Test: sit-ups, pull-ups, and squat-jumps.
5-8	Introduction to and practice of golf.
9	Swimming test
10-13	Introduction to and practice of bowling.
14-18	Introduction to and practice of handball.
19-23	Introduction to and practice of badminton and squash.
24-28	Introduction to and practice of volleyball.
29	Administer the first half of the Physical Capacity Test: dips, vertical jump, and shuttle run.
30	Administer the second half of the Physical Capacity Test: sit-ups, pull-ups, and squat-jumps.
31	Administer Wear's Attitude Inventory (form B).
32	Administer the Sports Skills knowledge test.

The Revised Introductory Physical Education Program

The revised introductory physical education program is the one which was designed specifically for this study and stresses physical conditioning. This program contains the same amount of time devoted to actual practice of these sports skills.

The following is an outline of the activities of this program as they were conducted for this study.

Class Meeting	
1	Check out lockers, purchase uniforms, and a guided tour of the building and facilities.
2	Administer Wear's Attitude Inventory (form A), explanation of the Physical Capacity Test, and a guided tour of the test stations.
3	Administer the first half of the Physical Capacity Test: dips, vertical jump, and shuttle run.
4	Administer the second half of the Physical Capacity Test: sit-ups, pull-ups, and squat-jumps.
5	Conditioning exercises (ten minutes), introduction to golf, quarter mile run.
6-7	Conditioning exercises (ten minutes), practice golf.
8	Conditioning exercises (eight minutes), squad competition in relays and other running events.
9	Swimming test.
10	Introduction to bowling, no conditioning exercises because of meeting in street clothing at the bowling lanes.
11	Practice bowling, no conditioning exercises.
12	Conditioning exercises (ten minutes), squad competition in rope climb, pull-ups, and leg-lifts; quarter mile run.
13	Conditioning exercises (ten minutes), lecture on the physiology of exercise (ten minutes), tumbling.
14-16	Conditioning exercises (eight minutes), introduction to and practice of handball.
17	Conditioning exercises (eight minutes), individual and dual stunts.
18-19	Conditioning exercises (ten minutes), introduction to and practice of badminton.
20-21	Conditioning exercises (ten minutes), introduction to and practice of squash.

22	Conditioning exercises (ten minutes), lecture on posture and its physical implication (ten minutes), running.
23-25	Conditioning exercises (ten minutes), introduction to and practice of volleyball.
26	Conditioning exercises (ten minutes), lecture on physical fitness and its eminent need by our society today.
27	Conditioning exercises (eight minutes), squad competition in an obstacle course run.
28	Conditioning exercises (eight minutes, squad competition in relay races; review of the procedure to follow in the Physical Capacity Test.
29	Administer the first half of the Physical Capacity Test: dips, vertical jump, and shuttle run.
30	Administer the second half of the Physical Capacity Test: sit-ups, pull-ups, and squat-jumps.
31	Administer Wear's Attitude Inventory (form B).
32	Administer the Sports Skills Knowledge Test.

For each class period members of the class were designated to select and lead the group in the "conditioning exercises." A copy of the exercises to be used, along with suggestions of leadership, was passed out to each class member at the beginning of the semester. A sample copy of this may be found in the Appendix, page 47.

Wear's Attitude Inventory

Wear's Attitude Inventory was administered to all of the students in all four sections to determine their attitudes toward physical education.

This inventory was developed by Carlos L. Wear[3] at the State University of Iowa. His first experimentation took place during the first semester of the academic year of 1949-50. This was a one hundred and twenty item inventory whose reliability, as determined by the split-level technique, was 0.96 for 472 cases which became 0.98 when raised by the Spearman-Brown formula.

Later this one hundred and twenty item inventory was reduced to a short form whose split-level reliability was 0.94 for 272 cases and became 0.97 when raised by the Spearman-Brown formula.

In a study conducted in 1955, Dr. Wear revised the short form again in an attempt to construct two forms which could be used on a "before and after" basis. "The forms have been shown to be statistically reliable. Scores on the forms have been shown to correlate highly with other measures of attitude and to differentiate at high levels of confidence between certain groups of subjects. Standards of equivalence have been proposed and followed in the construction. A very high correlation exists between scores on the two forms. On the basis of evidence we believe these two forms may be employed wherever the use of equivalent forms is desired."[4]

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[3]Carlos L. Wear, "The Evaluation of Attitude Toward Physical Education as an Activity Course.", Research Quarterly, March, 1951, p. 114.

[4]Carlos L. Wear, "Construction of Equivalent Forms of an Attitude Scale." Research Quarterly, March, 1955, p. 113.

Wear's Attitude Inventory Short, Form A, was given to the classes at the start of the semester, as indicated in the program outline of the Introductory Physical Education programs. Short Form B was given at the end of the semester. A copy of both forms along with the answer sheets which were used may be found in the Appendix, page 56.

Both of Wear's Attitude Inventory Short Forms are thirty item questionnaires which required between fifteen and twenty minutes to complete. The answer sheet has five columns, one of which is to be checked after reading the corresponding statement on the Inventory Form. The five columns on the answer sheet have these headings: Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree; in that order.

In scoring the Attitude Inventory the responses considered the most favorable to physical education received a score of five. Thus, the responses would be scored 5 - 4 - 3 - 2 - 1 or 1 - 2 - 3 - 4 - 5, depending on whether the item was worded positively or negatively. A student's score on the Attitude Inventory is the sum of scores made on the individual items. According to this method of scoring a high score would indicate a favorable attitude toward physical education. The highest possible score which could be made is 150 and the lowest is 30.

Administration of Wear's Attitude Inventory

This Attitude Inventory was given to the students in the four sections involved in this study during the

second and again during the thirty-first class meeting. The writer was the sole administrator.

Instructions were given to the students prior to the administration of the Attitude Inventory. It was pointed out that this was an inventory and not a test. Emphasis was placed on the fact that their answers should be their own feelings toward the statements at that particular time, and that in no way would their answers affect their grade in the course.

No time limit was set on completion of the statements. Most of the students finished in less than fifteen minutes, some taking as long as twenty minutes.

All of the answer sheets were scored by the writer. A recheck of all answer sheets was made after a time lapse of about one week to check for any errors. The results of these tests were tabulated and may be found in Chapter IV, Analysis of Data.

The Physical Capacity Test

This is not actually a test in itself, but rather a battery of smaller tests designed to test various areas of physical strength, power, and endurance. This is not a validated test and was given the name "Physical Capacity Test" by the writer specifically for this study.

Permission was given by the Physical Education Department to use the name University of North Dakota on the test record cards. This request was made so that the students would recognize this as an official test.

The information gathered at the top of each card included name, age, class, and section. This was used to identify the test results with the correct student. Recording of height and weight was primarily for the student's information.

The areas which were tested, termed test items, were: dips, vertical jump, shuttle run (3-minute), sit-ups (2-minute), pull-ups, and squat-jumps. These events are commonly used and accepted physical tests and are performed in the normal manner. A complete description and set of rules governing these tests may be found in the Appendix, page 53.

Administration of the Physical Capacity Test

The writer was assisted in the administration of the Physical Capacity Test by student aides. These students are discussed more fully in subsequent pages.

The test items were divided into two testing periods. The first testing period involved the weighing and measuring of each student and testing in the dips, vertical jump, and the shuttle run. The second period included the sit-ups, pull-ups, and squat-jumps. Since the classes contained approximately thirty students it was impossible to test all of the students completely during one class period.

Seven stations were used in administering the Physical Capacity Test. The first station was in the locker room where each student was weighed and measured. This information was recorded on his test record card.

The student was required to wear only a supporter, shorts, T-shirt, and sweat socks. At all other stations for this test he was required to wear his gym shoes too.

Upon completion of this station the students were given their test record cards and told to report to station number two in the apparatus room.

