A COMPARISON OF TEACHING TWO METHODS
OF PHYSICAL EDUCATION WITH
GRADE ONE PUPILS

A Thesis
Presented to
the Faculty of the Graduate School
Wisconsin State University at La Crosse

In Partial Fulfillment
of the Requirements for the Degree
Master of Science

by
Robert S. Scott
July 1965

WISCONSIN STATE UNIVERSITY AT LA CROSSE
GRADUATE SCHOOL

Candidate:

Robert S. Scott

We recommend acceptance of this thesis to the Graduate School in partial fulfillment of this candidate's requirements for the degree Master of Science.

William E. Felch

Thesis Committee Member

7-26-65

Date

Bernard J. Young

Thesis Committee Member

7-26-65

Date

Ernest Pershon

Thesis Committee Chairman

7-26-65

Date

This thesis is approved for the Graduate School:

James H. M. Erickson

Dean, Graduate School

July 27, 1965

Date

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ABSTRACT

Robert S. Scott, "A Comparison of Teaching Two Methods of Physical Education with Grade One Pupils" (Master's thesis, Wisconsin State University, La Crosse, 1965).

Five groups of grade one boys and girls (29 pupils in each group) were compared in physical fitness, perceptual motor development and creative ability at the conclusion of a five month program. Each group followed a different program: (a) the informal method four times a week, (b) the formal method four times a week, (c) the informal method twice a week, (d) the formal method twice a week, and (e) no physical education at all. There were no significant differences among the five groups in physical fitness and perceptual motor development at the beginning of the study. The findings of this study would appear to warrant the conclusions that at the five percent level of significance the methods and frequencies followed in this study: (a) do not vary in their effect on perceptual motor development, (b) are equally better than no physical education at all in the development of physical fitness, (c) are less effective in the development of creative ability than no physical education at all, and (d) have the same effect on boys as they do on girls.

ACKNOWLEDGEMENTS

The investigator would like to thank the following individuals who unselfishly contributed their valuable time and energy toward the completion of this study: the ten grade one teachers who taught the lessons and assisted with the testing; Dr. D.A. Bailey for his assistance with the statistical analysis; and Dr. E. J. Gershon for his expert guidance as advisor and thesis committee chairman.

R. S. S.

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CHAPTER I

INTRODUCTION

The Saskatchewan Department of Education has recently published a revised curriculum guide which outlines new procedures and materials to be used in grades one, two, and three in the province's elementary schools. No attempt was made to revise the physical education curriculum which is based on the formal method and which was originally compiled in 1952. Two of the largest school systems in the province have disregarded the department's program in favor of the British informal approach to teaching physical education in grades one, two, and three. There is a need to provide information that will justify the use of the informal approach as being superior to the formal approach.

The investigator has had several years of experience consulting classroom teachers in the use of both methods of teaching physical education. Experience has indicated that both classroom teachers and the pupils enjoy the informal approach more than the formal approach. Those who have used the informal approach maintain that their children get more physical activity and have a better opportunity to develop at their own particular rate. To date there have been no studies completed in the

Province of Saskatchewan that would support or refute the above opinions.

I. THE PROBLEM

Statement of the problem. An attempt was made to compare the formal approach with the informal approach of teaching physical education with groups of grade one pupils at different frequencies (four times a week, twice a week, and no physical education at all) with respect to physical fitness, perceptual motor development, and creative ability.

Limitations. The teachers who taught the five groups of grade one pupils were all experienced, government certified classroom teachers, and not physical education specialists. The effectiveness of their teaching was dependent upon their individual personal qualities, interest, and motivation.

The scope of this study is limited by the sampling method used. As explained in more detail in Chapter II of this study, an opportunistic, not random, sample was used.

The evaluation of the creative ability of the five groups, which was done from a film taken by the investigator, could have been affected by the poor quality of some parts of the film.

Assumption. The investigator assumes that the sample did not take part in out of school physical education activities to the extent that this participation made any significant difference in the results of this study.

II. RELATED LITERATURE

Literature directly related to this study was practically nonexistent. One reason for this could be that the informal approach of teaching physical education is relatively new in Canada and the United States. However, some literature relating to perceptual motor development and creative ability was found.

Ausubel states that tests of general creativity are not possible, but assessment of creative potential can be made in one particular field by using expert judgments of actual performances.¹ The testing procedure for the assessment of creative ability in this study was devised with the above statement in mind.

In a case study reported by Radler, motor therapy programs are shown to contribute to the academic improve-

¹David P. Ausubel, The Psychology of Meaningful Verbal Learning (New York: Grune and Stratton, 1963), p. 3.

ment of children who are low achievers in school.² In a later study by Radler and Godfrey, a physical education program was conducted in an experimental group consisting of gross motor activities and using the non-directive or informal approach. Significant gains in school achievement were made by the children in the experimental group. These gains were attributed to the role of motor development in perceptual and symbolic awareness.³

²D. H. Radler, Success Through Play How to Prepare Your Child for School Achievement and Enjoy It (New York: Harper Brothers, 1960), pp. 3-10.

³Barbara B. Godfrey, "Progress in School Achievement Through Motor Therapy" (abstract of a report presented at the National Convention of the American Association of Health, Physical Education, and Recreation, Minneapolis, Minnesota, March 6, 1963).

CHAPTER II

PROCEDURE

This chapter will delimit the study by describing the sample and explaining the criteria used for the selection of the sample. A review of the teaching methods and the tests used in this study will also be made.

I. SAMPLE

The sample consists of first year, or grade one, boys and girls from five of the thirty-two elementary schools in the city of Saskatoon. First year pupils in the Saskatoon Public School System must be six years of age by December 31st of the year they begin school. First year pupils were chosen because they would not have had previous instruction in physical education.

With the problem, stated at the beginning of this study, in mind the following groups were devised:

1. Group A - this group was taught the informal method for four twenty minute periods a week.
2. Group B - this group was taught the formal method for four twenty minute periods a week.
3. Group C - this group was taught the informal method for thirty minutes twice a week.
4. Group D - this group was taught the formal method for thirty minutes twice a week.
5. Group E - this group received no physical education program.

