DEVELOPMENT AND EVALUATION OF VISUAL-DESCRIPTOR MODELS FOR THE ASSESSMENT OF SELECTED FUNDAMENTAL LOCOMOTOR SKILLS IN TRAINABLE MENTALLY IMPAIRED CHILDREN

Dissertation for the Degree of Ph. D.

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DEVELOPMENT AND EVALUATION OF VISUAL-DESCRIPTOR MODELS FOR THE ASSESSMENT OF SELECTED FUNDAMENTAL LOCOMOTOR SKILLS IN TRAINABLE MENTALLY IMPAIRED CHILDREN

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ABSTRACT

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By

Gerald M. Nester

The purposes of this study were: (a) to produce visual-descriptor models which illustrate selected fundamental locomotor skills, primarily of elementary school age trainable mentally impaired students, based on criteria from the I CAN curriculum; and (b) to determine if the visual-descriptor models would enhance abilities of teachers to observe and assess the motor performance of elementary school age trainable mentally impaired students.

Fifty-four trainable mentally impaired elementary age students were analyzed and filmed. The film recorded eight fundamental locomotor skills according to criteria based on the I CAN physical education curriculum. When one trainable mentally impaired student appeared in more than two different skills an elementary age general education student was substituted into the film. The assumption that locomotor skills of all subjects filmed in this study progressed in the same developmental sequence was made to allow as many different individuals to appear in the film as possible. Three visual-descriptor models (short films, film loops, long sequential training

film) were produced along with two evaluation films which were used to assess the observation and assessment abilities of thirty teachers who volunteered for this study.

Measures of correct responses were obtained from the thirty teachers who were randomly assigned to one of three treatment groups which included five physical educators and five teachers. The test of correctness responses employed in this study provided information of the percent of possible correct answers and a deviation score which measured the distance of a response to the correct answer for each of two tests on the eight selected fundamental locomotor skills. The eight selected fundamental locomotor skills for this study were the run, leap, horizontal jump, vertical jump, slide, gallop, hop and skip.

The study was conducted using a posttest-only group design. Test results derived from the test of correctness evaluation procedure were analyzed by a three-way ANOVA with one factor repeated measure procedure. This procedure indicated if significant differences were found for visual-descriptor models, specific locomotor skills viewed, and teacher type. Further analysis employing a two-way ANOVA procedure isolated the most beneficial visual-descriptor models for each locomotor skill and gave pertinent information as to teacher type difference. The frequency of answers for a given test of correctness responses item give an indication of how teachers assessed each descriptor or focal point for each selected fundamental locomotor skill.

The results of the study were determined on a restricted sample, therefore the conclusions can be generalized to a similar population. The results suggest that:

(1) Short films and film loop visual-descriptor models were more effective than the long sequential training film in enhancing locomotor assessment abilities of teachers.

(2) The film loop visual-descriptor model was the easiest film presentation to administer.

(3) Physical educators were significantly more effective in assessing the gallop, leap, horizontal jump, and vertical jump.

(4) Physical educators also attained higher averages on all skills after two presentations than classroom teachers.

(5) Intensified viewing of one locomotor skill using a film speed of 24 frames per second followed by two viewings at 12 frames per second was more effective than using the same procedure with all eight locomotor skills.

(6) Teachers view locomotor skills by attending to specific anatomical reference points, relating a skill to specific background reference points and viewing a simple movement with a maximum involvement of two body segments.

The results of this study suggest the need to study the effects of visual-descriptor models with teachers over a longer training period employing fewer skills with more attention being directed at specific critical focal points of each skill.

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By

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CHAPTER I

INTRODUCTION

The study of motor development has been an area of importance for educators as they have attempted to deal with both the normal and mentally impaired school population. Primary emphasis has been directed toward the development of motor skills in the normal population. However, due to the interest of President John F. Kennedy and the formation of numerous "parent of the handicapped" groups within the last fifteen to twenty years, a growing concern for the impaired citizen's development has arisen.

The need for consistent, well-formulated and soundly-based research in motor development as it pertains to the mentally impaired is evidenced as special educators, physical educators, and others at times desperately grope for "anything" which will meet their teaching and/or training needs. The majority of research pertaining to motor development and the mentally impaired has been directed toward establishing motor performance standards. The results from this type of research have served as a basis for comparison within various mentally impaired populations, as well as non-impaired populations (Karl, 1972). For example, the established norms lead to a general assumption that in many instances the mentally impaired individual

matures at a slower, but similar, rate as a normal person (Rarick, 1967; Malpass, 1963).

Numerous motor training programs have attempted to indicate a direct bond between motor development and academic achievement (Kephart, 1960; Frostig, 1964; Barsch, 1967; McCormick, 1968). Delecatto (1966) has stressed the importance of motor activities along specified guidelines as important to the academic growth of impaired individuals. However, in an attempt to define and meet specific training goals, many qualitative and quantitative aspects of motor development have been overlooked. Seefeldt (1971) has eluded to this and a second problem by stating:

> It is quite possible that accurate prediction of motor and academic difficulties lies in the ability to identify the subtle qualifications of movement which are entirely overlooked in our present manner of observing and assessing motor skills (p. 16).

The last portion of this statement is important, because the question of identifying certain aspects of movement without regard to standards or norms is brought into focus.

Observing and assessing the subtle qualifications of motor performance presents a major problem for teachers of both the normal and mentally impaired students, because available materials are limited and in several instances contradictory (Wickstrom, 1970). Teachers of the mentally impaired, and in particular, the elementary school age trainable are at a greater disadvantage because of idiosyncrasies in motor skills that may be unique to their students. If this is the case, teachers or other individuals who work with the

trainable mentally impaired could benefit from a tool which will enhance their present manner of observing and assessing motor skills.

One of the most efficient methods of presenting a motor skill is the use of a visual-descriptor or film model (Greenhill, 1967; Pearson, 1972; Milner-Fenwick, 1972). The use of film loops, short training films, and a longer training film was used in this study to determine if one of the methods was effective in increasing the motor skill assessing abilities of teachers of elementary age trainable mentally impaired students. The criteria that were used as a basis to evaluate observation and assessment abilities of the teachers of elementary school age trainable students on selected fundamental locomotor skills were adapted from the I CAN curriculum being developed at Michigan State University (see Appendix A).

Need for the Study

Many of the fundamental motor skills have been defined in general terms for normal populations (Wild, 1938; McCaezskill, 1938; Broer, 1960; Hellebrandt, 1971; Espanschade, 1967; Wickstrom, 1970; Sinclair, 1971; Seefeldt, 1972). However, there are virtually no guidelines which define or illustrate the developmental sequence of fundamental skills for trainable mentally impaired individuals. The use of visual-descriptor models may be a useful tool to enhance both the observation and assessment abilities of those who work with elementary school age trainable mentally impaired students.

Purposes of the Study

The purposes of this study were: (1) to produce visual-descriptor models which illustrated selected fundamental locomotor skills, primarily of elementary school age trainable mentally impaired students, based on criteria from the I CAN curriculum; and (2) to determine if the visual-descriptor models would enhance abilities of teachers to observe and assess the motor performance of elementary school age trainable mentally impaired students. More specifically, the investigation attempted to answer the following research questions.

Research Question I.--Are there significant differences between the visual-descriptor models (film loop, short training film, and long sequential training film) when used to enhance the locomotor skill assessment abilities of teachers who work with elementary school age trainable mentally impaired students as measured by the test of correctness responses evaluation procedure?

A three-way ANOVA with one factor repeated measure procedure was used to test for significant differences between the treatment groups. Both percent correct responses and deviation score responses were analyzed as part of the test of correctness responses evaluation procedure.

Research Question II.--Do the tests of correctness responses within each fundamental locomotor skill vary with the treatment and/or the composition of the teachers within the treatment group?

Descriptive statistics including means and standard deviations were computed for each fundamental locomotor skill by treatment group and teacher type (physical education teacher and classroom teacher).

A two-way ANOVA procedure was used to analyze the significant effects attributed to specific fundamental locomotor skills by teacher type and/or treatment group. When applicable, the Tukey method of post hoc comparisons specified the location of the differences among the three treatment groups and teacher types within each treatment group. Both percent correct responses and deviations score responses were analyzed as part of the test of correctness responses evaluation procedure.

Research Question III.--To what extent can teachers respond correctly to specific focal points for each selected fundamental locomotor skill as measured by the test of correctness response evaluation procedure?

Descriptive statistics which analyze the frequency of responses for a given focal point were employed. Percentage responses attributed to each treatment group were recorded by total group score responses and teacher type score responses. The criteria of 80 percent correct indicated mastery of a given focal point.

Limitations of the Study

The results of this study are subject to the following limitations:

1. The individuals used in the filming of the visual-descriptor models were limited to the geographical areas which include Ingham, Eaton, and Clinton counties in the State of Michigan. This limitation is imposed because of the large concentration of trainable children found at the Marvin E. Beekman Center for the Trainable Mentally Impaired, excellent facility

arrangements for filming, and closeness of facility to the writer's location.

2. The sample of teachers of elementary school age trainable mentally impaired students was not a true random sample, because it consisted of subjects from I CAN Field Test Centers who volunteered for this study. Generalizations, therefore, may be limited to this specific group of teachers.
3. Although the three treatment groups received their presentations separately, such factors as time of day, temperature, and group interaction may have influenced both presentation and test results.

Definitions

Motor development.--The study of variations and changes of motor behavior due to the physiological and environmental interaction through which an individual progresses.

Selected fundamental locomotor skills.--A skill which involves two or more body segments and results in the transfer of the body from one spot to another, or in some instances the same spot, i.e., movement in a vertical direction. The fundamental motor skills in this presentation are: running, leaping, vertical jumping, horizontal jumping, hopping, galloping, sliding and skipping.

Sequence.--A series of movements which has continuity and predictability as the individual develops a skill.

Focal point/pattern.--An isolated movement which is confined to joints or body segments which are too restrictive to be classified

as a fundamental motor skill. An example to be observed later is the knee/leg position in the running skill.

Progression/deviation in the mature skill.--A "stage" in which the total fundamental motor skill is defined by the movements or relationships of body segments in a specific state of development between less mature forms to maturity.

Test of correctness of responses.--An assessment instrument designed to evaluate the results of the given treatments (see Appendix A).

Visual-descriptor model.--A film, short films, and/or film loops along with a narration which depicts the composition of the selected fundamental locomotor skills.

Teachers of elementary school age trainable mentally impaired students.--Those teachers who have completed a teacher education program in the specific area of mental impairment and who are certified by the State of Michigan to teach trainable mentally impaired students. The teachers are also volunteers who have been designated to work on the development and implementation of the I CAN curriculum.

Elementary school age trainable mentally impaired students.--Persons identified by an Educational Planning and Placement Committee, based upon a comprehensive evaluation by a school psychologist, certified psychologist or certified consulting psychologist, and other pertinent information, as having all the following behavioral characteristics:

(a) Development at a rate approximately 3 to 4 1/2 standard deviations below the mean as determined through intellectual assessment.

(b) Lack of development primarily in the cognitive domain.

(c) Unsatisfactory school performance not found to be based on their social, economic, and cultural background.

CHAPTER II

REVIEW OF LITERATURE

The topic of visual-descriptors for fundamental locomotor skill assessment by teachers of the trainable mentally impaired elementary school age student has received limited coverage in the literature, although a few investigators, Wild (1938), Hellebrandt et al. (1961), Sinclair (1971), and Seefeldt (1973), have directed their attention to motor development of normal children. This review, therefore, will be limited to the areas of study which relate to the problem under investigation; namely, to the development and implications of I CAN Curriculum for teachers of trainable mentally impaired students, to those studies dealing with motor characteristics of the mentally impaired and the pertinent motor development principles and laws which underlie the eight selected fundamental locomotor skills, to the efficiency of teacher types in assessing motor performance of trainable mentally impaired, and finally to the discussion of visual-descriptors as a technique for enhancing assessment abilities.

I CAN Curriculum--History

The I CAN Physical Education Curriculum Materials are being developed as a result of implications derived from the Battle Creek Title III Project which was from 1966 to 1970. The basic tenet of

the Battle Creek Project Vogel et al. (1969) was to develop a teaching-learning situation based on pertinent knowledges, skills, and values established by a systematic method of selecting, organizing, and evaluating curriculum content.

Under the direction of Dr. Janet Wessel, the basic concept of the Battle Creek Title III Project was carried on when the Programmatic Research Project in Physical Education for the Mentally Retarded Child in the Elementary School was funded in June, 1971, under Public Law 91-230, Title VI. The Programmatic Research Project is implementing the I CAN Curriculum materials in the following manner (Wessel, 1973):

1. First two year field test (September 1971-1973) of materials. First year's trial at Beekman Training Center, Lansing, Michigan, revised in the Summer of 1972 for retesting at the Beekman Training Center and selected field test sites (November 1972-1973).
2. Content analysis of materials (Fall 1971-January 1973). Experts and leaders in the field are reviewing the materials. The review will assist in establishing content validity and redirect the development of this curriculum.
3. Third year of field testing (October 1973-May 1974). Using materials as they are revised, a second group of teachers will test the I CAN Curriculum materials for their effectiveness in selected test sites.
4. Fourth year material decimination (October 1974-May 1975). Materials ready for use in schools throughout the country. Revised existing materials and develop new content units.

I CAN Curriculum--Implications

The I CAN Curriculum incorporates several unique features. These features may be summarized by the following (Wessel, 1973).

1. I CAN is an individually prescribed physical activity program adaptable for group instruction.
2. I CAN contains diagnostic instruments which permit teachers to assess and prescribe appropriate activities based on pupil needs.
3. I CAN inter-relates basic educational concepts and content into the total instructional program.

4. I CAN provides total flexibility so that its components may be incorporated into existing curriculum programs.

By developing the I CAN Curriculum based on diagnostic and prescriptive criterion a basic procedural model was developed which took into consideration a number of factors. These factors which project staff, consultants, and teachers felt important to the development and implementation of the I CAN Curriculum were based on documented evidence and assumptions from actual experience. The hierarchical structure of the I CAN Curriculum model was outlined in the following manner (Wessel, 1972):

Program Goal
Categories
Modules
Modular Objectives
Terminal Performance Objectives
Enabling Objectives, Competency Measures
Teaching-Learning Activities

At first glance, the structure of the model appears formidable, but a closer examination shows a logical deductive progression. Program goals are merely "broad, comprehensive statements of curriculum emphasis" (Wessel, 1972, p. 1). "Categories are organizational terms that provide structure for subdividing each goal" (Wessel, 1972, p. 1). "Modules further subdivide categories into areas of subject content" (Wessel, 1972, p. 2). "Module Objectives are delineations of the content contained within the module" (Wessel, 1972, p. 2). "Terminal performance objectives are subdivisions of the module objectives and are broad statements of desired student behavior" (Wessel, 1972, p. 2). "Enabling objectives are systematic subdivisions of the terminal performance objectives with a corresponding measure of competency which precisely describes acceptable student performance" (Wessel,

1972, p. 3). "Teaching-Learning activities contain the experiences which enable the learner to achieve the objectives" (Wessel, 1972, p. 3). It should be noted that the teaching-learning activities give specific guidelines as to what a teacher should stress in regard to focus, pre-requisite learnings, materials needed, organization of the class, specific directions as to the best use of the materials, and activities.

After several years of development, the working hierarchical structure has been modified into five divisions which serve as a guide for the teacher to present the I CAN materials in a realistic and practical manner. The five divisions are:

Modules
Performance Areas
Terminal Performance Objectives
Enabling Objective
Focal points for activity

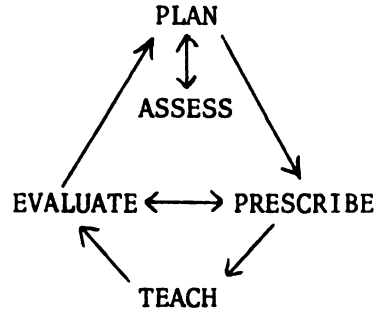
The modules serve as unity of materials, i.e., Aquatics, Body Management, Fundamental Skills, Health-Fitness. Performance Areas specifically indicate the materials which are a part of each module. The following terms used in addition to those already defined amplify the I CAN Curriculum (Wessel, 1973-74). Within each module, Performance Objectives define the activity that each learner should be able to perform. If the activity is too difficult to complete as defined, Enabling Objectives or "key-discrete" behaviors known as Focal Points are used to guide the learner to reach the terminal performance capacity or objective. A Teaching-Learning Activity is written for each focal point.

Games and a developmental inventory are also included to assist the teacher by providing appropriate activities which will promote student learning and a skill inventory which provide general expectancies for the teacher to develop a general plan for the individual or group.

The I CAN Program Model and its components have four characteristics in common which are designed to:

1. Bring about a specified and measurable outcome.
2. Provide continuous available evidence as to the effectiveness of the intended outcome.
3. Ameliorate or correct motor learning problems in children.
4. Serve as a resource which is both flexible and adaptable to different teaching-learning styles of children with mental handicaps (Wessel, 1972).

As indicated by the hierarchical structure progressing from 1969 to 1974, I CAN is both content and process orientated. Thus, the why, what, how, and resultant effects may be observed and analyzed in terms of "goal direction," "instructional systems principles" and "remedial or corrective feedback loops." This use of I CAN in such a role may be illustrated by the following teacher behavior model (Wessel, 1973-1974):



Motor Characteristics of the Mentally Impaired

Major investigation into the motor characteristics of the mentally impaired has developed primarily in the last twenty years. Impetus in research for the mentally impaired is due, in part, to the extreme interest expressed by President John F. Kennedy and his Administration. However, one should not overlook some of the earlier studies. Initial research, which considered the psychomotor domain, attempted to show that there were relationships between intellectual and motor abilities. Ismail (1967) could not find conclusive evidence to support such a relationship. Early studies by Heath (1942), Kulcinski (1945), and Brace (1948) also reported that the relationship between motor and intellectual abilities of the mentally impaired might differ from the normal population. The implications derived from such early studies, however, pointed to a source of ambiguity, which unfortunately exists to the present. The source is pointed out by Stein (1963) as he states that clear and concise definitions of motor characteristics, pertaining to the mentally impaired, must be developed if "research is to make its rightful contribution to the understanding and to improvement in managing and teaching the retardate" (p. 233).

By recognizing the problem of developing clear and concise definitions of motor characteristics pertaining to the mentally impaired, one can glean certain information regarding general trends which indicate characteristics of motor skill competency of the mentally impaired. Sloan (1951), Cantor and Stacey (1951), Head (1963), Karl (1972), Howe (1959), Francis and Rarick (1959), Rarick,

Widdop, and Broadhead (1967) and Drowatzky (1967) have found that when mentally impaired (basically educable mentally impaired) subjects are compared with normal subjects on the basis of chronological age, the performance of the mentally impaired are consistently inferior to their normal counterparts. Head (1963) and Karl (1972) when referring to a relatively complex item, dart throwing, noted that as the task becomes of a "higher order," profoundly lower scores were found when the subjects' IQ's were below 70. The classic study conducted by Francis and Rarick (1959), which compared educable mentally impaired students in the Madison and Milwaukee, Wisconsin areas, provided more information than just a simple statement regarding the inferiority of mentally impaired subjects compared with normal subjects when selected motor skills were considered. They found that on most measures of motor skill ability studied, mentally impaired children were two to four years behind normal children. In addition, the difference between normal and mentally impaired individuals increased with each advancing age level.