The second station was at the parallel bars in the apparatus room. The student performed the dip test here. The rules were again explained briefly by one of the aides before performing the test. Two testing aides administered this test, one explained the test and counted the repetitions and the other recorded the student's score on the test record card. All scores were recorded under the initial score column for the first testing.

The third station was at a chalk board which was firmly secured to the wall in the apparatus room. The rules for the vertical jump test were explained briefly before the student was allowed to perform. Two testing aides administered this test. One explained the rules and did the recording of the score and the other aide did the measuring.

The fourth, and last, station of the first testing period was the shuttle run. This test item was layed out on the gymnasium floor. Five lanes were layed out with metal badminton standards on the ends of each lane. The distance between the standards was twenty-five yards marked off by chairs set at five-yard intervals. A testing aide was stationed at each lane to count the number of

yards run and to record this on the student's test record card. In addition to the five recorders another testing aide was the starter and timer. Following this test the test record cards were collected.

In every case the students were required to take the test items in the order prescribed so that they would all be at the same level of fatigue for each test.

For the second testing period the students were asked to report to the apparatus room. The test record cards which had been collected at the end of the first testing period were again distributed.

The fifth station, the first of the second testing period, was the sit-up testing station. The students were paired for this test so that one could hold the other's ankles during the test. Aides were assigned for each pair so they could count the repetitions and record the scores. This was a timed, two-minute test which was administered and timed by the writer. A brief review of the rules for this test was given prior to starting.

The sixth station was the pull-up test. This too was performed in the apparatus room. The horizontal bar was employed so that two students could be tested at the same time. Two aides were used, one on either side of the bar so that all the student had to do was hand his card to the aide, jump up and grasp the bar, and perform the test while the aide counted the repetitions and recorded the score on the student's test record card.

The seventh station was squat-jumps. As the students finished the pull-up test item he would move over to the area assigned for squat-jumps and hand his test record card to one of the aides. The aide would then have the student do two or three squat-jumps to see if he understood the proper procedure. If the student was doing them properly he was told to continue, but if he was doing them improperly he was stopped for correction. Only those squat-jumps properly executed were counted. No time limit was set on this test item, but once the student stopped the test he had to remain stopped and could not rest and then begin again. The aide counted the repetitions and recorded the score on the student's test record card.

A sample copy of the record card used for this test may be found in the Appendix, page 52. A copy of the exact rules used in this test also appears in the Appendix, page 53.

All tabulation of the results of these Physical Capacity Test Record Cards was done by the writer. The data for all of these tests may be found in Chapter IV, Analysis of Data.

Student Testing Aides

The student testing aides who aided in the administration and recording of the Physical Capacity Test were volunteers selected from the male students majoring in physical education at the University of North Dakota.

All of the aides were at least juniors in class rank and the majority were seniors.

During the first day of classes of the first semester of the academic year 1959-1960, all of the instructors of the major physical education classes agreed to present the need for testing aides and requested that as many as possible report for the orientation meeting at the end of the week. The number of students who turned out for this project far exceeded the needs. Fifteen students were finally selected giving preference to senior students who were planning to attend Graduate School at some later date. Only twelve aides were actually needed, but the other three were used as alternates.

The fifteen aides were then given a copy of the rules which had been set up to govern the Physical Capacity Test. After they had finished reading the rules, they were reviewed orally and all questions were answered. Finally the entire group was taken through the various stations.

Upon completion of the tour of the stations, twelve of the fifteen student aides were assigned to a specific station and asked to review the rules governing that particular test several times before the first testing period. The three alternate aides were asked to review all of the tests and report to the writer at the first testing period to see if any of the regular aides were unavoidably absent.

Two substitutes were required during the first testing period of the final test. Both were required to act as counters and recorders in the shuttle run. With the exception of these two, all of the student aides were at the same stations performing the same duties throughout the testings.

The writer was free to supervise all of the testing, with the exception of the sit-up test. The professional attitude and leadership displayed by the student aides was very commendable.

Sports Skills Knowledge Test

The Sports Skills Knowledge Test is the final written examination normally given at the end of the semester to all students enrolled in the introductory physical education classes. This is a one hundred and eighty question objective test containing mostly true and false and multiple choice questions. There are thirty questions for each of the six sports areas which were introduced during the semester.

The administration of this test was done entirely by the writer. This was administered only once, during the last class meeting, which is the normal class procedure. All of the tests were corrected by the writer using the correcting key issued by the Department of Physical Education.

The results of this test may be found in Chapter IV, Analysis of Data.

CHAPTER III

REVIEW OF LITERATURE

Several research studies have been carried out to determine the effectiveness of certain activities within a particular program, but few of the studies involved testing an entire program to determine its effectiveness as a whole. An attempt was made to gather as much information as possible about studies concerning the problem in this study. In some cases the studies reviewed here were not exactly similar to this one, but the results of these studies seemed to be pertinent enough to be included.

J. W. Kistler[5] carried out a study involving 1650 male students of Louisiana State University who were enrolled in the regular required physical education classes. This study had for its purpose an investigation of the amount of improvement which was achieved through regular participation over a limited length of time. The program was designed primarily to improve strength, endurance, and agility, three of the elements of fitness which the authorities agree are needed to be physically fit.

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[5]J. W. Kistler, "A Study of the Results of Eight Weeks of Participation in a University Physical Fitness Program for Men." Research Quarterly, March, 1944, pp. 23-5.

The training program was eight weeks in length. The class met three times per week for a thirty minute workout, usually out doors.

Class periods consisted of approximately eight minutes of calisthenics and four bouts of exercise, each five minutes in duration. Calisthenics stressed stretching and bending exercises, sit-ups, push-ups and deep-knee bends. The five minute bouts of exercise were devoted to: all out chinning, obstacle-course running, personal-combat activities, and running.

A battery of five tests was administered to the men in making the study. The tests were: (1) a 5-minute run for distance, (2) an obstacle course run for time, (3) push-up test, (4) chinning test, and (5) sit-up test.

The results of the testing are as follows:

Test	Improved	Declined	No Change
Chinning	61%	15%	24%
Sit-ups	77%	16%	7%
Obstacle-course Run	61%	21%	18%
5-minute Run	36%	17%	47%
Push-ups	74%	18%	8%

9.8%	Improved in five tests
27.0%	Improved in four tests
33.0%	Improved in three tests
69.8%	Improved in three or more tests

Test	Avg. Initial Test	Avg. Final Test	Gain in Perform
Chinning	10.0	10.8	.8
Sit-ups	38.4	51.1	12.7
Obstacle-course Run	24.7 sec.	22.0 sec.	2.7 sec.
5-minute Run	1490.0 yds.	1510.0 yds.	20.0 yds.
Push-ups	18.1	21.3	3.2

The conclusions from these test results are:

1. The findings of this study would seem to justify the statement that significant improvement may be achieved in the physical fitness elements of strength, endurance, and agility through a specific training program devoted to these elements.

2. The time required for achieving physical fitness of the type involved in this study is not excessive.

3. Of the physical fitness elements investigated in this study, endurance of the cardio-respiratory type appears to be the most difficult to improve. Strength and endurance of the type measured in doing sit-ups and chinning are most ameable to improvement through systematic training procedures.

4. An appreciable per cent of men actually demonstrate retrogression in ability to perform in motor activities of the type used in this study during a training period of eight weeks.

5. University men compare favorably with men of the Army Specialized Training Units in their ability to chin themselves, to do push-ups, and to do sit-ups.

Frank D. Sills[6] carried on a research study at the State University of Iowa involving thirty-three students who achieved low scores in their physical fitness entrance tests.

[6]Frank D. Sills, "Special Conditioning Exercises for Students with Low Scores on Physical Fitness Tests." Research Quarterly, October, 1954, pp. 335-7.

These students were put into a special class where fitness type exercises were the main objective.

At the end of the semester all the students were given the same fitness tests again to determine improvement. In order to determine the significance of the "gains" made by the experiment group, a control group of thirty-three students was selected at random from a population of more than five hundred. The gains made by the experimental group and the control group were then compared.

