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The Effect of Kinesthetic and Demonstration Techniques of Instruction Upon Standing Broad Jump Performance

Howard Philip Meyer

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By

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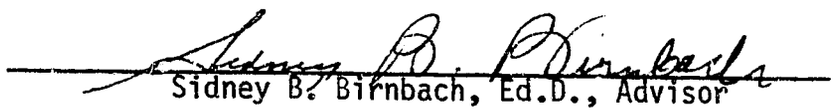

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ABSTRACT

A test of standing broad jump ability was administered to ninety-three sixth grade boys to compare the kinesthetic and demonstration methods of instruction. The subjects were classified on the Neilson-Cozens Classification Index and divided into three groups. The first group received the kinesthetic method of instruction, the second group was instructed using the demonstration method, and the third group did not receive any formal instruction.

The data were examined by computing the mean and standard deviation of each pre-test and post-test group. The mean and standard deviation of the pre-test scores were 60.61 and 7.589. The mean and standard deviation of the post-test scores were 61.31 and 7.397.

When each pre-test score was subtracted from its corresponding post-test score it was revealed that the demonstration group showed an increase in performance of eighteen boys, the kinesthetic group increased by sixteen boys and the group receiving no formal instruction increased by seven boys.

Analysis of variance of matched groups revealed an F ratio of 2.68 which was not significant at the .05 level. An alternate approach was attempted in which the effect of the pre-test scores were partialled out from the post-test scores. Subjected to matched group analysis of

variance design indicated an F ratio of 2.64 which was not significant at the .05 level.

The results of a randomized group analysis without matching revealed an F ratio of 2.68 which was quite similar to the previous results and also insignificant at the .05 level. Randomized group analysis without matching between post-test scores and the regression equation indicated an F ratio of 2.72 which again was found insignificant at the .05 level of significance.

It was found that no statistically significant difference could be obtained by use of one instructional technique exclusively in preference to another.

Howard Philip Meyer

PREFACE

This study was undertaken with the hope that it will contribute a better understanding of teaching methods in the field of physical education, so that the best possible results accrue for pupils. It is extremely important for prospective teachers of physical education and teachers presently in the field to know and understand not only how learning takes place but also how individuals learn.

The investigator wishes to express a very special thanks to Dr. Sidney B. Birnbach who served as advisor in this study. His valuable experience, expertise, and assistance is most fully appreciated.

Special thanks must be extended to Mr. Stephen Luchka, Assistant Director of Physical Education, and Mrs. Terry Ruyack, Physical Education Specialist, Yonkers, New York. Both were selected to serve as part of a panel of experts in the physical education field, collectively sharing over fifty years of teaching experience.

I am grateful also to Dr. Sol Ribner of Lehman College, New York, who provided invaluable assistance and suggestions concerning the statistical computation and analysis of this study.

Special thanks must also be extended to the sixth grade boys of the Martin Luther King Jr. Intermediate School and Public School Twenty-Seven, Yonkers, New York.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ILLUSTRATIONS

INTRODUCTION

Teaching physical education requires an understanding of growth and development of the needs of the individual. It also demands knowledge of a vast amount of activities through which physical, mental, social, and emotional needs may be satisfied.

Is there a best way to organize and conduct specific learning activities so the best possible results accrue for pupils? There is no simple formula for selecting the best method. The very complexity of conditions which exist in any learning situation prevents reliance on a set of stereotyped techniques. Learning is a highly individualized procedure, and what works effectively for one individual or group may prove ineffective with another.

A thorough understanding of how pupils learn assists teachers to select sound methods of teaching. The nature of educational objectives and the type of activities used in the program also dictate choice of methods.

The function of the physical educator is to understand each child's needs and give him adequate guidance in a program especially designed to meet these needs in respect to the physical education program. Few physical educators will dispute the important role of proper instruction upon learning and performance of motor skills. The method or methods of instruction is a key factor which must be

considered when teaching and evaluating the motor skill performance of youngsters.

Teaching methods in the repertoire of the physical educator are categorized into three general groups: (1) verbalization, (2) visualization, (3) kinesthesis. It is left to the physical educator to draw upon these methods at his discretion to most effectively present the skills he seeks to teach to his students.

CHAPTER I

The Problem

The purpose of this study was to contribute to a better understanding of teaching methods by comparing the demonstration and kinesthetic methods of instruction upon standing broad jump performance of sixth grade boys.

Specific Problems

In conjunction with the above problem, the following sub-problems were solved to find a solution of the main problem:

1. To determine the level of performance before and after the kinesthetic method of instruction
2. To determine the level of performance before and after the demonstration method of instruction
3. To determine the level of performance of a group of subjects without any formal method of instruction
4. To compare the amount of change in performance scores of the three groups

Definition Of Terms

Standing Broad Jump- The pupil stood with his feet several inches apart and the toes just behind the take-off line. Preparatory to jumping, the pupil swung his arms backwards and flexed the knees. The jump was accomplished by simultaneously extending the knees and swinging the arms forward.

Demonstration Method of Instruction

The instructor demonstrated the skill to be learned, possessing sufficient skill, agility, and coordination, in as near perfect form as possible. The demonstration was repeated several times due to the complexity of the skill. The student then attempted to perform the skill by duplicating the performance of the instructor. Verbal instructions were kept to a minimum and their complexity did not exceed the comprehension limits of the learners.

Kinesthetic Method of Instruction

The kinesthetic method of instruction used in this study comprised the following: (1) use of mimetics (2) mental perception (3) manual guidance (manual manipulation) of a part or parts of the body used in the learning of the standing broad jump skill. Verbal instructions were also employed by merely repeating those used in the demonstration method of instruction.

Delimitations

1. This study was conducted at the Martin Luther King Jr. Intermediate School, Yonkers, New York.
2. The students participating in the study were sixth grade boys, ranging in age from twelve years to twelve years and nine months.
3. The boys were tested during an eight week physical fitness program which was part of the required physical education curriculum.

Hypothesis

It was hypothesized that there was a significantly greater increase in standing broad jump performance of students taught by the kinesthetic method of instruction as compared with performance scores of students taught by the demonstration method of instruction.

Statement of Rationale

Several studies, Phillips and Summers [1] and McGrath [2] have suggested that the kinesthetic method of instruction is more important in the early stages of learning a motor skill, than at any other time. Wickstrom [3] states that until the subject has the kinesthetic image complete, his performance will demonstrate chance success and failure. Low positive correlation between kinesthesis learning procedure and learning a motor skill was found in a study by Lindsay. [4]

Other studies have stated no significant improvement in performance scores while using the method of kinesthesis. Since the demonstration method of instruction is the more traditional method and

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[1] Majorie Phillips and Dean Summers, "Relation of Kinesthetic Perception to Motor Learning," Research Quarterly, XXV (December,1954), pp. 456-469.