Rarick, Widdop, and Broadhead (1970) administered a modified version of the AAHPER Youth Physical Fitness Test to 4,235 educable mentally impaired boys and girls ranging in age from 8 to 18 years. The results paralleled the 1959 study by Francis and Rarick. The significance of the larger more comprehensive investigation, however, gives a better insight into the motor prowness, proficiency, or ability of a nation-wide population of mentally impaired subjects.

Data on trainable mentally impaired (TMI) subjects compared to educable mentally impaired and normal subjects are limited. The

trends, however, indicate that basic skill development is substantially retarded for the trainable mentally impaired. Rarick (1967) noted this as he reviewed the age at which TMI sat unsupported and walked alone as compared with the age for normal children. He found a few of the TMI children accomplishing "some of these abilities within the normal schedule of development, but for the most part, the acquisition of these abilities came late, the more severe the retardation, the more pronounced the delay" (p. 7). Brown (1967) compared four groups of normal children to 38 trainable mentally impaired children by administering the Kraus-Weber Test. His results indicated that the TMI group was seriously deficient in all areas of muscular fitness. The only area where the groups were basically similar on performance was in the test of flexibility.

The review of literature suggests that comparison of normal to retarded population based on mental age (MA) may be a better indicator of the development of motor skill proficiency. Heath (1942) found a positive correlation between MA (mean 8.5 years) and scores of 170 mentally impaired boys when the Rail Walking Test was administered. The studies compared familial retarded with organically retarded individuals. In 1953 Heath repeated the 1942 Rail Walk Test and included some additional motor tasks. The results were the same as those reported in his previous study. In his second study the mean chronological age was 19.6 years and the mental age was 8.1 years. Sengstock (1966) found that MA matching was not as good a technique as first suspected when he administered the AAHPER Youth Fitness Test to three groups of subjects. The EMI group was matched by chronological age

to one group and mental age to the third group. The study showed that the retarded group was significantly inferior to the group matched by chronological age and significantly superior on five of the seven subtests when compared to the group matched by mental age.

The basic literature regarding motor characteristics of the mentally impaired has indicated that they have a definite lack of motor proficiency in fundamental motor skills when compared with normal groups. However, several studies indicate that even if there is definite retardation of skill development, the mentally impaired have a capacity to develop many of their motor skills, but over a longer period of time and with specific training (Malpass, 1963). Kuleinski (1945) also found that with specific training periods, the mentally impaired as well as those within the normal range of mental abilities profited when 105 fifth and sixth graders (IQ range 41 to 125) were compared on a number of tumbling activities. He found that post-test scores, after an intervening physical education program, showed a high positive correlation between IQ and proficiency at the motor tasks. Data analysis showed that the lower IQ group made some improvement, but was significantly below the other comparison groups.

Several investigators have studied the development of motor skills as a function of a training program. Stein (1964), Carter (1966) and Solomon and Pringle (1966) administered the AAHPER Youth Fitness Test with educable mentally impaired boys. Carter (1966) found that from the 44 EMI subjects tested in his study, 35 had scores well below those of normal subjects in all tasks. Eight EMR boys, however, who were in a daily physical education program attained

scores equal to the averages of the national norms. Stein (1964) also found that his subjects who were enrolled in a daily physical education program either equaled or surpassed the scores based on the national norms. He explained his results by stating that the success of his subjects was due to "greater experience and opportunity for participation in physical activities and general familiarity with the test items" (p. 108). Karl (1972) contends that the same statement of success for the eight mentally impaired subjects in Carter's study who equaled the national average were due to experience and opportunity for physical education activities.

Solomon and Pringle (1966) also illustrated the positive effects in developing motor ability of the mentally impaired in a more carefully conducted study. Their investigation involved assigning 41 EMI boys to one of four physical education classes. Pre and post-tests for intelligence and physical ability (fitness as indicated by the AAHPER Youth Fitness Test) were administered. The four groups were assigned in the following manner: Group one had knowledge of the particular level of achievement and received encouragement to do better during the seven week physical education program; Group two received the same seven week program as group one, but had no knowledge of achievement and received minimal encouragement; Group three had little physical training, but received praise and encouragement verbally for the work; and Group four received neither training nor praise. Results of the study indicated that the EMI boys were inferior to the normal subjects on pre-test scores. Post-test scores and a six week follow-up

showed that the EMI had scores which significantly exceeded the national norms for normal boys of their age group.

In general, other investigators (Oliver, 1958; Godfrey, 1964; Corder, 1966; Lowe, 1966) also found that "motor proficiency" or motor skills of the mentally impaired increased with implementation of a physical education or training program. Data on trainable populations is relatively sparse, but those that have been published indicate that trainable children benefit from physical activity programs. Nunley (1965) has reported significant gains in motor performance, especially in activities which involve endurance, after a fifteen month program of physical education. She noted that motor skills which involved a relatively sophisticated level of upper and lower segment coordination were of greatest difficulty, but practice helped increase motor competence. Harvey (1966) also reported an increase in motor performance during the school year when physical activity was an integral part of the child's program. However, in this two year study, a decline in performance ability was noted after an extended vacation period, thus suggesting the importance of a year-round program for trainable mentally impaired children.

Major Principles of Motor Development

The presence of immature motor patterns in many fundamental locomotor skills is apparent when a group of trainable mentally impaired persons is observed in a physical activity setting. As previously cited, the mentally impaired, in general, have a delay of at least two to four years when compared to the national norms on most tests of motor performance. The word "delay" suggests a lag in the

normal development of motor skills, not a total cessation of progress toward a mature pattern. Therefore, it may be hypothesized that the mentally impaired follow basic motor development sequences similar to those of individuals with normal intelligence. Almost all research into the principles of motor skill development has been based exclusively on normal populations. However, if the above hypothesis which states that the mentally impaired only lag in the development of motor skills is correct, then the research into general trends, concepts and principles in motor skill development of normal subjects is pertinent to the mentally impaired.

Early investigators established that motor development proceeds in a continuous, orderly process which is essentially the same for all individuals, even though there are individual differences in the rates of progress (Shirley, 1931; Bayley, 1935; Gesell, 1929, 1940). Shirley (1931) developed a time table which classified five major stages of development, each of which was divided into a series of component activities. Her classification system was initially based on 25 babies who were observed as they developed basic motor patterns, beginning with creeping and crawling and progressing to walking upright unassisted. The period of observation was two years. Shortly thereafter, Bayley (1935, 1936) produced an infant scale of motor development which took into account the sequencing of growth and motor activities of the children in her studies. Gesell (1929, 1940) continued to study the developmental motor characteristics of children with a systematic approach during their first five years of life. His studies indicated many basic principles of early child

development in areas of reaction to postural changes, prehension, and motor patterns which eventually led to the development of specified skills. Some of the more specific principles which apply to the acquisition of skills are reciprocal interweaving, self-regulating fluctuation, directional development and the unique property of individual maturation. Accordingly, Gesell, along with several of his associates, developed a sequence of observable patterns of infants which involved 23 stages and four developmental levels as the infant progressed from the prone position to an unsupported walk. It must be noted that the above provides only a small portion of Gesell's contribution to motor development.

Other pioneers involved in the study of developmental sequences were Halverson (1933), Jones (1938), and McGraw (1943). Their studies support the principle of sequential development of skills in an orderly progression. All concluded that the motor progressions were related to maturational differences among their subjects.

A number of investigators have reported that motor development progresses in specific directions related to body control. Hooker (1952), Wolff (1966), Milani-Comparetti (1967) and Shambes and Campbell (1973) stated that motor development proceeds from control of flexion and adduction to control of extension. Burnside (1927), Shirley (1931), Halverson (1931), Bayley (1935), and Gesell (1942) indicated the direction of motor development proceeds both cephalo-caudally and proximo-distally throughout the body. The specific direction of motor development throughout the body again provides

support regarding the development of motor control proceeding in an orderly sequence.

The development of norms based upon quantitative data was an outgrowth of norms which could be used for the interpretation of general growth patterns of children. Gesell (1940), Bayley (1935), Cunningham (1927), Wellman (1937), McCaskill and Wellman (1938), and Frenkenburg and Dodds (1967) produced scales to assess the motor skill achievements of young children. The scales generally list specific motor tasks in a rank order beginning with simple tasks and progressing to more difficult skill activities. A typical test consists of items which deal with prehension, prone-to-walking activities, hopping, jumping, skipping, balancing, as well as object control activities such as bouncing, catching, throwing and kicking a ball. When 50 percent of the children could complete the tasks a motor age was assigned to the activity. Frankenburg and Dodds (1967) did not accept the 50 percent criterion as a sole basis for determining a "motor age." They established a time span for a given skill which indicated when 25, 50, 75, and 90 percent of their subjects passed a given test item. Thus, the mastery of one skill could continue over a period of several years before at least 90 percent of all subjects could complete the task. This approach allowed individual differences to be more readily observable and interpretable.

Quantitative measures of fundamental motor skills for primary and elementary age students were developed by a number of investigators. Taylor (1941) and Latchaw (1964) developed norms for activities found in the context of a physical education curriculum for the

primary and elementary grades. Carpenter (1942), Kane and Meredith (1952), Govatoe (1959), Glassow and Kruse (1960), and Johnson (1962) studied the motor performance of general motor ability or general capacity. The general nature of assessing fundamental motor skills consisted of measuring distances and recording times. Thus a range of ability scores could be compared over a period of years and for both sexes.

Although the quantitative measures of motor performance provide some benefit to the teacher in evaluating a class, performances based on time and distances may not portray the developmental level of the children. In addition, the quantitative measures provide little assistance in developing or correcting a given motor skill. Unfortunately, the quantitative methods are still used because relatively little has been done to provide a qualitative guidance in evaluating the majority of motor skills. Halverson (1933) and Gesell (1934, 1940) did much in the way of task analysis with several facets of motor behavior of infants; a noteable example is prehension. Qualitative aspects of fundamental motor skills were first identified in detail when Wild (1938) studied the overhand throwing pattern of 32 children ranging in age from 2 to 12 years. The cinematographical techniques used in the skill analysis defined three specific stages which were precursors to the fourth or mature overhand throwing pattern. Hellebrandt et al. (1961) investigated the standing long jump and were able to document the sequential development of that skill as the 47 subjects demonstrated different stages of the long jump as indicated by the head position and use of the arms and feet. Seefeldt (1972),

Milne (1972), and Wickstrom (1970) qualitatively have attempted to establish and document sequences of motor skill development in a variety of fundamental skills. Unfortunately, the work involving the developmental process in fundamental skills is really just beginning.

Selected Fundamental Locomotor Skills

Human movement is composed of specific motor skills or certain combinations of motor skills. Numerous investigators have attempted to classify motor skills by a measure or reference criterion designated a mature or optimum motor skill pattern. Those movements which deviate from the reference criterion may be classified by a number of terms such as: immature motor skill, developmental level "X," minimal form, stage one of "X," elementary skill pattern and deviations from the mature pattern. Seemingly, with the number of terms used to describe human movement many teachers educated to assess developmental movement may be confused as to the proper techniques which can be employed to guide individual students or athletes to a mature level of motor skill performance.

To complicate the problems of analyzing motor skills, many books dealing with sports contain numerous errors. In fact, McCloy (1960) has stated that if an athlete followed a prescribed set of directions he may not be able to master the skill at all. Wickstrom (1970) mentions that McCain (1963) found 348 pairs of statements that were in direct disagreement when the literature of one sport was reviewed.

In order to address these problems, literature pertaining to the selected fundamental locomotor skills of this study has been

reviewed in an attempt to identify basic criteria pertaining to the mature fundamental locomotor skill which is one of the primary tenets of the I CAN Curriculum. Another area, referred to as progressions to the mature fundamental locomotor skill, has been investigated. It must be noted that the second area considers stages of motor skill patterns as defined by Seefeldt (1972), Milne (1972) and idiosyncrasies within the progression classification primarily due to poor documentation and/or lack of published material related to several of the selected fundamental locomotor skills of this study.

The Mature Run

Running, a fundamental locomotor skill, has four major focal points of consideration in attempting to derive a functional understanding of the mature pattern (I CAN, 1973). These focal points are: (1) consistent periods of nonsupport, (2) flexing of the nonsupport leg more than 90° as observed from a side view, (3) placement of the foot approximately two inches either side of a one inch line, and (4) movement of the arms with elbows flexed in opposition to the movement of the legs (I CAN, 1973). The first point, consistent periods of nonsupport, refers to the period of time the body is without a base of support; i.e., this period allows for more time to be spent in increasing the stride length as a result of increased propulsion (Fait, 1961; Godfrey and Kephart, 1969; Wickstrom, 1970; Seefeldt, 1972). The second point considers the angle formed at the knee joint. The 90° or more flexion at this joint is important because the "swing phase," as Seefeldt (1972) has pointed out, shortens the lever which in essence moves the leg's weight close to the center of rotation.

This action allows for the "smallest expenditure of energy" because the flexor muscles of the hip are able to move the leg forward with the greatest velocity. Wickstrom (1970, p. 29) stresses this factor as he refers to "the closeness of the heel to the buttock on the forward swing of the recovery leg." It should be pointed out that as the 90° angle at the knee is achieved there will be a forward lean of the body which is related to the speed of the runner (Fait, 1961; Schurr, 1967; Wickstrom, 1970; Sinclair, 1971). The third point, which refers to foot placement within two inches of either side of a one inch line, refers to the direction and control an individual has in running. The placement of the foot also takes into consideration the "landing phase" which involves the "support and propulsive foot" landing on the ball of the foot allowing for the absorption of force and almost simultaneous forward momentum produced at the angle at which the application of force is direction by the foot (Broer, 1960; Fait, 1961; Schurr, 1967; Sinclair, 1971; Seefeldt, 1972). The fourth focal point is of major consideration in the mature run. Opposition of the arms to the legs allows for a coordinated effort from the viewpoint of "counter-rotary action" of the arms of the sprinter. The extension of the arm opposite the extended "driving leg" of a distance runner also provides power in his coordinated effort (Fait, 1961; Schurr, 1967; Wickstrom, 1970; Sinclair, 1971). Certain "cues" or characteristics of the mature performance are found in Appendix A which gives an overview of the focal points to be used in this study.

Progression and/or Deviations in the Mature Running Skill

In order to ascertain progressions leading to the mature running skill, certain characteristics or patterns are of considerable importance as they pertain to the four major focal points. During the nonsupport period, the most elementary characteristic or pattern is found when one foot remains in contact with the surface as the individual transfers body weight (Godfrey and Kephart, 1969; Wickstrom, 1970). Failure of the individual to flex the nonsupport leg to form a 90° angle as observed from a side view is a readily apparent progression in developing the running skill (Schurr, 1967; Sinclair, 1971; I CAN, 1973). Progressions in foot placement are typified by: a short stride taken with feet placed shoulder-width distance apart; surface contact with the entire foot; inversion of the foot during the "support phase"; eversion of the foot during the support phase (Schurr, 1967; Godfrey and Kephart, 1969; Seefeldt, 1972). Progressions and/or deviations in arm position are not always easy to identify; however, there are several which may be detected with a few cues. They include: the extension and abduction of the arms at shoulder height, the "high guard position"; the extension and slight abduction of the arms at waist height, the "middle guard position"; the lack of symmetrical arm movement often found when there is poorly coordination opposition of the arms and legs; exaggerated movement of the arms across the midline; and general "jerkiness" as an individual attempts to maintain a uniform direction, especially when eversion of the supporting foot occurs (Schurr, 1967; Godfrey and Kephart, 1969; Wickstrom, 1970; Seefeldt, 1972). Certain "cues," progressions and/or deviations in

the mature skill performance are found in Appendix A which give an overview of the focal points to be used in this study.

The Mature Leap

Leaping, a fundamental locomotor skill, has four major focal points which should be considered in order to understand the mature pattern (I CAN, 1973). These focal points are: (1) taking off with one foot and landing on the opposite foot with a smooth transfer of weight; (2) reaching forward with the arm opposite the lead foot; (3) projecting the body in a longer period of nonsupport when compared to running so that when observed from a side view the individual will lean forward 90° or less; and (4) maintaining speed before and after each leap by keeping the size of the approach and landing steps consistent (I CAN, 1973). It should be noted that when locomotor skills require the body to be projected through space certain physical laws will govern the body's movement which depend on the center of gravity, magnitude of force produced and the take-off angle (Bunn, 1955; Broer, 1960). Broer (1960) has simply referred to this by stating:

> Once the body has lost contact with the projecting surface no movement of various body segments can alter the path followed by the center of gravity (p. 126).

Seefeldt (1972) has stated:

> The in-flight phase is devoted to a rearrangement of the body segments so that the landing will be safe and efficient and . . . will cover the maximum distance (notes).

Focal point when referring to taking off on one foot and landing on the opposite foot with a smooth transfer of weight has been considered by definition as a leap (Broer, 1960; Schurr, 1967; Latchaw, 1959; Godfrey and Kephart, 1969; Milne, 1972; Seefeldt, 1972). Reaching

forward with the arm opposite the lead leg, focal point two, indicates a combination of two factors: (a) the forward reach in a forceful manner, as Latchaw (1969, p. 33) points out, allows for the body to raise "high in the air during the period of nonsupport," and (b) helps to sustain the individual's momentum and consequently increase the individual's time in covering a space (Broer, 1960; Schurr, 1967). Focal point two also refers to the extension of both arms and legs in opposition, as observed in the mature run, since in reality a leap is closely related to the run with the exception of a longer period of nonsupport (Schurr, 1967; Latchaw, 1969). Focal point three is closely related to the second point as it pertains to the period of nonsupport. However, the 90° or less forward lean enables the observer to note that with an appropriate take-off the upper body will virtually be erect with no forward lean (Hellebrandt et al., 1961; Wickstrom, 1970). Focal point four, which pertains to a running approach and landing, refers to a smooth transition for overcoming the individual's inertia and maintaining it once the leap is completed (Bunn, 1955; Broer, 1960). Seefeldt (1972) and Milne (1972) have alluded to the leaping skill as a precursor to jumping skill patterns. Certain "cues" or characteristics of the mature skill performance are found in Appendix A which gives an overview of the focal points to be used in this study.