A second control group was selected from records of persons in past years who had low scores in the physical fitness entrance tests. The gains made by the experimental group and the second control group were also compared.

A comparison between the increase in grade point average and the increase in physical fitness was correlated in all cases.

These are the conclusions arrived at by Dr. Sill upon completion of all the statistical procedure.

1. Greater gains in physical fitness level can be achieved by the low-level student if he is afforded an opportunity to take part in a special program of conditioning exercises.

2. There is a higher correlation between gains in physical fitness and academic success for low-level fitness students than for high-level fitness students.

The following two studies were taken from an article in the Journal of Health, Physical Education and Recreation

entitled, "For Physical Fitness Vary Your Program", written by Marion R. Broer.[7]

Two studies which investigated the effect of various service courses on muscular endurance test scores were carried out by Fordham and Berafato. Fordham studied basic conditioning, badminton, apparatus, and individual tumbling stunts. Berafato studied boxing, wrestling, weight lifting, and volleyball. Berafato also studied the effect of participation in an intramural program.

The scores made on the muscular endurance test at the end of the instruction in these activities can be compared, since the two studies used the same tests and experimental pattern. According to muscular endurance test scores, the activities ranked as follows: basic conditioning, 19; apparatus, 13; weight lifting, 11; boxing, 11; intramural participation, 9; individual tumbling stunts, 8; wrestling, 6.5; volleyball, 5; and badminton, 3.

In one of these studies, it was found that, although an intramural participation group had the highest score at the beginning, they gained more in muscular endurance than those in volleyball, wrestling, or badminton classes. The latter three were not found to contribute much to all-around muscular endurance.

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[7]Marion R. Broer, "For Physical Fitness Vary Your Program", Journal of Health, Physical Education and Recreation. September, 1956, pp. 16-8.

Aix B. Harrison[8] reported that moderate endurance swimming (intermediate level only a few lengths ever completed at one time) is not adequate to build strength but improves mainly the circulatory-respiratory responses, ability in the vertical jump, and total body-recreation time.

Charles P. Wolbers[9] studied volleyball and reported that improvements in physical fitness were not impressive, and that the results created doubt that volleyball at the beginner's level is of much value in developing fitness.

F. O. Bryant[10] reported the effects of handball instruction on physical fitness. He found that those who had participated in handball made significant gains in some circulatory tests, but not in respiratory tests, dynamometer strength, or speed in the agility run.

Carl W. Landiss[11] reported a study of the effect of eight activities on physical fitness and motor ability of college men. He found that the tumbling-gymnastics and conditioning groups made the greatest gains in physical

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[8]Aix B. Harrison, "Effects of a Swimming Conditioning Program on Physical Fitness of Adult Men", an unpublished Master's Thesis, University of Illinois, 1950.

[9]Charles P. Wolbers, "The Effect of Volleyball on the Physical Fitness of Adult Men," an unpublished Master's Thesis, University of Illinois, 1949.

[10]F. O. Bryant, "The Effect of Handball on the Physical Fitness of Adult Men," an unpublished Master's Thesis, University of Illinois, 1940.

[11]Carl W. Landiss, "Influence of Physical Education Activities on Motor Ability and Physical Fitness of Male Freshmen." Research Quarterly, October, 1955. pp. 295-308.

fitness. There was no significant difference between weight training, wrestling, volleyball, and boxing. All were superior to swimming in improving physical fitness of college men.

E. A. Wilbur[12] studied the effect on physical fitness of a sports program as compared to an apparatus program. The sports included in the study were boxing, wrestling, track and field, soccer, and swimming. The apparatus activities included were the horizontal bar, parallel bars, sidehorse, buck, rings, mats and ropes. He reported that he found the sports method superior in improving total physical fitness, arm and shoulder girdle strength, body co-ordination and agility. The methods were equally effective in the areas of arm and shoulder co-ordination, speed of the legs, endurance, and jumping or leg strength.

In summary of the literature here reviewed it was found that in almost every case where conditioning type exercises were employed an improvement in physical fitness resulted.

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[12]E. A. Wilbur, "Comparative Study of Physical Fitness Indices as Measured by Two Programs of Physical Education". Research Quarterly, October, 1953. pp. 326-332.

CHAPTER IV

ANALYSIS OF DATA

This chapter has been divided into three sections each dealing with one of the areas tested, physical capacity, attitude toward physical education, and knowledge of sports skills. Prior to an explanation of the data gathered, certain statistical tools had to be selected and defined. It was also necessary to reveal the reasons for eliminating some of the scores from the test data.

All of the students who were enrolled in the introductory physical education classes which took part in this study did not complete all phases of the testing program, and therefore their scores could not be used in tabulating the data for this study. At the beginning of the semester forty-nine students were enrolled in the two sections which had been selected as the "control group", while fifty-seven students were enrolled in the two sections which had been selected as the "experimental group". Of these students only thirty-seven of each group completed all phases of the testing program.

The reasons for not using the scores of these students, are listed.

Control Group:

1. Two students dropped from the course.
2. Five students were absent for part of the initial Physical Capacity Test.
3. Two students were absent for part of the final Physical Capacity Test.
4. Three students were absent for one of the Attitude Inventories.

Experimental Group:

1. One student dropped from the course.
2. Three students transferred to different sections.
3. Eight students were absent for part of the initial Physical Capacity Test.
4. Six students were absent for part of the final Physical Capacity Test.
5. One student was absent for the second Attitude Inventory.
6. One student was absent for the Sports Skills Knowledge Test.

A sample of the raw scores of the students who completed all phases of the testing program may be found in the Appendix.

Chi-Square

After collecting and tabulating all of the testing data, it was necessary to select a statistical tool that would determine significance. This statistical tool was first used to determine whether the two groups were of the same population at the beginning of the study. Secondly and equally important, to determine whether one of the groups was significantly different from the other at the end of the study. Chi-square was selected to accomplish this because it is an accurate statistical means for comparing two groups such as these.

In using chi-square as a measurement of significance of difference the null-hypothesis method was employed.

This means assuming a null hypothesis. "Experimenters have found the null hypothesis a useful tool in testing the significance of differences. In its simplest form this hypothesis asserts that there is no true difference between two population means, and the difference found between sample means is therefore, accidental and unimportant."[13]

Chi-square, as a statistical tool, requires the construction of a contingency table for each group of scores being compared. A contingency table is made up of two or more cells for each group. One group is selected as the expected outcome and is as evenly distributed as possible throughout it's group of cells. For example, in a group of thirty scores with a contingency table of three cells, an attempt would be made to place ten scores in each cell.

Since the number of student's scores in this study was thirty-seven for both groups an attempt was made to place a 12, 13, and 12 arrangement in the three cells for the control group. This was not possible in all cases which is evident in the gain and loss comparison for the Pull-up Test where the score arrangement for the control group was 12, 16, and 9.

The procedure which was followed in finding the significance of difference by use of the chi-square was taken from Henry E. Garret's book of Statistics in Psychology and Education.[14] The table used to determine the results

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[13]Henry E. Garrett, Statistics in Psychology and Education. New York, Longmans, Green and Co., 1958.

[14] Ibid.

of this procedure was taken from Table E, page 450 of the same book.

In finding the value of X^2 (chi-square) all division was carried to the ten-thousandths and then rounded to the thousandths place. Any ten-thousandths diget of 6 or over rounded the thousandths place to the next number. Any thousandths diget of 5 rounded the thousandths place to the next number if the thousandths diget was an odd number, otherwise it was left the same.

All calculations were checked twice to eliminate errors.

The Physical Capacity Test Results

The first analysis of test data deals with determining whether or not the control group and the experimental group were of the same population prior to the program. This analysis is for the Physical Capacity Test, the data on the Attitude Inventory will be given in subsequent pages.