[2] J.W. McGrath, "The Relative Importance of Kinesthetic and Visual Cues in Learning a Hand-Eye Co-Ordination Skill," (unpublished master's thesis, University of California, 1947).

[3] R.L.Wickstrom, "A Comparative Study of Methodologies for Teaching Gymnastics and Tumbling," (doctoral dissertation, University of Iowa, 1952).

[4] Doreen Lindsay, "Relationship Between Measures of Kinesthesis and Learning of a Motor Skill," (unpublished master's thesis, University of California at Berkeley, 1952).

it may teach more pupils as compared with other methods it is the favored method by a great many investigators.

The kinesthetic technique of instruction has the following theoretical advantages over the demonstration method of instruction: (1) allows the student mimetic practice, (2) the student develops a mental image of what is to be done in the desired movement, (3) allows pupil to rehearse the movement mentally which may help in the attainment of smooth, coordinated performance, (4) the body parts involved in the motor skill are led through the desired movement, allowing the student to get the "feel" of the skill to be performed.

The Need For The Study

Evidence now exists which indicates no specific improvement in learning a motor skill using the kinesthetic method as compared with conventional methods. Roloff [5] stressing the use of kinesthesis found no significant relationship to improved performance scores of a motor skill.

On the other hand it has been suggested that the kinesthetic method proves more favorable during the early stages of learning a motor skill. Lindsay [6] has found low positive correlation between

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[5] Louise L. Roloff, "Kinesthesis in Relation to the Learning of Selected Motor Skills," Research Quarterly, XXIV (March, 1953), p. 215.

[6] Lindsay, "Relationship Between Measures of Kinesthesis and Learning of a Motor Skill".

kinethesis and learning to roll a ball at a target. Significant differences have also been found between the use of kinesthesis as compared to other methods of learning motor skills by fast and slow-learning elementary school children.

The earliest reported studies of kinethesis was centered upon the use of tests to separate and measure the development of and improvement in the kinesthetic sense. Most of the later investigations have been conducted to determine the importance of the kinesthetic sense as it is related to the development of various motor skills and its role in spatial awareness. The measurement of kinesthesis on the high school and elementary school levels is still in the early experimental stages.

Continued investigation of the effects of kinesthesis on the development of motor skill learning must be undertaken. There must also be increased study of the teaching of motor skills through the emphasis of the kinesthetic sense as well as the visual sense.

CHAPTER II

Review Of The Literature

The most universally accepted method of teaching motor skills is one which is based upon the development of a visual concept of the skill through demonstration, verbal explanation, mimetics, mental practice and manual guidance.

In the learning of motor skills the student who possesses superior athletic prowess can rely to a greater extent on verbal cues and guides. This type of pupil tends to rely more on verbal guides and visual imagery than does the slow learner. The slow learner relies to a greater extent on kinesthetic cues.

In the learning of motor skills verbal directions are in general superior to mechanical guidance. For other individuals they seem to depend entirely upon kinesthetic sense experience.

Several studies on kinesthesis and the demonstration technique of instruction appear in the literature, but few are directly concerned with the specific methods of teaching motor skills.

Berlin [1] studied the effect of five different teaching methods on the rate of acquisition of a specific skill in golf, soccer, fencing,

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[1] Pearl Berlin, "Effects of Varied Teaching Emphases During Early Learning on Acquisition of Selected Motor Skills," (unpublished doctoral thesis, The Pennsylvania State University, 1959), p.196.

tennis, and lacrosse. The methods used were: (1) demonstration plus practice, (2) trial-and-error practice only, (3) verbal instruction plus practice, (4) visual aids plus practice, and (5) a combination of the preceding four. The learning time for the trial-and-error group was entirely devoted to practice. Then she compared the time it took each group to learn a skill under the respective methods, and ranked the methods as to effectiveness for most rapid learning per skill. She concluded that the trial-and-error method was most efficient, and the combination of methods ranked second. Berlin commented with respect to the verbal-instruction method as follows: words have little meaning for the motor skill beginner and verbalization by the instructor is increased proportionately with the learner's increased experience in performing the skill.

In a study conducted by Halverson [2] a test of accuracy in shooting a basket with a set one-hand push shot was given to sixty first-year women in college. Three groups were employed in addition to a non-practice group. Of the three groups compared ; (1) demonstration, (2) Kinesiological, (3) mental practice, all three groups improved significantly, though the mental practice group improved the least. No improvement was displayed by the non-practice group.

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[2]Lolas E. Halverson, "A Comparison of Three Methods of Teaching Motor Skills," (unpublished master's dissertation, University of Wisconsin, 1949), p. 58.

Kozman states, "some boys and girls seem to learn motor skills primarily kinesthetically. They get the "feel" of movements which bring the desired results. Probably kinesthetic feeling plays a part in all ways of learning motor skills, but with some learners it seems to predominate. As yet, we have no reliable way of measuring kinesthesis so it is difficult to determine how much it enters into any individual's learning of a skill. [3]

McGrath [4] indicates some evidence to support the hypothesis that kinesthesis is more related to learning in the early stages of learning a motor skill than in later stages.

Wickstrom's findings state that until the subject has the kinesthetic image almost complete, his performance will demonstrate chance success and failure. [5] Lindsay [6] found a low positive correlation between kinesthesis and learning to roll a ball at a target.

Methods of teaching in which awareness of the kinesthetic sense is emphasized do not appear to be more effective than more

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[3]Hilda Clute Kozman, Rosalind Cassidy, and Chester O. Jackson, Methods in Physical Education (Iowa: Wm. C. Brown, 1964), pp. 73-74.

[4]McGrath, "The Relative Importance of Kinesthetic and Visual Cues in Learning a Hand-Eye Co-Ordination Skill".

[5]Wickstrom, "A Comparative Study of Methodologies for Teaching Gymnastics and Tumbling".

[6]Lindsay, "Relationship Between Measures of Kinesthesis and Learning of a Motor Skill".

conventional approaches. Coady [7] found that golf skills were not significantly improved where the use of kinesthesis was stressed.

Roloff [8] reports no significant relationship between tests of kinesthesis and final bowling and tennis performance scores following an eight-week instructional period. Eight tests of motor ability was given to 200 college women with the instructional emphasis placed on the use of kinesthesis. No statistically significant evidence proved the experimental method of instruction better than the instructional method employed in the control groups.