The investigator felt that two classes of approximately thirty pupils each would be both a manageable and a sufficient number for each group. On this basis and on the basis of the investigator's knowledge and experience with the school system, five schools with two grade one classes in each were contacted. Each of the schools chosen serves a community of approximately the same socioeconomic level. An interview was held with the principal and teachers concerned in each school. It should also be explained that the choice of school was dependent to some extent on the cooperation of the principal and the experience and willingness of the teachers.

On the basis of the results from the first physical fitness test and perceptual motor test, each group was reduced to twenty-nine pupils. As indicated by the Chi Square Test for K Independent Samples, there was no significant difference among the groups in physical fitness and perceptual motor development.⁴ The test results are shown in Chapter III. The final sample consisted of five groups with twenty-nine pupils in each group.

⁴Sidney Siegel, Nonparametric Statistics for the Behavioral Sciences. (New York: McGraw Hill Company, 1956), pp. 175.

II. TEACHING METHODS

Formal Method

This method was developed and recommended by the Saskatchewan Department of Education. This was the method followed by Group B and Group D in this study. The yearly plan for the formal method is outlined in Table I. All game and page references in Table I refer to Van Hagen.⁵ The percentage of time spend on each of the activities in Table I was: basic movement and story plays, thirty per cent; games, twenty-five per cent; rhythms, thirty per cent; and self-testing, fifteen per cent.

The daily lesson plan for both the twenty minute and thirty minute lesson is shown in Table II. The times were given to the teachers so they could plan accordingly.

The grade one program outlined in the Saskatchewan Department of Education Guide and Van Hagen was followed exclusively.⁶ Suggestions as to the amount and types of equipment to be used were also followed. By the nature

⁵Winifred Van Hagen and Neils Neilson, Physical Education for Elementary Schools (New York: A.S. Barnes, 1954).

⁶Government of Saskatchewan, Elementary School Curriculum Guide for Division I. (Regina: Department of Education, 1964); Winifred Van Hagen and Neils Neilson, Physical Education for Elementary Schools (New York: A. S. Barnes, 1954).

TABLE I

YEARLY OUTLINE OF ACTIVITIES FOLLOWED
IN THE FORMAL METHOD*

8

ACTIVITY	UNIT 1 OCTOBER	UNIT 2 NOVEMBER DECEMBER	UNIT 3 JANUARY- FEBRUARY
BASIC MOVE- MENTS	WALKING: -quickly -slowly -on toes RUNNING: -on the spot -in a circle -on tiptoes	HOPPING: -on one foot -on both feet -moving ahead Follow the Leader	
MIMETICS OR DRAMA- TIZATION			Trotting horses Shovelling coal Bear Walking Elephant Walking
STORY PLAYS	Going for a Walk Shopping Picking up Toys	Hippity Hop to the Bar- ber Shop Hi Diddle Diddle Christmas Shopping	Three Bears Three Pigs Old King Cole Hickory Dick- ory Dock
GAMES	Bean Bag Throwing 327 Caged Tiger 328 Magic Carpet 334 Chase the Animals 329 Cat & Mice 328	Galloping & Skipping 320 Jack Be Nim- ble 333 Object Touch- ing 335 Stop & Start 340 Skip Tag 338	Huntsman 332 Railroad Train 337 Pussy Wants a Corner 336
RHYTHMI- CAL AC- TIVITIES	Clapping to Music Mark time to Music Walking to Music	Swaying to Music Moving to Music Skipping to Music	Did You Ever See a Lassie 343 Farmer in the Dell 344 Oats, Peas, & Beans 353
TEST- ING	Nos. 1,2,3, 4 - pp. 360	Nos. 4,5,6- pp. 360 Nos. 1,2 pp. 361	Nos. 7,8,9, - pp. 360 Nos. 3,4 - pp. 361

*Saskatchewan Department of Education, Elementary
Curriculum Guide for Division I (Regina: Government of
Saskatchewan, 1964).

TABLE II
DAILY LESSON PLAN FOR
THE FORMAL METHOD

ACTIVITY	30 MINUTE LESSON	20 MINUTE LESSON
Basic Movement Story Plays	3 - 10 minutes	3 - 10 minutes
Games and/or Rhythms	15 - 22 minutes	7 - 14 minutes
Self-Testing Activities	5 minutes	3 minutes

of the program suggested, climbing equipment and large apparatus were not used by the pupils following the formal method.

Informal Method

This was the method followed by Group A and Group C in this study. This method is in common use in Britain, and the investigator became acquainted with it during employment as a physical education consultant for the Regina Public Schools, where an extensive program had been in operation.

The yearly outline and percentage of time spent on each activity are shown in Table III. This outline was given to the teachers who followed the informal method.

Table IV shows the daily lesson plan for both a twenty minute lesson and a thirty minute lesson. The teachers used this information as a guide when planning their lessons.

The grade one program outlined in MacKenzie, Diem, and Halsey was followed exclusively by the teachers following the informal method.⁷ By the nature of the program

⁷Jack MacKenzie, Physical Education Program, Primary Department (Regina: Regina Public School Board, 1963); Lisilott Diem, Who Can (Chicago: George Williams College, 1962); and E. Halsey and Lorena Porter, Physical Education for Children (New York: The Dryden Press, 1958).

TABLE III
YEARLY OUTLINE AND PERCENTAGE
DISTRIBUTION FOR THE
INFORMAL METHOD

ACTIVITIES	FALL OUTDOORS	WINTER INDOORS	SPRING OUTDOORS
Self-testing	55%	40%	55%
Games	30%	20%	30%
Movement Exploration	10%	20%	10%
Rhythms	5%	20%	5%
	100%	100%	100%

TABLE IV
DAILY LESSON PLAN FOR THE
INFORMAL METHOD

ACTIVITY	20 MINUTE LESSON	30 MINUTE LESSON
Introductory Activities and Basic Movements	6 minutes	8 minutes
Skill Development in self-testing activities, rhythms and/or game skills	10 minutes	16 minutes
Game or Dance	4 minutes	6 minutes

suggested, the use of climbing equipment and large apparatus was common in the groups following the informal method.