In using chi-square as the statistical tool for this comparison, only the raw scores from the initial testing were considered. A sample of the raw scores for all subjects along with the chi-square statistics can be seen in the Appendix.

All of the tables which deal with the use of chi-square will contain the values derived for chi-square in each of the six tests. In all cases the P, or probability, is indicated next to the chi-square value. If this P equals

the .05 level or above it will be considered significant, otherwise it will be considered not-significant or due to chance.

Table 1 shows the chi-square comparison of the raw scores for the initial testings of the control group and the experimental group.

TABLE 1

A CHI-SQUARE COMPARISON OF THE CONTROL AND EXPERIMENTAL GROUPS ON THE INITIAL TEST

Test	X^2	P
Dips	0.720	.70 and .50
Vertical Jump	5.306	.10 and .05
Shuttle Run	1.486	.50 and .30
Sit-ups	0.948	.70 and .50
Pull-ups	1.432	.50 and .30
Squat Jumps	4.046	.20 and .10
df = 2	5.991 = .05	

The results shown in Table 1 indicate that the control group and the experimental group were of the same population as far as the Physical Capacity Test is concerned. Although the results of the Vertical Jump Test were close to the .05 level they did not equal or go beyond, so they must be considered as not significant.

This was a most important finding in that if the two groups had been found to be of different physical levels at the start of the study it would have been difficult to draw any conclusions about the results of the final testing.

The next part considered was whether or not these two groups were still of the same population at the end of the study period. To do this the test results of the final testing were compared in the same manner by use of the chi-square.

Table 2 shows the chi-square comparison of the raw scores for the final testing of the control and the experimental groups.

TABLE 2

A CHI-SQUARE COMPARISON
OF THE FINAL TESTING

Test	X^2	P
Dips	6.582	beyond .05
Vertical Jump	6.846	beyond .05
Shuttle Run	4.622	.10 and .05
Sit-ups	7.278	beyond .05
Pull-ups	5.682	.10 and .05
Squat Jumps	14.522	beyond .01
df = 2	5.991 = .05	9.210 = .01

The results shown in Table 2 indicate that the two groups were significantly different in the dips, vertical jump, sit-ups, and squat jump tests. This table also indicates that the two groups were not significantly different in the shuttle run and the pull-up test. The control group was used as the standard for setting up the cells for computing the chi-square results thus indicates that the experimental group was significantly superior to

the control group in the dips, vertical jump, sit-up, and squat jump tests at the final testing.

Another area of importance which was examined is that of the comparison of the increase or decrease in performance of the two groups between the initial and final testings. To obtain the scores for this comparison it was necessary to subtract the initial individual raw scores from the final individual test scores for each student to determine his gain or loss.

In making the chi-square comparison the same procedure is followed as was used in the previous two tables.

TABLE 3

A CHI-SQUARE COMPARISON OF THE INCREASE OR DECREASE BETWEEN THE INITIAL AND FINAL TESTINGS

Test	X^2	P
Dips	20.638	beyond .01
Vertical Jump	15.672	beyond .01
Shuttle Run	8.356	beyond .02
Sit-ups	16.180	beyond .01
Pull-ups	10.168	beyond .01
Squat Jumps	23.864	beyond .01
df = 2	7.824 = .02	9.210 = .01

The results of Table 3 indicate that the experimental group was significantly different from the control group as far as the amount of increased performance between the initial and final testing is concerned.

The following two tables contain the number of students who gained, lost, or remained the same in each

test of the Physical Capacity Test as measures by the initial and final testings. By "gain" it is meant that the student attained a higher score in the final testing than he did in the initial testing. Likewise "loss" means he attained a lower score in the final testing than he did in the initial. The term "unchanged" indicates that the student attained the same score in the final testing as he did in the initial testing.

Table 4 shows the number of students in the control group who gained, lost, or remained the same between the initial and final testings.

TABLE 4

THE NUMBER OF STUDENTS IN THE CONTROL GROUP WHO GAINED OR LOST BETWEEN THE INITIAL AND FINAL TESTING

Test	Gained	Lost	Unchanged
Dips	16	9	12
Vertical Jump	19	8	10
Shuttle Run	19	15	3
Sit-ups	21	13	3
Pull-ups	12	15	10
Squat Jumps	20	16	1

Table 5 shows the number of students in the experimental group who gained, lost or remained the same between the initial and final testings.

TABLE 5

THE NUMBER OF STUDENTS IN THE EXPERIMENTAL GROUP WHO GAINED OR LOST BETWEEN THE INITIAL AND FINAL TESTING

Test	Gained	Lost	Unchanged
Dips	35	1	1
Vertical Jump	32	3	2
Shuttle Run	29	7	1
Sit-ups	34	3	0
Pull-ups	23	4	10
Squat Jumps	36	0	1

In comparing the results of Table 4 with those of Table 5 it is noted that many more students in the experimental group than in the control group made a gain in the tests. The number of students making a gain is of no statistical importance, however, unless this gain is significant. Table 3 indicates the significance of the gains made by the experimental group over those made by the control group.

Tables 4 and 5 merely make an interesting comparison between the two groups as to the number of students who gained, lost, or remained the same.

Table 6 shows the number of students in each group who gained on one or more tests. This means that a tabulation was made to determine the number of students who made a gain in six tests, five tests, four tests, etc. This again is merely an interesting comparison between the control and experimental groups as to their amount of improvement between the initial and final testing.

TABLE 6

THE NUMBER OF STUDENTS WHO GAINED IN ONE OR MORE OF THE TESTS

Group	Number of Test Improvements						
	6	5	4	3	2	1	0
Control	0	4	12	6	8	5	2
Experimental	14	13	9	1	0	0	0

The results as indicated in Table 6 show that a larger number of students in the experimental group improved in more tests than did students in the control group. By comparison, fourteen students in the experimental group improved in six tests while not one student in the control group improved in six tests. Likewise thirteen students of the experimental group improved in five tests while only four students of the control group improved in five tests.

The Results of Wear's Attitude Inventory

The Attitude Inventory was administered twice to each of the two groups. The first administration was at the start of the semester, prior to the initial Physical Capacity Test. The second administration was at the end of the semester after the final Physical Capacity testing.

The first analysis of the data collected from the Attitude Inventory is to determine if both the control group and the experimental group were of the same population at the start of the study as far as attitude toward physical education is concerned. The statistical tool, chi-square was selected for this purpose. The raw scores of the

students in both groups were taken from their first Attitude Inventory. All of the raw scores along with the chi-square statistics may be found in the Appendix.

Table 7 shows the chi-square comparison of the two groups for the first Attitude Inventory.

TABLE 7

A CHI-SQUARE COMPARISON OF THE FIRST ATTITUDE INVENTORY

Test	X^2	P
Attitude Inventory	1.860	between .50 and .30
df = 2	5.991 = .05	

The results of Table 7 indicate that the control group and the experimental group were of the same population at the start of the study. The fact that P did not reach the .05 level indicates this.

It is important that the two groups were of the same population as far as attitude toward physical education is concerned. If they had not been of the same population the results of the second Attitude Inventory would have been of no value as it would have been impossible to compare two unlike groups in the final analysis if they were significantly different at the start.

The next comparison was made of the results of the second Attitude Inventory. This comparison was made to determine if the groups were changed as a result of their having participated in an introductory physical education program.

Table 8 shows the chi-square comparison of the groups after the second Attitude Inventory.

TABLE 8

A CHI-SQUARE COMPARISON OF THE SECOND ATTITUDE INVENTORY

Test	X^2	P =
Attitude Inventory	1.100	between .70 and .50
df = 2	5.991 = .05	

The results of Table 8 indicate that the control group and the experimental group were still of the same population after the completion of the study. This means that the activities of the two introductory physical education programs had no different effect on the experimental group over that of the control group as far as attitude toward physical education is concerned.

Because of the fact that the groups were of the same population at the end as well as at the start of the study, it was not necessary to determine if the gain or loss by one group was significantly different from the other group.

