THE COMPARATIVE EFFECT OF TWO METHODS OF TEACHING GOLF SKILLS TO COLLEGE STUDENTS

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Roy Dean Johansen

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INTRODUCTION

One objective of physical education is the neuro-muscular development of individuals through motor learning. The progressive physical education instructor is constantly on the alert for new methods to improve the teaching of motor skills.

For many years the accepted procedure for learning the golf swing was through use of the part method. This method involves learning partial swings and gradually progressing into the full swing. As the popularity of golf has increased, more and more professional golfers and teachers have begun to advocate another method of teaching golf. The whole method as compared to the part method involves learning the full swing as soon as the golfer has mastered the techniques of gripping the club.

Each year colleges are graduating future physical education teachers. One thing which should be included in the course of study is golf, due to its inclusion in the life-time sports program. The average physical education teacher will have a limited background in golf participation, and it is up to his teacher-training institution to inform him as to the best method to present it to his students.

I. STATEMENT OF THE PROBLEM

The purpose of this study was to compare the effectiveness of two different methods of teaching golf skills to college students. More specifically, this study attempted to answer the following question: Is there any significant difference in the effectiveness of the part method of golf instruction as compared to teaching golf skills by the whole method?

II. DEFINITIONS OF TERMS

Part-teaching technique. As the instruction progresses emphasis is given to the various components of the full swing. The instructor calls the attention of the group to such things as forward press or waggle, starting the club head back, cocking the wrists, position of the elbow, club position at the top of the backswing, initial movement downward, uncorking the wrists, and the follow-through. Each body and club movement is taken up in order until the students ultimately arrive at the full swinging wood shots. Some writers have described this method as the repetitive-part technique. In the write-up of this investigation the procedure will simply be referred to as the part method.

Whole-teaching technique. This technique involves learning the full swing as soon as the golfer has mastered the techniques of gripping the club.

III. LIMITATIONS OF THE STUDY

This study was limited to students regularly enrolled in two golf classes at Kansas State Teachers College in Emporia, Kansas, during the spring semester, 1967.

A second limitation is that the motivation of the individual cannot be controlled, and there is no way to measure whether the effort by each student was really his best.

CHAPTER II

REVIEW OF LITERATURE

As a foundation for this study investigations were made of learning methods and their specific adaption for learning the golf swing. An evaluation of golf skill tests was also made to ascertain their applicability in this study. The review of previous research will be categorized under the following headings; (1) learning of mental skills; (2) learning of motor skills; (3) learning of combined skills; (4) research dealing with golf skill tests.

I. PREVIOUS RESEARCH

Research related to learning of mental skills. Pechstein made probably the first study in the motor field of learning.[1] Previous studies in methods of learning dealt primarily with the learning of prose and poetry. He set up a maze which consisted of four distinct units. These units could be separated and learned as a whole. The whole method proved far superior while using both humans and rats as subjects; not satisfied, he went further and tried the

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[1] L. A. Pechstein, "Whole Versus Part Method in Motor Learning: A Comparative Study," Psychological Monographs, XXIII, (1917).

progressive-part method, finding it superior to either the whole method or the part method. The existing thought at that time had been all in favor of whole learning and Pechstein questioned its superiority until the results of certain modified forms of part learning had been obtained and found inferior.

A later study by Pechstein involved the question of massed learning as opposed to distributed learning.[2] He found that it was tied up with the question of whether the difficult problem was to be learned as a whole or in parts. It was discovered that the hard problem became easier when it was learned under mass conditions by the part method. The problem remained hard if it was learned as a whole under massed or distributed conditions. These results held for the motor learning of the maze type, both for selected animals and the human adult.

Barton used six males and twenty-eight females from college psychology classes to investigate smaller and larger units in learning a maze.[3] These thirty-four subjects were

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[2]L. A. Pechstein, "Massed vs. Distributed Effort in Learning," Journal of Educational Psychology, XII (February 1921), pp. 92-97.

[3]J. W. Barton, "Smaller vs. Larger Units in Learning the Maze," Journal of Experimental Psychology, IV (December 1921), pp. 418-429.

randomly assigned to three groups. With the whole method the subject always started at the beginning of the maze and continued until he had reached the end; in the part continuous the subject learned the first quarter of the maze, then the second quarter, and then practiced the two together and so forth until all parts had been learned. In the part method each quarter was learned as a separate unit after which the units were combined and relearned as a whole. The subjects practiced each day for fifteen minutes until the criterion of being able to trace the maze three consecutive times without error was met. Barton concluded that the part method was by far the best of the three methods used.

Reed reviewed studies and conclusions reached by eminent psychologists up to that time and found that they seemed to highly favor the whole method of learning.[4] Reed then conducted his own experiment in the learning of poetry. He used the part method, the progressive-part method and the whole method. Conclusions were that progressive-part method and the part method were both superior to the whole method in the learning of poetry.

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[4] H. B. Reed, "Part and Whole Methods of Learning," Journal of Educational Psychology, XV (January, 1924), pp. 107-115.

Brown disagreed with Reed and other advocates of the part method.[5] He conducted an experiment of his own dealing with vocabulary association. Brown's data indicated that the whole method of learning was superior.

Another experimenter named Brown made a comparison of whole, part and combination methods of learning piano music.[6] The combination method was identical to the whole method except that errors were practiced separately. The whole method was most efficient, the combination (whole-part-whole) was second, and the part method was the least efficient method of all.

In 1929 Crafts published the results of an experiment in which the task was to sort cards into various compartments; the whole method and various types of part methods of learning were used.[7] The subjects were one hundred forty-three male and female undergraduate college students.

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[5] W. Brown, "Whole and Part Methods in Learning," Journal of Educational Research, XV (April, 1924) pp. 229-233.

[6] R. W. Brown, "A Comparison of the Whole, Part and Combination Methods of Learning Piano Music," Journal of Experimental Psychology, XI (June, 1928), p. 235.

[7] L. W. Crafts, "Whole and Part Methods with Non-serial Reactions," American Journal of Psychology, XXXI, (October, 1929), pp. 543-563.

In each of the methods used the order of the compartments into which the cards were sorted was not known previous to the preliminary of learning trials. In the whole method preliminary sorting of cards into four compartments was followed by sorting the complete deck of nine differently numbered cards into nine compartments. Sorting the cards by the pure part method began with sorting three differently marked cards into three compartments, the last three differently marked cards into the remaining compartments and finally sorting a deck containing all nine numbers. In the combination part method of learning the subjects sorted packs of cards containing three differently marked cards into three compartments, then a pack with six different numbers into six compartments, and then the complete pack into nine compartments. The progressive part method began with decks of three different numbers, then decks of four, five and so on until packs of cards with the full nine numbers were reached. Time was used as the scoring device with one second added for each error. To compare the various methods, ten trials were given in which the speed attained on a given trial with the full deck of nine cards was recorded, and the second criterion was the amount of practice time required to attain the given speed. The speed to be reached in the second criterion was arbitrarily set by the investigator.