The comparison of the two methods made in Table V will further clarify the differences between them.

Administration of Methods

Each group in the study was tested for perceptual motor development and physical fitness the first week in October, 1964. Starting the second week in October, each group proceeded with its respective physical education program until the first week in March, 1965. At the beginning of the program, all teachers were thoroughly briefed on the programs they were to follow. Teachers observed demonstration lessons on the method they were to teach. The teachers were also visited four times during the five months in order for the investigator to observe and assist with their programs.

III. THE TESTS

Physical Fitness Test

The Saskatchewan Physical Fitness Test was used for the following reasons.⁸ The investigator was familiar with the test because of his part in the formation of the

⁸D. A. Bailey and W. A. R. Orban, Saskatchewan Physical Fitness Test Manual (Saskatoon Public School Board: Saskatoon, 1964).

TABLE V

COMPARISON BETWEEN THE FORMAL METHOD AND
THE INFORMAL METHOD OF TEACHING
PHYSICAL EDUCATION*

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FORMAL METHOD	INFORMAL METHOD
<ol style="list-style-type: none"> 1. "Drill"-inherited from military maneuver <ul style="list-style-type: none"> -children were considered "little adults". 2. Mainly teacher-directed approach <ul style="list-style-type: none"> -formal -teacher being focus of attention. -little thought or concentration by pupils. -children copied or imitated the teacher ("follow the leader"). 3. Little use of apparatus (mostly small). <ul style="list-style-type: none"> -Lining up and taking turns. 4. Formal commands given. 5. External discipline imposed <ul style="list-style-type: none"> -passive obedience by pupils. -lack of initiative by pupils. -alert response. 	<ol style="list-style-type: none"> 1. Physical Education, based on study of growth and development of children. <ul style="list-style-type: none"> -methods and activities based on this basis. 2. A mixture of teacher direction and pupil initiative and enterprise <ul style="list-style-type: none"> -more scope for independence, exploration, and enterprise. -more pupil centered; pupil must "puzzle through situations". 3. More abundant use of apparatus, large and small. <ul style="list-style-type: none"> -everyone active - little standing around and waiting. 4. More use of a natural teaching voice; guidance and help. <ul style="list-style-type: none"> -the intelligent cooperation of child is needed, rendering much of command-response method obsolete. 5. Mixture of external and self-discipline <ul style="list-style-type: none"> -scope for pupil initiative and independence. -stress on developing self-discipline. -alert response, if and when desired - but not simply for its own sake.

*Jack MacKenzie, Physical Education Program, Primary Department (Regina: Regina Public School Board, 1963), pp. iii-iv.

TABLE V (continued)

FORMAL METHOD	INFORMAL METHOD
6. Rigid class formations used.	6. Freer groupings - child develops a sense of spacing for himself and his apparatus without bothering others. -gymnasium space used to best advantage.
7. Little consideration for individual differences. -class approach used, based on commands and work in unison.	7. Progressive stages of activities -opportunities for each one to progress at his own rate and level. -teaching geared to the individual.
8. Little chance to observe children as they really are.	8. Pupils can be themselves, more natural. -the teacher must be an astute observer to guide and help each child's development. -children can display and develop character.
9. Greater physical demands on teacher -she joined in with class and led them.	9. Less physical demands - more mental activity needed to plan and give scope for pupil development -discussion, observation, and the posing of problems.

TABLE V (continued)

FORMAL METHOD	INFORMAL METHOD
<p>10. Children hampered through adult fear</p> <ul style="list-style-type: none"> -over-emphasis on caution "Be careful, now!" -lack of adventure -"Safety" achieved by restricting many of the activities. 	<p>10. Wider opportunity for activity.</p> <ul style="list-style-type: none"> -more adventure and initiative. -safety precautions taught and developed. e.g., light, flowing landings. -teacher helps devise tasks permitting a variety of interpretation. -children learn a great deal about themselves through "trial and error".
<p>11. Held back physical development through restrictions - and formal mass activity.</p>	<p>11. Promotes physical development of class up to limit of each child.</p> <ul style="list-style-type: none"> -more freedom for children to select their own activities with and without apparatus. -pupils can work at their own individual level.
<p>12. Teacher took a prominent role in placing of apparatus.</p>	<p>12. Pupils arrange their own apparatus</p> <ul style="list-style-type: none"> -learn to take things out and put them away. -learn to manage their own affairs as much as possible.
<p>13. Formal, specific exercises for various parts of the body.</p> <ul style="list-style-type: none"> -pupils went through stereotyped motions of the limbs. 	<p>13. Exercise needs are met more as "by-products", where appropriate.</p> <ul style="list-style-type: none"> -pupil's mind <u>and</u> body brought to bear on activities; the whole being benefits.

test and through the use of the test in the Saskatoon Public Schools. The test norms were developed in Saskatchewan and include norms for grade one pupils. The nature of the test is such that it is practical to administer in a reasonable amount of time. This is an important criterion because pupil's time out of the classroom had to be kept to a minimum. It was necessary that the test items be simple and that they give the best possible indication of physical fitness.

The test involves the administration of the following four items:

1. Full Squats: muscular strength and endurance of the legs.
2. Sit Ups: strength and endurance of the abdominal and ilio-psoas muscles.
3. Trunk Flexion: flexibility of the trunk and hamstring muscles.
4. Flexed Arm Hang: static strength and endurance of the arms and shoulder girdle.

Description of Physical Fitness Test Items

1. Full Squats. This test is of a maximal nature in which the subject performs as many correct full squat movements as possible within the space of one minute.

1) The subjects are placed facing the wall, feet shoulder width apart at right angles to the wall with their toes at a point about two of their own foot lengths from the base of the wall. Refer to Figure 1.