Results of the Sports Skills Knowledge Test

This test was administered to both the control and the experimental groups at the end of the study only. As a result of this, no comparison can be made as to which group increased the most. This is a standard test which is always administered at the end of the introductory physical education course.

The results of this test are compared to determine if the two groups seemed to acquire the same amount of sports skill knowledge. A comparison of the results by using chi-square will indicate whether the two groups are of the same population at the end of the study. This was to determine whether the regular program or the revised program of introductory physical education accomplish the same end as far as knowledge of sports skills is concerned.

Table 9 shows the chi-square comparison of the raw score results of the two groups for the Sports Skills Knowledge Test.

TABLE 9

A CHI-SQUARE COMPARISON OF THE SPORTS SKILLS KNOWLEDGE TEST

Test	X^2	P =
Sports Skills Test	1.634	between .50 and .30
df = 2	5.991 = .05	

The results of the Sports Skills Knowledge Test as indicated in Table 9 show that the control group and the experimental group are not significantly different.

CHAPTER V

SUMMARY AND CONCLUSIONS

Since the revelation of the results of the Kraus-Weber tests on European and American children,[15] followed by the President's Conference on Youth Fitness there has been definite emphasis placed on physical fitness in many of the schools. Because of this emphasis on fitness and the inadequacy of the physical education programs in many of North Dakota's high schools, the writer believed that a program stressing physical fitness seemed justified in the physical education curriculum at the University of North Dakota. The content of the introductory physical education program could be controlled completely and therefore was selected over others for revision.

The purpose of this study was to make a comparative study of two introductory physical education programs. The two programs compared were the regular introductory course which has been in effect at the University of North Dakota, and a revised introductory course designed by the writer specifically for this study. The most important

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[15]Hans Kraus and Ruth P. Hirshland. "Fitness of American Youth", Journal of Health, Physical Education and Recreation, September, 1956, p. 8.

area of comparison was physical fitness which was determined by a Physical Capacity Test composed of a dip test, vertical jump, a three-minute shuttle run, sit-ups, pull-ups, and the squat jump. Another area of comparison was in attitude toward physical education determined by the results of Dr. Wear's Attitude Inventory, Short Forms. The third area of information was the knowledge of the sports skills studied during the semester. This was determined by a Sports Skills Knowledge Test which was administered at the end of the semester. Because of the fact that this test was administered only once no comparison of gain or loss could be made. The results were used, however, to give an indication as to which group had more knowledge of the sports skills studied.

Four classes of introductory physical education students were selected to take part in this study. Two of the classes were placed in the control group and subjected to the regular introductory physical education program. The other two classes were placed in the experimental group and subjected to the revised introductory physical education program.

A Summary of the Physical Capacity Testing

The results of the initial testing determined that the students in the control group and the experimental group were of the same population. The only test which indicated otherwise was the vertical jump which indicated a difference of between .10 and .05. This difference could

not be considered significant, however, as the .05 level had been preselected as the lowest acceptable number. Finding the two groups to be of the same population was of major importance as it would have been very difficult to determine the final results.

The next comparison of testing data was that of the final test results. This comparison showed that the experimental group was significantly different from the control group in the dip test, vertical jump test, sit-up test, and squat jump test. The first three indicated a significant difference beyond the .05 level, and the squat jump test was significant beyond the .01 level. The three-minute shuttle run test and the pull-up test indicated a difference of between the .10 and the .05 level.

In addition to the two comparisons just made, a comparison of the gains made by each group for each test was done. The results of this comparison indicated that the experimental group gains were significantly different from those made by the control group. The dip test, vertical jump test, sit-up test, pull-up test, and squat jump test showed a significant difference beyond the .01 level. The three-minute shuttle run test showed a significant difference of beyond the .02 level. It is interesting to note that, even though the three-minute shuttle run test and the pull-up test did not indicate a significant difference when the final testing scores were compared, they were both beyond the .01 level when their gains were compared.

A Summary of Wear's Attitude Inventory

Short Form A of Wear's Attitude Inventory was administered to both groups at the start of the semester. The results of this first testing of attitude toward physical education indicated that the control group and the experimental group were of the same population. It must be stressed again that this result was of utmost importance to the study in that if the two groups had made significantly different scores the comparison of the final test scores would have been extremely difficult, if not impossible.

The writer had two theories as to what might be indicated by the comparison of the second, or final, Attitude Inventories. First of all it was hoped that the experimental group would make a significant gain in their attitude toward physical education. Secondly, if no significant gain was made, it was hoped that the two groups would be of the same population at the end of the study. The reason for this second theory was that if the experimental group, which had been subjected to a much more rigorous program, did not fall below the control group in attitude then this was at least some consolation.

The results of the second Attitude Inventory, Short Form B, indicated that the two groups were of the same population.

Because of the fact neither group was significantly different from the other at either the first or second testing, no comparison of their gains was made.

A Summary of the Sports Skills Knowledge Test

The sports Skills Knowledge Test is one which has been administered to the students of introductory physical education classes for several years. This same test was administered to both groups at the end of the semester which is normal procedure.

This test was given in conjunction with this study for the purpose of trying to determine if one of the two groups had acquired more knowledge of the sports skills studied.

The results of the comparison of the scores made by the two groups indicates that they had approximately the same knowledge of sports skills.

Conclusions

In conclusion the writer wishes to point out several things.

First, the comparison of the regular with the revised introductory physical education program seems to have been successful. The area of physical fitness, as measured by the Physical Capacity Test, was better developed through the revised program. This was the primary objective for revising the program and developing this study.

Secondly, although the experimental group did not make a greater change in attitude than did the control group, the results should not be overlooked. The primary purpose of the revised program was to develop physical fitness. The effect of this did not alter the students' attitude toward physical education. Although the revised program did not improve attitude it did not hinder it either.

Third, the knowledge of sports skills acquired by the experimental group was approximately the same as that of the control group. This would indicate that, although much less actual practice of the sports skill was given, the experimental group still acquired about the same amount of understanding.

Recommendations

Because of the results of this study and the need for youth fitness, the writer wishes to make the following recommendations:

1. Because of the time limitations of one semester placed on this study, it is recommended that additional study be given to the revision of the introductory physical education program.

2. If additional studies are made the writer wishes to recommend that more emphasis be placed on the values of physical fitness and its important role in our society today.

3. It is hoped that this revised program will be given some consideration when a revision of the introductory physical education program takes place.

Teaching Hits for Conditioning Drills

The activity known as calisthenics, but more appropriately called conditioning drills, is frequently lacking from the viewpoint of interest and enjoyment. This lack of acceptance is due in part to a misunderstanding concerning the purpose of the work and also to the methods of instruction. Because of the body building value inherent in the conditioning drills, when properly directed, a number of teaching suggestions are presented.

1. Give short, clear explanations.
   a. Give the name of the exercise.
   b. Do not waste words but protect the voice.
   c. Stand at an adequate distance from the class; stand in front, and talk to the whole class.

2. Give good demonstrations.
   a. Give them where everyone in class can see them.
   b. Use snappy movements with good form emphasized. Many students do not concentrate on what is said, so a demonstration will give them a mental picture of what is wanted.
   c. Demonstrate exercises to the left if the class is to perform to the right. (Mirrorlike)

3. Frequently combine demonstration and explanation.

4. Present the exercise to the class "on count". That is, give the commands one count at a time and have the class take each position. Gradually swing into a rhythmic performance.

5. Insist on good form. Do not be satisfied with indefinite, half-hearted work.

6. Keep the voice pleasant. Do not use a harsh, drill master type of voice.

7. Change rapidly from one exercise to another. Waste no time between exercises.

8. Start with a fairly slow tempo so that all can reach the end position with proper form and return again in time. Then increase the tempo so all get a good work out and cardiovascular stimulation.

9. Extend the tempo of the counts for difficult movements. Carefully watch the tempo. Count slower or use multi-rhythm method.