Crafts found that within the limits of the investigation the whole method was superior and the pure part least effective with the combination and progressive part methods between the two in efficiency.

McGeoch investigated the relative efficiency of the whole, progressive-part and pure part methods in learning and retention in relation to the intelligence quotient of gifted and normal subjects.[8] The gifted group of thirty-nine ten year old children had a mean intelligence of one hundred fifty-one while the mean intelligence of the normal group of the same age was ninety-nine. Vocabularies of ten paired associates of Turkish-English words and nonsense syllables, English words and poems of twelve lines each were used as the tasks to be learned. The amount of retention was tested after a twenty-four hour interval. McGeoch found that "the whole method is reliably superior to the pure part in learning and retention of both types of vocabulary with both gifted and normal groups."[9] It was also found that no reliable difference existed between the whole and pure part

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[8]Grace O. McGeoch, "The Intelligence Quotient as a Factor in the Whole-Part Problem," Journal of Experimental Psychology, XIV (August, 1931), pp. 333-358.

[9]Ibid., p. 357.

method of learning or retention of poetry for either group. In comparing the whole and progressive-part methods, the whole method of learning was superior to the progressive-part method only with the normal group in learning the ten pairs of nonsense-English associates. There was found to be a reliable difference between the pure part and progressive-part methods when the gifted children were learning the non-English associates.

The learning of music by the part and whole methods was investigated by Rubin-Rabson in 1940. Nine adults were used in the investigation; their task was to learn three compositions by three methods.[10] The whole method involved memorizing the eight-measure unit in its entirety; a part method involved learning the piece of music in two units or plases followed by practice of the whole piece. No superiority was found with any one of the three methods used. Rubin-Rabson stated:

> Despite the violence done to the psychological unity of the eight-measure fragment by tearing it into small parts, no evidence of this appears in the statistical results. There is reason to believe that the Gestalt theory of ineducable configurations may be faulty and that the smaller elements of the whole may not only be perceived as such, but may be welded successively into a whole by a simple-to-complex progression.[11]

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[10]Grace Rubin-Rabson, "Studies on the Psychology of Memorizing Piano Music: III. A Comparison of the Whole and Part Approach," Journal of Educational Psychology, XXXI, (September, 1940), pp. 460-476.

[11]Ibid., p. 475.

Research related to learning of motor skills. Each conducted an investigation concerning the relative value of the whole method as opposed to the part method in sensory motor learning demanding the simultaneous integration of simpler or part reaction.[12] Subjects had to perform simultaneously on two typewriters with the sequence of fingers on each hand being different and to acquire a speed equal to a metronome set at 140. One group practiced each hand separately while the other group attempted from the very beginning to manipulate both hands simultaneously and to keep time with the metronome. The data indicated that the part method tended to reduce considerably the total number of trials required for mastering the problem. The chances were seventy-five to one in favor of the part method as a trial saving device. Errors were more rapidly eliminated by the part method group. Koch felt that the advantage of the part method group over the whole method was greatest when the task was most unfamiliar and difficult.

Gopalaswami investigated the most economical methods of motor learning.[13] Comparison was made of the advantages

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[12] H. L. Koch, "A Neglected Phase of the Part-Whole Problem," Journal of Experimental Psychology, VI (October 1923), pp. 366-376.

[13] M. Gopalasami, "Economy in Motor Learning," British Journal of Psychology, XV (January, 1925), pp. 226-236.

of learning by whole and part methods. He had his subjects trace a star pattern by observing it through a mirror. Work was done with four different groups, each using a different approach. These groups consisted of the whole-method, the pure-part method (massed), the progressive-part method (distributed), and the two-part method. Gopalaswami found considerable superiority for the progressive-part method and greatest inferiority in the whole method. The most varied results were obtained by the pure-part method which indicated that it was advantageous for some subjects but disadvantageous for others.

Cook investigated the whole-part problem by using a maze. The maze was a finger tracing device made of staples and blocks, and because of its resemblance to a spider, it was named the Spider Maze.[14] Three subjects were used: a woman thirty years of age, a male college student twenty years of age and a ten year old girl. Each of the three subjects learned to trace thirty-eight patterns on a maze while blindfolded. Both the part and whole methods were used. The results of the experiment found the whole method was superior in terms of trials and time.

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[14]Thomas W. Cook, "Whole Versus Part Learning the Spider Maze," Journal of Experimental Psychology, XX (May 1937), pp. 447-491.

A second investigation was reported by Cook.[15] The subjects were apparently the same three as were used in the previous investigation: a woman, a male college student and a ten year old girl. The investigation was conducted to study the significance of whole and part learning when repetition occurred in the maze patterns to be learned. Cook reported that the presence of repetitive patterns provided no assurance that the subject would respond to them, but if the repetition were discovered, it might lead to increased efficiency in tracing.

One of the early studies in the field of physical education which pertained to the whole-part problem was conducted by Shay.[16] Using two equated groups of sixteen each, the upstart on the horizontal bar was taught by the whole method and the progressive part method. The results showed the whole method superior to the progressive part method, having obtained a critical ratio of 3.3.

A study by Knapp and Dixon compared learning to juggling by two methods; the whole and whole-part methods

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[15]Thomas W. Cook, "Repetitive Patterns in Whole and Part Learning the Spider Maze," Journal of Experimental Psychology, XXIV, pp. 530-541.

[16]Clayton T. Shay, "The Progressive-Part vs. the Whole Method of Learning Motor Skills," Research Quarterly, XXIII (December, 1932), pp. 62-67.

of learning were employed.[17] The fifty-eight subjects were male senior students majoring or minoring in physical education. Two groups were formed by matching the subjects on the basis of opinions of the subjects and on previous athletic experience. One group was composed of seventeen pairs and the other group of twelve pairs. A part of each group used the whole method to practice juggling. The second part of one group followed a part-whole program of practice. The second part of the remaining group was allowed to choose its own method of practice.

The criterion measure used was the ability to make one hundred successful catches. The time required to meet the criterion was recorded and used as the basis for computations. The results of this study showed the whole method tended to be superior to the other methods in the time taken to attain the criterion.

Research related to learning combined skills. In 1934 Hanawalt used eight subjects at the University of Michigan to investigate various whole and part methods of learning.[18] The

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[17] C. G. Knapp and W. R. Dixon, "Learning to Juggle: II. A Study of Whole and Part Methods," Research Quarterly, XXIII (December, 1952), pp. 389-401.