ITEM 1
FULL SQUATS

Fig. 1 **Determining Distance from Base of Wall.**

Fig. 2 **Starting and 'Up' Position.**

Fig. 3 **Squat or 'Down' Position.**

ii) The subjects are then asked to place their palms against the wall above shoulder height approximately one foot apart, with their fingers pointed up and with an imaginary line connecting the hands parallel to the floor. Refer to Figure 2.

iii) To perform the squat, the subject bends his knees and keeping his back straight, places his arms between his feet, and palms against the floor with fingers pointed to the wall. In this action, the seat should be kept down and the head erect, with eyes focused on the wall directly in front. At this point the subject may adjust the distance between his feet to a comfortable width. Refer to Figure 3.

iv) The subject then stands and places his hands against the wall in the original position.

v) All subjects are then given three practice trials in which to perfect the movement, and any mistakes should be corrected by the teacher.

vi) The subject resumes the position with palms on the wall and on the signal "go" performs as many full squats as possible in the preceding manner during the course of one minute.

2. Sit Ups. This test is of a maximal nature in which the subject performs as many correct sit ups as possible within the space of one minute.

i) The subject lies on his back on the floor. The legs are extended with the feet together. The hands are placed behind the neck with fingers interlocked. Refer to Figure 4.

ii) The counter kneels and the soles of the subject's feet are placed against the counter's thighs. The counter holds the subject's legs so that the heels are in contact with the floor at all times.

iii) On the command "start", the subject sits up, turning the trunk to the right and touching the left elbow to the right knee. The subject returns to the starting position, then immediately raises his body forward again and turns his trunk to the left to touch the right elbow to the left knee. The exercise is continued, alternating elbow and knee contacts for one minute. For the above sequence refer to Figures 5, 6, and 7.

3. Trunk Flexion.

i) The pupil stands on the appartus with his toes flush with the front edge of the apparatus. Refer to Figure 9, page 22.

ii) He bends over and places the crossbar in the V between the thumb and hand. (THIS IS IMPORTANT)

iii) Keeping his knees straight and crossbar in place, he pushes the crossbar down as far as possible. Refer to Figure 8, page 22.

ITEM
SIT

2
UPS

Fig. 4 Starting Position.

Fig. 5 Sit Up Position. Left Elbow - Right Knee.

Fig. 6 Down Position.

Fig. 7 Sit Up Position. Right Elbow - Left Knee.

ITEM 3

TRUNK FLEXION

Fig. 8 Flexometer - Front View.

Fig. 9 Flexometer - Side View.

iv) The score is the number of inches which the pupil pushes the bar beyond the reference point marked on the flexometer (twelve inches above the floor). The score is read off the tape at the point of measurement to the nearest one half of an inch.

4. Flexed Arm Hang. This test is of a maximal nature in which the subject performs the task for as long as possible.

i) The bar should be approximately eye level when the subject stands on a chair. If the subject must be lifted into position, complete support must be given until he is ready to begin. Refer to Figure 10.

ii) The fingers of both hands encircle the bar at shoulder width with the palms facing the subject.

iii) The bridge of the nose is brought in contact with the bar (not over) and on the same level. Students who wear glasses should take them off before performing this exercise. Refer to Figure 11.

iv) The subject is told to get ready, the support is removed and the watch started. The timer calls out the time elapsed in seconds each second.

v) When the subject can no longer maintain the starting position he is finished and time should be recorded to the nearest second on the score card.

ITEM 4
FLEXED ARM HANG

Fig. 10 Starting Position.

Fig 11. Hanging Position.

Administration of the physical fitness test. The test was administered to each of the five groups during the first week of October, 1964 and a second time during the first week in March, 1965. Each group was divided into four smaller groups. In the gymnasium of each school, the four test items were set up at four different stations. University physical education majors were used to help test and record. The four small groups rotated to each test station and their scores were recorded on the report card shown in the Appendix on page 61.

Perceptual Motor Performance Test

The perceptual motor process is best defined by Figure 12 taken from Kephart.⁹ The input area shown in Figure 12 is from the organism itself. It is a translation of outside energy into patterns of neural impulses. The integration area on the diagram is the elaboration of the input so that the output operation may be made. The output is also a pattern of neural impulses. It is a pattern in the motor area of the cortex which can be sent to the muscles and will result in movement.¹⁰ The feed-

⁹Newell C. Kephart, The Slow Learner in the Classroom (Columbus, Ohio: Charles E. Merrill Books Inc., 1960) p. 56.

¹⁰Ibid.

FIGURE 12

THE PERCEPTUAL PROCESS*

*Ibid.

back area on the diagram is used as a control in this closed system which becomes self-monitoring. Part of the output response is drained off and goes to the input area where it can be evaluated. It is important to understand that perceptual activities and motor activities are one and the same thing.¹¹

In Kephart's book, a chapter entitled, "Motor Basis of Achievement", describes the importance of perceptual motor development. To a large extent, so called higher forms of behavior develop out of and have their roots in motor learning.¹² Laterality, directionality, postural flexibility and body image are all dependent on sound motor development. Usually the child, by the age of six or seven years, has developed normally in this respect. However, in many children the developmental process has not been complete.¹³

The relationship which exists between the perceptual motor process and physical education is well illustrated by the following statement by Kephart.

¹¹Ibid., p. 57

¹²Ibid., p. 35

¹³Ibid., p. 120

Because of the cyclical nature of the process, physical education becomes a part of reading and the too frequent dichotomy between muscular or motor activities and intellectual activities becomes untenable. Since we cannot separate the perceptual and the motor in the process of the child, we should not separate these in teaching him.¹⁴

The subjects in this study were tested using the following perceptual motor test, before and after their respective programs. The test was taken from Kephart's book and has been designed for and clinically tested with children six to nine years old.¹⁵

Perceptual Motor Tests

1. Walking Board. (This is a four inch wide board ten feet long and ten inches from the floor.)

i) Demonstrate a natural walk down the board. Instruct the child to do the same. Evaluate.

ii) Demonstrate a natural walk backward down the board. Ask the child to look straight ahead when walking. Evaluate.

iii) Demonstrate a sidewise walk on the board. Ask the child to go from one end to the other and then come back. Evaluate.

¹⁴Ibid., p. 65

¹⁵Ibid., p. 122

EVALUATION: If the child steps off the board more than once, it is a failure. It is a failure if the child does not complete the task.