10. Permit some talking and joviality while working, but keep it under control.

Suggested Conditioning Drills

1. The Stretcher;

Starting position:	Stand erect.
Count 1	Swing arms to thrust position elbows down and back, and step sideward with the right foot.
Count 2	Stretch arms upward and rise on toes.
Count 3	Return arms to thrust position and heels to the floor.
Count 4	Return to starting position.
Count 5 - 8	Repeat to the other side.

2. The Twister;

Starting position:	Straight seat on the floor, legs apart, hands on hips, and straight back.
Count 1	Twist the trunk to the right, bend forward, and touch the right toe with the left hand.
Count 2	Return to starting position.
Count 3 - 4	Repeat to the other side.

3. Cross Booter;

Starting position:	Standing erect, hands on hips.
Count 1	Stretch the left hand forward, shoulder high and kick it with the right foot, do not lower the hand.
Count 2	Return to starting position.
Count 3 - 4	Repeat to other side.

4. The Side Bender;

Starting position:	Standing erect, feet apart, hands behind the neck, elbows forced back.
Count 1	Bend the trunk right sideward and stretch the arms overhead. Do not twist the trunk.
Count 2	Return to starting position.
Count 3 - 4	Repeat to the other side.

5. The Neck Twister;

Starting position:	Standing erect, hands behind the neck, elbows back. Twist the head.
Count 1	Twist the head to the right and press it backward. Keep the chin low.
Count 2	Return to starting position.
Count 3 - 4	Repeat to the other side.

6. The Squatter;

Starting position:	Stand erect.
Count 1	Bend knees to squat position and place hands on floor.
Count 2	Straighten the knees keep the hands on the floor.
Count 3	Return to squat position.
Count 4	Return to starting position.

7. Leg Lifter;

Starting position:	Lying on the back, hands under the buttocks.
Count 1	Raise both legs 6 inches from the floor, keeping them straight and toes pointed.
Count 2	Raise the legs to the vertical, keeping them straight and the hips on the floor.
Count 3	Lower the legs to within 6 inches of the floor.
Count 4	Return to starting position.

8. The Compressor;

Starting position:	Stand erect, feet wide apart, arms sideward, palms upward.
Count 1	Bend the trunk forward over the right knee and wrap the arms around the right thigh.
Count 2	Return to starting position.
Count 3 - 4	Repeat to the other side.

9. The Dipper;

Starting position:	Squat position with the hands on the floor.
Count 1	Straighten the legs backward to a front support.
Count 2	Bend the arms till the chest touches the floor.
Count 3	Straighten the arms to a front support.
Count 4	Return to starting position.

10. The Bellows;

Starting position:	Raise arms upward, rise on toes, and inhale.
Count 1	Calapse forward from the hips, touch toes, and exhale.
Count 2	Return to starting position.

11. The Splitter;

Starting position:	Standing erect, hands on hips.
Count 1	Jump to a stride stand with the feet 12 inches apart.
Count 2	Jump to a stride stand with the feet 24 inches apart.
Count 3	Jump to a stride stand with the feet as far apart as possible.
Count 4	Return to starting position.

12. Spread Eagle;

Starting position:	Stand erect.
Count 1	Jump to a stride stand and clap the hands overhead.
Count 2	Return to starting position.

13. Toe tapper;

Starting position:	Stand erect, feet wide apart, arms sideward, palms up.
Count 1	Bend the trunk forward and touch the left toe with the right hand. Keep both knees straight.
Count 2	Return to starting position.
Count 3 - 4	Repeat to the other side.

14. Trunk Circling;

Starting position:	Stand erect, feet wide apart, hands behind the neck, elbows back.
Count 1	Bend the trunk right sideward. Do not twist it.
Count 2	Circle the trunk forward keeping the elbows back.
Count 3	Circle the trunk to the left side.
Count 4	Return to starting position.
Count 5 - 8	Repeat starting to the left side.

15. Double Leg Plunger;

Starting position:	Sitting on the floor, legs straight and together, hand on the floor behind the buttocks.
Count 1	Draw the knees in to the chest keeping the heels off the floor.
Count 2	Straighten the legs forward and upward.
Count 3	Repeat without touching the heels to the floor.
Count 4	Return to starting position.

16. Resistance Stretcher;

Starting position:	Stand erect.
Count 1 - 2	Swing arms forward and upward and place the hands behind the neck while inhaling.
Count 3 - 4	Move hands upward and forward (fingers laced, palms forward) to position at the sides while exhaling.

17. Twist Bender;

Starting position:	Stand erect, feet apart, arms sideward, palms up.
Count 1	Twist the trunk to the right.
Count 2	Bend forward and touch the right toe with both hands. Keep both legs straight.
Count 3	Straighten the trunk and move the arms sideward.
Count 4	Return to starting position.
Count 5 - 8	Repeat to the other side.

18. Vertical Jump;

Starting position:	Stand erect, feet slightly apart, hands overhead.
Count 1	Swing arms downward and backward and half squat.
Count 2	Whip arms upward and leap upward for height.

19. Squat Thrust;

Starting position:	Stand erect.
Count 1	Squat and place hands on the floor.
Count 2	Extend the legs backward to a front support.
Count 3	Return to a squat position.
Count 4	Return to starting position.

20. Squat Vault;

Starting position:	Front support.
Count 1	Squat through to rear support (legs and hips pass between arms).
Count 2	Turn over to the right to a front support.

PHYSICAL CAPACITY TEST

University of North Dakota

Name_____ Age_____

Class_____ Section_____

Height: Initial _____ Final _____

Weight: Initial _____ Final _____

Test Items	Initial Score	Final Score	Gain or Loss
1- Dips			
2- Vertical Jump			
3- Shuttle Run			
4- Sit-ups			
5- Pull-ups			
6- Squat Jumps			

Instructor Comments:

PHYSICAL CAPACITY TEST

1. DIPS

To be done on one end of the parallel bars.

The exercise starts from a straight arm support position. The body is then lowered by the arms until the elbows are completely flexed. The body is then raised until the arms are in a straight arm support position. This constitutes one complete exercise. The student shall continue as long as he possibly can with a continuous motion. No kicking, swinging, or jerking is allowed.

One point will be given for each completed exercise. No half points will be given for any partial completions.

2. VERTICAL JUMP

To be executed near a wall where a chalk board has been securely fastened.

The student will first chalk the ends of his fingers and place them securely against the chalk board while facing the wall with his toes touching the wall and the feet flat on the floor and together. This mark will indicate the highest point of the boy's standing reach.

The student will then chalk his fingers again and turn one of his shoulders to the wall directly below the initial chalk mark. He will then flex his knees and holding his arms down and slightly back will spring into the air throwing his arms upward. At the highest point of his jump, he will reach to the chalk board with his inside hand and mark the board with his chalked finger tips. This mark will then indicate his highest point of vertical jump. This same procedure of jumping will be done two more times and the highest mark will be taken as his vertical jump.

To score the boy's vertical jump, the distance between the standing reach and the jumping reach will be measured to the nearest half inch and recorded. All measurements will be done in inches and half-inches.

3. SHUTTLE RUN (3-minute)

To be done on the gymnasium floor.

Five running lanes will be used, each designated by a metal standard at each end. Each running lane is twenty-five yards in length, and has a chair marking each five-yard interval along the lane.

Five boys will be given the test at one time and are started together. The run is not against any of the other boys, but to see the number of times each boy can run in

shuttle fashion around the standards in his lane. The object is to run as far as possible in the three minutes allowed.

The signal "GET SET", "GO!" will be used to start the shuttle run. At this time, the timer will press the button on the stop watch. The boys will then run to the other standard, go around it, and come back to the starting standard, going around it and continuing this route until the three minutes are up at which time the timer will then yell, "STOP!" The person scoring for each boy will then note the chair which the runner was closest to when the time expired.