Progression and/or Deviations in the Mature Leaping Skill

Progressions and/or deviations in the mature leap are apparent as certain "cues" or characteristics are examined with reference to

the above major focal points. Leaping may often be confused by a hop, taking off with one foot and landing on the same foot (Broer, 1960; Wickstrom, 1970), or taking off on one foot and landing on both (Schurr, 1967). Thus, these movements would be by definition deviations in the leaping pattern. Individuals who maintain surface contact with one foot tend only to reach as far as their opposite leg will stretch (Fuller, 1972). Probably the most common elementary pattern, however, is the inability of an individual to use first the dominant, then the nondominant foot for the push-off or landing phases (Godfrey and Kephart, 1969). Progressions found with focal point two and three must be examined together. Arm movement is one cue which gives rise to several common elementary patterns. They are: (1) arms oppose the leg action as the arms act as "brakes" due to their position posterior to the forward lean of the trunk and extended forward leg (Milne, 1972); (2) the arms extend outward and abduct from the sides in opposition again to the leg action (Milne, 1972); (3) failure to use the arms by holding them in a fixed position (Godfrey and Kephart, 1969). Failure to extend both the lead and trailing leg at the height of the leap is another common elementary characteristic. During the period of nonsupport three progressions and/or deviations may be observed from a side view: (a) little, if any, forward lean (I CAN, 1973); (b) vertical distance greater than the horizontal distance (Milne, 1972); and (c) twisting or jerky corrective movements while the body is in the nonsupport phase (Schurr, 1967; Godfrey and Kephart, 1969). The fourth focal point refers to the running component of the mature leap. Progressions in timing the

leaping motion or other running characteristics mentioned previously would be applicable here. Certain "cues," progressions and/or deviations in the mature skill performance are found in Appendix A which gives an overview of the focal points to be used in this study.

The Mature Horizontal Jump

The fundamental locomotor skill referred to as the horizontal jump has six focal points which describe the mature performance pattern. The I CAN Curriculum (1973) lists these as: (1) a preparatory movement which includes a 90° flexion (± 5°) at the knee with both arms extended behind the body; (2) a forceful thrust of both arms and a full extension of the legs (hip, knee, and ankle joints) in a forward and upward direction at take-off; (3) from a side view the angle of take-off as measured through the center of the body to the surface of 45° ± 5°; (4) both feet landing simultaneously; (5) both knees flexed so that the thighs are nearly parallel to the surface at the time of landing; and (6) a simultaneous forward thrust of arms as both feet make contact with the surface at the same time. Focal point one is directed at the preparatory phase of jumping in which the body is getting ready to generate a force which will result in overcoming gravity (Broer, 1960; Godfrey and Kephart, 1969; Latchaw, 1969; Seefeldt, 1972). The 90° flexion at the knee ± 5° defines a deep crouch which Wickstrom (1970) cites as imperative in attaining a maximum performance.

The second focal point considers both the arm and leg thrust. The importance of the arm movement in a forward and upward direction just as the body leaves the surface moves the center of gravity of the

body forward (Broer, 1960; Scott, 1966; Schurr, 1967; Sinclair, 1971). As the arms extend with the thrust produced by both legs, the body enters the "in-flight phase" of the horizontal jump. Seefeldt (1972) distinctly summarizes this point as he states:

> The arms extend vigorously forward and upward upon take-off reaching full extension above the head at lift-off (personal note).

The same full extension of the legs is noted by a number of investigators as they describe the importance of an explosive extension of the entire leg (Zimmerman, 1956; Broer, 1960; Schurr, 1967; Latchaw, 1969; Godfrey and Kephart, 1969; Wickstrom, 1970; Seefeldt, 1971). The 45° ± 5° angle according to physics is the maximum angle one may use to attain the greatest distance (Broer, 1960; Bunn, 1955). Zimmerman (1956) has stated that the very best of her subjects attained the 45° angle. However, Wickstrom (1970), citing the unpublished work of Henry (1948), concluded that very few individuals attained the 45° angle of take-off. Henry's average angle of take-off was 41.3°, with 32° to 48° as the range. Seefeldt (1972) has stated:

> The very best jumpers have achieved angles of only 38 to 40 degrees. A factor preventing man from realizing greater distances in long jumping (horizontal jumping) is the inability to generate the force required to raise the center of gravity vertically while traveling at such great horizontal velocity (p. 3).

Seefeldt (1972) goes on to state that the 45° angle is possible, however, depending on the extensor muscle strength when the force is applied. During the in-flight phase of jumping the individual cannot change the path of the center of gravity as explained for leaping, but near the end of the "in-flight" phase the body begins to prepare for landing. Focal point four states that both feet land simultaneously

ahead of the body. This is accomplished by the body assuming a pike position just prior to landing with the center of gravity lower than 45° because the landing point is lower than the "take-off" point (Hellebrandt et al., 1961; Schurr, 1967; Godfrey and Kephart, 1969; Wickstrom, 1970; Seefeldt, 1972). Focal points five and six occur simultaneously. The importance of the thighs being positioned nearly parallel to the surface as Wickstrom (1970) points out, allows for maximum distance to be attained without losing balance as the arms are thrust forward, thus the center of gravity continues to move forward quickly. The two foot landing allows for a greater distribution of the force of landing impact over a greater period of time and in reality over more of the body segments (Fait, 1961; Wickstrom, 1970; Seefeldt, 1972). Certain cues or characteristics of the mature performance are found in Appendix A which give an overview of the focal points to be used in this study.

Progressions and/or Deviations in the Mature Horizontal Jumping Skill

Progression and/or deviations from the mature horizontal jump as they relate to the six focal points of the I CAN Curriculum may be considered with three elements having several components within each element. The preparatory movement has the following components where a progression may be observed: little forward and backward arm movement (Schurr, 1967; Sinclair, 1971); no forward lean of the upper body (Broer, 1960; Wickstrom, 1970; Seefeldt, 1972). The period of nonsupport or in-flight phase has three components. Progressions in arm movement are noticeable as: (a) the arms move backward in a braking

action (Hellebrandt, 1961; Espenschade and Eckert, 1967; Seefeldt, 1972); (b) arms extended from the sides in a winging action (Hellebrandt, 1961; Espenschade and Eckert, 1967; Seefeldt, 1972); and arms extending forward, but not exceeding or extending above the head (Seefeldt, 1972). Progressions and/or deviations in the trunk or upper body lean is observable from the side as, one, a forward lean lesser than 45° ± 5° and, two, a greater forward lean greater than 45° ± 5° (Zimmerman, 1956; Wickstrom, 1970; Seefeldt, 1972). Take-off primarily from one foot with partial extension is a precursor to the "2-footed" take-off of the mature horizontal jump (Godfrey and Kephart, 1969; Seefeldt, 1972; I CAN, 1973). The final element is termed landing. Its components include: foot position which involves landing on one foot (Godfrey and Kephart, 1969; Wickstrom, 1969; Sinclair, 1971; Seefeldt, 1972) and landing on both feet behind the body's center of mass (Broer, 1960; Godfrey and Kephart, 1969); arm positions including an arm in back of the body as feet make contact with the surface or the arms extending out from the sides as the feet make contact with the surface; the knee position being slightly flexed and fixed as the center of mass moves in front of the body (Godfrey and Kephart, 1969; Seefeldt, 1972); and the knees flexed in a manner which exceeds the parallel requirements of the thigh position of a mature jump (Godfrey and Kephart, 1969). Certain "cues," progressions and/or deviations in the mature skill performance are found in Appendix A which gives an overview of the focal points to be used in this study.

The Mature Vertical Jump

The mature vertical jump has basically three focal points (I CAN, 1973). These are: (1) a preparatory movement which includes a 65° to 90° flexion at the knee from the standing position with both arms extended backwards (in a posterior direction); (2) an in-flight phase in which there is a forceful upward thrust of both arms and full extension of both legs (hip, knee, and ankle joints); and (3) a balanced landing incorporating trunk and knee flexion, with little or no horizontal displacement when contacting the surface of a one-foot diameter take-off area (I CAN, 1973). Focal point one refers to the preparatory phase of the vertical jump where the leg muscles are stretched to increase the force in the direction to which it is applied (Scott, 1964). Wickstrom (1970) cites the figures of knee flexion between 65° and 90° as reference angles for the best jumps. However, a range was observed from 45° to 135°. Martain and Stull (1969) found that knee flexion of 90° was better than a 65° flexion and that a 115° flexion was better than a 90° knee flexion for the most efficient vertical jump when college males were studied. Fait (1961) uses the 90° knee flexion as a reference point. There is great variance in the best angle for maximum height attained during the vertical jump, no doubt dependent on the strength of the leg muscles (Broer, 1960). The inclusion of the "arms extended backward" in vertical jumping determines the angle at which the force will be applied (Broer, 1960). The aforementioned studies did not discuss the forward lean of the upper body. Keeping the center of mass directly above the base of support is important since a forward lean would tend to move the

center of mass forward and thus hinder the upward projection of the body when the force is applied (Broer, 1960). Foot placement was not included as a focal point for the vertical jump because little research is available. However, as with the standing long jump or horizontal jump, the position of the feet should be within and less than shoulder-width or hip-width distance. As Martain and Stull (1969) intimated, an increase in foot spacing decreases performance.

Focal point two for the vertical jump refers to the explosive thrust of the body upward. Thus, if the center of gravity was directly over the feet at take-off, maximum performance will be achieved (Broer, 1960). The arms extended upward over the head with the quick contraction of leg extensor muscles applied equally. This action directs the body in the desired upward direction (Godfrey and Kephart, 1969). Wickstrom (1970) also emphasizes the importance of force production by the arms as well as the metatarsalarphalangeal joints of the legs. The second focal point also considers the continued extension throughout the entire in-flight phase. As the individual prepares to land (focal point three), little forward displacement due to a shift of balance is of no consequence for, as Hellebrandt et al. (1961) states,

> The forceful extension of the legs in the vertical jump leaves them in position directly below the center of gravity so equilibrium on landing is of no problem (p. 20).

As the feet touch the surface the legs and the upper body excluding the neck begin to flex, thus reducing downward momentum (Broer, 1960; Seefeldt, 1973). This body action, as Scott (1964) points out, allows the body to "give" in a controlled manner and avoid injury. Broer

(1960) noted that balance is maintained if the base is widened to "beyond hip-width" just before the feet make contact with the surface. Certain "cues" or characteristics of the mature skill performance are found in Appendix A which give an overview of the focal point to be used in this study.

Progressions and/or Deviations in the Mature Vertical Jumping Skill

Progressions and/or deviations in the mature vertical jump as they relate to the literature are almost nonexistent. However, by analyzing the focal points with the available information, general progressions and/or deviations may be gleaned (Broer, 1960; Seefeldt, 1972). The preparatory movement involves the three components: leg position, trunk position, and arm movement. Leg position includes: (a) a running approach; (b) little flexion of the knees and a slight extension of the hips; and (c) an exaggerated flexion of the legs. Trunk positions include: (a) the body almost erect to the surface; and (b) a forward body lean greater than 75° ± 5°. Arm movement progressions include: (a) no upward thrust of the arms; (b) an upward thrust of the arms only without a posterior extension preceding the thrust; and (c) a slight posterior extension of the arms with a forceful forward thrust of the arms. Focal point two, the in-flight phase also includes three components. Leg position includes: (a) little hip or leg extension with the ankles flexed, thus little height is attained; (b) knee and ankles flex, but the force of the jump upward is dissipated by the flexion of the legs; and (c) a partial extension of legs and ankles. Trunk position is characterized by little or slight

extension and when a running approach is used the horizontal distance traveled is often greater than the vertical distance. Arm movement progressions include: (a) arms slightly extended above the shoulder; (b) one arm extended above the head with the opposite arm extended to the side for balance; and (c) the arms extended over the head with a swinging or slapping motion (Seefeldt, 1972). Focal point three describes the landing position with three components: knee position, arm position, and foot position. Knee position is characterized by: (a) little or no flexion of the knees or ankles; (b) partial flexion of knees and ankles greater than 45° ± 5°. Arm position includes: (a) both arms extended out from the shoulders for balance; (b) one arm extended out from the side for balance with a flailing type of movement. Foot position is characterized by: (a) the entire foot contacting the surface; (b) landing on one foot followed with a compensatory movement of the opposite foot outside the designated landing area.

skill performance are found in Appendix A which gives an overview of the focal points to be used in this study.

The Mature Hop

The fundamental locomotor skill of hopping has three focal points as described by the "I CAN" materials (I CAN, 1973). The three focal points are: (1) an upright carriage of the upper body over the support leg; (2) keeping the nonsupport leg near the midline of the body and slifhtly flexed so that the foot is within two to four inches of the floor and in back of the support leg; (3) both arms lifting in

front of the body during the projection phase of the leg action with the elbows flexed, as well as providing for balance during the entire hopping sequence. The first focal point denoting the carriage of the body over the support leg implies that the body is supported by one leg only. That is, during the entire hopping movement an individual uses one foot to both exert a force to lift the body from the surface and land on the surface with the same foot while the body remains centered over and slightly ahead of that foot (Broer, 1960; Schurr, 1967; Espenshade and Eckert, 1967; Latchaw, 1967). Seefeldt (1973) and Milne (1972) regard the second focal point, which receives little recognition by others, as an important factor in a description of the mature hop. Milne (1972) describes the nonsupport leg as being slightly flexed and carried close to the surface slightly behind the frontal plane with the length of the hop increasing as the height is decreased in relation to the less mature stages.

The third focal point considers primarily the push-off phase of the hop with the importance of arm action. Consequently, if a push-off phase is mentioned, a landing phase must also be an integral facet of this focal point. By lifting the arms forward and upward in syncrony with the leg action, Latchaw (1967) states:

> The center of gravity is displaced forward by a slight lean, and the weight-bearing (support) foot pushes off as the body extends in a jump. As the body is airborne, the weight-bearing foot is swung forward to a position ahead of the center of gravity, and the weight is once again caught. The knee flexes to help absorb the shock and the center of gravity passes over the base of support (p. 34).

Several others (Schurr, 1967; Godfrey and Kephart, 1969; Sinclair, 1971; Milne, 1972) agreed with Latchaw's basic statement; however,

they tend to stress the importance of the arm action in front of the body assisting in balance, push-off, and landing. It is evident that hopping is a relatively difficult skill to master, therefore Sinclair (1971), Milne (1972), and "I CAN" (1973) include that an individual must perform the mature hop at least three to five times using both the dominant and nondominant foot as the support foot in order for complete mastery. Certain "cues" or characteristics of the mature skill performance are found in Appendix A which gives an overview of the focal points to be used in this study.

Progressions and/or Deviations in the Mature Hopping Skill

Progressions and/or deviations noted in the development of the mature pattern are related to the three major focal points defined by the "I CAN" (1972). Progressions attributed to the first focal point are centered on the nonsupport leg. Milne (1972) has listed: (1) extending the nonsupport leg in front of the body, and (2) flexing the nonsupport leg 90° or less behind the support leg with the thigh directed downward. Godfrey and Kephart (1969) mention the nonsupport leg attempting to assist during the propulsion of the hop as a major deviation. Fuller (1972) and Cook (1973) have stated that they have observed trainable mentally retarded pupils trying to balance while hopping by extending the leg away from the midline or by bringing the nonsupport leg across the midline.

Arm position is the second area in which a progression may be observed as it relates to the mature hopping pattern. Arms not working together symmetrically, arms extended from the sides above the waist

and yielding excessive pumping actions have been noted by Milne (1972) and Godfrey and Kephart (1969). Other patterns in the progression toward the mature skill observed by Fuller (1972) and Cook (1973) were the arm of the same side as the hopping leg moving across the midline of the body and the arm on the same side of the hopping leg remaining motionless.

Any movement which causes the individual to depart from a straight line due to loss of balance is another progression and/or deviation from the development of the mature hopping pattern (Schurr, 1967; Godfrey and Kephart, 1969; Sinclair, 1971; Milne, 1972). Likewise, failure to hop three to five hops on the dominant or nondominant support foot is a deviation from what is termed the "basic movement" (Sinclair, 1971; Milne, 1972; I CAN, 1973). Certain "cues," progressions and/or deviations from the mature skill performance are found in Appendix A which gives an overview of the focal points to be used in this study.

The Mature Gallop

There is little descriptive information regarding the fundamental locomotor skill of galloping. However, three particular focal points are of importance. They are: (1) a step forward with the lead foot; (2) flexion of the rear knee during the nonsupport period as the rear leg moves toward and almost even with the lead leg; and (3) a coordinated lift of both arms extended in front of the body as the body weight is transferred (I CAN, 1973). Focal point one refers to the tendency of the individual to "pound" the surface in a forceful manner with the same leading foot, sometimes when music is introduced

or sometimes during the course of normal play (Guttridge, 1939; Espenschade and Eckert, 1967; Sinclair, 1971). As the individual "pounds" the surface with the lead foot the front knee is raised relatively high in order to produce the stressful force of the "pound" (Haubenstricker, 1973). The individual may introduce a leaping movement as he leads with the "pounding foot" (Guttridge, 1939; Espenschade and Eckert, 1967). As the individual masters the step-lead, a longer step and a short leap with the same foot leading will result (Latchaw, 1969). These two statements take into consideration the focal point which Haubenstricker (1973) mentions, allowing the back foot to approach but never pass the lead foot, or as focal point two from the I CAN Curriculum states: "flexion of the rear knee during the nonsupport phase as it moves toward and almost even with the lead leg" (T.P.O. 6). Focal point three refers to the coordinated lift the arms provide in order to overcome the inertia of the nonsupport period (Bunn, 1955; Broer, 1967) as well as to assist with balancing (Espenschade and Eckert, 1967; Sinclair, 1971). It should be noted that Sinclair (1971) made reference to a rhythmic and steady action with a staccato movement; this possibly pertains to the "pounding" of the lead foot to a given beat, such as music or a drum beat. Fuller (1973) mentioned that once a gallop pattern is learned the pupils tend to maintain a steady rhythmical pattern which reflects the music or drumbeat employed. Certain "cues" or characteristics of the mature skill performance are found in Appendix A which gives an overview of the focal points to be used in this study.

Progressions and/or Deviations in the Mature Galloping Skill

As previously mentioned, there is little published information on the true nature of the gallop. Even less of the published literature pertains to progressions and/or deviations in the mature gallop. Each focal point gives rise, however, to possible sources in the progression. Focal point one, referring to the lead leg movement, indicates two elementary characteristics: namely, not pointing the lead foot forward and, as in leaping, the inability to use both the dominant or nondominant foot as the lead foot (Godfrey and Kephart, 1969; Sinclair, 1971). The second focal point, referring to the flexion of the rear leg, points to a fact mentioned by Fuller (1973) and Cook (1972); namely, when an individual first begins galloping the rear leg is nearly straight as it approaches the lead leg. Progressions and/or deviations which are found with focal point three basically refer to the position of the arms. Thus, three common characteristics may be noted, primarily related to the nonsupport phase of galloping. They are: (1) extraneous arm movements observed in general during the entire galloping movement (Godfrey and Kephart, 1969); (2) arms extended from the sides for balance in the "braking" or winging positions (Seefeldt, 1972; Milne, 1972); and (3) the arm on the same side as the lead foot at the midline in front of the body while the opposite arm is extended either to the side or rear, thus rotating the body. The third characteristic pertaining to arm position may possibly be what Espenschade and Eckert (1972, p. 21) referred to as they state, ". . . the children will master technique and degree of balance . . . when they experiment with . . . variations

. . . ." Certain "cues," progressions and/or deviations in the mature skill performance are found in Appendix A which gives an overview of the focal points to be used in this study.