2. Jumping. The instructor will demonstrate each activity a maximum of two times and then ask the child to attempt it.

i) Both Feet. Stand the child at the side of the room where he has a clear space measuring the length of the room in front of him. Ask him to put both feet together and to jump forward one step. The child must hold his feet together while he jumps and must not step forward as in walking. Observe whether he can use both sides of his body in this parallel fashion.

ii) Right Foot. Ask the child to stand on his right foot with his left off the floor. Now ask him to jump forward one step using his right foot only. Observe whether he can shift his posture in order to operate with one side of his body only. During the task, the left foot must not touch the floor.

iii) Left Foot. Ask the child to stand on his left foot and hop one step forward with his left foot only. Some children will be found who can perform this task with one foot but not with the other. Observe the same behavior as in the right foot task.

iv) Skip. Ask the child to skip across the room using the feet alternately. Observe whether this is good free movement. Does the child alternate sides with ease or does he, in effect, have to stop after each step and determine which side he must use next?

v) Hop 1/1. Ask the child to stand with his feet together. Now ask him to hop on the right foot, lifting the left. Next ask him to hop on the left foot, lifting the right. The child's body should remain in one spot during the hopping performance. Observe whether he is able to shift easily from one side to the other and whether his behavior is smooth and rhythmical or stiff and jerky. The latter type of behavior is evidence that he cannot readily shift from one postural orientation to another in a lateral direction.

vi) Hop 2/2. This task is the same as the foregoing except that the child hops twice on the right foot, twice on the left, etc. This task is more difficult since the rhythm patterns and alternations are not as regular. Observe the performance for rhythm and smoothness.

vii) Hop 2/1. Ask the child to hop twice on the right foot, once on the left, twice on the right, etc. This task is still more difficult since the alternation patterns are more complicated. Observe for rhythm and

smoothness.

viii) Hop 1/2. Ask the child to hop once on the right foot, once on the left, twice on the right, etc. This task is the same as the preceding except that the sides are reversed.

EVALUATION: If the child does not execute the exact movement demonstrated, it is a failure.

3. Identification of Body Parts. Ask the child to stand facing you at a distance of about ten feet. Say to the child:

1. Touch your shoulders
2. Touch your hips
3. Touch your head
4. Touch your ankles
5. Touch your ears
6. Touch your feet
7. Touch your eyes
8. Touch your elbows
9. Touch your knees

EVALUATION: It is a failure if the child cannot locate the part. It is also a failure if he does not locate both of the paired parts. It is also a failure if the child starts in the general direction of the part but has to feel around for the exact location of the part.

4. Imitation of Movements. Ask the child to stand about ten feet away from you and do whatever you do. Refer to Figure 13.

FIGURE 13
SEQUENCE OF ARM FORMATIONS
FOR THE IMITATION OF
MOVEMENTS TEST

EVALUATION: It is desirable that the child reverses the laterality of the examiner's movements. That is to say, when you move your right hand, he should move his right hand. A great many children will be found to parallel the movements which they see. Do not instruct the child regarding this situation. Consistency of performance is what to look for. It is a failure if the child does not to the exact movement shown. It is a failure if the child does not do the movement promptly without hesitation.

5. Obstacle Course.

i) Ask the child to step over a yard stick placed on two chairs.

ii) Ask the child to duck under the same obstacle.

iii) Ask the child to squeeze through a space between two chairs. The space should be small enough to require the child to turn sidewise in order to get through.

EVALUATION: It is a failure if the child touches any part of the obstacle. It is also a failure if the child fails to complete the task.

Administration of the perceptual motor test. The investigator personally tested and recorded all pupils in this test. The apparatus was set up in a vacant room or on the stage in each school. Two pupils were tested at one time. It took approximately five minutes to test and re-

cord each pair of pupils. Their scores were recorded on the report card shown in the Appendix on page 62.

Creative Ability Test

Creative ability for the purpose of this study shall be interpreted as the ability of children to exhibit originality and flexibility in given physical education activities. Originality is the ability to produce uncommon, clever or remote responses. Flexibility is the ability to explore materials by rearrangement so that new responses may be attempted. For further clarification of the term creative ability it is necessary to refer to Gallagher and Ausubel. The definition of creative ability in children is a difficult matter since it has to be in terms of the child's own experiences rather than creativity in an adult sense.¹⁶ We must also distinguish between creativity as a continuously and normally distributed intellectual-personality trait on one hand and a person manifesting a unique and qualitatively distinctive degree of this trait on the other.¹⁷ For the purpose of this study, creative

¹⁶James J. Gallagher, "A Psychologist Looks at Creativity" (paper read at the Midwest Art Conference in Urbana, Illinois, October 27, 1961).

¹⁷David P. Ausubel, The Psychology of Meaningful Verbal Learning (New York: Grune and Stratton, 1963).

ability will be that trait which is a continuously and normally distributed intellectual personality trait.

The importance of creative ability in the education of the child is supported by Gallagher, Schmadel, Getzels, and Jackson.¹⁸ The investigator wanted to find out if physical education has any effect on creative ability and if different methods of physical education provide different results.

The creative ability test was devised by the investigator. The original plan for the test was to have each group come into the auditorium where fifteen boxes, ten inches high, eighteen inches long, and twelve inches wide and fifteen wands or sticks, forty inches long and one inch in diameter, had been placed at random. This arrangement is shown in Figure 14. The children would be asked by the investigator to use the equipment in any way they wished and their response would be recorded on film. Several pilot projects were conducted by the investigator with various grade one classes throughout the city. The results of these pilot projects indicated that the best

¹⁸Gallagher, loc. cit.; Elnora Schmadel, "The Relationship of Creative Thinking Abilities to School Achievement" (unpublished Doctoral dissertation, The University of Southern California, 1960); and Jacob W. Getzels and Phillip W. Jackson, Creativity and Intelligence (New York: John Wiley and Sons Inc., 1962).

FLASHERS OF THE LIGHTS

response from pupils was obtained when their teachers gave the instructions.