[18] Ella M. Hanawalt, "Whole and Part Methods in Trial and Error Learning," Journal of Experimental Psychology, XVII (October, 1934), pp. 691-708.

investigator developed a rather complicated piece of equipment to be used in the study. The subject was to learn to move a drum which could be rotated and manipulated while looking at the blueprint of a maze to be followed. To determine the score for each subject, Hanawalt measured the actual distance the drum was moved plus the length of the true pathway times the number of trials. From this investigation the order of effectiveness of the various methods was found to be: the whole method, pure-part method, direct-repetitive-part method, reversed-repetitive-part method and the progressive-part method.

Experimenting with methods of teaching basketball skills to ninth-grade boys, Cross used three methods of teaching.[19] These methods were the whole method, the whole-part method and the minor game method. Using various skill tests as a basis for computing critical ration, the following results were reported:

> 1. The simpler unitary skills (visual and hand coordination of passing ball, and changing from catch to throw) are best taught by the whole method.

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[19]Thomas J. Cross, "A Comparison of the Whole Method, The Minor Game Method, and the Whole-Part Method of Teaching Basketball to Ninth-Grade Boys," Research Quarterly, VIII (December, 1937), pp. 49-54.

> 2. The most complex, as well as complex from a motor point of view (muscular coordination of handling ball, stopping and grasping ball, skill in shooting, visual and hand coordination of dribble, muscular coordination of feet, and ability to start and stop), are best taught by the whole-part method.
> 3. Skills of intermediate degree of complexity, and ones which are easily carried over from simpler games in identical form (such as pivoting, change from catch to throw, ability to start and stop, and ability to jump), are best taught by the minor game method.[20]

The relative effectiveness of the pure-part, progressive-part and the whole methods of teaching beginning tennis to college women was investigated by O'Donnell.[21] Sixty-nine subjects were assigned at random to three groups. Each of these groups received instruction by a different method in the forehand drive, the backhand drive, the service, followed by practice in a game situation. The results of the Dyer Backboard Test of Tennis Ability were used as a criterion measure. An analysis of covariance was the statistical design used. It was stated in the conclusions:

> There is substantial evidence that the tennis playing ability of college women, as measured by the Dyer Backboard Test of Tennis Ability, is more effectively improved under the whole method than under either the pure-part or progressive-part methods of teaching.[22]

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[20] Ibid., p. 54.

[21] Doris J. O'Donnell, "The Relative Effectiveness of Three Methods of Teaching Beginning Tennis to College Women," (Doctoral dissertation, Indiana University, 1956).

[22] Ibid., p. 84.

R. L. Wickstrom set out to determine whether the whole method or the whole-direct repetitive method (variation of the part method) was most effective in teaching gymnastics and tumbling.[23] This study was concerned with both the elementary and the intermediate levels of difficulty. The conclusion was that the whole method was superior to the whole direct-repetitive method on both levels of difficulty.

Two studies were found which reached no definite conclusion as to the most efficient method of learning. Combs compared the whole method of teaching track activities to seventh and eighth grade boys.[24] He found that his results differed with the different events and that innate individual differences might be factors to consider in determining teaching methods.

Bartley carried on a study to determine the difference in the amount of learning in tennis between two equivalent groups of college women when two different methods of teaching were used.[25] One method provided all instruction on the

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[23]Ralph Lee Wickstrom, "A Comparative Study of Methodologies for Teaching Gymnastics and Tumbling," (Unpublished doctoral dissertation, University of Iowa, 1952).

[24]L. V. Combs, "A Comparison of the Efficacy of the Whole Method and the Whole-Part-Whole Method of Teaching Track Activities," (Unpublished Master's thesis, University of Iowa).

[25]L. S. Bartley, "An Experimental Study to Determine the Effectiveness of Two Different Methods of Teaching Tennis," (Unpublished Doctoral dissertation, University of Michigan, 1952).

tennis courts while the other method made use of the classroom and tennis courts on alternate class meeting days. The general conclusion of this study was that there was no significant difference in the amount of learning that took place when the two different methods of teaching employed in this study were used.

A study by Theunissen compared the relative merits of teaching group golf by the whole and a part method.[26] The whole method of teaching emphasized learning the whole swing with concentration on feeling the correct swing. The component parts of the swing were not included in the instruction to this group. The group taught by the part method, however, was made aware of the various component parts of the swing as the waggle, starting the club head back, cocking the wrists, the downswing and so forth. The part method of instruction which was used is frequently called the progressive part method. Theunissen describes this method in the following manner:

> The first element is included in the practice of the second until the latter is learned, then the two elements are included in the practice of the third and this continues until the entire movement has been learned.[27]

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[26] William Theunissen, "Part-Teaching and Whole-Teaching of Beginning Group-Golf Classes for Male College Students," (Master's thesis, Indiana University, 1955).

[27] Ibid., pp. 3-4.

The subjects used in this study were male college students. The forty-eight subjects were divided into two groups of equal general motor ability, and paired man for man. The conclusions of the study were as follows:

1. There was a positive and significant relationship between general motor ability and golfing ability.

2. For beginning male golfers of college age, being instructed in group classes, the whole-method proved superior to the part-method of teaching over a ten-week, twenty-lesson, indoor instruction program.

3. For variations from the whole-swing--run-up approaches, pitch shots, putting, sand-shots--the part-method showed earlier results, but the whole-method eventually equaled and passed it.

4. Previous studies on teaching methods in the various motor skills, backed by statistical evidence, were definitely lacking.[28]

The progression of clubs used was the 7 or 8 iron, 5 iron, 3 iron, putter, 3 wood without tees, and 1 wood with tees.

A study by Loftin compared the whole and part method, plus two different club progressions on achievement in

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[28] Ibid., p. 46.

beginning golf skills of freshman college women.[29] The variations of progression were presentation of the putter first followed by the 9 iron, 5 iron, 2 iron and wood club and presentation of the wood first followed by the 2 iron, 5 iron, 9 iron and putter. The criterion measure was the score earned while playing eighteen holes of golf following the instruction period.

Loftin found no significant difference in achievement as measured by the total score for eighteen holes of golf, among the groups taught under the four experimental treatments.

Research dealing with golf skill tests. A limited number of research studies have been conducted in golf; one of these, a study by McKee in 1950 was made to devise a test for the full swinging shot in golf.[30] Two tests were constructed; one for use outside with a hard ball and the other inside with a cotton ball. Both tests are virtually the same although the measurements for the cotton ball test were easier to secure. The elements used to

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[29]Aimee M. Loftin, "Effects of Variations in Method and Club Progression on Golf Achievement of College Women," (Doctoral dissertation, Indiana University, 1957).