Edwin A. Fleishman and Simon Rich [9] administered a spatial test and a new measure of "kinesthetic sensitivity," to forty undergraduate males who then received extended practice on a Two-Hand Coordination (THC) task. The results confirm the hypothesis that, if kinesthetic cues predominate, mainly, later in motor learning, then subjects who have superior sensitivity to these cues should be superior to other subjects at advanced stages of learning a complex motor task; but these subjects would not necessarily excel during initial stages of learning.

Fleishman states, "reliable measures of spatial abilities exist but first, we needed to develop a reliable measure of individual differences in "kinesthetic sensitivity."

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[7] Charlene Coady, "The Effect of Applying the Principles of Kinesthesis in Teaching Golf Skills to College Women," (unpublished master's thesis, Indiana University, 1950)

[8] Roloff, "Kinesthesis in Relation to the Learning of Selected Motor Skills," p. 215.

[9] Edwin A. Fleishman and Simon Rich, "Role of Kinesthetic and Spatial-Visual Abilities in Perceptual-Motor Learning," Journal of Experimental Psychology, LXVI (1963), pp. 6-7.

Jenkins [10] stresses that, "kinesthesis--the sense of position and movement, is probably the most important sensitivity that man possesses."

Frances A. Hellebrandt [11] states, "Kinesthesis," "the feel of the movement," "a conscious muscle sense" are terms that have all been used extensively in the literature, many times with the apparent assumption that such "sensing" in skill adjustment was a conscious, rationally directed type of learning. Experimental evidence does not support this viewpoint although it does indicate great value to proprioceptive sensing and adjustment.

Witte [12] studied the relationship of kinesthetic perception to measures of accuracy in a ball rolling skill of children ages seven to nine. The correlation of .2832 between the total kinesthetic battery and the combined ball rolling scores indicated no real relationship between ball rolling accuracy and positional measures of kinesthesis.

Phillips and Summers [13] in an investigation involving 115 college women tested on twelve positional measures of kinesthesis indicated that,

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[10] Fleishman and Rich, "Role of Kinesthetic and Spatial-Visual Abilities in Perceptual-Motor Learning," p. 6.

[11] John D. Lawther, The Learning of Physical Skills (Englewood Cliffs, N.J. : Prentice-Hall Inc, 1968), p. 57.

[12] Fae Witte,"Relation of Kinesthetic Perception to a Selected Motor Skill for Elementary School Children," Research Quarterly, XXXIII (October, 1962), pp. 476-477.

[13] Phillips and Summers, "Relation of Kinesthetic Perception to Motor Learning," p. 468.

the kinesthetic sense is more important in the early stages of learning a motor skill than in later stages.

Fitts [14] states that "visual control is important while an individual is learning a new perceptual-motor task. As performance becomes habitual, however, it is likely that proprioceptive feedback or "feel" becomes the more important. In the absence of visual perception there is some evidence indicating that kinesthetic feel is learned more rapidly. Coleman R. Griffith [15] reported an experiment in learning to drive a golf ball in which one group practiced blindfolded for four weeks, then without blindfolds for two weeks. The other group practiced for six weeks, but of course, without blindfolds. During the early part of the experiment the performance of the blindfolded group was inferior. But by the end of the fourth week, the blindfolded group actually did a little better than the other group. At the conclusion of the experiment the blindfold group was superior.

Hollis F. Fait [16] states, " I am inclined to think that the demonstrative method of teaching motor skills is more effective because: (1) students are accustomed to this type of teaching, and (2) more students can be taught with this method.

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[14]Fleishman and Rich, "Role of Kinesthetic and Spatial-Visual Abilities in Perceptual-Motor Learning," p. 7.

[15]Clyde Knapp and E. Patricia Hagman, Teaching Methods For Physical Education (New York: McGraw-Hill Book Company, 1953), p. 30.

[16]Hollis F. Fait, Adapted Physical Education (Philadelphia: W.B.Saunders Company, 1960), pp. 55-56.

The easiest way to achieve a specific motor skill is to follow a good example, states, Lockhart.[17]

Sheila R. Caskey[18] in a study on the effects of motivation on standing broad jump performance of children concluded that visual motivation positively affected the standing broad jump performance of children in grades 1, 2, 3, above and beyond the effects of verbal motivation. The dominance of visual incentives would seem to indicate that the young child needs more concrete reinforcement than merely the verbal urging of an adult.

The demonstration method of instruction stresses the idea and attitude of "seeing is believing." The following lines written by an unknown author may serve to amplify this belief.

THE DEMONSTRATION WAY

I'd rather see a lesson
Than to hear one any day.
I'd rather you'd walk with me
Than to merely show the way.

The eye's a better teacher
And more willing than the ear,
And counsel is confusing
But examples always clear

The best of all the teachers
Are the ones who live the creed.
To see good put in action
Is what everybody needs.

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[17]Aileene Lockhart, "Conditions of Effective Motor Learning," Journal of Health, Physical Education and Recreation, XXXVIII (February, 1967), p.37.

[18]Sheila R. Caskey, "Effects of Motivation on Standing Broad Jump Performance of Children," Research Quarterly, XXXIX (March, 1968), pp. 54-59.

I soon can learn to do it
If you let me see it done.
I can see your hand in action
But your tongue too fast may run.

And the counsel you are giving
May be very fine and true,
But I'd rather get my lesson
By observing what you do. 19

In trying to evaluate the importance of verbal instruction in motor learning, one must take into account the nature of the skill, the nature of the specific learner, and the nature and purpose of the verbal instruction.

Bonnie G. Berger and Robert E. Stadulis investigated the effects of two methods of presentation and three extents of angular displacement upon accuracy in horizontal arm-positioning. They concluded that the passively moved method of presentation was significantly superior to the verbal instruction method under large and medium ranges of angular displacement. [20]

"As to the verbal instruction itself one must distinguish between (1) directions as how to perform the skill, (2) explanations as to why to perform the skill the stated way, (3) verbalizations which aim at focusing attention on results for more accurate feedback, and (4) verbalizations used for motivating purposes. Sir W.G. Stimpson stated the above distinctions concerning the first lessons in golf. [21]

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[19]Leslie W. Irwin and James H. Humphrey, Priciples and Techniques of Supervision in Physical Education (Iowa: Wm. C. Brown Company, 1954), pp. 128-129.

[20]Bonnie G. Berger and Robert E. Stadulis, "Effects of Method of Presentation and Extent of Angular Displacement Upon Accuracy in horizontal arm-positioning," Research Quarterly, XXXIX (October,1968), p. 449.

[21]Lawther, "The Learning of Physical Skills," p. 63.

Relating mental practice to performance, Richardson [22] concludes; despite a variety of methodological inadequacies the trend of most studies indicate that mental practice procedures are associated with improved performance of a motor task. L. Verdelle Clark [23] also studying the effect of mental practice on the development of motor skills, states that mental practice was almost as effective as physical practice for the varsity and junior varsity groups, and not as effective for the novice groups.