The children warmed up for two minutes around, but not touching the equipment. This was necessary to allow the children to become familiar with the equipment, which they had never seen before. The teacher then gave the class the following instructions and the class used the equipment for three minutes, the last minute and ten seconds of which were recorded on 8 m.m. film.

Boys and girls. I would like you to show me how many different things you can do with your bodies while using the boxes and sticks that you see around you. When I say go I want you to go to a box or a stick and start using it in as many ways as you can. You may trade your stick for a box after you have tried some things if you wish.

Do your best and do not act silly. I will not be telling you what to do, you must show me all the different things that you can do.
GO!

The film was taken by the investigator who was hidden from the children by stage curtains. The film used was 8 m.m., 400 A.S.A., black and white. This type of film can be used without extra lighting.

Twelve specialists in the field of elementary school physical education consented to evaluate the film. They were asked to view the film a minimum of three times and rank the groups from superior to poor. Instructions given to the specialists and the rating scale they used are illustrated in the Appendix on pages 63 and 64.

CHAPTER III

ANALYSIS AND INTERPRETATION OF DATA

This chapter contains the analysis of the findings of this study. The data have been analysed by means of non-parametric statistics because the data satisfy only the requirements of the ordinal scale for which only non-parametric statistics may be applied.¹⁹ The five percent level of significance has been used with all calculations.

I. PHYSICAL FITNESS

The results from trial one of the physical fitness test for all five groups were ranked and the general median of 180 was recorded. The Chi Square Test For k Independent Samples²⁰ was used to determine the significance of difference among the five groups. Table VI shows the placement of boys and girls in each group above and below the general median. Scores that are the same as the median are included in the scores above the median. The chi square value of .51 is not significant at the five

¹⁹Sidney Siegel, Nonparametric Statistics for the Behavioral Sciences (New York: McGraw Hill Co., 1956), pp. 23-26.

²⁰Ibid., pp. 175-179.

TABLE VI
CHI SQUARE VALUES AND GROUP PLACEMENT OF
PUPILS ABOVE AND BELOW THE GENERAL
MEDIAN FOR TRIAL ONE OF THE
PHYSICAL FITNESS TEST

OBSERVATION	GROUPS					TOTAL
	A	B	C	D	E	
MEDIAN AND ABOVE	15	15	17	15	16	78
BELOW MEDIAN	14	14	12	14	13	67
TOTAL	29	29	29	29	29	145

OBSERVATION	X ² COMPUTATION*					TOTAL	X ² .05
MEDIAN AND ABOVE	.02	.02	.13	.02	.01	.51	9.49
BELOW MEDIAN	.03	.03	.19	.03	.03		

*Ibid.

percent level. The five groups were not significantly different in physical fitness at the beginning of this study.

The results of trial one and trial two of the physical fitness test for each pupil in the five groups were compared and the differences recorded. The differences were ranked and the general median of 40 was found. The Chi Square Test For k Independent Samples was used to determine the significance of differences among the five groups.²¹ Table VII shows the placement of pupils in each group above and below the general median. The chi square value of 19.03 shown in Table VII is significant at the five percent level. This indicates that there was a significant difference among the groups in physical fitness at the conclusion of their various physical education programs. Individual Degrees of Freedom of Chi Square Test of Independence was used to determine where and what the differences were.²² Table VIII shows that the only significant value of chi square is 5.63 between Group B and Group E. There is a significant difference between Group E and each other group, but no significant differences

²¹Ibid.

²²Jerome Li, Statistical Inference (Ann Arbor: Edward Brothers, Incorporated, 1964), pp. 475-84

TABLE VII

CHI SQUARE VALUES AND GROUP PLACEMENT OF PUPILS
 ABOVE AND BELOW THE GENERAL MEDIAN OF THE
 DIFFERENCE BETWEEN THE RESULTS OF
 TRIAL ONE AND TRIAL TWO OF THE
 PHYSICAL FITNESS TEST

OBSERVATION	GROUPS					TOTAL
	A	B	C	D	E	
MEDIAN AND ABOVE	20	15	18	20	6	79
BELOW MEDIAN	9	14	11	9	23	66
TOTAL	29	29	29	29	29	145

OBSERVATION	X ² COMPUTATION*					TOTAL	X ² .05
MEDIAN AND ABOVE	1.12	.04	.31	1.12	6.08	19.03	9.49
BELOW MEDIAN	1.34	.05	.37	1.34	7.26		

*Siegel, loc. cit.

TABLE VIII
INDIVIDUAL DEGREES OF FREEDOM OF
CHI SQUARE TEST OF
INDEPENDENCE*

SOURCE OF VARIATION	SUM OF SQUARES	DEGREES OF FREEDOM	χ^2	$\chi^2_{.05}$
GROUP B vs E	1.397	1	5.63	3.84
GROUP A vs B	.431	1	1.74	3.84
GROUP A vs C	.069	1	.28	3.84
GROUP C vs B	.155	1	.63	3.84
$\bar{Y} (1 - \bar{Y})$	.2480			

*Li, op. cit., pp. 475 - 484.

exist among the other four groups.

II. PERCEPTUAL MOTOR DEVELOPMENT

The results from Trial one of the perceptual motor development test for all five groups were ranked and the general median of $3\frac{1}{4}$ was recorded. The Chi Square Test for k Independent Samples was used to determine the significance of differences among the five groups.²³ Table IX shows the placement of boys and girls in each group above and below the general median. The chi square value of 2.43 is not significant at the five percent level. The five groups were not significantly different in perceptual motor development at the beginning of this study.

The results of trial one and trial two of the perceptual motor test for each pupil in the five groups were compared and the differences were ranked and the general median of 3 was found. The Chi Square Test For k Independent Samples was used to determine the significance of differences among the five groups.²⁴ Table X shows the placement of pupils above and below the general median. The chi square value of 2.04 shown in Table X is not significant. This indicates that there are no significant differences among the groups in perceptual motor

²³Siegel, op. cit., pp. 175-179

²⁴Ibid.