[30]Mary Ellen McKee, "A Test for the Full Swinging Shot in Golf," Research Quarterly, XXI (March, 1950), pp. 40-46.

evaluate a full swinging shot were "the velocity of the ball, and the angle of impact of the club head with the ball, and the angle of deviation to the right or left of the intended line of flight."[31]

The hard ball test was shown to be a reliable and valid measure of the full swinging shot in golf. The cotton ball test was also reported to be reliable and valid although the validity coefficients were not as high as those for the hand ball test. The reliability of these tests were "undoubtedly influenced in a higher direction by the wide range of skill of the subjects . . . ."[32]

No comparison was made between the results of these tests and actual playing ability. McKee felt that the tests were a good motivating device and could be an aid in evaluating the success of the teaching method used when repeated throughout the instruction period.

Vanderhoof constructed an indoor golf test using the 2 wood for the drive and the 8 iron for the approach shot.[33] Standards were placed fourteen feet from a line with a rope eight feet above the floor between the standards. A ten pin

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[31] Ibid., p. 40.

[32] Ibid., p. 46.

[33] Ellen R. Vanderhoof, "Beginning Golf Achievement Tests," (Master's thesis, State University of Iowa, 1956).

or other small object was placed at the opposite end as a target. The scoring area was divided into three areas, one through three, with the closest being one. Each student received fifteen trials and the sum of the scores was then totaled. Reliability was 0.90 and validity 0.71 for the drive test. For the approach shot reliability was 0.84 and validity 0.66.

Mathews devised a test for measurement of the ability to hit a golf ball with a 5 iron.[34] He designed his test to measure the accuracy in terms of both distance and direction, with which the ball was hit. Mathews marked a circular target on the ground which was fifty yards from a hitting line. The target had a diameter of one hundred feet. Each subject took two practice trials and twenty-five trials. Mathews counted as a successful trial one in which the ball landed inside or rolled inside the circular target. He scored each successful trial one point. He reported no validity or reliability coefficients for the test.

Glassow and Broer described a battery of tests which were developed by Elizabeth Autrey.[35] Autrey designed the

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[34]Donald Mathews, "Effectiveness of Using Golf-Lite in Learning the Golf Swing," Research Quarterly, XXXIII (October, 1962), pp. 488-491.

[35]Ruth B. Glassow and Marion R. Broer, Measuring Achievement in Physical Education (Philadelphia: W. B. Saunders Company, 1938), p. 189.

tests to measure the ability to drive at a target, to drive for distance, to hit approach shots, and to putt. She constructed a vertical target, on which six concentric circles were marked, for use in the measurement of the ability to drive at a target. Autrey had the subjects stand twenty feet from the target and take thirty trials. She found a reliability coefficient of 0.68. In the drive-for-distance test, Autrey had the subjects take ten trials with a 2 wood on an outdoor range. Autrey found a reliability coefficient of 0.72. She recommended that twenty trials be given, instead of ten, and estimated the reliability of twenty trials to be 0.84. In the approach test Autrey had the subjects hit thirty balls at a target marked on the ground. The subjects stood ninety feet from the target on which five concentric circles were marked. The smallest circle had a diameter of twenty feet and the largest circle had a diameter of one hundred feet. Autrey found the reliability of the approach test to be 0.44. No validity coefficients were reported.

Reese used a test of the ability to hit a golf ball with a 5 iron in her study.[36] The test is essentially a test of the ability to hit for distance. A field is marked with a

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[36]Patsy Anne Reese, "A Comparison of the Scores Made on an Outdoor and the Scores Made on an Indoor Golf Test by College Women," (Unpublished Master's thesis, University of Colorado, 1960).

twenty-yard line, a forty-yard line, and a sixty-yard line. The subject stands at the hitting line and takes three practice trials and twenty test trials. The subject earns seven points for a trial in which the ball goes at least as high as her head and first hits the ground beyond the sixty-yard line. The subject earns five points for a trial in which the ball goes at least as high as her head and first hits the ground between the forty and the sixty-yard lines. The subject earns three points for a trial in which the ball goes at least as high as her head and first hits the ground between the twenty and forty-yard lines. The subject earns one point for a trial in which the ball does not go at least as high as her head, but goes past the twenty-yard line.[37] Reese determined the reliability of the test by correlating the sums of the scores made on the ten odd trials with the sums of the scores made on the ten even trials by one hundred and nine beginning golf students. By using the Spearman-Brown Prophecy formula, Reese estimated the reliability of twenty trials to be 0.87.[38]

Reese also compared the scores made on an indoor test of the ability to hit a golf ball with a 5 iron with the scores on the outdoor test. She concluded that, although .

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[37] Ibid., p. 78.

[38] Ibid., p. 44.

there was a substantial relationship between the scores made on the indoor and the outdoor tests, the tests did not measure identical abilities and that it is possible that loft, as measured by the indoor test, and distance, as measured by the outdoor test, do not have a close relationship.[39]

Stallard investigated the effect of two learning methods and the effect of two grips on the acquisition of power and accuracy in the golf swing of college women beginning golfers.[40] The 5 iron for distance and a ninety yard test for accuracy using the 5 iron, 7 iron or the 9 iron were administered. Fifteen trials each with regular golf balls were given, after a five minute warm-up in which only plastic balls were hit. Reliability coefficients for the two skill tests were determined in a pilot study correlating the scores for the 5 iron drive for distance and the ninety yard approach shot for accuracy using the split-half method. The total of the first ten trials were correlated with the total of the second ten trials, using the Pearson Product Moment Method of Correlation. After the correlation coefficients were stepped

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[39] Ibid.,

[40] Mary Louise Stallard, "The Effect of Two Learning Methods and Two Grips on the Acquisition of Power and Accuracy in the Golf Swing of College Women Beginning Golfers," (Unpublished Master's thesis, University of Washington, 1965).

up to fifteen trials by the Spearman-Brown Prophecy formula the reliability coefficient for the 5 iron drive for distance was 0.82 and the ninety yard approach for accuracy was 0.81.

II. SUMMARY OF PREVIOUS RESEARCH

The review of literature has indicated numerous factors that might be taken into consideration in determining the effectiveness of teaching golf skills to college students. The review can be summarized in the following points:

1. Studies in which the whole method proved superior to the part method. (1), (5), (6), (7), (8), (14), (16), (17) (18), (21), (23), (26).