The Mature Slide

The fundamental locomotor skill of sliding has several definitions. Guttridge (1939, p. 39) defined sliding as "propelling the body or allowing it to slip down a sloping board." Godfrey and Kephart (1969, p. 92) refer to sliding as incorporation of a propulsive phase of a "quick push . . . followed by a sudden stop" which allows the individual to continue moving in a fixed position along a slippery surface. However, a more commonly accepted definition involves four focal points which the I CAN Curriculum (1973) has attempted to take into consideration. These focal points are: (1) a sideways step with one foot while the arms extend slightly from the sides; (2) a slide of the trailing foot to a position next to the lead foot during the nonsupport phase; (3) a smooth weight transfer from the push-off or trailing leg to the lead foot along a straight line; and (4) maintaining the trunk of the body in an upright position. Focal point one refers to the long sideways step of the lead foot and the balance position which the arms assume as the nonsupport phase of the slide begins (Schurr, 1967; Latchaw, 1969; Sinclair, 1971). Even though the arm position is given little definitive consideration it should be noted that the arms do aid in balancing throughout the entire slide (Sinclair, 1971). It is difficult to separate focal points two and three because the movement of the propulsive or trail foot occurs rapidly with a hop-leap to the lead foot during the simultaneous

smooth-flowing weight transfer along a straight line (Schurr, 1967; Latchaw, 1969; I CAN, 1973). The rapid movement during the nonsupport phase is referred to by Schurr (1967): "As the body weight is always within the base of support, the sliding pattern provides a well-balanced position . . ." (p. 239). The importance of moving in a sideways direction while keeping the "body facing forward" may indicate a sideways straight line motion although not explicitly stated by Latchaw (1969) and Sinclair (1971). It should be noted that if there is a nonsupport phase resulting from a form of propulsion there must be a landing phase. Although the I CAN Curriculum does not account for landing due to the rapidity of the movement, the ball of the lead foot absorbs the initial impact of the body weight (Schurr, 1967; Haubenstricker, 1973). Focal point four alludes to the fixed body position which serves as a component necessary to define a slide as well as provides a component of maturity regarding balance throughout the entire mature slide (Sinclair, 1971; I CAN, 1973). Certain "cues" or characteristics of the mature skill performance are found in Appendix A which gives an overview of the focal points to be used in this study.

Progressions and/or Deviations in the Mature Sliding Skill

Progressions and/or deviations noted in the mature pattern are related to four major focal points by "four cues." The movement of the lead foot is of primary concern because when that foot in its sideway movement begins to point in the direction of the slide the body will then assume a gallop position (Schurr, 1967). A second

characteristic may be observed if the individual lifts the training leg. This not only indicates a lack of mastery but may also indicate a balance problem (Schurr, 1967; Fuller, 1973; Cook, 1973). Any exaggerated unsteady movement of the arms during the execution of the slide indicates possible balance problems (Sinclair, 1971; Fuller, 1973). Any jerky or deliberate transfer of weight from the trailing foot to the lead foot, causing the individual to deviate from a straight line as well as not successfully complete five consecutive rhythmic cycles along the given line, give rise to the fourth deviation (Sinclair, 1971; I CAN, 1973). Certain "cues," progressions and/or deviations of the mature skill performance are found in Appendix A which gives an overview of the focal points to be used in this study.

The Mature Skip

The mature fundamental locomotor skipping pattern in reality combines elements of galloping and hopping. Three focal points of the I CAN Curriculum consider the basic components of this skill as: (1) a repetition of a step and hop on alternate feet along a straight line; (2) the arms move in opposition to the legs at about waist level; and (3) a smooth transfer of body weight from one leg to the opposite leg. Focal point one refers to the step-hop on one foot to a step-hop on the alternate foot in a continuous rhythmical sequence (Schurr, 1967; Godfrey and Kephart, 1969; Sinclair, 1971; Milne, 1972). Latchaw (1969) best describes it as "a combination of a step and a hop, performed as a long step and a short hop, and alternating feet after each step-hop" (p. 34). It is interesting to note that Wellman

(1937), Guttridge (1939), Espenschade and Eckert (1967), and Cratty (1970) were extremely vague on an explicit definition as it pertained to skipping. Guttridge (1939), for example, simply defined skipping as "a series of rhythmical movements along the horizontal level of the floor or ground involving a slight hop on alternating feet" (p. 39). The second focal point centers on the position of arm and leg movement which Schurr (1967), Sinclair (1971), and Milne (1972) mention generally but which Godfrey and Kephart (1969) give importance to by further delineating opposition of movement by stating that:

> Thus, the opposing arm to the foot on which the step forward is taken moves forward with the foot and stays forward lifting slightly with the hop at the end of the skip on that foot (pp. 77-78).

A minor principle related to arm movement is the fact that the motion of the arms increases momentum if height and distance in a desired direction are of importance (Schurr, 1967). However, Schurr's basic mechanical principle related to arm movement and momentum which will be discussed later is often considered a deviation from the mature skip. The third focal point, referring to the transfer of body weight, cannot be separated from the entire skipping pattern. Milne (1972) has stated that the mature pattern cannot exist unless "there is a smooth, graceful transfer of weight from foot to foot." The importance of a straight line in the direction an individual travels must include four to ten successive cycles with steadiness and a consistent rhythm (Sinclair, 1971; I CAN, 1973). This requirement will indicate if an individual has truly developed a mature skip (Sinclair, 1971; I CAN, 1973). Certain "cues" or characteristics of the mature

skill performance are found in Appendix A which gives an overview of the focal points to be used in this study.

Progressions and/or Deviations in the Mature Skipping Skill

Certain progressions and/or deviations are of importance as they pertain to three focal points. During the rhythmical repetition of the step-hop on alternate feet along a straight line, four progressions and/or deviations may be observed. They are: (a) a deliberate step-hop pattern with a forceful step on the landing (Godfrey and Kephart, 1967); (b) crossing the midline of the body when placing the support foot on the surface during the skip (Seefeldt, 1972); (c) an exaggerated nonsupport flexed leg (foot almost contacting the buttock) (Seefeldt, 1972; and (d) the inability to use both feet equally well during the execution of the skip (Sinclair, 1971; Fuller, 1973). Deviations related to arm movement are easily recognizable. They include: jerky or extraneous arm movement (Godfrey and Kephart, 1969; Milne, 1972); one-sided or ipsilateral arm action (Seefeldt, 1972); use of arms for balance only, i.e., arms extended from sides in a "winging" action (Milne, 1972); arms crossing the midline for balance (Fuller, 1973; Cook, 1973); symmetrical arm action for elevation (Godfrey and Kephart, 1969; Seefeldt, 1972). The third focal point, referring to weight transfer from one leg to another along a straight line, illustrates an area where deviations may be noted by loss of balance while the weight is being transferred, resulting in a zig-zag movement; poor alternation along with uneven or difficult execution of the skip over a straight line for more than four to ten successive

cycles (Godfrey and Kephart, 1969; Sinclair, 1971; I CAN, 1973). Certain "cues," progressions and/or deviations from the mature skill performance are found in Appendix A which gives an overview of the focal points to be used in this study.

Motor Performance Training and Teacher Type

The literature related to the efficiency of teacher types in assessing motor performance of trainable mentally impaired is practically nonexistent. Vogel (1974) found that when classroom teachers and physical education specialists were compared in their ability to effect change in motor performance of trainable mentally impaired students after a "training period," both groups were able to produce a positive change in motor performance level.

Data obtained on normal children after both classroom teachers and physical education teachers have worked with children in improving motor skill performance has indicated that physical education specialists are more effective than classroom teachers (Hallstrom, 1965; Workman, 1968). The results in each study indicated that the physical education specialist was significantly more effective in producing positive changes in motor performance ability than the classroom teacher.

There appears to be an indication from the literature that if both classroom teachers and physical education specialists are compared, the specialist is more effective than the classroom teacher in effecting positive changes in motor performance of normal children. It must be noted that the comparison of teachers did not stress the

type of training and experience in relation to the given skills in the studies.

Vogel (1974) found that there was a variance of results when teacher types were considered after each had received the same performance based, diagnostic-prescriptive training in four selected fundamental motor skills. He found that both physical education specialist and teachers were equally effective in two skill areas (underhand roll and catching). The specialists were more effective in results attained in the running pattern, as compared with the classroom teachers, and less effective than classroom teachers when compared with catching skills.

From the available data, one can conclude that when a performance based, diagnostic-prescriptive activity program is presented teacher type may have little bearing, if motor skill performance can be directed in an organized manner for both physical education specialist and classroom teachers. Where comparisons have been made without reference to the same training procedures it appears that physical education specialists are more effective in producing positive effects in programs with normal children. In these cases the training and experience of the teacher types must be taken into consideration. However, if Vogel's (1974) work is valid, teacher type may not be as important as previously thought, given that both specialist and teacher are guided along the same procedure without reference to their original background and training.

The Use of Visual-Descriptors, Films, in Instruction

The effectiveness of information transmission for instructional purposes may be traced to the times of the caveman. Broudy (1963), May (1958), Smith and Smith (1966), and Wittich and Fowlks (1952), have described the transition and use of pictures in recording and instructing man from the Neolithic period to the current use of sophisticated twentieth century electronic equipment. The transmission of information is a relatively simple area to understand in general terms; however, as one looks more deeply, the complexities become evident.

There are three basic components in information transmission. Milner-Fenwick (1972) has defined these areas as (1) The sending of the message, (2) The medium through which the message is sent and (3) The receiving of the message. Much research has been directed towards each area.

The earliest research in the area of visual-descriptors dealt primarily with the reception of the message. The words "reception of the message" point to the area of perception. There is a very basic problem inherent in the research on perception through visual, auditory, and/or combination of other century impressions. Musterberry and Bigham (1894) investigated the relationship of visual and auditory modalities to cognitive learning. Their work indicated that the visual modality was superior to the auditory modality when students were to identify colors and numbers after a training period. Krawiech (1946), in preparation of a study pertaining to symbols and three-letter words used in advertising, reviewed the major studies of

Musterbery and Bigham to 1941. The results of his review indicated much confusion as to the best mode for transmission of information. Krawiech, however, concluded from his study that visual presentations appeared to be the best method for information transmission in advertising new products when compared with any other single mode of information transmission.

From 1945 to 1964 little research on information transmission was undertaken. Travers' (1964) critical review of work before and after 1945 revealed a major source of confusion. He found that the majority of studies were poorly designed due to the inability to successfully separate and control the dependent as well as independent variables. Thus, Travers tried to empirically repeat the work of selected previous studies. The results failed to indicate any advantage to either the visual or auditory modalities. The implication from Travers' investigation indicated that only one form of information can successfully be used by the nervous system at a given time. The nervous system tends to block out information received through other sensory channels until the information is processed properly.

Other investigators have shown that more than a "sensory channel" or "multi-sensory system" is important in the reception of information when visual as well as other methods of presentation are employed. Evidence from studies of visual and auditory channels, alone or in combination, have been cited by Day and Beach (1950), Hoban and VanOrmer (1950), and Nelson and Moll (1950). These investigators have indicated that visual aids in the form of pictures added

to auditory material were more effective than the auditory mode alone. Hartman (1961) found that:

> multiple channel presentations alone do not produce increases in learning over single channel presentations unless the situation in which learning is elicited also contains necessary cues (p. 42).

In this study names of individuals were printed below the pictures of individuals in a series of five-second film clips as the additional cues for the viewer. Perrin (1969) also pointed out in his conclusions regarding multi-media presentations that "the amount of information presented can be much greater than with other communication media" (p. 42). However, he cautioned that the process of selection and organization of media and material are extremely critical. Rappaport (1971), Wilenta (1968), Greenhill (1967), Haney and Ullmer (1970), and Sage (1972) presented additional information pertaining to implications of perception in the field of audio-visual communications.

Regardless of the actual perceptual background necessary in the learning processes, widespread acceptance of visual-descriptors and films has led to a number of studies which have focused on the transmission of information. A classic study by Sumstine (1918) pioneered the evaluation of teaching techniques incorporating film, film-lecture, and lecture. The results demonstrated that the lecture only presentation test scores were substantially lower over 24-hour, 10-day, and 3-month time periods than the film and film-lecture methods.

Research pertaining to the advantages of film presentations over most other media for the transmission of information is abundant.

Weber (1922, 1930), Freeman (1924), Marchant (1925), McClusky (1924), Greenhill (1967), Twyford (1953), Haney and Ullmer (1970), and Pearson (1972) have all demonstrated the effectiveness of film over other methods of information transmission. A typical study was conducted by Miles and Spain (1947) on the results of data obtained during World War II. The investigators compared three methods, namely: a training film, studying from a well illustrated manual, and an organized lecture using lantern slides to illustrate key factors. Two groups of soldiers were selected by a means of scores from a "cross-section survey" of soldiers opinion as to why they were fighting World War II, and classified as superior or inferior in knowledge of why the United States was fighting in the War. The two groups were divided into sub-groups to receive one of the above treatments. Both the superior and inferior groups who saw the film scored significantly better than the other groups on both the immediate and delayed two-month tests.

A summary of instructional media and its relationship to learning objectives compiled by Milner-Fenwick (1972, p. 19) further illustrates the effectiveness of the film on a three-point scale (high, medium, and low).

As pointed out, the film is an outstanding way of presenting information. The type of film or use of film is another area of concern. Goodman (1942), for example, compared (1) sound motion pictures, (2) silent motion pictures, (3) sound filmstrips, and (4) silent filmstrips with visual cues, captions dealing with safety topics. The sound and silent modalities contained the same verbal and pictorial material. He found, after a 24 hour period that the silent motion

A Comparison of the Learning Objectives:*

Not all of the Instructional Media offer the same capabilities for learning. To help determine the appropriate instructional medium, the chart below shows the relationship between the media in several different categories of learning. Careful study of the chart is most advantageous.

Instructional Media Stimulus Relationships to Learning Objectives.

Instructional Media Type:	Learning Objectives					
	Learning Factual Information	Learning Visual Identifications	Learning Principles, Concepts and Rules	Learning Procedures	Performing Skilled Perceptual-Motor Acts	Developing Desirable Attitudes, Opinions & Motivations
Still Pictures	Medium	HIGH	Medium	Medium	low	low
Motion Pictures	Medium	HIGH	HIGH	HIGH	Medium	Medium
Television	Medium	Medium	HIGH	Medium	low	Medium
3-D Objects	low	HIGH	low	low	low	low
Audio Recordings	Medium	low	low	Medium	low	Medium
Programmed Instruction	Medium	Medium	Medium	HIGH	low	Medium
Demonstration	low	Medium	low	HIGH	Medium	Medium
Printed Textbooks	Medium	low	Medium	Medium	low	Medium
Oral Presentation	Medium	low	Medium	Medium	low	Medium

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picture was statistically superior when compared to the sound motion picture and the sound filmstrip. The silent filmstrip was statistically superior in presenting information when test scores were compared to those test scores of the sound motion picture and sound filmstrip. No significant difference was found between the silent filmstrip and silent film in terms of information learned or retained. A delayed measure of learning, 30 days later showed that the silent filmstrip was not as effective in its presentation of information as the silent motion picture and lost its advantage over the sound motion picture and sound filmstrip test scores. The silent motion picture still maintained a slight significant advantage in its ability to present information in terms of the subject's ability to retain specific information. McBeath (1961) and Vernon (1950) found no difference between the use of silent motion pictures, sound motion pictures, silent filmstrips, sound filmstrips, and "narration" when identical facts and concepts were presented by an immediate post-test or a retention test given a month later.

The above statements indicate that the use of visual-descriptor, in this instance movie film, can be an integral part of the instructional process, but at the same time complexities of presentation are vital factors of concern. In order to more thoroughly understand several of the complexities involving films, six areas of importance must be mentioned. They are (1) the number of repetitions of a treatment an individual must be exposed to for maximum instruction; (2) the action portrayed by the film in terms of film speed; (3) the type of narration used with each treatment; (4) the sequence of action

in the film or other treatment group; (5) the film treatments, use of color or black and white presentation; and (6) the type of equipment which should be considered as the "message is sent."

The number of repetitions which an individual is exposed to for a given treatment has been studied. Motavish (1949) studied the significance of showing a film on general science and learning. He found that the second showing of the film produced significant test score increases. More repetitions of the film beyond two showings were not significant. Studies by Jaspen (1952), Lumsdaine (1953), Kurtz (1950), and Greenhill (1967) have demonstrated that repetitive film showings is an effective means of increasing learning. Greenhill (1967) points out the importance of only few repetitions by stating that:

> even this variable can be used to excess, and that it is possible to produce a reduction in learning as well as negative attitudes by too many showings of a film (usually in excess of two or three) (p. 10).

The action portrayed by the film in terms of film speed is another critical factor. Unfortunately, little research has been done in this area. Lumsdaine (1963) cites the unpublished work of W. J. McGuire in 1955 and 1961 regarding the acquisition of a motor skill when the skilled act occurs too swiftly for the observer to obtain an adequate perceptual pattern. Lumsdaine states:

> The limited evidence on comparative effectiveness of slow motion and normal speed photographic depiction comes from a study by McGuire, who compared them as an aid to learning pursuit-rotor performance. The difference obtained favored the use of slow motion (p. 630).

Montgomery (1967) also found that slower rates of film presentation were significantly more effective when normal speed and two slower

motion speeds were compared when the task of tying and testing an unfamiliar knotted figure was studied. Haney (1970) has mentioned that from an instructional point of view that when technical analysis of motor skill is made, e.g., a swimming competition dive, the motion picture film can capture vital details which at slow speeds or even stop action will allow one to truly study important factors missed when observed at normal speed. This writer feels that the ability to reduce the rate or speed of action in a learning situation is one reason why Milner-Fenwick (1972) rate the instructional media relationship to learning objectives of "Learning Procedures" and Performing Skilled Perceptual Motor Acts as high to medium when compared to other types of media presentation. Higgins (1970) used film loops to demonstrate errors in volleyball skills and found this method of instruction to be successful with her subjects. The Athletic Institute (1974, 1975) stresses the importance of presenting motor skills by (1) showing film loops at regular speed to view the total skill, (2) slowing the motion to analyze complicated movements, and then (3) using stop action within each motor skill sequence to point out the most critical components of the motor skill.

The third area for consideration is the type of narration to be used with the film. May (1958) compared sound track narration of a film with live narration of the identical film, entitled the Season. He found no significant difference between two presentations when 160 fifth graders and 60 ninth graders were randomly assigned to one of two treatments.

The sequence of action in a training film is another complex area for consideration. However, there is no definite answer as to how a psychomotor skill should be presented in order for the viewer to master assessment abilities of a given skill. A general trend in motor skill presentations is to show the basic or complete skill first at normal speed, then reduce the speed of the film to again show the complete skill, and conclude by denoting components which comprise the complete motor skills, i.e., the backswing in a golf swing related to arm and head positions. A. A. Lumsdaine (1963) regarded the sequence of analysis as pertaining to familiarization, defined as:

> . . . directing the attention of students to those aspects before an instructional presentation. This is done by oral or written instructions, or by giving a prefilm test, and by pointing out the "hardest" questions on a post film test before giving a second showing of a film (p. 40).