On a ten-pin bowling skill, Waterland [24] compared mental practice with physical practice. The physical practice group was coached under standard conditions of instructions. The mental practice group was encouraged to recapture the kinesthetic "feel" of the bowling action before delivering each ball down the alley. The mental practice group was found to produce a smoother action, greater speed of delivery, and a higher score than when bowling was carried out under the standard physical practice condition.

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[22]Alan Richardson, "Mental Practice: A Review and Discussion Part I," Research Quarterly, XXXVIII (March, 1967), pp. 95-105.

[23]L. Verdelle Clark, "Effect of Mental Practice on the Development of a Certain Motor Skill," Research Quarterly, XXXI (December, 1960), p. 560.

[24]J.C. Waterland, "The Effect of Mental Practice Combined With Kinesthetic Perception When the Practice Precedes Each Overt Performance of a Motor Skill," (unpublished master's dissertation, University of Wisconsin, 1956),

Vandell, Davis, and Clugston [25] reported that mental practice was almost as effective as physical practice (using the skills of dart throwing and foul shooting). Twining [26] reported 137 per cent improvement from physical practice and 36 per cent from mental practice (in ring tossing).

Scott [27] claims little is known concerning the identification of the varying degree of sensory acuity.Probably the most forceful statement of the significance in motor performance comes from Ragsdale in a discussion of motor learning. He states, " manual guidance may help to develop kinesthetic perception of the activity."

"It is apparent that demonstration often needs the supplement of mechanical manipulation with infants or primary school children, and with low-skill-level students at any age, when they are trying to learn what seems to them to be complex skills." 28

Both Koch and Lundgate [29] found that manual guidance was beneficial (as opposed to trial and error) when learning small maze tasks.

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[25]John D. Lawther, The Learing of Physical Skills (Englewood Cliffs, N.J.: Prentice-Hall Inc, 1968) p. 89.

[26]Ibid.

[27]M. Gladys Scott, "Measurement of Kinesthesis," Research Quarterly, XXVI (October, 1955), p. 325.

[28]Lawther, The Learning of Physical Skills, p. 62.

[29]Bryant J. Cratty, Movement Behavior and Motor Learning (Philadelphia, Pa.: Lea and Febiger, 1967), p. 54.

Jones [30] concluded that it is possible for male university students without previous experience to learn gross body skills of a gymnastic nature by a learning procedure involving only the reading of a mechanical analysis and mental practice of the skill.

Bowdlear [31] a psychologist, in summarizing one of his studies, said, " Man would be at a decided disadvantage if he could not learn by trial and error since often the thing he has to manage is very difficult to learn through rational analysis. Much motor skill is acquired by doing the best you can; getting into trouble, varying your procedure, and gradually " getting the hang of the thing" without ever clearly seeing what are the conditions for success".

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[30] John Gerald Jones, "Motor Learning Without Demonstration of Physical Practice, Under Two Conditions of Mental Practice," Research Quarterly, XXXVI (October, 1965), p. 272.

[31] Charles W. Bowdlear, "An Experiment in Kinesthetic Learning," American Physical Education Review, XXXII (February, 1927), p. 100.

CHAPTER III

Procedure In Collecting Data

Subjects

The subjects used in this study were ninety-three boys enrolled in required physical education classes in a Yonkers, Intermediate school. The subjects participating in the study were sixth grade boys, ranging in age from twelve years to twelve years and nine months.

All of the students were participating in an eight week physical fitness program. The entire sixth grade consisted of 160 boys divided into four different physical education classes.

Procedures and Experimental Design

As the boys in each class were assigned regular spot (positions) on the gymnasium floor, the sampling procedure consisted of drawing of spot positions from a container which included all possible floor positions.

All subjects were selected from the four different classes and classified on the Neilson-Cozens Classification Index. These data were translated into exponents; the exponents were then totaled to produce the pupil's class. For example, a boy in the sixth grade

who is 146 months old, 60 inches tall, and weighs 98 pounds is classified in the class D classification, as follows:

Data	Exponent
Age- 146 months	5
Height- 60 inches	10
Weight- 98 pounds	8
Sum of exponents	23
Pupil's class	D

The subjects were numbered consecutively after classification and placed into one of three groups of thirty-one students each according to their position. [1] Shown in Table 1. and Table 2.

Administration of the Standing Broad Jump Test

The standing broad jump test was administered according to the directions set forth in the A.A.H.P.E.R. Youth Fitness Test Manual. [2] The instruction and testing was completed indoors. The pre-test had been administered prior to any formal instruction in regard to the standing broad jump Test illustrated in PLATE I.

Group one (Kinesthetic) had undergone a four week instructional period during which they met weekly in a physical education class and were given seven minutes of kinesthetic instruction and eight

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[1] Youth Fitness Test Manual, American Association For Health Physical Education and Recreation, (Washington: 1965), p. 41.

[2] Ibid., p. 20.

TABLE 1

CLASSIFICATION OF SUBJECTS

Exponent	Months Old	Height (inches)	Weight	Subjects
1	144	55	84	2
2	144	56	85	4
3	145	56	86-90	6
4	146	57	91-95	4
5	146	60	96-105	12
6	147	61	106-110	14
7	148	62	111-120	13
8	149	63	121-125	9
9	150	64	126-130	11
10	151	65	131-135	10
11	152	66	136-140	3
12	153	67	141-145	5

TABLE 2

GROUP PLACEMENT OF SUBJECTS

Exponent	Group One	Group Two	Group Three
1	1	1	-
2	1	1	2
3	2	2	2
4	2	1	1
5	4	4	4
6	4	5	5
7	5	4	4
8	3	3	3
9	3	4	4
10	4	3	3
11	1	1	1
12	1	2	2

PLATE I

STANDING BROAD JUMP

standing broad jump

BOYS AND GIRLS

4

EQUIPMENT

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

DESCRIPTION

Pupil stands as indicated in FIGURE 8, with the feet several inches apart and the toes just behind the take-off line. Preparatory to jumping, the pupil swings the arms backward and bends the knees. The jump is accomplished by simultaneously extending the knees and swinging forward the arms.

RULES

1. Allow three trials.
2. Measure from the take-off line to the heel or other part of the body that touches the floor nearest the take-off line (FIGURE 8).
3. When the test is given indoors, it is convenient to tape the tape measure to the floor at right angles to the take-off line and have the pupils jump along the tape. The scorer stands to the side and observes the mark to the nearest inch.