2. The greatest improvement of massed versus distributed learning takes place when the difficult part is learned under mass conditions by the part method. (2)

3. Studies in which the part method proved superior to the whole method. (3), (4), (12), (13)

4. Studies in which no significant difference between methods was found. (10), (25), (29)

5. The advantage of the part method over the whole method was greatest when the task was most unfamiliar and difficult. (12)

6. Repetitive patterns in a maze provide no assurance that subjects using either method would respond to them. (15)

7. Simpler skills are best taught by the whole method while more complex skills are best taught by the whole-part method. (19)

8. A hard ball and a cotton ball test were devised to measure a full swinging shot. Elements used were velocity of ball, angle of club impact with ball, and intended line of flight. (30)

9. An indoor test for drive and approach shot was constructed. (33), (36)

10. Constructed an outdoor test to measure accuracy of approach shots. (34)

11. Constructed a battery of outdoor tests which included the drive for distance and power, approach shot and putting. (35)

12. Compared scores on indoor and outdoor skill test and concluded that although there was substantial relationship between the scores identical abilities were not being tested. (39)

13. High reliability coefficients were obtained in a pilot study correlating a 5 iron for distance with a 9 iron for accuracy. (40)

III. THEORETICAL IMPLICATIONS OF PREVIOUS RESEARCH

The review of literature related to the whole-part method and other types of methods of presentation by

experimental psychologists and physical education give some indication of the magnitude of the problem confronting the teacher in the selection of the best method. It is clear that no one method can be considered most efficient. Consideration should be given to the age of pupils, experience in the particular activity, facilities which are available, amount of time spent in experimental evidence available and any other pertinent factors before final selection of a method for a particular situation can be made.

IV. RELATION OF THE STUDY TO THE RESEARCH

The researcher hoped to determine whether there is any significant difference in the effectiveness of the part method of golf instruction as compared to teaching golf skills by the whole method.

CHAPTER III

DESIGN OF THE STUDY

The purpose of this study was to compare the effectiveness of the part method of golf instruction with the whole method. For the study the whole method involved learning the full golf swing as soon as the student mastered the techniques of gripping the club. The part method stressed emphasis on the various components of the full golf swing, such as starting the club head back, cocking the wrists, position of the elbows, initial movement downward, uncocking the wrists, and the follow through.

In an effort to compare two methods of golf instruction upon the performance of beginning college golfers. two regularly scheduled co-educational golf physical education activity classes were utilized. Group I consisted of one golf class. The method of instruction was decided by a flip of a coin for each group. Group I received the whole method of instruction and met at 1:30 Wednesday and Friday; Group II received the part method of instruction and met at 2:30 Wednesday and Friday.

I. NATURE OF THE PHYSICAL EDUCATION PROGRAM

Kansas State Teachers College offers a wide selection

of activity classes and basic physical education classes in the physical education program. All male and female students are required to complete four semester hours of physical education activities elected from the required program for graduation from the college.

II. CLASS ORGANIZATION AND INSTRUCTION

This study was conducted in regular co-educational physical education activity classes which met twice weekly for 1967 spring semester of eighteen weeks. Each class met for fifty minutes a session of which approximately forty-five minutes was devoted to instruction. Normal street clothes were worn to all class periods. Due to uncontrolled enrollment random sampling could not be used for class organization. However, with the large enrollment and the requirement within the Health, Physical Education and Recreation Department concerning activity classes at Kansas State Teachers College, a normal sampling of the student population would occur. This study included twenty-two periods of instruction and ten periods of objective skill testing.

III. SUBJECTS

The combined total subjects were fifteen women and twenty men regularly enrolled in two golf classes at Kansas

State Teachers College, Emporia, Kansas, during the spring semester, 1967. Group I was composed of six women and twelve men. Group II was composed of nine women and eight men. The classification of students ranged from freshmen through seniors. The range of skill of the subjects was from approximately ninety per cent having no past background of golf experience of instruction and approximately ten per cent of the subjects having acquired some previous skill in the game.

IV. EQUIPMENT AND FACILITIES

Due to the weather conditions in Emporia, Kansas, the first ten weeks, or indoor period, of the study took place in the college indoor golf facility, while the last six weeks were spent on outdoor practice fields. The college indoor golf facility was large enough to provide an adequate amount of floor space between students for the golf swing and sufficient wall space to hit the ball against the retrieve some without being in the line of flight of another's golf ball. There were twenty-five driving range tee mats and twenty-five 5" x 20" polypropylene green turf brushes, which simulates outdoor surfaces, available for each class. The subjects practiced hitting Pee Gee Bee plastic practice golf balls against the inside walls, as practice nets were unavailable. The golf clubs available for class instruction were fifteen

number one and two woods and twenty-five irons, ranging from the two iron through the nine iron. The subjects rotated the clubs each class period to insure all subjects equal amount of time on all clubs.

Pee Gee Bee plastic practice golf balls perforated with many holes were used for practice balls. These practice balls were very durable for the continuous pounding required in beginning golf classes. Each student had a driving range tee mat from which to hit when practicing wood shots. When practicing iron shots a polypropylene green turf brush was substituted for the driving range tee mat. In the outdoor periods Pee Gee Bee plastic balls were teed up on the grass. No actual golf balls were used in either the indoor or outdoor golf skill tests. No action golf balls were utilized in instructional periods, because of the excessive expense of actual golf balls as compared with plastic balls and because of the higher safety features of the plastic balls for group instruction.

IV. TESTING PROCEDURES

The following tests were conducted in this study: (1) Initial and final five iron and two wood indoor skill tests; (2) Initial and final five iron outdoor tests for distance and accuracy, plus a nine iron outdoor test of

accuracy; (3) Twenty-seven hole scores.

Initial and Final Indoor Skill Tests

The initial test was administered during the fifth and sixth sessions. This test constructed by Vanderhoof consists of a two wood drive test and a five iron approach test using plastic balls. This test was administered again in sessions nineteen and twenty as a final indoor skill test. Specifications for the two wood and five iron approach test appear in Appendix A.

Vanderhoof's Indoor Golf Skill Test

Drive Test

Facilities and Equipment: Mat with a permanent tee, two woods, plastic practice balls, two eight foot standards, one rope twenty feet in length, and some object at the end of the scoring area to serve as a target for the golfer.

Instructions: Stand at the coca mat with a #2 wood and take some practice swings and hit two or three of these plastic practice balls. Then drive fifteen times aiming for the ten pin in the distance. The ball must go over the rope and land in the areas marked on the floor to score.

Scoring: Score each ball by the value of the area in

which it lands if it goes above the rope. Total the score for fifteen trials. Count only one trial for two balls in a row which are topped.

#5 Iron Approach Shot

This test is administered exactly as the Drive Test except that the #5 iron is used.

Initial and Final Outdoor Skill Tests

The initial outdoor skill tests were administered during the twenty-fourth, twenty-fifth and twenty-sixth sessions. This test used by Stallard[2] consists of a five iron for distance and accuracy and a ninety yard test for accuracy using a nine iron. This test was administered again as a final outdoor skill test in sessions twenty-nine, thirty, and thirty-one. Field markings for the five iron and nine iron tests are illustrated in Appendix B.