It was found that without "directing the attention of the students" trainees may attend to irrelevant features during the presentation. Lumsdaine cited the work of Wolff and Kraeling in 1961 by directing certain students' attention to important components of mechanical assembly while another group was shown all possible components, hypothesizing that the group which saw all the parts would "be very likely to attend to irrelevant features . . . and would thus be handicapped when they subsequently attempted to assemble the mechanism" (p. 643). The results indicated that the group given only important features of the mechanical assembly performed better in terms of part selection errors and assembly errors than the group which was given a familiarizing treatment to all parts. Seefeldt (1972) in producing films which show selected stages of motor skills presents the most

elementary stages of a skill pattern first and thus progresses to the mature pattern as the last segment within a single film clip of a selected motor skill. Wild (1939), Hellebrandt et al. (1961), and Wickstrom (1970) also describe and illustrate the motor skills in a sequential progression with the mature pattern described last. Sinclair (1970), Godfrey and Kephart (1969), however, discuss the mature skill pattern first with deviations and/or progressions leading to the mature skill discussed later so that a reference point of mature versus immature is the criteria for attending to a given motor skill. It appears that no one method of presentation is superior to another, thus, for the purposes of this study the use of selected key components of motor skill patterns, as opposed to an illustration of all factors, was presented first. The presentation of the mature motor skill pattern was viewed first with deviations or progressions leading to the mature skill pattern. In the words of McFee (1969) as cited by Perrin (1969):

> Visual ordering makes messages of content easier. Much of our responding is so fast we are unaware of the processing we do. One of the tasks of the message designer is to make the visual sorting process easier; he selects and organizes visual information so that it is easier for the viewer to assimulate (p. 377).

The use of color in teaching and training films is not a major issue. May (1958) found when comparing the Seasons in black and white versus color that no statistical difference could be found with respect to:

> (1) mean initial scores, (2) mean final scores (after seeing the film), and (3) mean score gain from initial to final scores (p. 28).

Bauer (1972) and Greenhill (1967) agreed that when black and white and color films were compared this variable did not produce differences in learning.

Contrary to the indication of the research, color is the "medium of the film today." The Instructional Media Center at Michigan State University recommended color usage. Commercial and professional film makers at Omnicon (1973) stressed color from two points of view: (1) color film costs about the same to make and develop because the public no longer is satisfied with black and white film, thus supply and demand has forced both film prices to equal levels; and (2) color film gives the viewer the sense of "true life" portrayed through motion where human beings are involved in action. Unfortunately, point (2) is very subjective, but was mentioned in context with motor skill assessment when this writer discussed the study with the advisory staff of Omnicon.

The type of equipment necessary to "send the message" can be of two types. Sixteen millimeter projectors can be used initially. Motion analyzers can slow or stop film at critical spots. If the sixteen millimeter film is reproduced into Super eight millimeter film a number of facets are possible. Super eight millimeter is therefore the second area for consideration. Single loop films may be produced which show a single motor skill from the mature pattern to elementary stages which deviate from the mature skill pattern. The following descriptions show the extreme adaptability of the single concept film loop as described by Milner-Fenwick (1972):

> Single concept films are short films (4 minutes or less) devoted to a single idea, procedure, technique or method. The content is concise; all irrelevant material is eliminated. These short films are normally packaged in a plastic cartridge in a continuous strip making a film loop. The film never has to be rewound as it will run again and again until it is stopped. The advantage of the cartridge is that you can start and stop the projector or insert or remove the cartridge at any desired time. The film loop enclosed in the cartridge precludes the necessity of threading the projector. The film is never handled.
>
> There is no sound track; sub-titles and captions are used as appropriate. The single concept film normally is used with authoritatively prepared commentary for maximum benefit of the user.
>
> The single concept film loop cartridge is functionally packaged in a specially designed, rugged, plastic case. In addition to shelf-storing like a book, the case has film notes accompanying the film loop which describe the contents in a straightforward manner. The film notes may be 500 words in length, are permanently attached to the sides of the loop case and are protected by a transparent plastic coating. Additional information when required to enhance the usefulness of the loops to either teacher or student can be furnished in a separate study guide.
>
> The film notes and the study guide are prepared for various levels of training, adding to the flexibility of the film loop (p. 21).

The reason Super eight millimeter film projection equipment is mentioned in this section is due to the recognition of Super 8 mm as the "A-V Tool" for the future in education. Gearhart and Brown (1969) listed eight reasons for employing the Super 8 mm system. They are: (1) Super 8 mm systems are simple to use; (2) the Super 8 mm system is reliable; (3) the Super 8 mm film is designed to accept standard reels; (4) Super 8 mm systems specifications for parts are the lowest possible in terms of cost when compared to any other visual system; (5) Super 8 mm projectors are capable of projecting film at forward, reverse, slow, normal, and high speeds; (6) Super 8 mm systems are easy to clean; (7) Super 8 mm systems are compact; and (8) Super 8 mm systems are adaptable for both silent and sound applications in a variety of settings.

Summary

The development and evaluation of a visual-descriptor model for teacher's assessment of trainable mentally impaired children pertaining to selected fundamental motor skill based on a given curriculum is comprised of several components. These components are grouped into five general categories which include: (a) the I CAN Curriculum; (b) motor characteristics of the mentally impaired; (c) motor development principles and laws; (d) eight selected fundamental locomotor skills; and (3) the use of visual-descriptors in instruction.

The I CAN Curriculum provides a structure and philosophy for physical education specifically designed for mentally impaired children. The I CAN materials are designed to enable the teacher to function effectively and efficiently and with purpose. The I CAN Curriculum materials are presented in a manner which provides an individual or group plan to be developed by assessing the students and/or students' needs, prescribing the appropriate "Teaching-Learning Activities," teaching the essential individual or group activities, evaluating the achievements of the individual or group and recycling the process by re-assessing and prescribing the appropriate materials either by increasing or decreasing the demands of the "Teaching-Learning Activities."

Certain motor characteristics of the mentally impaired have been investigated. Unfortunately little study has been specifically directed at the trainable mentally impaired. Pertinent information

concerning motor characteristics of the mentally impaired includes the following:

(a) Educable mentally impaired individuals generally lag behind intellectually normal individuals from two to four years on national norms of most tests of gross motor proficiency. Trainable mentally impaired individuals are in many cases substantially below the norms recorded for educables when compared on the basis of chronological age.

(b) Motor development of the mentally impaired follows a trend similar to that of intellectually normal individuals.

(c) There appears to be very little correlation of motor skill proficiency with intelligence when subjects are matched by mental age.

(d) When the complexities of motor skill increases, the proficiency of the mentally impaired decreases.

(e) The mentally impaired students, when given a structured physical education program, respond, in general, by reaching or exceeding minimal levels of normal physical performance.

(f) The majority of motor skills studied were based on qualitative rather than quantitative analysis of the skills involved.

Major principles, concepts, and techniques in discussing motor development have been developed over the last fifty years. Those principles, concepts, and techniques of significance that are applicable to this study are:

(a) Motor development is a continuous, orderly process with the basic sequence of progress the same for all human beings. The rate of progression varies from individual to individual. Thus it is assumed that the mentally impaired follow basic motor development sequences similar to those individuals with normal intelligence.

(b) Motor development scales have been developed which provide quantitative norms of children's growth patterns.

(c) Motor skills have been sequenced into stages of development which are related to maturational differences of individuals.

(d) Specific direction of motor development throughout the body supports the development of motor control proceeding in an orderly sequence.

(e) Quantitative measures of motor performance give information as to time and distances but do not portray the quality of the motor skill measured.

(f) Little qualitative description of fundamental psychomotor skills is available for the teacher of normal or mentally impaired individuals.

The eight selected fundamental locomotor skills, namely, running, leaping, horizontal jumping, vertical jumping, galloping, hopping, sliding, and skipping have been described in qualitative terms based on the mature motor skill as defined by the I CAN Curriculum. The literature is limited in terms of qualitative descriptions of mature fundamental locomotor skills and progressions and/or deviations from the mature fundamental skills. Some descriptions, in fact, present contradictions which present difficulty to the teacher in guiding an individual or class to master a specific fundamental locomotor skill. The review of literature underscores this point, but in addition provides focal points which adequately describe the mature selected fundamental skill along with characteristic deviations and/or progressions in the locomotor skill. Refer to Appendix A for a complete summary.

The effect of motor performance training and teacher type may not be an important factor in effecting changes in instructional methods of physical education specialists and classroom teachers. The results of studies dealing with this concept are:

(a) A number of studies indicate that physical education specialists are significantly more effective in improving motor performance than classroom teachers (little mention as to initial training and experience was noted when the teacher type was considered).

(b) It appears that if both the physical education specialist and classroom teacher have the basic performance based, diagnostic-prescriptive activity program background, differences will occur; however, the physical education specialist will not be significantly more effective in improving motor skill performance. In fact, the "teacher" type will be equal to or significantly more efficient in the improvement of motor skill performance.

The transmission of information regarding visual-descriptors or films in instruction deals with several components which are important to this study. Results of studies dealing with these components are:

(a) Films are excellent methods for presenting a message dealing with motor skills when compared with other media.

(b) The importance of two or three repetitions of a film are adequate for maximum instruction.

(c) Slow motion analysis of a motor skill increases the understanding of the skill.

(d) A verbal narration which describes important components of a skill helps direct the individual's attention and eliminates extraneous features.

(e) The sequence of action in a film must be in some pertinent order. However, there is no agreement as to the order when dealing with the presentation of psychomotor (sports and fundamental motor) skills.

(f) The use of color vs. black and white film is not an important variable in learning a motor skill. Color film is now the preferred medium and there is virtually no demand for black and white film on the commercial market.

(g) Training films and film loops are used in describing motor skills. Training films are longer, but may provide more information. Film loops average four minutes and may be shown repeatedly without rewinding; however, repetition can become boring. Comparison between the two visual-descriptors is limited and does not clearly define the preferred method for assessing or teaching psychomotor skills.

(h) There are basically two pieces of equipment for "sending the message" available in the instructional setting. They are the sixteen millimeter and the super eight millimeter projectors. The use of super eight millimeter projectors is rapidly replacing sixteen millimeter projectors, because of their versatility and economy.

CHAPTER III

METHODS AND PROCEDURES

The purposes of the study were: (1) to produce visual-descriptor models (training films) which illustrate selected fundamental motor skills based on the criteria from the I CAN curriculum developed for elementary school-age trainable mentally impaired students; and (2) to determine if the visual-descriptor models enhanced the motor skill observation and assessment abilities of teachers of elementary school-age trainable mentally impaired students.

Design

The motor performance of fifty-four TMI elementary school-age students was recorded in the development of the visual-descriptor models for this study. The TMI students were enrolled at the Marvin E. Beekman Training Center in Lansing, Michigan. Twenty Lansing area general education elementary age youngsters were also filmed so that one of them could be substituted in a sequence if one TMI student appeared in more than two different skills. The assumption that locomotor skills of all subjects filmed in this study progressed in the same developmental sequence was made.

All TMI elementary age students were evaluated for the eight selected fundamental locomotor skills based on the mature pattern criteria of the I CAN curriculum measures of skill competencies. Progressions and/or deviations in the mature pattern also were evaluated (Appendix A). The results of the evaluation were used to select the individuals whose motor skills were recorded on film.

The preliminary locomotor evaluation process was conducted by the writer with the assistance of two physical education doctoral students. Prior to the evaluation process, five training sessions were held. The first session was directed by Dr. Vern Seefeldt, Director of the Motor Performance Program and faculty member at Michigan State University, East Lansing, Michigan. The four remaining sessions were conducted by the writer. The purpose of the training sessions was to familiarize the observers with the specified locomotor skills and the written descriptors based on the I CAN curriculum competency measures, as well as progressions and/or deviations from the mature skill. Techniques in film analysis of certain locomotor skills, which reflect normal development, were covered and reviewed.

The preliminary work involved shooting film of locomotor patterns to determine the proper film speed, lighting, and other pertinent details that were necessary for capturing the selected fundamental locomotor skills, which involved velocity of subject movement and clarity of specific pattern components. The results indicated that a film speed of at least 48 frames per second was necessary. A 240 Bell & Howell 16 millimeter reflex camera, shooting 48 frames per second, with a subject-to-camera distance of 20 to 30

feet with the lense set at infinity was used to record the action. Three 1,000 watt film lamps provided the necessary lighting. The filming equipment mentioned above, along with a L-M motion analyzer and various editing techniques permitted the writer to experiment and find the right combinations necessary to shoot and edit the film in the production of the visual-descriptor models of this study.

Each elementary school-age TMI student and general education student was recorded by means of student number, age of student to nearest birthday, date of filming, and skill performed. This information was available on a single statement board filmed before the actual performance of the locomotor skill. A master file list with the same information was kept to provide a way of double checking each student and each film sequence. To facilitate the filming of each skill, a schedule was developed which allowed for filming one specific skill per two-day period. Four make-up periods were scheduled to retake or film a given student who was absent during the regular filming sessions at the Marvin E. Beekman Training Center. The twenty elementary school-age general education students were transported to the Beekman Training Center in order to maintain a consistent background for the filmed sequences. Two filming dates were arranged for the general education students.

After the filming was completed, two basic films were produced. Both films, the visual-descriptor models and evaluation films, were equally consistent with the established criteria depicting specific locomotor patterns. The visual-descriptor models and evaluation films consisted of film segments which depicted a mature

fundamental locomotor skill based on criteria specified by the I CAN curriculum; and those progressions and/or deviations to the mature fundamental locomotor skills based on the literature, work of Dr. Vern Seefeldt, and the writer (Appendix A).

The visual-descriptor model was edited into three types or treatment film packages. The first film package was composed of a series of eight short films with each film showing one selected fundamental locomotor skill sequence. The second visual-descriptor model consisted of eight film loops with each film loop showing one selected fundamental locomotor skill sequence. The third visual-descriptor model, the long sequential locomotor skill film, consisted of all eight selected fundamental locomotor skill sequences.

The evaluation films consisted of randomly selected single film clips which depicted only one stage of each of the eight selected fundamental locomotor skills. Numbers preceded each single film clip of the evaluation film. The numbers corresponded to the appropriate test form given to the teachers. Precautions were taken to avoid the use of individual TMI or general education students in the evaluation films who also served as subjects in the visual-descriptor models. The visual-descriptor models and evaluation films included boys and girls of different ages and body builds. Variations in body size were introduced to dissuade teachers observing the films to associate the mature pattern or specific progressions and/or deviations of that mature pattern with the sex, size, or age of the student appearing on the film.

After the visual-descriptor models and evaluation films were produced, three physical educators with backgrounds in motor development reviewed the visual-descriptor models with the accompanying descriptions and the evaluation films. This group established internal validity of the visual-descriptor models and the evaluation films in the following ways: (1) viewing the visual-descriptor model presentations and evaluation films; (2) evaluating the materials by actually responding to specific evaluation forms which the teachers would eventually use; (3) commenting on the visual-descriptor models, evaluation films, and evaluation forms after the completion of the presentation forms; and (4) arriving at a consensus of opinion with the writer and Dr. Vern Seefeldt regarding both the visual-descriptor models and evaluation films. Revisions to the visual-descriptor models, evaluation films, and evaluation forms were made twice during this process.

Presentation of Treatment

Before the presentation of the visual-descriptor models, volunteers consisting of physical education teachers and classroom teachers of elementary age trainable mentally impaired students were chosen from those who had been assisting in working on the development and implementation of the I CAN curriculum from Clinton, Eaton, and Ingham Counties, Michigan. Ten teachers were randomly assigned to one of three treatment groups, so that each group had five physical education teachers and five classroom teachers. Group I received the short film visual-descriptor presentation. Group II received the film loop visual-descriptor presentation. Group III received the

long sequential training visual-descriptor presentation. Each group received the same written materials at the beginning of the formal presentation.

Group I received the short film visual-descriptor model. This consisted of viewing one short film of a specific fundamental locomotor skill three times; the first viewing at a normal speed followed by two slow motion presentations of 12 frames per second. After viewing all of the eight short films in the above manner, the evaluation film was shown twice; once at normal speed of 24 frames per second and finally at 12 frames per second.

Group II received the film loop visual-descriptor model. This consisted of viewing one film loop of a specific fundamental locomotor skill three times; the first viewing at a normal speed followed by two slow motion presentations of the skill at 12 frames per second.

Group III received the long sequential training visual-descriptor model. This involved viewing the entire film consisting of all eight selected fundamental locomotor skills three times; once at normal film speed followed by two presentations at a slow motion speed of 12 frames per second. The evaluation film was presented in the manner described in Group I.

There were two basic differences between the three different visual-descriptor model presentations or treatments. One, there was a difference in duration of viewing a given skill. Group I viewed the short film once in slow motion, paused 1.5 minutes while the film was being rewound, viewed the short film a second time in slow motion,

paused another 1.5 minutes while the film was being rewound, and finally viewed the film for the third time at normal film speed. Group II viewed the film loop presentation. This consisted of viewing the specific locomotor skill twice at slow motion and once at normal film speed without a pause between repeated viewing. One point five minutes was allowed to change film loops. Group III viewed the entire eight fundamental locomotor long sequential training visual-descriptor in slow motion, paused 5 minutes while the film was being rewound, viewed the long sequential training film a second time in slow motion, paused another 5 minutes while the film was being rewound, and finally viewed the film for the third time at normal film speed. In summary, Group I had 35 minutes of nonviewing time to look at the written materials while the film was being rewound or changed. Group II had 12 minutes of nonviewing time while film loops were being changed. Group III had 10 minutes of nonviewing time while the film was being rewound. Two, the three groups received the same amount of viewing time per skill, but with different schedules of viewing. Groups I and II viewed each skill three times before proceeding to the next skill. Group III viewed all eight skills without repeating or viewing the same skills again until after the entire film had been presented. Thus, the intensity of examining one skill was not available to the teachers.

The same evaluation format was used for each group. This process consisted of: allowing a short 10 minute break after the visual-descriptor model presentation; reviewing the evaluation process (Appendix A) with the teachers; allowing the individuals to

look over the evaluation form for one minute before viewing the specific skill; viewing the specific evaluation film clip at 12 frames per second, pausing 1.5 minutes for the teachers to circle the appropriate responses, viewing the same evaluation film clip at normal film speed of 24 frames per second, pausing one minute for the teachers to re-check their responses before proceeding to the next skill to be evaluated.

One of the original intentions of the viewing exercises was to provide enough training to allow teachers to score 80 percent correct responses for each selected fundamental locomotor skill. Unfortunately, this goal could not be attained, because 26 out of the 30 volunteers could spend only two consecutive evenings away from their obligations. Thus, one repeat of the visual-descriptor model presentation was possible after the initial presentation. Generalizations and conclusions are limited to the two presentations of the visual-descriptor models per group.