SCORING

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

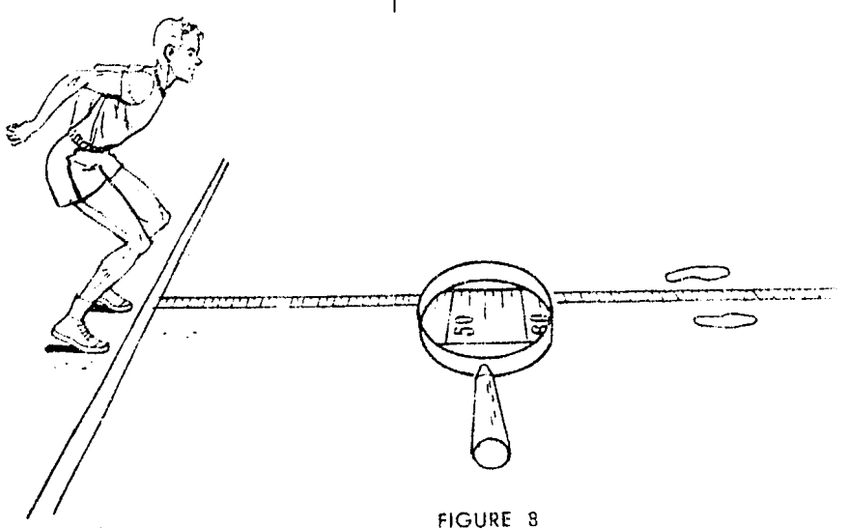


FIGURE 8
Measuring the standing broad jump.

PLATE II
BROAD JUMP MAT

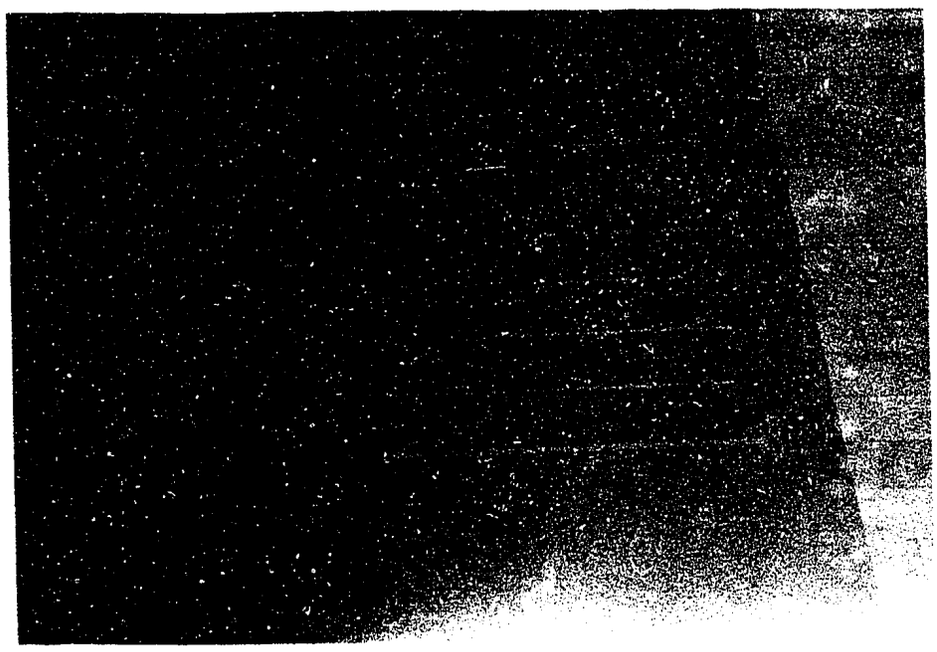


PLATE III
STARTING POSITION

minutes of practice.

The Kinesthetic Method of Instruction was as follows:

1. Verbal orientation of skill to be performed
2. Verbal instruction for use of mimetics
3. Mimetic practice with appropriate teaching cues
    a. pupil stood behind the starting line with feet comfortably spread apart, arms were swung back and forward.
    b. Knees were well bent, head up, and body leaned forward
    c. At the jump the arms were thrust vigorously forward, legs gathered underneath the body
    d. At the top of the leap forwards and upwards, the legs were thrust forward, the arms were thrust forward, and the body lean was increased
    e. Take-off was from the balls of the feet
4. Imaginary practice- Kinesthetic memory of the jump and suggested concentration on the recall of the: (1) range of movement (2) amount of force (3) take-off, and (4) feel of balance.
5. The instructor carefully observed the skill performed by the student and manually manipulated a part or parts of the student's body to correct the fault or faults in the movement.

Upon completion of the seven minute instructional period the students practiced the skill by actual jumping. Prior to each

jump the pupils closed their eyes and pictured themselves performing the movement.

Group Two (Demonstration) received the identical amount of instruction time and practice period as group one. The Demonstration Method was as follows:

1. Verbal orientation of the stated movement by the instructor
2. Visual communication by way of a demonstration of the standing broad jump as performed by the instructor
3. The demonstration of the skill was performed by the instructor and executed as best as possible
4. The students were allowed to practice the jump several times. The instructor employed pertinent teaching cues in attempting to improve the performance of the student.
5. A review of the jump and the major faults encountered was discussed by the instructor
6. Eight minutes of practice

Group Three (No Formal Instruction) verbally received a description of the skill, exactly as stated in Plate I. The students were then allowed to practice the standing broad jump. See Plates II,III,IV, and V.

All instruction was taken from the same lesson plan, the formal lesson plan was followed to the letter. At the conclusion of the four week period, the program of instruction and practice was fully completed, and all groups had received the identical number of lessons and practice sessions. Upon completion of the four week period the groups were re-tested.