Outdoor Golf Skill Test

#5 Iron Drive for Distance

Equipment: The field is lined at fifty foot intervals as illustrated in Appendix B. The subjects use the five iron only, and each subject has fifteen "live" golf balls.

Test: Each subject is allowed five minutes to warm up using plastic balls only. Following this warm-up, each sub-

ject stands at the tee and attempts to stroke with the full swing each "live" golf ball as far as possible with the number five iron.

Ninety Yard Approach Shot for Accuracy

Equipment: The target for the test consists of a pin with a red flag attached at the top, a circular target is used and each fifteen foot section is assigned a point designation according to its distance from the pin (illustrated in Appendix B). The subjects are allowed to use either the 5, 7, or 9 iron, and each subject has fifteen "live" golf balls.

Test: Each subject is allowed five minutes to warm up using plastic balls only. Following this warm-up, each subject stands at the tee and attempts to stroke each one of the fifteen "live" golf balls as close as possible to the pin.

Score: Each ball hit is scored according to the distance from the pin where it stops rolling.

Twenty-seven Hole Scores

Both groups were required to play twenty-seven holes of golf at the Emporia Airport Golf Course between session twenty-six and session twenty-nine. All score cards were required to be signed by personnel in the clubhouse.

V. SPECIFIC HYPOTHESIS

It was of primary concern to the investigation to compare the effectiveness of two different methods of teaching golf skills to college students. This purpose can be stated in terms of the following null hypothesis: There is no significant difference between the adjusted total final test mean golf skill scores of students instructed by the part method as compared to those instructed by the whole method. The computer center at Kansas State Teachers College was utilized for statistical analysis.

For the purpose of this study, the .05 level of significance was deemed necessary for the rejection of the null hypothesis.

CHAPTER IV

ANALYSIS OF DATA

There were two analyses compiled upon the factors under study. The statistical procedure employed was the significance or the gain made for each group on the five variables and the t test for significance for the difference between the groups for six golf variables.

I. SIGNIFICANCE OF THE DIFFERENCE BETWEEN THE GAINS MADE FOR EACH OF THE FIVE VARIABLES

Five Iron Indoor Test - Group I (Whole Method).

The five iron indoor test had an initial mean of 3.50 as opposed to a final mean of 3.50. A mean difference of 0.00 yielded a standard error of the difference of 1.61. With seventeen degrees of freedom a t of 2.11 was needed to be significant at the .05 level of probability. The t of 0.00 was found not to be significant at the desired .05 level of significance. There proved to be no improvement between the initial and final five iron indoor test means for Group I.

Five Iron Indoor Test - Group II (Part Method).

The five iron indoor test had an initial mean of 7.35 as opposed to a final mean of 2.52. A mean difference of

-4.83 yielded a standard error of the difference of 2.79. With sixteen degrees of freedom a t of 2.12 was needed to be significant at the .05 level of probability. The t of -1.72 was found not to be significant at the desired .05 level of significance. There proved to be a negative amount of improvement between the initial and final five iron indoor test means for Group II.

The significance of the difference for the initial and final five iron indoor test for both groups are presented in Table I.

TABLE I

SIGNIFICANCE OF THE DIFFERENCE FOR THE INITIAL AND FINAL FIVE IRON INDOOR TEST FOR BOTH GROUPS

Group	N	Initial Mean	Final Mean	Mean Diff.	SE Diff.	t	p
I	18	3.50	3.50	0.00	1.61	0.00	--
II	17	7.35	2.52	-4.83	2.79	-1.72	--

t needed with 17 df at .05 level of probability = 2.11
t needed with 17 df at .01 level of probability = 2.91

Two Wood Indoor Test - Group I (Whole Method)

The two wood indoor test had an initial mean of 7.72 as opposed to a final mean of 6.44. A mean difference of -1.28 yielded a standard error of the difference of 2.19. With seventeen degrees of freedom a t of 2.11 was needed to

be significant at the .05 level of probability. The t of -.58 was found not to be significant at the desired .05 level of significance. There proved to be a negative amount of improvement between the initial and final two wood indoor test means for Group I.

Two Wood Indoor Test - Group II (Part Method)

The two wood indoor test had an initial mean of 10.47 as opposed to a final mean of 9.58. A mean difference of -.89 yielded a standard error of the difference of 2.85. With sixteen degrees of freedom a t of 2.12 was needed to be significant at the .05 level of probability. The t of -31 was found not to be significant at the desired .05 level of significance. There proved to be a negative amount of improvement between the initial and final two wood indoor test means for Group II.

The significance of the difference for the initial and final two wood indoor test for both groups are presented in Table II.

TABLE II

SIGNIFICANCE OF THE DIFFERENCE FOR THE INITIAL AND FINAL TWO WOOD INDOOR TEST FOR BOTH GROUPS

Group	N	Initial Mean	Final Mean	Mean Diff.	SE Diff.	t	p
I	18	7.72	6.44	-1.28	2.19	-.58	--
II	17	10.47	9.58	-1.89	2.85	-.31	--

t needed with 17 df at .05 level of probability = 2.11
t needed with 17 df at .01 level of probability = 2.91

Five Iron Outdoor Test For Distance - Group I (Whole Method)

The five iron outdoor test for distance had an initial mean of 76.4 yards as opposed to a final of 87.9 yards. A mean difference of +11.5 yielded a standard error of the difference of 5.13. With seventeen degrees of freedom a *t* of 2.11 was needed to be significant at the .05 level of probability. The *t* of 2.24 was found to be significant at the desired .05 level of significance. There proved to be a significant improvement between the initial and final five iron outdoor test for distance means for Group I.

Five Iron Outdoor Test For Distance - Group II (Part Method)

The five iron outdoor test for distance had an initial mean of 67.2 yards as opposed to a final mean of 76.6 yards. A mean difference of +9.4 yielded a standard error of the difference of 2.90. With sixteen degrees of freedom a *t* of 2.12 was needed to be significant at the .05 level of probability. The *t* of 3.24 was found to be significant at the .01 level of significance. There proved to be a highly significant improvement between the initial and final five outdoor test irons for distance means for Group II.

The significance of the difference for the initial and final five iron outdoor test for both groups are shown in Table III.