For each lap the runner recieves fifty yards and for each partial lap he receives five yards for each chair he passes. Therefore, if the runner completes fourteen laps and passes three chairs, he will have run a total of (14 x 50 plus 3 x 5) 715 yards. This is the score which is recorded on the boy's test card.

4. SIT-UPS (2-minute)

To be done on a wooden floor.

The person being tested starts in a sitting position with fingers interlaced and hands locked behind the head. One person is holding his ankles so that his feet will not raise off the floor during the exercise. The person then arches his back and bends backward until his fingers and only his fingers touch the floor. He must then raise to a sitting position and touch his elbows to his knees; this constitutes one repetition. At no time may he touch any part of his upper body to the floor other than his hands. He then completes as many repetitions as possible within the time allowed, which is two minutes. He may stop and rest if need be, but this must be done in a sitting position and the hands must remain locked behind the head.

One point is scored for each complete repetition, and half points are not scored. On any repetition where the student touches any part of his upper body other than his hands, no point is scored, but he is allowed to continue the test.

5. PULL-UPS

To be done on the horizontal bar with the bar adjusted at such a level so that no student when hanging on the bar can touch his feet to the floor.

When the student is ready to begin the test he will jump up and grasp the bar with an over-hand grip and come to a complete straight arm hang. He will then begin by pulling his body up until his chin clears the top of the bar.

He then lowers his body again to a complete arm hang. This completes one execution of the exercise.

No swinging, kicking, or jerking is allowed and any repetition when this is used is not to be counted.

One point is scored for each correct repetition of the exercise. No resting is allowed; this must be a continuous exercise.

6. SQUAT JUMPS

To be done on a smooth wooden surface.

The student begins the exercise in a squat position with one foot placed slightly in front of the other foot. His hands are locked behind his head with his elbows extended back and on the same vertical plane with the back bone. The student then jumps into the air straightening out his legs and clearing the floor with his feet. While in the air the foot which was slightly ahead is then the back foot, and the foot which was in back now becomes the front foot. The hands remain locked behind the head with the back kept straight. Upon returning to the floor, the student goes into the original squat position. This completes one repetition of the exercise. The student is to continue this procedure as long as possible.

One point is scored for each repetition of the exercise.

PHYSICAL EDUCATION ATTITUDE SCALES

FORM A

C. L. Wear
University of Nebraska

Below you will find some statements about physical education. We would like to know how you feel about each statement. You are asked to consider physical education only from the standpoint of its place as an activity course taught during a regular class period. No reference is intended in any statement to interscholastic or intramural athletics. People differ widely in the way they feel about each statement. There is no right or wrong answers.

You have been provided with a separate answer sheet for recording your reaction to each statement. (a) Read each statement carefully; (b) Go to the answer sheet, and (c) opposite the number of the statement place an "X" in the square which is under the word (or words) which best expresses your feeling about the statement. After reading a statement you will know at once, in most cases, whether you agree or disagree with the statement. If you agree, then decide whether to place the "X" under "agree" or "strongly agree." If you disagree, then decide whether to place the "X" under "disagree" or "strongly disagree." In case you are undecided or neutral concerning your feeling about the statement then place an "X" under "undecided." Try to avoid placing an "X" under "undecided" in most instances.

Wherever possible, let your own personal experience determine your answer. Work rapidly, do not spend much time on any statement. This is not a test, but is simply a survey to determine how people feel about physical education. Your answers will in no way affect your grade in any course. In fact, we are not interested in connecting any person with any paper, so please answer each statement as you actually feel about it.

Be sure to answer every statement.

1. If for any reason 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 most 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 physically 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.

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 activities makes for a more wholesome outlook on life.

21. Physical education adds nothing to the improvements 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 helthful 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.

PHYSICAL EDUCATION ATTITUDE SCALES

FORM B

C. L. Wear
University of Nebraska

Below you will find some statements about physical education. We would like to know how you feel about each statement. You are asked to consider physical education only from the standpoint of its place as an activity course taught during a regular class period. No reference is intended in any statement to interscholastic or intramural athletics. People differ widely in the way they feel about each statement. There is no right or wrong answers.

You have been provided with a separate answer sheet for recording your reaction to each statement. (a) Read each statement carefully; (b) Go to the answer sheet, and (c) opposite the number of the statement place an "X" in the square which is under the word (or words) which best expresses your feeling about the statement. After reading a statement you will know at once, in most cases, whether you agree or disagree with the statement. If you agree, then decide whether to place the "X" under "agree" or "strongly agree." If you disagree, then decide whether to place the "X" under "disagree" or "strongly disagree." In case you are undecided or neutral concerning your feeling about the statement then place an "X" under "undecided". Try to avoid placing an "X" under "undecided" in most instances.

Wherever possible, let your own personal experience determine your answer. Work rapidly, do not spend much time on any statement. This is not a test, but is simply a survey to determine how people feel about physical education. Your answers will in no way affect your grade in any course. In fact, we are not interested in connecting any person with any paper, so please answer each statement as you actually feel about it.

1. Associations 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 outside the class.

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.

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 contributions 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 class 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. Physical education may help to develop leadership qualities in a person.

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.

PHYSICAL EDUCATION ATTITUDE SCALES

FORM A

NAME_____ CLASS_____ SECTION_____

ANSWER SHEET:

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
17.					
18.					
19.					
20.					
21.					

Form A

	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
22.	_____	_____	_____	_____	_____
23.	_____	_____	_____	_____	_____
24.	_____	_____	_____	_____	_____
25.	_____	_____	_____	_____	_____
26.	_____	_____	_____	_____	_____
27.	_____	_____	_____	_____	_____
28.	_____	_____	_____	_____	_____
29.	_____	_____	_____	_____	_____
30.	_____	_____	_____	_____	_____

TABLE OF RAW SCORES FOR THE PHYSICAL CAPACITY TESTS

TEST Dips GROUP Control

Student	Initial test	Final test	Raw Score Difference
JA	3	4	1
WA	8	8	0
TB	10	9	-1
KB	0	1	1
LD	1	6	5
JD	1	1	0
MD	3	5	2
RD	8	8	0
GE	8	8	0
JG	7	4	-3
GG	9	6	-3
WG	12	12	0
JCG	1	7	6
LG	6	7	1
DH	8	8	0
SH	11	8	-3
AJ	8	9	1
RJ	3	3	0
RL	5	5	0
DWL	9	9	0
DL	5	7	2
CM	10	8	-2
RM	7	9	2
RN	7	5	-2
JO	0	1	1
RS	5	5	0
DS	0	0	0
GS	3	3	0
WS	4	8	4
JT	7	10	3
MT	5	4	-1
TT	7	6	-1
DV	13	15	2
GW	8	9	1
EW	13	15	2
DW	7	8	1
JW	3	1	-2

TABLE OF RAW SCORES FOR THE PHYSICAL CAPACITY TESTS

TEST Dips GROUP Experimental

Student	Initial test	Final test	Raw Score Difference
RA	10	11	1
RAB	7	7	0
BB	13	14	1
GD	16	18	2
JJD	12	15	3
GJD	6	10	4
GE	14	15	1
JE	15	17	2
JH	1	2	1
LH	1	7	6
DH	1	7	6
KH	4	8	4
GH	6	7	1
SJ	7	9	2
WJ	9	11	2
RK	3	6	3
DK	3	9	6
DL	7	14	7
JGM	9	8	-1
JM	9	12	3
LM	1	4	3
HM	2	4	2
GN	0	4	4
LN	2	7	5
RO	1	7	6
MP	9	10	1
RP	0	4	4
EP	7	11	4
GP	8	9	1
WS	7	11	4
LS	2	8	6
JS	7	9	2
LV	4	14	10
AW	1	7	6
KW	9	18	9
WW	7	9	2
GW	2	5	3