PLATE IV MANUAL GUIDANCE

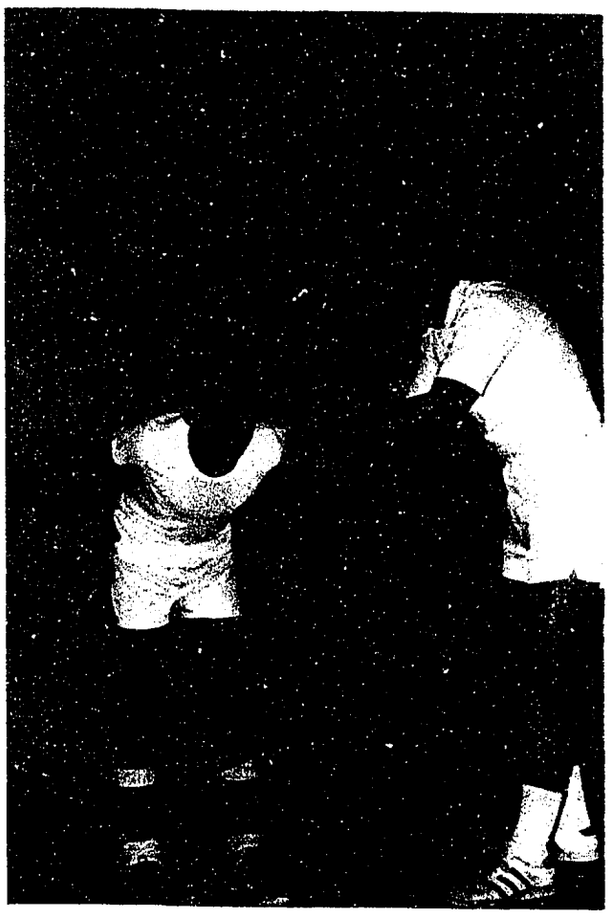
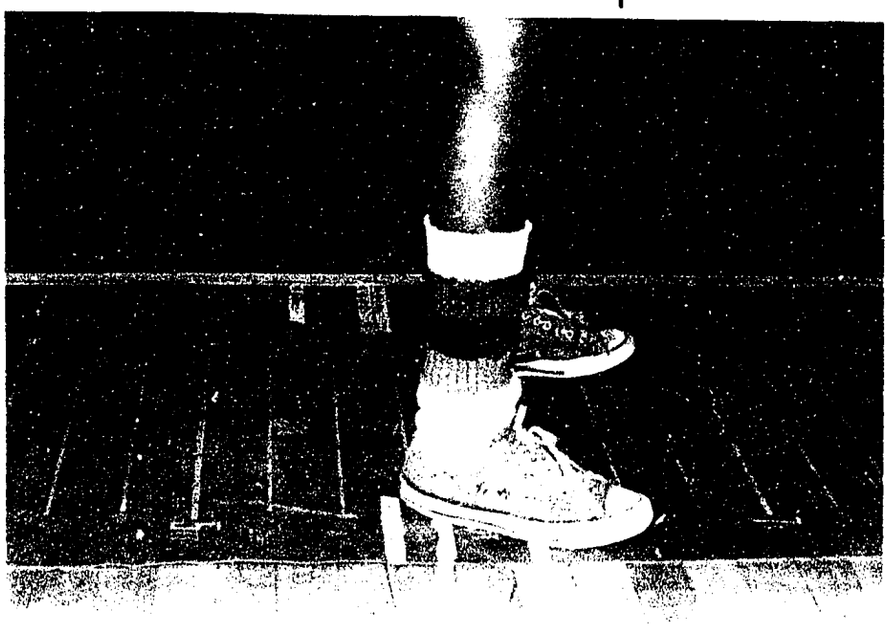


PLATE V MEASUREMENT OF JUMP



Procedure In Treating Data

The performance scores on the pre-test were grouped into frequency distribution tables and the mean and standard deviation were computed.

Table 3, lists the scores, in inches, of each subject for groups one, two, and three. Tables 4, 5, and 6, indicate the scores grouped into a frequency distribution and the mean and standard deviation for groups one, two, and three, respectively.

The students then embarked upon the four week program. During the course of this program the type of instruction each group received was strictly regulated, so as: (1) group one received no instruction other than of the kinesthetic type; (2) group two was limited to only demonstration lessons; and (3) group three received no formal instruction of any nature in regard to the standing broad jump.

Table 7, indicates the post-test scores for all subjects participating in the study. Tables 8, 9, and 10, contain the post-test scores grouped into a frquency distribution and the means and standard deviation for groups one, two, and three, respectively.

TABLE 3

PRE-TEST SCORES OF BROAD JUMP PERFORMANCE

Subject Number	Group One	Group Two	Group Three
1	63	70	54
2	64	55	60
3	60	61	63
4	56	76	59
5	68	59	62
6	56	60	62
7	65	54	54
8	60	67	67
9	62	42	68
10	64	66	63
11	36	60	48
12	76	59	56
13	60	66	63
14	63	65	66
15	66	44	58
16	62	62	61
17	72	49	64
18	66	61	65
19	66	48	52
20	60	56	70
21	68	69	58
22	62	59	51
23	44	68	60
24	67	51	58
25	56	62	52
26	63	50	65
27	60	62	50
28	69	63	63
29	60	81	67
30	65	64	59
31	51	48	72

TABLE 4

FREQUENCY DISTRIBUTION OF PRE-TEST SCORES

GROUP ONE

Interval	f	d	fd	fd^2	$(fd)^2$
75.5-79.4	1	4	4	16	16
71.5-75.4	1	3	3	9	9
67.5-71.4	3	2	6	12	36
63.5-67.4	7	1	7	7	49
59.5-63.4	12	0	0	0	0
55.5-59.4	4	-1	-4	4	16
51.5-55.4	0	-2	0	0	0
47.5-51.4	1	-3	-3	9	9
43.5-47.4	1	-4	-4	16	16
39.5-43.4	0	-5	0	0	0
35.5-39.4	1	-6	-6	36	36

Mean = 61.9 Standard Deviation = 7.48

TABLE 5

FREQUENCY DISTRIBUTION OF PRE-TEST SCORES

GROUP TWO

Interval	f	d	fd	fd^2	$(fd)^2$
77.5-81.4	1	4	4	16	16
73.5-77.4	1	3	3	9	9
69.5-73.4	1	2	2	4	4
65.5-69.4	5	1	5	5	25
61.5-65.4	6	0	0	0	0
57.5-61.4	7	-1	-7	7	49
53.5-57.4	3	-2	-6	12	36
49.5-53.4	2	-3	-6	18	36
45.5-49.4	3	-4	-12	48	144
41.5-45.4	2	-5	-10	50	100

Mean = 60.0 Standard Deviation = 8.64

TABLE 6

FREQUENCY DISTRIBUTION OF PRE-TEST SCORES

GROUP THREE

Interval	f	d	fd	fd^2
71.5-73.4	1	5	5	25
69.5-71.4	1	4	4	16
67.5-69.4	1	3	3	9
65.5-67.4	3	2	6	12
63.5-65.4	3	1	3	3
61.5-63.4	6	0	0	0
59.5-61.4	3	-1	-3	3
57.5-59.4	5	-2	-10	20
55.5-57.4	1	-3	-3	9
53.5-55.4	2	-4	-8	32
51.5-53.4	2	-5	-10	50
49.5-51.4	2	-6	-12	72
47.5-49.4	1	-7	-7	49