TABLE III

SIGNIFICANCE OF THE DIFFERENCE FOR THE INITIAL AND FINAL FIVE IRON OUTDOOR TEST FOR DISTANCE FOR BOTH GROUPS

Group	N	Initial Mean	Final Mean	Mean Diff.	SE Diff.	t	p
I	18	76.4	87.9	+11.5	5.13	2.24	.05
II	17	67.2	76.6	+ 9.4	2.90	3.24	.01

t needed with 17 df at .05 level of probability = 2.11
t needed with 17 df at .01 level of probability = 2.91

Five Iron Outdoor Test for Accuracy - Group I (Whole Method)

The five iron outdoor test for accuracy had an initial mean of 33.5 feet right or left of a middle mine as opposed to a final mean of 27.2 feet. A mean difference of +6.3 yielded a standard error of the difference of 3.69. With seventeen degrees of freedom a t of 2.11 was needed to be significant at the .05 level of probability. The t of 1.72 was found not to be significant at the desired .05 level of significance. There proved to be an improvement between the initial and final five iron outdoor test for accuracy means for Group I, but not a significant one.

Five Iron Outdoor Test For Accuracy - Group II (Part Method)

The five iron outdoor test for accuracy had an initial

mean of 22.8 feet right or left of a middle line as opposed to a final mean of 1.30 feet. A mean difference of +9.8 yielded a standard error of the difference of 4.65. With sixteen degrees of freedom a *t* of 2.12 was needed to be significant at the .05 level of probability. The *t* of 2.13 was found to be significant at the desired .05 level of significance. There proved to be a highly significant improvement between the initial and final five iron outdoor test for accuracy means for Group II.

The significance of the difference for the initial and final five iron outdoor test for accuracy for both groups is presented in Table IV.

TABLE IV

SIGNIFICANCE OF THE DIFFERENCE FOR THE INITIAL AND FINAL FIVE IRON OUTDOOR TEST FOR ACCURACY FOR BOTH GROUPS

Group	N	Initial Mean	Final Mean	Mean Diff.	SE Diff.	t	p
I	18	33.5	27.2	+6.3	3.69	1.72	--
II	17	22.8	13.0	+9.8	4.65	2.13	.05

t needed with 17 df at .05 level of probability = 2.11
t needed with 17 df at .01 level of probability = 2.91

Nine Iron Outdoor Test - Group I (Whole Method)

The nine iron outdoor test had an initial mean of 9.3 as opposed to a final mean of 10.3. A mean difference of +1.0 yielded a standard error of the difference of 5.85. With seventeen degrees of freedom a *t* of 2.11 was needed to

be significant at the .05 level of probability. The t of 1.71 was found not to be significant at the desired .05 level of significance. There proved to be an improvement between the initial and final nine iron outdoor test means for Group I, but not a significant one.

Nine Iron Outdoor Test - Group II (Part Method)

The nine iron outdoor test had an initial mean of 9.405 as opposed to a final mean of 9.376. A mean difference of -.029 yielded a standard error of the difference of .39. With sixteen degrees of freedom a t of 2.12 was needed to be significant at the .05 level of probability. The t of -.08 was found not to be significant at the desired .05 level of significance. There proved to be a negative amount of improvement between the initial and final nine iron outdoor test means for Group II.

The significance of the difference for the initial and final nine iron outdoor test for both groups is presented in Table V.

TABLE V

SIGNIFICANCE OF THE DIFFERENCE FOR THE INITIAL AND FINAL NINE IRON OUTDOOR TEST FOR BOTH GROUPS

Group	N	Initial Mean	Final Mean	Mean Diff.	SE Diff.	t	p
I	18	9.3	10.3	+1.0	5.85	1.71	--
II	17	9.405	9.376	- .029	.39	-.08	--

t needed with 17 df at .05 level of probability = 2.11
t needed with 17 df at .01 level of probability = 2.91

II. SIGNIFICANCE OF THE DIFFERENCE OF THE FINAL MEAN SCORE BETWEEN GROUP I AND GROUP II ON SIX VARIABLES

A *t* test for significance was utilized to compare the final mean scores of Group I and Group II on the following tests; Five Iron Indoor Test, Two Wood Indoor Test, Five Iron Outdoor Test for Distance, Five Iron Outdoor Test for Accuracy, Nine Iron Outdoor Test, and the twenty-seven hole totals.

Final Five Iron Indoor Test

Group I had a mean of 3.50 compared to 2.52 for Group II. A mean difference of .98 in favor of Group I yielded a standard error of the difference of 1.6. With thirty-four degrees of freedom a *t* of 2.03 was needed to be significant at the .05 level of probability. The *t* of .62 was found not to be significant at the desired .05 level of significance.

The significance of the difference of the final mean scores of the five iron indoor test for both groups are presented in Table VI.

TABLE VI

SIGNIFICANCE OF THE DIFFERENCE OF THE FINAL MEAN SCORES FOR THE FINAL FIVE IRON INDOOR TEST FOR BOTH GROUPS

Group	N	Final Mean	Mean Diff.	SE Diff.	t	p
I	18	3.50	.98	1.6	.62	--
II	17	2.52				

t needed with 34 df at .05 level of probability = 2.03
t needed with 34 df at .01 level of probability = 2.73

Final Two Wood Indoor Test

Group I had a mean of 6.44 compared to 9.58 for Group II. A mean difference of 3.4 in favor of Group II yielded a standard error of the difference of 2.82. With thirty-four degrees of freedom a t of 2.03 was needed to be significant at the .05 level of probability. The t of 1.11 was found not to be significant at the desired .05 level of significance.

The significance of the difference of the final mean scores of the two wood indoor test for groups I and II are presented in Table VII.

TABLE VII

SIGNIFICANCE OF THE DIFFERENCE OF THE FINAL MEAN SCORES FOR THE FINAL TWO WOOD INDOOR TEST FOR BOTH GROUPS

Group	N	Final Mean	Mean Diff.	SE Diff.	t	p
I	18	6.44	3.14	2.82	1.11	--
II	17	9.58				

t needed with 34 df at .05 level of probability = 2.03
t needed with 34 df at .01 level of probability = 2.73

Final Five Iron Outdoor Test For Distance

Group I had a mean of 87.9 yards compared to 76.6 yards for Group II. A mean difference of 11.3 yards in favor of Group I yielded a standard error of the difference of 9.49. With thirty-four degrees of freedom a t of 2.03

was needed to be significant at the .05 level of probability. The t of 1.19 was found not to be significant at the desired .05 level of significance.

The significance of the difference of the final mean scores of the five iron outdoor test for distance for both groups are presented in Table VIII.

TABLE VIII

SIGNIFICANCE OF THE DIFFERENCE OF THE FINAL MEAN SCORES FOR THE FINAL FIVE IRON OUTDOOR TEST FOR DISTANCE FOR BOTH GROUPS

Group	N	Final Mean	Mean Diff.	SE Diff.	t	p
I	18	87.9	11.3	9.49	1.19	--
II	17	76.6				

t needed with 34 df at .05 level of probability = 2.03
t needed with 34 df at .01 level of probability = 2.73

Final Five Iron Outdoor Test For Accuracy

Group I had a mean of 27.2 feet right or left of a middle line compared to 13.0 feet for Group II. A mean difference of 14.2 feet in favor of Group II yielded a standard error of the difference of 6.31. With thirty-four degrees of freedom a t of 2.03 was needed to be significant at the .05 level of probability. The t of 2.25 was found to be significant at the desired .05 level of significance. The part method was found to be significantly better than the whole method when tested on a five iron outdoor test for

accuracy.