TABLE IX
CHI SQUARE VALUES AND GROUP PLACEMENT OF PUPILS
ABOVE AND BELOW THE GENERAL MEDIAN FOR
TRIAL ONE OF THE PERCEPTUAL
MOTOR DEVELOPMENT TEST

OBSERVATION	GROUPS					TOTAL
	A	B	C	D	E	
MEDIAN AND ABOVE	20	19	17	15	16	87
BELOW MEDIAN	9	10	12	14	13	58
TOTAL	29	29	29	29	29	145

OBSERVATION	X ² COMPUTATION*					TOTAL	X ² .05
MEDIAN AND ABOVE	.39	.15	.00	.33	.11	2.43	9.49
BELOW MEDIAN	.58	.22	.00	.50	.15		

*Ibid.

TABLE X
CHI SQUARE VALUES AND GROUP PLACEMENT OF PUPILS ABOVE
AND BELOW THE GENERAL MEDIAN OF THE DIFFERENCE
BETWEEN THE RESULTS OF TRIAL ONE AND TRIAL
TWO OF THE PERCEPTUAL MOTOR
DEVELOPMENT TEST

OBSERVATION	GROUPS					TOTAL
	A	B	C	D	E	
MEDIAN AND ABOVE	16	14	18	15	13	76
BELOW MEDIAN	13	15	11	14	16	69
TOTAL	29	29	29	29	29	145

OBSERVATION	X ² COMPUTATION*					TOTAL	X ² .05
MEDIAN AND ABOVE	.04	.09	.52	.00	.32	2.04	9.49
BELOW MEDIAN	.05	.10	.57	.00	.35		

*Ibid.

development at the completion of their various physical education programs.

III. COMPARISON OF BOYS AND GIRLS IN PHYSICAL FITNESS AND PERCEPTUAL MOTOR DEVELOPMENT

Physical fitness. The results of trial one of the physical fitness test indicated that there was no significant difference between boys and girls in physical fitness at the beginning of this study. The chi square value of .01 shown in Table XI is not significant at the five percent level.

The results of trial one and trial two of the physical fitness test for boys and girls were compared and the differences recorded. Table XII shows the placement of boys and girls above and below the general median. As indicated in Table XII the chi square value of 1.04 is not significant. Therefore, there was no significant difference between boys and girls in physical fitness at the completion of their various physical education programs.

Perceptual Motor Development. The same procedure was followed with the results of the perceptual motor development test as was done with the results of the physical fitness test. As shown in Tables XIII and XIV no significant differences existed between boys and girls in

TABLE XI
 PLACEMENT OF BOYS AND GIRLS ABOVE AND BELOW
 THE GENERAL MEDIAN AND CHI SQUARE
 VALUES FOR TRIAL ONE OF THE
 PHYSICAL FITNESS TEST

OBSERVATION	BOYS	GIRLS	TOTAL
MEDIAN AND ABOVE	37	41	78
BELOW MEDIAN	31	36	67
TOTAL	68	77	145

OBSERVATION	X ² COMPUTATION*		TOTAL	X ² .05
MEDIAN AND ABOVE	.00	.00	.01	3.84
BELOW MEDIAN	.01	.01		

*Ibid.

TABLE XII

PLACEMENT OF BOYS AND GIRLS ABOVE AND BELOW THE
GENERAL MEDIAN AND CHI SQUARE VALUES
OF THE RESULTS OF THE DIFFERENCE
BETWEEN TRIAL ONE TRIAL TWO OF
THE PHYSICAL FITNESS TEST

OBSERVATION	BOYS	GIRLS	TOTAL
MEDIAN AND ABOVE	34	45	79
BELOW MEDIAN	34	32	66
TOTAL	68	77	145

OBSERVATION	X ² COMPUTATION*		TOTAL	X ² .05
MEDIAN AND ABOVE	.25	.22	1.04	3.84
BELOW MEDIAN	.30	.27		

*Ibid.

TABLE XIII

PLACEMENT OF BOYS AND GIRLS ABOVE AND BELOW
THE GENERAL MEDIAN AND CHI SQUARE VALUES
FOR TRIAL ONE OF THE PERCEPTUAL
MOTOR DEVELOPMENT TEST

OBSERVATION	BOYS	GIRLS	TOTAL
MEDIAN AND ABOVE	35	51	86
BELOW MEDIAN	33	26	59
TOTAL	68	77	145

OBSERVATION	X ² COMPUTATION*		TOTAL	X ² .05
MEDIAN AND ABOVE	.70	.62	3.26	3.84
BELOW MEDIAN	1.03	.91		

*Ibid.

TABLE XIV

PLACEMENT OF BOYS AND GIRLS ABOVE AND BELOW THE
GENERAL MEDIAN AND CHI SQUARE VALUES OF THE
DIFFERENCE BETWEEN TRIAL ONE AND
TRIAL TWO OF THE PERCEPTUAL
MOTOR DEVELOPMENT TEST

OBSERVATION	BOYS	GIRLS	TOTAL
MEDIAN AND ABOVE	40	36	76
BELOW MEDIAN	28	41	69
TOTAL	68	77	145

OBSERVATION	X ² COMPUTATION*		TOTAL	X ² .05
MEDIAND AND ABOVE	.53	.47	2.11	3.84
BELOW MEDIAN	.59	.52		

*Ibid.

perceptual motor development before the study began or at the conclusion of the study.

IV. CREATIVE ABILITY

The ranks given by each judge for each group can be examined in Table XVI of the Appendix. Table XV shows the total for each group. One point was given for superior, two points for above average, and so on up to five points for poor. The Kendall Coefficient of Concordance W : was used to determine the degree of association among the twelve judges.²⁵ The W value of .26 shown in Table XV has a X^2 value of 12.48 which is significant at the five percent level. This indicates that there is strong agreement among the judges. In Table XV the groups are listed in order of their creative ability.

²⁵Ibid., pp. 229-239.

TABLE XV
RANKS ASSIGNED TO THE FIVE GROUPS IN CREATIVE
ABILITY BY TWELVE JUDGES

GROUPS	R _i	RANK
E	23	SUPERIOR
C	31	ABOVE AVERAGE
A	35	AVERAGE
B	44.5	BELOW AVERAGE
D	46.5	POOR

VALUE OF W = .26*
 χ^2 VALUE OF W = 12.48
 $\chi^2_{.05}$ = 9.49

*Ibid.