Treatment of the Data

Design

The design of the study was basically a three-group design consisting of three experimental groups each receiving a treatment and a posttest measure. Campbell and Stanley (1963) described this prototype as "Design 6," the Posttest Only Control Group Design. This design is used in behavioral experiments where new subject matter is to be presented and it is felt that pretests would prejudice the treatment and consequently the posttest results of the entire study.

Research in curriculum development and in improving teacher training technique has as its purpose the evolution of new information. It was concluded that employing a pretest would prevent an accurate assessment of the visual-descriptor model's effect on teacher training, as well as bias the subjects' receptiveness to the materials in this study. To maximize the results of this study, random assignment of volunteers, both physical education teachers and classroom teachers of the TMI, was made so that each of the three treatment groups contained ten teachers, five physical education teachers and five classroom teachers. This procedure satisfied "Design 6" requirement of randomization of subjects within treatment groups.

Statistical Significance

Statistical significance indicates that obtained differences in socres could have occurred by chance. To assure meaningful results as to the possible statistical significance attributable to this experiment, the .05 level of significance was chosen. The .05 level provides more detectable differences to be observed than the .01 level and does not increase the risk of committing a Type I error to the extent that a larger level of significance, i.e., .10, would with the number of subjects involved in this study.

Statistical Procedures

The statistical procedures to be used in this study are both descriptive and inferential. They are designed to answer the following research questions.

Research Question I.--Are there significant differences between the visual-descriptor models (film loop, short training film, and long sequential training film) when used to enhance the locomotor skill assessment abilities of teachers who work with elementary school age trainable mentally impaired students as measured by the test of correctness responses evaluation procedure?

A three-way ANOVA with one factor repeated measure procedure was used to test for significant differences between the treatment groups. Both percent correct responses and deviation score responses were analyzed as part of the test of correctness responses evaluation procedure.

Research Question II.--Do the tests of correctness responses within each fundamental locomotor skill vary with the treatment and/or the composition of the teachers within the treatment group?

Descriptive statistics including means and standard deviations were computed for each fundamental locomotor skill by treatment group and teacher type (physical education teacher and classroom teacher). A two-way ANOVA procedure was used to analyze the significant effects attributed to specific fundamental locomotor skills by teacher type and/or treatment group. When applicable, the Tukey method of post hoc comparisons specified the location of the differences among the three treatment groups and teacher types within each treatment group. Both percent correct responses and deviations score responses were analyzed as part of the test of correctness responses evaluation procedure.

Research Question III.--To what extent can teachers respond correctly to specific focal points for each selected fundamental locomotor skill as measured by the test of correctness response evaluation procedure?

Descriptive statistics which analyze the frequency of responses for a given focal point were employed. Percentage responses attributed to each treatment group was recorded by total group score responses and teacher type score responses. The criteria of 80 percent correct indicated mastery of a given focal point.

CHAPTER IV

RESULTS AND DISCUSSION

It was the purpose of this investigation to: (1) produce visual-descriptor models (training films) which illustrate selected fundamental locomotor skills based on criteria of the I CAN curriculum developed for elementary school age trainable mentally impaired students; and (2) to determine which of the visual-descriptor models enhance the motor skill observation abilities of teachers of elementary school age trainable mentally impaired students. The results of descriptive and inferential statistical procedures as they applied to each of the following questions will be reported, discussed, and summarized under each question.

Question I

Are there significant differences between the visual-descriptor models when used to enhance the locomotor skill assessment abilities of teachers who work with elementary school age trainable mentally impaired students as measured by the test of correctness responses evaluation procedure.

A three-way ANOVA with one factor (skill) repeated procedure was used to determine the influence of the visual-descriptor models when used to enhance the locomotor skill assessment abilities of

teachers who work with elementary school age trainable mentally impaired students. Analyses were designed to determine if a significant difference existed between treatments (visual-descriptor models), fundamental locomotor skills, and teacher type (physical educator or classroom teacher). A summary of the results is presented in Tables 4.1 and 4.2.

The results of testing for significant differences demonstrated treatment, skill and treatment by skill interaction effects for the first visual-descriptor presentation (Test I) percent correct responses. Significant differences also were found for treatment and skill effects for the first visual-descriptor presentation (Test I) deviation score responses. These values were all significant at the .05 level (d.f. 24 and 168).

The results of testing for significant differences demonstrated treatment, skill and teacher effect for the second visual-descriptor presentation (Test II) percent correct responses. The same results were found to be true for the second visual-descriptor presentation (Test II) deviation score responses. Test II values for both percent correct responses and deviation score responses were significant at the .05 level (d.f. 24 and 168).

In summary, data obtained by the three-way ANOVA with one factor (skill) repeated procedure found significant differences between the visual-descriptor models for percent correct responses and deviation score responses after both visual-descriptor presentations. There also was a significant effect due to fundamental locomotor skills used in the visual-descriptor models for percent

correct responses and deviation scores after both visual-descriptor presentations. Only in results from the first visual-descriptor presentation (Test I) pertaining to percent correct responses was a treatment by skill interaction response found to be significant. Teacher type effects were found to be significant after the second visual-descriptor presentation for both percent correct responses and deviation score responses. The results of testing for significant differences on the test of correctness responses (discussed under Question II) specified and explained the visual-descriptor model differences, individual locomotor skill differences and teacher type differences.

Descriptive statistics including means and standard deviation were obtained for percent correct responses and deviation score responses on treatment, teacher-type, and locomotor skills. The necessity of this information was to examine the nature of the treatment by skill interaction effect found after the first visual-descriptor presentation (Test I) percent correct responses. The interaction of treatment by interaction may be observed from Table 4.3. These data indicate the close interrelationship found for Treatment I (short film) and Treatment II (film loop) presentations.

Question II

Do the tests of correctness responses within each fundamental locomotor skill vary with the treatment and/or the composition of teachers within the treatment group?

Table 4.1

Three-way ANOVA Tables for Test of Correctness Responses--Percent Correct Responses and Deviation Score Responses, Test I

PERCENT CORRECT RESPONSES

TEST I

Source	degrees freedom	means squared	F-ratio	F-value= α .05
Teacher	1	189.0375	.7130	4.26
Treatment	2	6824.5042	25.7380	* 3.40
Teacher by Treatment Interaction	2	381.0875	1.4370	3.40
Subject Nested Within Teacher by Treatment Interaction	24	265.1540	--	--
Skill	7	819.3661	3.063	* < 2.09
Teacher by Skill Interaction	7	183.7804	.687	< 2.09
Treatment by Skill Interaction	14	598.4950	2.237	*< 1.83
Teacher by Treatment by Skill Interaction	14	376.9732	1.297	< 1.83/> 1.67
Subject by Skill Nested Within Teacher by Treatment Interaction	168	267.5018	--	--

DEVIATION SCORE RESPONSES

TEST I

Source	degrees freedom	means squared	F-ratio	F-value= α .05
Teacher	1	487.3500	2.6430	4.26
Treatment	2	2394.0290	12.9830	* 3.40
Teacher by Treatment Interaction	2	179.2625	.9720	3.40
Subject Nested Within Teacher by Treatment Interaction	24	184.3920	--	--
Skill	7	1597.5500	9.6998	* 2.09
Teacher by Skill Interaction	7	75.8167	.4470	2.09
Treatment by Skill Interaction	14	251.2480	1.5260	< 1.83/> 1.67
Teacher by Treatment by Skill Interaction	14	139.2720	.8460	< 1.83/> 1.67
Subject by Skill Nested Within Teacher by Treatment Interaction	168	164.6980	--	--

* Indicates Statistical Significance

Table 4.2

Three-way ANOVA Tables for Test of Correctness Responses--Percent Correct Responses and Deviation Score Responses, Test II

PERCENT CORRECT RESPONSES

TEST II

Source	degrees freedom	means squared	F-ratio	F-value= α .05
Teacher	1	3382.5042	11.6036	* 4.26
Treatment	2	2082.2720	7.1432	* 3.40
Teacher by Treatment Interaction	2	60.1542	.2064	3.40
Subject Nested Within Teacher by Treatment Interaction	24	291.5042	--	--
Skill	7	1181.8613	5.9270	*<2.09
Teacher by Skill Interaction	7	55.4566	.2781	<2.09
Treatment by Skill Interaction	14	241.4327	1.2108	<1.83/ >1.67
Teacher by Treatment by Skill Interaction	14	106.2208	.5327	<1.83/ >1.67
Subject by Skill Nested Within Teacher by Treatment Interaction	168	199.4017	--	--

DEVIATION SCORE RESPONSES

TEST II

Source	degrees freedom	means squared	F-ratio	F-value= α .05
Teacher	1	1738.8167	10.2188	* 4.26
Treatment	2	933.0542	5.4835	* 3.40
Teacher by Treatment Interaction	2	146.3042	.8600	3.40
Subject Nested Within Teacher by Treatment Interaction	24	170.1583	--	--
Skill	7	500.0929	6.4970	* 2.09
Teacher by Skill Interaction	7	31.3310	.4070	2.09
Treatment by Skill Interaction	14	113.0016	1.4680	<1.83/ >1.67
Teacher by Treatment by Skill Interaction	14	86.7756	1.1270	<1.83/ >1.67
Subject by Skill Nested Within Teacher by Treatment Interaction	168	76.9720	--	--

* Indicates Statistical Significance

A two-way ANOVA procedure was used to test the significance of the differences of the three treatment groups and the teacher type composition within each group for each of the eight fundamental locomotor skills. The use of this procedure also enabled further analyses of the significant effects found from the results in Question I. The most powerful method for post hoc pairwise comparisons with equal cell size, the T-method or Tukey method, was employed to isolate which treatment methods and teacher type caused the significant differences as indicated from both the three-way ANOVA procedure employed in Question I and the two-way ANOVA employed in Question II. The results are summarized in Tables 4.3 and 4.4.

Examination of treatment effect results found that Treatment I (short film) and Treatment II (film loop) were significantly different from Treatment III (long sequential training film) after one visual-descriptor presentation. Treatment I (short film) and Treatment II (film loop) were superior to Treatment III (long sequential training film) in eliciting correct responses as measured with the test of correctness evaluation procedure for percent correct responses on the vertical jump, gallop, and hop skills. The same results were found for deviation score responses with one exception, the hop.

Examination of treatment effect results after a second visual-descriptor presentation found that Treatment I (short film) and Treatment II (film loop) were still significantly superior to Treatment III (long sequential training film) as measured by the test of correctness evaluation procedure for the gallop (refer to Tables 4.3 and 4.4). Unlike results found after the first visual-descriptor

Table 4.3

Summary of Significant Effects for Treatment

Test I Results percent correct responses/deviation score responses

Treatment \ Skill	run	leap	horizontal jump	vertical jump	gallop	slide	hop	skip
I (short film)	X			X X	X X		X	
II (film loop)	X			X	X X		X	
III (long sequential training film)								

Test II Results percent correct responses/deviation score responses

Treatment \ Skill	run	leap	horizontal jump	vertical jump	gallop	slide	hop	skip
I (short film)				X	X X			
II (film loop)	X X				X			
III (long sequential training film)								

Note: Significant differences are indicated by X for visual-descriptor models (Treatments).

Table 4.4

Summary of Significant Effects For Treatment By Teacher Type

Test I Results percent correct responses/deviation score responses

Treatment	run	leap	horizontal jump	vertical jump	gallop	slide	hop	skip
I (short film)					X X			
II (film loop)					X X			
III (long sequential training film)								

Test II Results percent correct responses/deviation score responses

Treatment	run	leap	horizontal jump	vertical jump	gallop	slide	hop	skip
I (short film)		X X	X	X				
II (film loop)		X X	X	X				
III (long sequential training film)								

Note: Significant differences are indicated by X for physical educator responses. There were no significant differences which favored classroom teachers.

model presentation, significant differences were found between Treatment I (short film) and Treatment II (film loop) for percent correct responses and deviation score responses. Treatment I (short film) was superior to Treatment II (film loop) for the run on both measures derived from the Test of Correctness process. Treatment II (film loop) was superior to Treatment I (short films) for eliciting responses closest to the correct answer as indicated from the deviation response scores of the test of correctness evaluation process for the vertical jump.

Descriptive statistics including means and standard deviations were obtained for each treatment by skill. The results after one visual-descriptor presentation (Test I) are presented in Tables 4.5 and 4.6 with the row designation "combined." The average values for percent correct responses and deviation score responses were quite similar for both Treatment I (short film) and Treatment II (film loop). Treatment III (long sequential training film) response averages were notable below the other treatment groups with the exception of percent correct responses for the skip and deviation score responses for the run. In these two instances, Treatment III (long sequential training film) averages were the same as or slightly better than the other treatments.

After a second visual-descriptor presentation, the average values for percent correct responses and deviation score responses were again quite similar for Treatment I (short film) and Treatment II (film loop) (refer to Tables 4.6 and 4.7). Treatment III (long sequential training film) response averages were still below the other

Table 4.5

Percent Correct Responses For Teacher Type
(Classroom & Physical Education)
Test I

MEANS & STANDARD DEVIATION

		RUN		LEAP		HORIZONTAL JUMP		VERTICAL JUMP		GALLOP		SLIDE		HOP		SKIP	
		M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Treatment 1 (Short Film)	Cl.	71.2	40.55	72.8	40.31	84.0	5.48	74.6	14.08	80.2	9.20	72.6	28.57	90.4	5.37	73.2	14.70
	P.E.	91.2	4.91	85.4	5.80	80.0	7.07	72.8	9.62	86.8	4.92	80.2	31.43	83	11.18	83.2	11.67
	Combined	81.2	22.75	79.1	23.06	82.0	6.28	73.7	11.85	83.5	14.11	76.4	30.00	86.7	8.28	78.2	13.19
Treatment 2 (Film Loop)	Cl.	80.2	12.04	75.4	12.50	74.0	8.94	68.8	21.29	82.4	9.83	82.8	7.12	70.2	18.86	83.2	11.61
	P.E.	86.8	4.91	77.6	5.80	70.0	26.92	74.2	8.47	89.0	7.78	75.2	8.84	87.6	12.52	80.0	13.74
	Combined	83.5	8.48	76.5	9.15	72.0	17.93	71.5	14.88	85.7	8.80	79.0	7.98	78.9	15.68	81.6	12.68
Treatment 3 (Long Sequential Training Film)	Cl.	57.8	31.97	77.8	16.15	74.0	8.94	52.8	15.34	51.4	10.28	45.4	16.92	80.4	11.24	79.8	7.16
	P.E.	39.8	18.77	72.8	10.40	66.0	8.94	42.8	19.45	64.8	9.20	65.2	29.92	60.4	18.61	83.2	11.68
	Combined	48.8	25.37	75.3	13.28	70.0	8.94	47.8	17.39	58.1	9.74	55.3	23.42	70.4	14.92	81.5	9.42

Table 4.6

Deviation Score Responses For Teacher Type
(Classrrom & Physical Education)
Test I

MEANS & STANDARD DEVIATION

		RUN		LEAP		HORIZONTAL JUMP		VERTICAL JUMP		GALLOP		SLIDE		HOP		SKIP	
		M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Treatment 1 (Short Film)	Cl.	22.2	39.68	23.4	38.70	4.8	2.17	24.4	16.75	15.6	9.89	16.6	15.71	8.8	4.92	12.4	6.66
	P.E.	5	3.08	7.4	2.19	3.0	1.41	24.0	9.21	8.4	4.98	10.6	17.26	12.0	12.06	7.8	5.34
	Combined	13.6	21.38	15.4	20.44	3.9	1.79	24.2	12.98	12.0	7.43	13.6	16.48	10.4	8.49	10.1	5.34
Treatment 2 (Film Loop)	Cl.	8	5.5	13.6	7.23	5.2	1.79	36.2	25.68	15.0	6.52	10.8	5.02	18.2	13.94	7.8	5.34
	P.E.	6	3.08	12.4	4.66	4.4	3.29	24.8	10.87	7.4	6.19	14.4	6.84	9.6	9.39	9.2	6.22
	Combined	7.0	4.29	13.0	5.95	4.8	2.54	30.5	18.28	11.2	6.35	12.6	5.93	13.9	11.66	8.5	5.78
Treatment 3 (Long Sequential Training Film)	Cl.	2.75	2.01	16.8	12.89	5	2.12	44.8	12.93	32.8	4.55	28.2	10.23	17.0	5.48	12.4	6.66
	P.E.	5.2	3.53	15.6	4.67	6	2.45	50.6	20.60	25.4	6.98	16.4	13.20	26.2	10.98	7.8	5.34
	Combined	3.9	2.77	16.2	8.78	5.5	2.28	47.7	16.76	29.1	5.77	22.3	11.71	21.6	8.23	10.1	5.99

Table 4.7

Percent Correct Responses For Teacher Type
(Classroom & Physical Education)
Test II

MEANS & STANDARD DEVIATION

		RUN		LEAP		HORIZONTAL JUMP		VERTICAL JUMP		GALLOP		SLIDE		HOP		SKIP	
		M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Treatment 1 (Short Film)	Cl.	67.0	7.78	70.2	14.34	80.0	15.81	67.2	14.91	75.8	9.20	57.2	41.48	65.4	13.67	79.8	7.16
	P.E.	71.2	12.19	82.8	14.17	82.0	7.07	75.8	4.38	81.6	17.52	77.6	18.61	75.2	23.25	80.0	13.75
	Combined	69.1	9.99	76.5	14.26	81.0	11.44	71.5	9.65	78.7	13.36	67.4	30.04	70.3	18.46	79.9	10.45
Treatment 2 (Film Loop)	Cl.	73.6	12.54	70.2	14.34	78	10.95	58.6	22.19	71.4	9.84	77.6	18.61	82.8	14.17	86.6	13.87
	P.E.	80.2	4.92	85.4	5.81	86	8.94	81.6	13.08	80.2	12.04	80.4	17.37	80.2	14.17	89.8	9.31
	Combined	76.9	8.73	77.8	10.07	82.0	9.95	70.1	17.64	75.8	10.95	79.0	17.99	81.5	14.17	88.2	11.59
Treatment 3 (Long Sequential Training Film)	Cl.	53.4	20.18	67.6	11.13	70.0	10.0	55.6	5.86	57.8	20.15	52.8	25.24	60.2	16.53	83.0	0
	P.E.	62.6	14.76	72.6	5.37	80.0	0	60.0	19.15	62.4	18.80	87.6	12,50	67.8	14.34	93.2	9.31
	Combined	58.0	17.47	70.1	8.25	75.0	5.0	57.8	12.51	60.1	19.47	70.2	18.87	64.0	15.44	88.1	4.66

treatment groups. The notable exceptions were found for: the skip for both percent correct responses and deviation score responses; the slide for percent correct responses; and, the horizontal jump for deviation score responses. In these three instances, Treatment III (long sequential training film) averages are the same as or slightly better than the other treatments (refer to Tables 4.7 and 4.8).