Mean = 60.4 Standard Deviation = 5.86

TABLE 7

POST-TEST SCORES OF BROAD JUMP PERFORMANCE

Subject Number	Group One	Group Two	Group Three
1	64	70	54
2	64	55	60
3	62	61	63
4	57	77	59
5	67	58	62
6	57	60	64
7	68	58	55
8	64	68	66
9	61	46	68
10	64	66	60
11	39	59	52
12	80	61	57
13	60	66	63
14	63	64	67
15	56	47	58
16	64	63	61
17	74	52	64
18	67	64	65
19	66	52	52
20	61	55	72
21	69	68	58
22	62	59	51
23	48	73	60
24	70	53	58
25	56	65	50
26	60	51	66
27	60	62	50
28	69	64	63
29	58	84	67
30	65	66	59
31	53	51	72

TABLE 8

FREQUENCY DISTRIBUTION OF POST-TEST SCORES

GROUP ONE

Interval	f	d	fd	fd^2
79.5-83.4	1	4	4	16
75.5-79.4	0	3	0	0
71.5-75.4	1	2	2	4
67.5-71.4	4	1	4	4
63.5-67.4	9	0	0	0
59.5-63.4	8	-1	-8	8
55.5-59.4	5	-2	-10	20
51.5-55.4	1	-3	-3	9
47.5-51.4	1	-4	-4	16
43.5-47.4	0	-5	0	0
39.5-43.4	0	-6	0	0
35.5-39.4	1	-7	-7	49

Mean = 62.6 Standard Deviation = 7.56

TABLE 9

FREQUENCY DISTRIBUTION OF POST-TEST SCORES

GROUP TWO

Interval	f	d	fd	fd^2
83.5-87.4	1	5	5	25
79.5-83.4	0	4	0	0
75.5-79.4	1	3	3	9
71.5-75.4	1	2	2	4
67.5-71.4	3	1	3	3
63.5-67.4	7	0	0	0
59.5-63.4	5	-1	-5	5
55.5-59.4	4	-2	-8	16
51.5-55.4	5	-3	-15	45
47.5-51.4	2	-4	-8	32
43.5-47.4	2	-5	-10	50

Mean = 61.3 Standard Deviation = 8.92

TABLE 10

FREQUENCY DISTRIBUTION OF POST-TEST SCORES

GROUP THREE

Interval	f	d	fd	fd^2
71.5-73.4	2	6	12	72
69.5-71.4	0	5	0	0
67.5-69.4	1	4	4	16
65.5-67.4	4	3	12	36
63.5-65.4	3	2	6	12
61.5-63.4	4	1	4	4
59.5-61.4	4	0	0	0
57.5-59.4	5	-1	-5	5
55.5-57.4	1	-2	-2	4
53.5-55.4	2	-3	-6	18
51.5-53.4	2	-4	-8	32
49.5-51.4	3	-5	-15	45

Mean = 60.6 Standard Deviation = 5.64

CHAPTER IV

Analysis Of Data

The data were examined initially by computing the mean and standard deviation of each pre-test and post-test group, as indicated in tables 4,5,6,8,9, and 10. The mean and standard deviation of the pre-test scores are 60.61 and 7.589. The mean and standard deviation of the post-test scores are 61.31 and 7.397.

Comparisons were made both at the beginning of the study and again at the conclusion of the instructional and practice period. Table 11, indicates the difference in performance scores achieved by each subject when we subtract his pre-test score from his post-test score. A negative number indicates that upon re-testing, the subject failed to do as well when compared with his initial performance score.

It was revealed that group one (kinesthetic) shows an increase in standing broad jump performance of 16 boys. Group two (demonstration) exhibited increases for 18 boys and that group three (no formal instruction) shows an increase in performance scores of 7 boys.

The difference between the pre-test and post-test scores obtained and these different scores were subjected to analysis of variance of matched groups.[1] Results are shown in table 12.

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[1]Allen L. Edwards, Experimental Design in Psychological Research (New York: Holt, Rinehart and Winston, Inc, 1968), 156.

TABLE 11

DIFFERENCE IN PERFORMANCE SCORES OF GROUPS ONE, TWO, AND THREE

Subject Number	Group One	Group Two	Group Three
1	1	0	0
2	0	0	0
3	2	0	0
4	1	1	0
5	-1	-1	0
6	1	0	2
7	3	4	1
8	4	1	-1
9	-1	4	0
10	0	0	-3
11	3	-1	4
12	4	2	1
13	0	0	0
14	0	-1	1
15	-10	3	0
16	2	1	0
17	2	3	0
18	1	3	0
19	0	4	0
20	1	-1	2
21	1	-1	0
22	0	0	0
23	4	5	0
24	3	2	0
25	0	3	-2
26	-3	1	1
27	0	0	0
28	0	1	0
29	-2	3	0
30	0	2	0
31	2	3	0

TABLE 12

ANALYSIS OF VARIANCE OF MATCHED GROUPS

Source of Variations	Sum of Squares	d.f.	Mean Square	F
Between Columns(treatment)	20.41	2.00	10.20	2.68
Between Rows (Matching Effect)	108.90	30.00	3.63	0.95
Residual (Error)	228.26	60.00	3.80	
Total	357.57	92.00	0.00	

The .05 level of significance was selected as the reference point for determining whether any difference which were found would be attributed to chance.

The F ratio of 2.68 was obtained and the probability of obtaining such a ratio by chance is greater than the .05 level of significance.

Referring to Snedecor's table [2] it takes an F at 3.10 to be significant at the .05 point and an F at 4.85 to be significant at the .01 level. Therefore, we cannot accept that a different treatment (instruction) affected performance of the standing broad jump.

This is readily apparent in table 13, by checking the means of the different scores which is relatively low.

[2] J.P. Guilford, Fundamental Statistics in Psychology and Education (New York: McGraw-Hill Book Company, 1965), p. 586.

TABLE 13

MEANS OF THE DIFFERENT SCORES

Different Scores	Means of Group One	Means of Group Two	Means of Group Three
Pre-test Scores	61.9	60.0	60.4
Post-test Scores	62.6	61.3	60.6
Difference	.7	1.3	.2

An alternate approach was attempted in which the effect of the pre-test scores were partialled out from the post-test scores. These new scores were again subjected to matched group analysis of variance design. Table 14 indicates the results.

TABLE 14

ANALYSIS OF VARIANCE OF MATCHED GROUPS

Source of Variations	Sum of Squares	d.f.	Mean Square	F
Between Columns	19.07	2.00	9.54	2.64
Between Rows	103.76	30.00	3.46	0.96
Residual (Error)	216.50	60.00	3.61	
Total	339.33	92.00	0.00	

The obtained F ratio of 2.64 for the effects of different methods of instruction on standing jump performance was again insignificant at the .05 level.

It was thought that perhaps the matched group design was not best suited for this kind of analysis because the effects of the grouping were very minor and whatever advantage was obtained from matching was cancelled out by the corresponding loss of degrees of freedom.