CHAPTER IV

SUMMARY AND CONCLUSIONS

A comparison of the informal and formal methods of teaching physical education was undertaken to provide evidence that one method is superior to the other in the development of physical fitness, perceptual motor development, and creative ability.

An opportunistic sample of 145 grade one pupils was selected from five different schools in the same area of the city. Each group was taught the following method by its classroom teacher for a five month period.

1. Group A - this group was taught the informal method for four twenty minute periods a week.
2. Group B - this group was taught the formal method for four twenty minute periods a week.
3. Group C - this group was taught the informal method for thirty minutes twice a week.
4. Group D - this group was taught the formal method for thirty minutes twice a week.
5. Group E - this group received no physical education program.

The informal method is currently in use in Britain and consists mainly of self-exploration, self-discipline, and the use of large and small apparatus during every lesson. The formal method is widely used in the United States and Canada and consists mainly of running and tagging games, singing games, and little use of large

apparatus.

The Saskatchewan Physical Fitness Test and Kephart's Perceptual Motor Development Test were administered to each group at the beginning and at the conclusion of their various physical education programs.²⁶ A creative ability test was devised and administered by the investigator to each group at the conclusion of the study. Each group's participation in the test was recorded on 8 m.m. film and evaluated by twelve judges.

Within the limitations of this study and at the five percent level of significance the methods and frequencies in this study: (a) do not vary in their effect on perceptual motor development, (b) are equally better than no physical education at all in the development of physical fitness, (c) are less effective in the development of creative ability than no physical education at all, and (d) have the same effect on boys as they do on girls.

²⁶D. A. Bailey and W. A. R. Orban, Saskatchewan Physical Fitness Test Manual (Saskatoon: Saskatoon Public School Board, 1964) and Newell C. Kephart, The Slow Learner in the Classroom (Columbus: Charles E. Merrill Books Incorporated, 1960), p. 122.

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APPENDIX

TABLE XVI

RANKS ASSIGNED TO THE FIVE GROUPS BY
TWELVE JUDGES AFTER OBSERVATION
OF THE CREATIVITY FILM

59

JUDGES	GROUPS				
	A	B	C	D	E
1	5	4	1.5	3	1.5
2	5	4	1.5	3	1.5
3	4	2.5	1	2.5	5
4	2	5	3	4	1
5	2	5	3	4	1
6	1	4	3	5	2
7	2	5	3	4	1
8	2	5	3	4	1
9	2	4	5	3	1
10	4	2	3	5	1
11	4	3	1	5	2
12	2	1	3	4	5
TOTAL (R_i)	35	44.5	31	46.5	23

TABLE XVII
 MEDIAN AND RANGES OF THE DATA
 USED IN THIS STUDY

ITEM	MEDIAN	HI	LO	RANGE
Physical fitness test, trial I	180	250	120	130
Difference between trial I and trial II of physical fitness	40	140	-40	180
Perceptual motor test, trial I	34	43	25	18
Difference between trial I and trial II in perceptual motor test	3	16	-13	29

PHYSICAL FITNESS TEST
REPORT CARD

61

TEST SCORES

TRIAL I

ITEM		RAW SCORE	ACHIEVEMENT LEVEL
1	Full Squats		
2	Sit-ups		
3	Trunk Flexion		
4	Flexed Arm Hang		
Achievement level total for Trial One →			

TRIAL II

ITEM		RAW SCORE	ACHIEVEMENT LEVEL
1	Full Squats		
2	Sit-ups		
3	Trunk Flexion		
4	Flexed Arm Hang		
Achievement level total for Trial Two →			

PERCEPTUAL MOTOR PERFORMANCE

TEST REPORT CARD

62

NAME _____

GROUP _____

TRIAL I				
Walking Board	Jumping	Identification of Body Parts	Imitation of Movements	Obstacle Course
FORWARD	A	1	1	1
	B	2	2	
	C	3	3	
BACKWARD	D	4	4	2
	E	5	5	
	F	6	6	
SIDEWISE	G	7	7	3
	H	8	8	
Total X 3		9	9	Total X 3
			10	

Form 1

TOTAL
FOR TRIAL I

TRIAL II				
Walking Board	Jumping	Identification of Body Parts	Imitation of Movements	Obstacle Course
FORWARD	A	1	1	1
	B	2	2	
	C	3	3	
BACKWARD	D	4	4	2
	E	5	5	
	F	6	6	
SIDEWISE	G	7	7	3
	H	8	8	
Total X 3		9	9	Total X 3
			10	

Form 1

TOTAL
FOR TRIAL II

INSTRUCTIONS FOR THE COMPLETION OF THE CREATIVITY
RATING SCALE GIVEN TO EACH RATER

1. Please rate each group in terms of creativity as it is defined on this page.
2. Please compare the five groups with each other and attempt to give each group a different rating unless you feel strongly that two or more groups are identical.
3. View the film twice and make general observations.
4. View the film a third time and complete the rating scale on the basis of your observation.

CREATIVITY:

The term "creative ability" shall be interpreted as the ability of children to exhibit originality and flexibility in given physical education activities. Originality is the ability to produce uncommon, clever and/or remote responses. Flexibility is the ability to explore materials by rearrangement so that new responses may be attempted.

NOTE:

Each group in the film was given the following instructions by their teacher.

Boys and girls. I would like you to show me how many different things you can do with your bodies while using the boxes and sticks that you see around you. When I say go I want you to go to a box or a stick and start using it in as many ways as you can. You may trade your stick for a box after you have tried some things if you wish.

Do your best and do not act silly. I will not be telling you what to do, you must show me all the different things that you can do.

GO!

CREATIVITY RATING SCALE

Please check the quality of creative ability that you feel each group exhibits from your observation of the film.

GROUP	SUPERIOR	ABOVE AVERAGE	AVERAGE	BELOW AVERAGE	POOR
A					
B					
C					
D					
E					

NAME OF RATER _____

POSITION _____

LOCATION _____