In summary of treatment, by skill data, two general trends were noted (refer to Table 4.3). The first trend indicated that Treatment I (short film) and Treatment II (film loop) visual-descriptor models were better in eliciting correct responses (percent scores) and responses closest to the correct response on a number of skills when compared to Treatment III (long sequential training film). This finding suggests that an intensified viewing period with three back to back repetitions of a given skill were more effective in producing more correct responses than viewing all eight selected locomotor skills once before repeating the viewing process. The work of Montgomery (1967) and Higgins (1970) indicates that intensified viewing employing slow motion repetitions allows individuals to direct their attention to specific factors viewed on the screen. The second trend indicated the period of nonviewing may have influenced the responses. Both Treatment I (short film) and Treatment II (film loop) permitted individuals to analyze focal point materials between skill presentation. Thus, the nonviewing time possibly contributed to the better responses observed in Treatment I (short film) and Treatment II (film loop). The literature reviewed indicated no evidence as to nonviewing time between film presentations as a critical factor in assessing desired responses.

Table 4.8

Deviation Score Responses For Teacher Type
(Classroom & Physical Education)
Test II

MEANS & STANDARD DEVIATION

		RUN		LEAP		HORIZONTAL JUMP		VERTICAL JUMP		GALLOP		SLIDE		HOP		SKIP	
		M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Treatment 1 (Short Film)	Cl.	17.4	5.32	17.8	4.55	12.8	9.71	13.8	5.72	20	6.36	13.4	20.97	19.0	8.37	9.4	3.13
	P.E.	17.2	12.11	8.0	4.95	12.8	7.70	10.6	4.98	14.6	12.84	13.2	9.20	15.8	14.94	8.2	6.22
	Combined	17.3	8.72	12.9	4.75	12.8	8.70	12.2	5.35	17.3	9.60	13.3	15.09	17.4	11.65	9.3	4.68
Treatment 2 (Film Loop)	Cl.	12.0	5.56	17.8	10.43	15.2	6.57	22.8	15.93	18.0	8.09	12.4	10.74	10.8	8.23	6.2	6.33
	P.E.	8.8	3.21	10.2	6.94	5.6	3.58	8.4	5.94	14.6	10.21	12.4	8.56	8.8	6.06	4.8	3.58
	Combined	10.4	4.38	14.0	8.69	10.4	5.07	15.6	10.94	16.3	9.15	12.4	9.65	9.8	7.14	5.5	4.95
Treatment 3 (Long Sequential Training Film)	Cl.	28.8	17.63	17.8	12.13	17.6	8.76	24.6	10.55	36.6	13.52	24.4	12.62	20.0	8.20	11.0	6.70
	P.E.	17.4	7.81	14.4	4.73	8	0	24.4	12.58	22.2	8.7	5.6	5.50	20.2	13.35	3.2	4.38
	Combined	23.1	12.12	16.1	8.43	12.8	4.38	24.5	11.57	29.4	11.11	15.0	9.06	20.1	10.77	7.1	5.54

Even though significant differences were found for different visual-descriptor models, Treatment II (film loop) appeared to be of greater value. A film loop is easier to use if repeated viewings are needed and costs about the same as a short film to produce. Film loops also are of more practical value if small group or self-directed instruction is desired because of the advances in portable, small screen projectors and viewers (Athletic Institute, 1974).

Examination of teacher type effect results indicated that physical educators were significantly different from classroom teachers after one visual-descriptor model presentation (refer to Table 4.4). The significant differences favored the physical educator for the gallop in both percent correct responses and deviation score responses. After two visual-descriptor presentations the significant differences between the two teacher types became more apparent. Physical educators were superior to classroom teachers as measured by the test of correctness evaluation procedure for the leap, horizontal jump, and vertical jump.

Inspection of the combined percent correct responses and deviation score responses mean scores after one visual-descriptor model presentation suggested that physical educators are more capable of observing and assessing locomotor skills than classroom teachers in five out of eight selected skills; run, leap, gallop, slide, and skip (refer to Table 4.9). After two visual-descriptor model presentations, the physical educators combined mean percent correct responses and deviation score responses were higher than the classroom

Table 4.9

Total Combined Percent Correct Responses For Teacher Type
Means and Standard Deviations of Short Film, Film Loop, and Long Sequential Training Film

	TEST I				TEST II			
	Physical Educator		Classroom Teacher		Physical Educator		Classroom Teacher	
Skill	Means	Standard Deviation	Means	Standard Deviation	Means	Standard Deviation	Means	Standard Deviation
Run	72.60	9.53	69.73	28.19	71.33	10.60	64.66	13.50
Leap	78.60	7.34	75.33	21.07	80.27	8.45	69.33	13.26
Horizontal Jump	72.00	12.79	77.33	7.78	82.67	5.78	76.00	12.59
Vertical Jump	63.27	12.51	65.40	16.90	72.47	12.20	60.47	14.32
Gallop	80.20	7.30	71.33	9.77	74.33	15.77	68.33	13.07
Slide	73.53	23.40	66.93	17.53	81.87	16.04	73.53	24.58
Hop	77.00	14.43	80.33	11.82	74.40	17.24	68.47	14.18
Skip	82.13	12.36	78.73	11.17	87.66	10.79	83.13	7.01

Total Combined Deviation Score Responses For Teacher Type
Means and Standard Deviations of Short Film, Film Loop, and Long Sequential Training Film

	TEST I				TEST II			
	Physical Educator		Classroom Teacher		Physical Educator		Classroom Teacher	
Skill	Means	Standard Deviation	Means	Standard Deviation	Means	Standard Deviation	Means	Standard Deviation
Run	14.07	5.28	17.46	20.39	14.47	7.70	19.40	9.50
Leap	12.47	4.87	17.93	19.96	10.87	6.09	17.80	9.03
Horizontal Jump	14.46	8.04	13.00	4.38	8.80	3.75	15.20	8.56
Vertical Jump	33.13	13.56	35.46	20.34	14.47	7.83	20.40	10.73
Gallop	13.73	6.05	21.13	6.98	17.13	10.58	24.86	9.32
Slide	13.80	12.43	18.53	10.32	10.40	7.92	16.73	14.77
Hop	16.33	10.40	14.66	8.11	14.83	11.44	16.60	8.27
Skip	8.27	5.61	10.87	6.20	5.73	4.99	8.86	5.39

teachers mean scores on all eight selected locomotor skills (refer to Table 4.9).

Further examination of teacher type effect results to treatment methods indicated that after one visual-descriptor presentation, physical educators were statistically significantly superior to classroom teachers when Treatment I (short film) and Treatment II (film loops) were employed (refer to Table 4.4). After two visual-descriptor presentations, physical educators were statistically significantly superior to classroom teachers when Treatment I (short film) and Treatment II (film loops) were employed (refer to Table 4.4). In no instance was statistical superiority attributed to Treatment III (long sequential training film) for either teacher type.

Inspection of percent correct responses and deviation score responses mean scores also indicated that physical educators were generally superior after one visual-descriptor presentation to classroom teachers for Treatment I (short film) and Treatment II (film loop) (refer to Tables 4.5 and 4.6). Physical educator mean scores were notable inferior to classroom teachers for Treatment III (long sequential training film) with only four exceptions. These exceptions for percent correct responses were the gallop and skip (refer to Table 4.5) and for deviation score responses were the leap, gallop, slide and skip (refer to Table 4.6).

Inspection of mean scores indicated physical educators were able to elicit more percent correct responses by observing Treatment II (film loop) than the other visual-descriptor models for percent correct responses after a second presentation. The only exceptions

were the gallop for Treatment I (short films) and the slide and skip for Treatment III (long sequential training film). In all three exceptions physical educator scores were better than the classroom teacher scores (refer to Table 4.7). Physical educators were also able to elicit average mean score responses closer to the correct answers (deviation score responses) by observing Treatment II (film loop) than the other visual-descriptor models after a second presentation. The exceptions were the leap for Treatment I (short film) and the slide and skip for Treatment III (long sequential training film) (refer to Table 4.8). These three exceptions favored physical educators.

In summary of teacher type effects by treatment data as presented in Table 4.4, two general trends were observed. The first trend indicated that physical educators were better in eliciting correct responses or responses closest to the correct response than classroom teachers. This finding suggests that constant exposure to physical education activities on a daily or regular basis and previous training acquainted physical educators with the mechanics of locomotor skills.

The second trend indicated that physical educators were better able to use Treatment II (film loop) with generally better success as found with average scores than the other two visual-descriptor models. Classroom teachers varied in their responses to the visual-descriptor models. From these results however, film loop presentations are still suggested as the best visual-descriptor model (refer to remark pertaining to treatment effect page 93).

Question III

To what extent can teachers respond correctly to specific focal points for each selected fundamental locomotor skill as measured by the Test of Correctness Responses evaluation process.

Descriptive statistics, which analyzed the frequency of responses for a description of each focal point were employed. Tables C.1 to C.8 found in Appendix C presented the following data: (a) a description of each focal point for each of the eight selected locomotor skills; (b) the responses for each of the two visual-descriptor presentations; and (c) the teacher type responses for each visual-descriptor model for each of the two presentations. The criteria of 80 percent correct indicated mastery of a given focal point.

Inspection of the data indicated that when individual focal points are considered Treatment I (short film) and Treatment II (film loop) models are the most effective in eliciting more correct responses that Treatment III (long sequential training film). Furthermore, teacher type results favored the performance of physical educators in both the number of correct responses and higher average scores with only a few exceptions.

The pertinent information for each focal point that pertained to the criteria for each of the eight selected locomotor skills follows:

(1) Run (refer to Table C.1, Appendix C).

Focal point responses met the criteria of acceptance for less than half of the possible responses. Those focal points

in which the criteria were met pertained to arm position and knee and leg positions or actions. There was much variance associated with the other focal points. Treatment I (short film) appeared to elicit the most frequent number of correct responses when compared with the other two treatments. Physical educators and classroom teachers respond to the same critical focal points, however physical educators scores are generally higher than classroom teachers. Physical educators also tend to view all focal points with more attention as evidenced by higher scores than classroom teachers. After two visual-descriptor presentations, physical educators surpassed classroom teachers in meeting criteria and higher scores for all three treatments.

(2) Leap (refer to Table C.2, Appendix C).

Focal point responses met the criteria for more than half of the possible responses. Those focal points in which the criteria were met pertained to leg movement and trunk lean. The focal points had basically static positions with little motion, i.e., both feet begin from a stationary position as a critical factor. Treatment I (short film) and Treatment II (film loop) appear to be elicit the most frequent number of correct responses. Physical educators respond to leg movement and trunk lean focal points. The classroom teachers respond to leg movement focal points as critical references. Physical educators surpassed classroom teachers in meeting criteria most often and with generally higher scores per focal point.

(3) Horizontal jump (refer to Table C.3, Appendix C).

The focal point responses met the criteria for about 60 percent to 80 percent of the possible responses. Those focal points in which criteria were met pertained to arm movement, leg position, knee and foot position. The focal points which presented difficulty all pertained to body angles, i.e., forward lean of 45° (±5°) of upper body at hips and the simultaneous movement of two or more body parts, i.e., simultaneous vigorous forward thrust of arms as feet make contact with the surface. Treatment I (short film) appears to elicit the most frequent number of correct responses when compared with the other two treatments. Physical educators attained higher average scores on all treatment models after two presentations than classroom teachers, however, both teacher types displayed little difference in their ability to respond to individual focal points.

(4) Vertical jump (refer to Table C.4, Appendix C).

The focal point responses met the criteria of acceptance less than twenty-five percent of the time. Those focal points in which the criteria were met pertained to fixed points of reference of the body to the surface, i.e., feet parallel and next to one another in a stationary position or landing with a toe to heel landing within a 6 foot area. The period of nonsupport focal points were generally easy to identify when noncomplex aspects of arm movement and trunk extension were to be identified. Physical educators generally

surpassed classroom teachers with higher scores on the individual focal points. Treatment I (short film) appears to elicit the most frequent number of focal points when compared to the other two treatments.

(5) Gallop (refer to Table C.5, Appendix C).

Focal point responses met the criteria of acceptance for less than half of the possible responses. Those focal points in which the criteria were met pertained to simple noncomplex movements of the leg movements. The focal points which caused teachers difficulty in judgment pertained to angles of leg flexion or leg extension. Arm position focal points were also difficult to assess. Treatment I (short film) and Treatment II (film loop) were equally successful in eliciting the most frequent number of correct responses. Physical educators and classroom teachers were able to meet the criteria for approximately the same number of focal points. However physical educators attained higher average scores than classroom teachers. Classroom teachers also displayed more variance in their responses than physical educators.

(6) Slide (refer to Table C.6, Appendix C).

Fifty percent of the focal point met the criteria of acceptance. The focal points that were used as critical reference factors were uncomplicated simple movements pertaining to the arm as well as specific references to the surface. Treatment I (short film) and Treatment II (film loop) were more effective in eliciting more frequent correct

responses than Treatment III (long sequential training film). There was no evidence to suggest that physical educators responded correctly to more focal points or attained higher average scores than classroom teachers.

(7) Hop (refer to Table C.7, Appendix C).

Focal point responses met the criteria of acceptance for less than half of the possible responses. Those focal points which were used as critical references were generally attributed to arm position, leg position responses, and numerical counts of subject success to a surface reference, i.e., line on floor. Treatment II (film loops) was the most consistent visual-descriptor model for eliciting correct responses from physical educators. Classroom teacher responses varied considerably for all three treatments. Physical educators tended to surpass classroom teachers in both number of correct responses and higher averages.

(8) Skip (refer to Table C.8, Appendix C).

Five out of six focal points met the criteria of acceptance. Those focal points meeting the criteria pertained to leg movement and weight transfer. The focal point not meeting the criteria pertained to arm movement. Treatment II (film loop) was most consistent in eliciting frequent responses for both teacher types. There was no indication that physical educators outperformed classroom teachers on frequency of correct responses or higher score averages for any of the three treatments.

Table 4.10 presents a summary of numbers of focal points that met the criteria for the identifiable critical factors. Examination of these results indicated that there are specific critical reference factors which are important to the teachers' ability to analyze locomotor skills. These factors pertain to specific anatomical reference points found with the description of each skill, surface reference points, i.e., a line on the floor, or a simple movement involving one or two body segments. The importance of these findings suggests that visual-descriptor models of locomotor skills must be specific to distinct body segment references. A background which enables an observer to judge a motion with a limited number of specific reference lines or target areas was also indicated. The complexity of a specific focal point effects the observers' ability to correctly analyze motion. Therefore, simple movements involving a maximum of two body segments must be considered.

The summary of focal point results (Table 4.10) indicated that Treatment I (short film) and Treatment II (film loop) were equally effective visual-descriptor models when an average frequency of correct responses descriptive statistic was employed. With these visual-descriptor models there was some indication that Treatment I (short films) was more effective with locomotor skill which have definite phases, i.e., horizontal jump and vertical jump each have a preparatory phase, period of nonsupport phase, and landing phase. In this instance, the period needed for rewinding (nonviewing) would allow individuals more opportunity to review and organize their responses. Treatment II (film loop) results indicated that a short

Table 4.10

Summary of Recognizable Average Number of Focal Points and Critical Factors For Visual-Descriptor Model (Treatment) by Skill

Treatment		Run	Leap	Horizontal Jump	Vertical Jump	Gallop	Slide	Hop	Skip
Treatment I (short film)	Number	4.5	5.5	8.0	6.5	5.5	6.0	4.5	4.5
	Critical Factors	Arm Position. Knee/Leg/ Foot Position.	Simple Movement.	Arm Movement. Trunk Position. Knee/Leg Position. Foot Position.	Surface Reference. Simple Movement. Arm Movement. Trunk Movement.	Simple Movement. Leg Movement.	Simple Movement. Arm Movement. Surface Reference.	Leg Position. Surface Reference. Arm Position.	Leg Movement. Arm Movement. Surface Reference.
Treatment II (film loop)	Number	3.5	5.5	6.5	5.0	6.0	6.0	5.0	4.5
	Critical Factors	Arm Position. Knee/Leg/ Foot Position.	Simple Movement. Leg Movement.	Arm Movement. Trunk Position. Knee/Leg Position. Foot Position.	Surface Reference. Simple Movement. Arm Movement. Trunk Movement.	Simple Movement. Leg Movement. Arm Movement.	Simple Movement. Arm Movement. Surface Reference.	Leg Position. Arm Position. Surface Reference.	Leg Movement. Arm Movement. Surface Reference.
Treatment III (Long Sequential Training Film)	Number	3.0	5.0	6.0	1.5	4.5	4.0	2.0	4.5
	Critical Factors	Arm Position. Knee/Leg Position.	Simple Movement.	Arm Movement. Trunk Position. Knee/Leg Position Foot Position.	Surface Reference. Arm Movement.	Simple Movement. Leg Move. ment.	Surface Reference.	Surface Reference.	Leg Movement. Arm Movement. Surface Reference.

continuous film loop allowed teachers (primarily physical educators) to more readily recognize and evaluate the dynamic and more complex locomotor skills, i.e., gallop and hop after three complete viewing without the pause necessitated by rewinding the film. If in fact, the nonviewing time is critical, film loop presentations can easily be adapted to nonviewing time allowances, thus allowing both nonviewing time and repeated showings to be controlled for specific locomotor skills.

Physical educators surpassed classroom teachers on seven of eight fundamental skills pertaining to frequency of focal point responses. The one exception indicated that physical educators and classroom teachers responded equally. This data is supported by Hallstrom (1965), Workman (1968), and Vogel (1974) by the fact that locomotor skills were better observed by physical educators than classroom teachers. Thus, a number of factors indicate that classroom teachers need more time and experience in learning to correctly identify fundamental locomotor activities.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The purpose of this investigation was to: (1) produce visual-descriptor models (training films) which illustrate selected fundamental locomotor skills based on criteria of the I CAN curriculum developed for elementary school age trainable mentally impaired students; and (2) to determine which of the visual-descriptor models enhanced the motor skill observation abilities of teachers of elementary school age trainable mentally impaired students.

Before any teacher evaluation procedure could be started, the motor performances of fifty-four trainable mentally impaired and twenty general education students of elementary school age were analyzed and recorded on film. The film illustrated eight selected fundamental mature locomotor skills from the I CAN curriculum as well as progressions and/or deviations in the mature skills based on the literature and the evaluation and assessment of three expert observers of motor development. The assumption that locomotor skills of all subjects filmed in this study progressed in the same developmental sequence was made. Three visual-descriptor models were produced along with two evaluation films which were used to assess the observation and assessment abilities of the teachers who volunteered for this study.

Measures on a Test of Correctness Responses evaluation instrument were obtained from thirty teachers who were randomly assigned to one of three treatment groups so that each group consisted of five physical educators and five classroom teachers. The teachers were from a three-county area in Central Michigan, namely, Clinton, Eaton, and Ingham Counties. A "Posttest-Only Group Design" (Campbell and Stanley, 1963) was employed in this study. Data were secured from the teachers within each of three treatment groups. Treatment Group I received a series of eight short film presentations. Treatment Group II received a series of eight film loop presentations. Treatment Group III received all eight locomotor skills in a continuous, or long sequential training film. One presentation of the respective visual-descriptor model was given to the specified group on two consecutive days. At the conclusion of each presentation, a test of correctness response evaluation procedure was given. The results of this procedure provided two measures, namely, total correct responses calculated into a percent correct score and a measure of how close an individual teacher came to actually scoring a correct response calculated into a deviation response score.