Table 15 indicates the expected values based on pre-test scores. These are the values of X'.

Table 16 indicates the actual differences between the pre-test scores and the post-test scores.

Table 17 is based on the different scores between the pre-test and the post-test results. This table indicates the results of a randomized group analysis without matching. As can be seen the F value of 2.68 is quite similar to the previous results and is insignificant at the .05 level.

Table 18 indicates an F ratio of 2.72 which again is found to be insignificant at the .05 level. Randomized group analysis without matching between post-test scores and the regression equation is shown in table 18. The regression equation is $X = 4.255 + 0.9413x$ Y. The standard error of the slope of the regression equation is 0.02653. The simple correlation coefficient of X and Y and its square is 0.9657 0.9326.

TABLE 15

VALUES OF X'

Subject Number	Group One	Group Two	Group Three
1	63.56	70.15	55.09
2	64.5	56.03	60.73
3	60.73	61.68	63.56
4	56.97	75.8	59.79
5	68.27	59.79	62.62
6	56.97	60.73	62.62
7	65.44	55.09	55.09
8	60.73	67.32	67.32
9	62.62	43.79	68.27
10	64.5	66.38	63.56
11	38.14	60.73	49.44
12	75.8	59.79	56.97
13	60.73	66.38	63.56
14	63.56	65.44	66.38
15	66.38	45.67	58.85
16	62.62	62.62	61.68
17	72.03	50.38	64.5
18	66.38	61.68	65.44
19	66.38	49.44	53.2
20	60.73	56.97	70.15
21	68.27	69.21	58.85
22	62.62	59.79	52.26
23	45.67	68.27	60.73
24	67.32	52.26	58.85
25	56.97	62.62	53.2
26	63.56	51.32	65.44
27	60.73	62.62	51.32
28	69.21	63.56	63.56
29	60.73	80.5	67.32
30	65.44	64.5	59.79
31	52.26	49.44	72.03

TABLE 16

THE DIFFERENCE VALUES OF X-X'

Subject Number	Group One	Group Two	Group Three
1	0.4411	-0.1482	-1.087
2	-0.5002	-1.028	-0.7349
3	1.265	-0.6762	-0.5589
4	0.03044	1.204	-0.7936
5	-1.266	-1.794	-0.6175
6	0.03044	-o.7349	1.382
7	2.558	2.913	-0.08691
8	3.265	0.6758	-1.324
9	-1.618	2.209	-0.2655
10	-0.5002	-0.3829	-3.559
11	0.857	-1.735	2.561
12	4.204	1.206	0.03044
13	-0.7349	-0.3829	-0.5589
14	-0.5589	-1.442	0.6171
15	-10.38	1.326	-0.8522
16	1.382	0.3825	-0.6762
17	1.969	1.62	-0.5002
18	0.6171	2.324	-0.4415
19	-0.3829	2.561	-1.204
20	0.2651	-1.97	1.852
21	0.7345	-1.207	-0.8522
22	-0.6175	-0.7936	-1.263
23	2.326	4.734	-0.7349
24	2.676	0.7371	-0.8522
25	-0.9696	2.382	-3.204
26	-3.559	-0.3216	0.5585
27	-0.7349	-0.6175	-1.322
28	-0.2069	0.4411	-0.5589
29	-2.735	3.497	-0.3242
30	-0.4415	1.5	-0.7936
31	0.7371	1.561	-0.03084

TABLE 17

ANALYSIS OF VARIANCE WITHOUT
MATCHING-USING PARTIALLED SCORES

Source of Variations	Sum of Squares	d.f.	Mean Square	F
Between Groups	19.07	2	9.54	2.68
Within Groups	320.26	90	3.56	
Total	339.33	92		

TABLE 18

ANALYSIS OF VARIANCE WITHOUT MATCHING
BETWEEN POST-TEST SCORES AND REGRESSION EQUATION

Source of Variations	Sum of Squares	d.f.	Mean Square	F
Between Groups	20.41	2	10.20	2.72
Within Groups	337.16	90	3.75	
Total	357.57	92		

CHAPTER V

SUMMARY AND CONCLUSIONS

A test of standing broad jump ability was administered to ninety-three sixth grade boys. The subjects were divided into three equal groups of thirty-one pupils, and each group was tested prior to any formal instruction.

Group one received seven minutes of kinesthetic instruction and eight minutes of practice, group two received seven minutes of demonstrational instruction and eight minutes of practice. The third group received no formal instruction but an equal amount of practice time as the preceding groups.

The analysis of variance of matched groups was employed, and an F ratio of 2.68 was not significant at either the .05 or the .01 levels.

In an alternate approach, the pre-test scores were partialled out from the post-test scores. Again subjected to analysis of variance of matched groups. An F ratio of 2.64 was obtained and was found insignificant at the .05 level.

Randomized group analysis without matching was attempted, this method obtained an F ratio of 2.68, also insignificant at the .05 level of significance. An F ratio of 2.72 was found to be insignificant at the .05 level when randomized group analysis without matching between post-test scores and the regression equation was computed.

In comparing the means of the different scores, some improvement was found to occur in all three groups. However, it was found that no statistically significant difference could be obtained by use of one instructional technique exclusively in preference to another.

Conclusions

Within the limitations of this study, the following conclusions may be drawn:

1. It was hypothesized that there would be a significantly greater increase in standing broad jump performance of students taught by the kinesthetic method of instruction as compared with performance scores of students taught by the demonstration method of instruction. From these results, it is concluded that there is no difference in the two teaching methods under the conditions of this study.
2. Each group showed a slight increase in performance scores when the pre-test scores were subtracted from the post-test scores. It was revealed that group one (kinesthetic) showed an increase in standing broad jump performance of sixteen boys. Group two (demonstration) exhibited increases for eighteen boys, and that group three (no formal instruction) showed an increase in performance scores of seven boys.

Recommendations

In respect to the above stated conclusions the following recommendations are made for the instruction of the standing broad jump.

Due to differences in maturity and development, previous experiences, abilities and capacities, the personal goals and the desire of the students all present a wide variability within any class in the field of physical education. The pupil learns only if he actually perceives, thinks, and plans during the instructional period.

Optimum teaching effectiveness would be reached by including both the kinesthetic and demonstration methods in presenting a motor skill to a class. The value of individual practice must not be minimized and sufficient time should be allowed for such practice.

There must be more investigation done in the field of teaching motor skills, with an emphasis on the kinesthetic sense, as well as the visual sense. There is also need for more study on the measurement of learning and the understanding of movement developed through the teaching of motor skills.

It is recommended that similar studies invclving motor skills be undertaken to assist in the determination of the effect of instruction upon performance.

CHAPTER VI

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