The significance of the difference of the final mean scores of the five iron outdoor test for accuracy for both groups are presented in Table IX.

TABLE IX

SIGNIFICANCE OF THE DIFFERENCE OF THE FINAL MEAN SCORES FOR THE FINAL FIVE IRON OUTDOOR TEST FOR ACCURACY FOR BOTH GROUPS

Group	N	Final Mean	Mean Diff.	SE Diff.	t	p
I	18	27.2	14.2	6.31	2.25	.05
II	17	13.0				

t needed with 34 df at .05 level of probability = 2.03
t needed with 34 df at .01 level of probability = 2.73

Final Nine Iron Outdoor Test

Group I had a mean of 10.3 compared to 9.4 for Group II. A mean difference of .9 in favor of Group I yielded a standard error of the difference of .78. With thirty-four degrees of freedom a t of 2.03 was needed to be significant at the .05 level of probability. The t of 1.14 was found not to be significant at the desired .05 level of significance.

The significance of the difference of the final mean scores of the nine iron outdoor test for both groups are presented in Table X.

TABLE X

SIGNIFICANCE OF THE DIFFERENCE OF THE FINAL MEAN SCORES FOR THE FINAL NINE IRON OUTDOOR TEST FOR BOTH GROUPS

Group	N	Final Mean	Mean Diff.	SE Diff.	t	p
I	18	10.3	.9	.78	1.14	--
II	17	9.4				

Twenty-Seven Hole Scores

Group I had a mean of 170.94 compared to 175.0 for Group II. A mean difference of 4.06 in favor of Group I yielded a standard error of 12.68. With thirty-four degrees of freedom a t of 2.03 was needed to be significant at the .05 level of probability. The t of .32 was found not to be significant at the desired .05 level of significance.

The significance of the difference of the final mean scores for the twenty-seven hole scores for both groups are presented in Table XI.

TABLE XI

SIGNIFICANCE OF THE DIFFERENCE OF THE FINAL MEAN SCORES FOR THE TWENTY-SEVEN HOLE SCORES FOR BOTH GROUPS

Group	N	Final Mean	Mean Diff.	SE Diff.	t	p
I	18	170.94	4.06	12.68	.32	--
II	17	175.00				

t needed with 34 df at .05 level of probability = 2.03
t needed with 34 df at .01 level of probability = 2.73

III. ACCEPTANCE OF THE NULL HYPOTHESIS

As a basis for this experiment, the investigator proposed the null hypothesis that there would be no significant difference between the effectiveness of the part method of golf instruction as compared to teaching golf skills by the whole method. This hypothesis asserts that the obtained results will not be significantly different between the whole method group and the part method at the .05 level of significance between the final means was the final five iron outdoor test for accuracy, which favored the part method of instruction. Therefore, the investigator accepted the null hypothesis.

CHAPTER V

FINDINGS, CONCLUSIONS, DISCUSSIONS AND RECOMMENDATIONS

I. SUMMARY

The purpose of this study was to compare the effectiveness of two different methods of teaching golf skills to college students. More specifically, this study attempted to answer the following question: Is there any significant difference in the effectiveness of the part method of golf instruction as compared to teaching golf skills by the whole method?

In an effort to answer the above question, the following tests were conducted in this study: (1) Initial and final five iron indoor skill tests; (2) Initial and final five iron outdoor tests for distance and accuracy, plus a nine iron outdoor test for accuracy; (3) Twenty-seven hole scores.

II. FINDINGS

The findings of the study were as follows:

1. The whole and part method of instruction caused significant improvement in the following initial and final golf skill tests:

   a. Five Iron Outdoor Test for Distance - Whole Method, significant at the .05 level of significance.

b. Five Iron Outdoor Test for Distance - Part Method, significant at the .01 level of significance.

c. Nine Iron Outdoor Test - Part Method, significant at the .05 level of significance.

2. Neither the whole or part method of instruction caused a significant improvement in the following initial and final golf skill tests:

a. Five Iron Indoor Test

b. Two Wood Indoor Test

c. Five Iron Outdoor Test for Accuracy - Whole Method

d. Nine Iron Outdoor Test

3. There was only one significant difference between the groups that being the five iron outdoor test for distance. The difference was at the .05 level of significance and favored the part method of instruction.

III. CONCLUSIONS

The following conclusions resulted from this study:

1. The whole instructional group made no improvement on the following initial and final tests, five iron and two wood indoor tests, but did improve on the five iron outdoor test for distance and accuracy, and the nine iron outdoor accuracy test.

2. The part instructional group made no improvement on the following initial and final test, five iron and two wood indoor tests, and the five iron outdoor test for accuracy, but did improve on the five iron outdoor test for distance and the nine iron outdoor accuracy test.

3. In comparing the final mean differences of the two groups, the whole instructional group made the most improvement on the five iron indoor test, five iron outdoor test for distance and accuracy, and the twenty-seven hole scores. The part instructional group made more improvement than the whole instructional group on the two wood indoor test and the five iron outdoor test for accuracy.

IV. DISCUSSION

The results of this study showed improvement in favor of the whole instructional group, even though this improvement was not statistically significant, with the exception of the final five iron outdoor test for accuracy which favored the whole instructional group.

The results of this study are somewhat in agreement with the findings of Theunissen (page 18) in that golfers of college age, being instructed in group classes, the whole method was superior to the part method of teaching over an eighteen week, thirty-two lesson, instruction program.

This superiority was not significant at the .05 level of significance.

V. RECOMMENDATIONS

A limited number of studies concerning the teaching methods of golf skills were found. This absence of related literature indicates several possibilities for future studies. The following statements and questions might motivate such investigations:

1. The class periods could be more concentrated. The experimental period could continue for four days a week for nine weeks rather than two days a week for eighteen weeks. Would this concentrated instruction make a difference in a similar experiment?

2. The number of subjects in a class could be larger. Would a similar experiment produce the same results if the subjects numbered 40 or 50 in each group?

3. The subjects could be of a different age group. Group instruction could be given to elementary, junior high, high school, or older adult classes as well as to the college students used in this experiment. Would a different age group make a difference in a similar experiment?

4. A study comparing beginning golfers, with no previous experience in golf participation, compared to a group with intermediate experience or prior golf participation.

Would an experiment with these two groups produce the same results?

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APPENDIXES

APPENDIX A