CHI-SQUARE CONTINGENCY TABLE FOR THE PHYSICAL CAPACITY TEST

TEST Dips TESTING PERIOD Initial

	control	experimental	
8 - up	14 (12.5)	11 (12.5)	25
4 - 7	12 (12.0)	12 (12.0)	24
0 - 3	11 (12.5)	14 (12.5)	25
	37	37	74

$$
\begin{aligned}
(1.5)^2 \div 12.5 &= 0.180 \\
(-1.5)^2 \div 12.5 &= 0.180 \\
0 \div 12.0 &= 0.000 \\
0 \div 12.0 &= 0.000 \\
(-1.5)^2 \div 12.5 &= 0.180 \\
(1.5)^2 \div 12.5 &= 0.180 \\
X^2 &= 0.720
\end{aligned}
$$

P = between .70 and .50

df = 2

From Table E:

$$
\begin{aligned}
0.713 &= .70 \\
1.386 &= .50 \\
2.408 &= .30 \\
3.219 &= .20 \\
4.605 &= .10 \\
5.991 &= .05
\end{aligned}
$$

CHI-SQUARE CONTINGENCY TABLE FOR THE PHYSICAL CAPACITY TEST

TEST Dips TESTING PERIOD Final

	control	experimental	
9 - up	9 (14.5)	20 (14.5)	29
6 - 8	14 (13.0)	12 (13.0)	26
0 - 5	14 (9.5)	5 (9.5)	19
	37	37	74

$$(-5.5)^2 \div 14.5 = 2.086$$
$$(5.5)^2 \div 14.5 = 2.086$$
$$(1.0)^2 \div 13.0 = 0.076$$
$$(-1.0)^2 \div 13.0 = 0.076$$
$$(4.5)^2 \div 9.5 = 2.131$$
$$(-4.5)^2 \div 9.5 = 2.131$$

$$x^2 = 6.586$$

$$P = \text{beyond } .05$$

df = 2

From Table E:

0.713 = .70
1.386 = .50
2.408 = .30
3.219 = .20
4.605 = .10
5.991 = .05

CHI-SQUARE CONTINGENCY TABLE
FOR THE PHYSICAL CAPACITY TEST

TEST Dips TESTING PERIOD Gain or loss between

	control	experimental	
2 - up	9 (18.5)	28 (18.5)	37
0 - 1	19 (13.5)	8 (13.5)	37
- (-1)	9 (5.0)	1 (5.0)	10
	37	37	74

$(-9.5)^2 \div 18.5 = 4.878$
$(9.5)^2 \div 18.5 = 4.878$
$(5.5)^2 \div 13.5 = 2.241$
$(-5.5)^2 \div 13.5 = 2.241$
$(4.0)^2 \div 5.0 = 3.200$
$(-4.0)^2 \div 5.0 = 3.200$

$X^2 = 20.638$

P = beyond .01

df = 2

From Table E:

0.713 = .70
1.386 = .50
2.408 = .30
3.219 = .20
4.605 = .10
5.991 = .05

TABLE OF RAW SCORES FOR
WEAR'S ATTITUDE INVENTORY

TEST Short Forms A and B GROUP Control

Student	Initial test	Final test	Raw Score Difference
JA	104	108	4
WA	123	139	16
TB	91	113	22
KB	131	134	3
LD	136	137	1
JD	109	116	7
MD	118	85	-33
RD	134	136	2
GE	142	134	-8
JG	109	113	4
GG	131	137	6
WG	120	118	-2
JCG	132	129	-3
LG	133	132	-1
DH	114	131	17
SH	122	127	5
AJ	130	114	-16
RJ	130	135	5
RL	108	110	2
DWL	120	130	10
DL	131	130	-1
CM	134	94	-40
RM	116	103	-13
RN	132	129	-3
JO	68	85	17
RS	122	124	2
DS	95	97	2
GS	130	130	0
WS	129	124	-5
JT	123	125	2
MT	124	124	0
TT	125	136	11
DV	135	131	-4
GW	142	126	-16
EW	118	125	7
DW	120	124	4
JW	120	130	10

TABLE OF RAW SCORES FOR WEAR'S ATTITUDE INVENTORY

TEST Short Forms A and B GROUP Experimental

Student	Initial test	Final test	Raw Score Difference
RA	127	132	5
RAB	121	130	9
BB	112	84	-28
GD	141	149	8
JJD	125	132	7
GJD	122	122	0
GE	116	78	-38
JE	137	138	1
JH	118	127	9
LH	120	130	10
DH	122	132	10
KH	130	128	-2
GH	134	131	-3
SJ	120	128	8
WJ	121	127	6
RK	127	129	2
DK	120	118	-2
DL	110	108	-2
JGM	104	95	-9
JM	140	131	-9
LM	137	134	-3
HM	116	129	13
GM	124	120	-4
LM	112	126	14
RO	99	125	26
MP	131	121	-10
RP	131	138	7
EP	117	117	0
GP	123	111	-12
WS	122	132	10
LS	109	138	29
JS	119	127	8
LV	122	129	7
AW	123	135	12
KW	125	127	2
WW	117	115	-2
GW	124	134	10

CHI-SQUARE CONTINGENCY TABLE FOR
WEAR'S ATTITUDE INVENTORY

TESTING PERIOD Initial

	control	experimental	
131 - up	12 (9.5)	7 (9.5)	19
120 - 130	14 (16.0)	18 (16.0)	32
30 - 119	11 (11.5)	12 (11.5)	23
	37	37	74

$(2.5)^2 \div 9.5 = 0.658$
$(-2.5)^2 \div 9.5 = 0.658$
$(-2.0)^2 \div 16.0 = 0.250$
$(2.0)^2 \div 16.0 = 0.250$
$(-0.5)^2 \div 11.5 = 0.022$
$(0.5)^2 \div 11.5 = 0.022$

$X^2 = 1.860$

P = between .50 and .30

df = 2

From Table E:

0.713 = .70
1.386 = .50
2.408 = .30
3.219 = .20
4.605 = .10
5.991 = .05

CHI-SQUARE CONTINGENCY TABLE FOR WEAR'S ATTITUDE INVENTORY

TESTING PERIOD Final

	control	experimental	
131 - up	11 (12.0)	13 (12.0)	24
119 - 130	14 (15.0)	16 (15.0)	30
30 - 118	12 (10.0)	8 (10.0)	20
	37	37	74

$$
\begin{aligned}
(-1.0)^2 \div 12.0 &= 0.083 \\
(1.0)^2 \div 12.0 &= 0.083 \\
(-1.0)^2 \div 15.0 &= 0.067 \\
(1.0)^2 \div 15.0 &= 0.067 \\
(2.0)^2 \div 10.0 &= 0.400 \\
(-2.0)^2 \div 10.0 &= 0.400 \\
\hline
X^2 &= 1.100
\end{aligned}
$$

P = between .70 and .50

df = 2

From Table E:

$$
\begin{aligned}
0.713 &= .70 \\
1.386 &= .50 \\
2.408 &= .30 \\
3.219 &= .20 \\
4.605 &= .10 \\
5.991 &= .05
\end{aligned}
$$

CHI-SQUARE CONTINGENCY TABLE FOR
SPORTS SKILLS KNOWLEDGE TEST

TEST Final

	control	experimental	
111 - up	13 (11.0)	9 (11.0)	22
105 - 110	12 (11.5)	11 (11.5)	23
30 - 104	12 (14.5)	17 (14.5)	29
	37	37	74

$(2.0)^2 \div 11.0 = 0.364$
$(-2.0)^2 \div 11.0 = 0.364$
$(0.5)^2 \div 11.5 = 0.022$
$(-2.0)^2 \div 11.5 = 0.022$
$(-2.5)^2 \div 14.5 = 0.431$
$(2.5)^2 \div 14.5 = 0.431$

$X^2 = 1.634$

P = between .50 and .30

df = 2

From Table E:

0.713 = .70
1.386 = .50
2.408 = .30
3.219 = .20
4.605 = .10
5.991 = .05

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