A three-way ANOVA with one factor (skill) repeated procedure was employed to detect significant differences with Alpha set at the .05 level. Tables were constructed for each measure (percent correct responses and deviation score responses) of both tests. Means and standard deviations were also computed for each treatment by the two measures of correctness responses and teacher type.

When significant differences were found, a two-way ANOVA procedure was used for each individual locomotor skill to test for treatment and teacher effects. The T-method or Tukey method of pair-wise comparisons was used if results of the two-way ANOVA indicated that significance differences were present. This post hoc testing procedure isolated the specific variable which caused the significant differences to be observed in the three-way ANOVA with one factor repeated procedure and/or the two-way ANOVA procedure.

The results of the study suggested that there were significant differences in the visual-descriptor models on both tests as measured by the correctness of responses procedure. In addition to the treatment's main effect, Test I results indicated significant differences of skills on both percent correct responses and deviation score responses. There was a significant difference treatment by skill interaction effect for percent correct responses. Test II results yielded significant differences for teacher type and skill effects, as well as the indicated treatment effect.

In order to detect where the significant differences were, the two-way ANOVA procedure and Tukey method of post hoc pair-wise comparisons was employed. The results for Test I indicated: percent correct responses were significant for the run, vertical jump, gallop and hop locomotor skills for Treatment I (short films) and Treatment II (film loops) when compared with Treatment III (long sequential training film). Physical educators responded significantly better than classroom teachers to the galloping skill evaluation. Deviation score responses (closeness of answer to correct response) indicated

that significant differences were found for the vertical jump and gallop. Treatment I (short film) was more effective than Treatment II (film loop) and Treatment III (long sequential training film) for the vertical jump. Both Treatment I (short film) and Treatment II (film loop) were more effective than Treatment III (long sequential training film) for the gallop. Again, physical educators responded significantly better than classroom teachers to the procedures for evaluating the gallop.

The two-way ANOVA procedure and Tukey method of post hoc pair-wise comparisons was employed to isolate indicated significant differences for Test II. The results for Test II indicated: percent correct responses were significant for the run on Treatment II (film loops) and the gallop on Treatment I (short films) when comparisons were made between Treatment I (short films), Treatment II (film loops) and Treatment III (long sequential training film). Physical educators responded significantly better than classroom teachers on the leap and vertical jump skills evaluations. Deviation score responses (closeness of answer to correct response) indicated significant differences in favor of Treatment I (film loop) for the run, Treatment II (short films) for the vertical jump; and, Treatment I (short films) and Treatment II (film loops) for the gallop when comparisons were made between the three treatments. Physical educators responded significantly better than classroom teachers for the leap and horizontal skills evaluations. It should be noted that descriptive statistics, means and standard deviations indicated better average responses on all measures for Test II.

There was extreme variability on correct responses for specific focal points of each individual skill as measured by the frequency of correct responses. Standard deviations in responses also indicated great variability in teacher responses to treatment presentation on each of the two tests given.

Conclusions

Within the limitations of these data, the following conclusions were drawn:

Visual Descriptor Models

1. Short film and film loop visual-descriptor models are equally effective in enhancing locomotor skill assessment abilities of teachers.
2. The long sequential training film was never a significant visual-descriptor model in the development of locomotor assessment abilities of teachers.
3. The film loop visual-descriptor model was the easiest to administer of all three visual-descriptor models.

Teacher Type Effects

4. Physical educators are significantly superior to classroom teachers in assessing the gallop, leap, horizontal jump, and vertical jump.
5. Physical educators combined average scores after one visual-descriptor presentation were higher on eleven of sixteen possible test of correctness measures.

6. Physical educators combined average scores after two visual-descriptor presentations were higher on all sixteen possible Test of Correctness measures.
7. Physical educators surpassed classroom teachers in assessing individual skill focal points on seven out of eight selected fundamental locomotor skills. Both physical educators and classroom teachers were equally effective in assessing focal points pertaining to the slide.
8. Physical educators scores were most consistent across all skills when the film loop visual-descriptor model was employed. Classroom teachers scores varied across all skills for all treatments.

Training Effects

9. Intensified viewing of a locomotor skill produces higher scores when a normal film speed of 24 frames per second precedes two slow motion viewing of 12 frames per second than when the same procedure is employed for all eight locomotor skills.
10. Short nonviewing periods between each skill presentation tends to allow teachers a time for review of pertinent focal points.

Critical Factors in Viewing Movement

11. Teachers view locomotor skills by identifying specific anatomical reference points. The anatomical reference points vary with each skill.

12. Teachers view locomotor skills by relating an individual performer to specific background points, i.e., line on a floor or wall.
13. Teachers are able to view simple movements involving one or two body segments better than complex movements involving more than two body segments.

Recommendations

The following suggestions are recommended for future research concerned with the development and evaluation of visual-descriptor models for the assessment of fundamental locomotor skills:

1. Techniques involving the film loop presentation should be pursued. This visual-descriptor model appears to have the greatest versatility for both large group and self-directed training potentials.
2. There is a need to more thoroughly analyze visual-descriptors models with teachers over a longer training period with fewer skills. This suggestion is made because the analysis of locomotor skills is a complex process which cannot be learned in two, four or five hour sessions.
3. Results of Research Question III indicated that there are great differences in the teacher responses to individual focal points for each locomotor skill. Such information indicates that each skill should be examined with critical factors clearly defined. Those focal points which were difficult to assess should be re-examined to see if they are too complex or not necessary in the descriptions of the

specific locomotor skills which enhance assessment abilities of teachers.

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APPENDIX A

TEST OF CORRECTNESS RESPONSES, MATURE LOCOMOTOR SKILLS, PROGRESSIONS AND/OR DEVIATIONS IN THE MATURE SKILLS

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TEST OF CORRECTNESS RESPONSES, MATURE LOCOMOTOR SKILLS, PROGRESSIONS AND/OR DEVIATIONS IN THE MATURE SKILLS

Test of Correctness of Responses

Scoring Key

1. The number circled for each focal point indicates the correct answer.
2. The total number of correct answers is recorded at the lower left hand corner of page 1.
3. To calculate the percent of correct responses for each skill, one sums the number of correct responses and divides by the total number of correct responses (lower left hand number).
4. The number above each possible focal point response indicates the distance from the correct response. Whole, absolute numbers were assigned so that a measurement could detect differing degrees attributed to incorrect response. This ordinal type of measurement is used in the deviation score response.
5. The total number of possible incorrect responses is recorded at the lower right hand corner of page 2 for each fundamental locomotor skill.

6. To calculate the deviation score response, one totals the number above each incorrect response.

Fundamental Locomotor Skills

Running

Characteristics of the Mature Skill	Progressions/Deviations in the Mature Skill (less mature to more mature)
Period of Nonsupport	
1. Constant well-defined period of nonsupport.	1. One foot basically in contact with surface at all times (bried period of nonsupport).
Foot Placement	
1. Near, on the line, or midline foot placement (2" either side of 1" line).	1. Wide foot placement (shoulder-width distance).
2. Heel to toe contact with toes pointing forward.	2. Heel to toe contact with toes pointing in or out.
3. Stride length varies with speed (approximately 3' distance).	3. Short stride 6" to 10" distance.
Body Lean	
1. Depends on speed of runner, but is slightly exaggerated with rotation of shoulders coordinated.	1. Body erect, no shoulder rotation.
Arm Position	
1. Arms move in direct opposition to leg action.	1. No opposition of arms to leg action.
2. Arms move in anterior-posterior direction with elbows flexed (middle guard position).	2. Arms extended out from sides at shoulder height (high guard position) with little movement.
Knee/Leg Position	
1. Knee of nonsupport leg flexed more than 90° (nearly touches buttock) from side view.	1. Little knee flexion, less than 90° of nonsupport leg from side view.
2. Knee and/or leg of nonsupport leg does not cross midline.	2. Compensation during push-off to maintain straight line body action.

Running (Part 2)

1. Not observable.		
1. Wide foot placement (less shoulder width but greater than 4") often causing body sway.	1. Not observable.	
2. Exaggerated heel to toe contact (bounce).	2. Not observable.	
3. Stride covers 6" to 10" but is less than 3 foot distance.	3. Not observable.	
1. Slight forward body lean with beginning of coordinated shoulder rotation.	1. Not observable.	
1. Nonsymmetrical movement of arms across midline.	1. Excessive arm action, not in coordination with leg movement.	1. Not observable.
2. Arms extended forward and slightly flexed at waist (low guard position) with beginning of counter rotation of shoulders.	2. Excessive arm movement across midline (hit chin) with exaggerated posterior arm thrust (middle guard position) beginning.	2. Not observable.
1. Not observable.		
2. Knee of nonsupport leg crosses midline with excessive or exaggerated movement (bouncing or full extension of support leg as body weight is transferred).	2. Not observable.	

Fundamental Locomotor Skills

Leaping

Characteristics of the Mature Skill	Progressions/Deviations in the Mature Skill (less mature to more mature)
Preparatory Movements	
Leg Movement	
1. Push-off with one foot as opposite leg begins to extend fully.	1. Push-off with one foot as opposite leg extends fully, but feet always in contact with surface (Precursor to leap).
2. Both feet begin from stationary position.	2. Moving forward one or more steps.
Arm Movement	
1. Forward and upward reach of arm opposite lead leg.	1. Not observable.
Period of Nonsupport	
Trunk Lean	
1. Longer period of nonsupport than with run (horizontally) with forward trunk lean of more than 75° (body approaching upright position).	1. One foot in contact with surface at all times with little forward trunk lean (Precursor to leap).
Leg Movement	
1. Push-off leg fully extends after lift off.	1. Push-off leg partially extends at height of leap, then flexes for downward movement.
2. Lead leg extends fully at height of leap, then flexes for downward movement.	2. Lead leg partially extends at height of leap, then flexes for downward movement.
Arm Movement	
1. Continued forward and upward reach of arm opposite lead leg.	1. Arms extend out from sides approaching shoulder level for balance (Precursor to leap).

Landing

Leg Movement

1. Landing with heel to toe action on lead leg with opposite foot moving step forward to overcome inertia.

1. Landing with heel to toe action of lead leg with individual coming to a complete stop as opposite foot makes contact with surface next to the lead leg.

Leaping (Part 2)

1. Push-off with one leg as opposite leg begins to extend partially.	1. Not observable.		
2. Not observable.			
1. More than 75° forward trunk lean with vertical distance greater than horizontal.	1. Not observable.		
1. Not observable.			
2. Not observable.			
1. Arm reach forward together but not in opposition to leg action.	1. Arms in opposition to leg action behind individual in braking movement.	1. Arms extended outward from sides to leg action in winging movement.	1. Not observable.
1. Not observable.			

Fundamental Locomotor Skills

Horizontal Jump

Characteristics of the Mature Skill

Preparatory Movements

Arm Movement	
1. A 90° forward and upward thrust of both arms (arms begin from sides moving back then forward).	1. Little backward and upward arm thrust.
Trunk Position	
1. Forward lean of 45° (±5°) of upper body at hips.	1. Little or no forward lean of upper body at hips.
Leg Position	
1. Knees flexed (110°-130°), thighs approximately parallel to floor.	1. Knees slightly flexed.

Period of Nonsupport

Arm Movement	
1. Full extension of arms in a forward and upward direction above the head at an angle of approximately 180°.	1. Arms move back behind body (braking).
Body Position	
1. 45° (±5°) from take off spot through center of body mass.	1. Greater than 45° (±5°) lean of body from take off point (upright position).
Leg Position	
1. Take off with both legs simultaneously.	1. Take off primarily from one foot with partial extension of legs.
2. Approximate full extension of both legs in forward and upward direction.	2. Slight extension of both legs, however, little forward and upward distance attained.

Landing

Foot Position	
1. Both feet landing simultaneously and slightly ahead of the body's center of mass.	1. Landing primarily on one foot.
Arm Position	
1. Simultaneous vigorous forward thrust of arms as feet make contact with surface.	1. Arms move forward and back as feet make contact with surface.
Knee Position	
1. Knees flexed so that thighs are approximately parallel to surface (may be flexed 45° to 30°).	1. Knees slightly flexed (between 75° and 45°).

Horizontal Jump (Part 2)

1. Not observable.

1. Forward lean of upper body greater than 45° (±5°) at hips.	1. Not observable.	
1. Not observable.		
1. Arms extended from sides (winging).	1. Arms extended and move forward, but do not exceed height of head.	1. Not observable.
1. Not observable.		
1. Not observable.		
2. Not observable.		
1. Both feet landing simultaneously behind body's center of mass.	1. Not observable.	
1. Arms tucked into body for balance.	1. Arms extended out from sides as feet make contact with surface (balancing).	1. Not observable.
1. Not observable.		

Fundamental Locomotor Skills

Vertical Jump

Characteristics of the Mature Skill	Progressions/Deviations in the Mature Skill (less mature to more mature)
Preparatory Movement	
Arm Movement	
1. Forceful backward and upward thrust of both arms.	1. No backward or upward thrust of arms.
Trunk Position	
1. Slight forward lean of upper body (75°, ±5°) with eyes focused on target.	1. Body almost erect with surface.
Leg Position	
1. Knees flexed 110° (±5°).	1. Little flexion of knees with slight hip extension.
2. Feet parallel and next to one another in stationary position.	2. Running approach.
Period of Nonsupport	
Arm Movement	
1. Full extension of arms upward directly above head.	1. Slight extension of arms above shoulders.
Trunk Position	
1. Full extension.	1. Little or slight extension.
2. Little if any horizontal distance covered.	2. Little vertical distance covered.
Leg Position	
1. Full extension of hips.	1. Little extension of hips.
2. Full extension of legs.	2. Little extension of legs. Little Height
3. Full extension of ankles.	3. Ankles remain flexed.

Landing

Foot Position	
1. Toe to heel landing within 6" area.	1. Entire foot contacts surface.
Arm Position	
1. Arms flexed slightly to side of body with delayed downward movement of arms as knees begin to flex.	1. Arms extended out from side for balance with elbows flexed (high guard position).
Knee Position	
1. Knees flex slightly when feet touch surface (110 to 120°).	1. Little if any knee flexion.
2. Ankles flex fully during completion of landing.	2. Little if any ankle flexion.

Vertical Jump (Part 2)

1. Upward thrust only of arms.	1. Slight backward with forceful upward thrust of arms.	1. Not observable.
1. Forward lean of upp upper body less t than 45° (±5°).	1. Forward lean of upper body greater than 45° but less than 75° (±5°) over base of support.	1. Not observable.
1. Exaggerated flexion of legs greater than 110° (±5°). 2. Not observable.	1. Not observable.	
1. Arms extended above head, opposite arm out to side for balance.	1. Arms extended over head with swinging motion (step).	1. Not observable.
1. Not observable. 2. Horizontal distance traveled greater than vertical.	2. Not observable.	
1. Slight extension of hips. Force of jump upward dissipated by leg flexion. 2. Knees flexed. 3. Ankles flexed.	1. Partial extension of hips. 2. Partial extension 3. Partial extension of ankles.	1. Not observable. 2. Not observable. 3. Not observable.
1. Landing on one foot followed with compensatory movement of opposite foot outside 6" landing area.	1. Not observable.	

1. One arm extended out from side for balance (flailing).	1. Not observable.
1. Partial flexion of knees (90° to 110°).	1. Not observable.
2. Partial flexion of ankles (landing on toes, taking a step before completion on jump.	2. Not observable.

Fundamental Locomotor Skills

Gallop

Characteristics of the Mature Skill	Progressions/Deviations in the Mature Skill (less mature to more mature)
Lead Leg Movement	
1. A step forward with the lead foot with heel to toe movement.	1. Not observable.
2. Knee is slightly flexed (more than rear leg as step is taken).	2. (Precursor) Exaggerated flexion of lead leg.
3. Lead foot pointing forward.	3. Lead foot not pointing forward.
4. Complete extension of lead foot (150°-160°).	4. Partial extension of lead leg as forward step is taken (120°-150°).
5. Able to use either foot as lead leg.	5. Not able to establish a dominant lead leg.
Rear Leg Movement	
1. Flexion of the rear knee (between 120°-150°) as it moves toward and almost even with lead leg.	1. Straight rear leg as it is brought toward lead leg.
2. The toe of rear leg makes contact with the surface before the toe of the lead foot departs for next step.	2. Not observable.
3. Rear foot points forward.	3. Rear foot points to side (inside portion of foot used to push).
Arm Position	
1. A coordinated lift of the arms in front on the body as the body weight is transferred smoothly.	1. Extraneous flailing arm movements as weight is shifted in haphazard manner (Precursor).

Gallop (Part 2)

2. Not observable.			
3. Not observable.			
4. Exaggerated extension of lead leg (180°).	4. Not observable.		
5. Not observable.			
1. Partial flexion (between 170°-180°) of rear leg as it is brought forward toward lead leg.	1. Not observable.		
3. Not observable.			
1. Extraneous arm movement used for both force production and braking action necessitated for balance as weight is deliberately transferred.	1. Arm immobile, tucked into chest not helping with weight transfer.	1. Arms extended from sides for balance (winging) possibly causing body to rotate in a sliding pattern as arms work in uncoordinated list to assist with weight transfer.	1. Not observable.

Fundamental Locomotor Skills

Slide

Characteristics of the Mature Skill	Progressions/Deviations in the Mature Skill (less mature to more mature)
Lead Foot Movement	
1. A step sideways with one foot (90° from direction of movement).	1. Lead foot does not point forward (foot points toward direction of movement--less than 90° from direction of movement).
2. Body of individual faced forward.	2. Body turns in direction of movement.
Following Foot Movement	
1. A slide of following foot next to lead foot, touching or almost touching the heel of th of the lead foot during a short nonsupport period.	1. Exaggerated stiffness of following leg as it is being moved toward the stationary lead foot.
2. Following foot points forward (90° from direction of movement).	2. Following foot points in direction of movement.
Arm Position	
1. Arm opposite lead leg extends slightly from the side in the direction opposite of the body movement.	1. No movement of arm opposite lead leg in direction opposite of body movement.
2. Both arms extended and elbows flexed between waist and shoulder height.	2. Both arms display exaggerated stiffness from sides of body.
Weight Transfer	
1. A smooth flowing weight transfer from following leg to lead foot.	1. A deliberate transfer of weight from following foot to lead foot.
2. Can slide for 5 consecutive cycles in a straight line.	2. Cannot slide 5 consecutive cycles in a straight line.

Slide (Part 2)

1. Not observable.

2. Not observable.

1. Exaggerated stiffness of following leg with a short period of nonsupport.	1. Not observable.
2. Not observable.	
1. Not observable.	
2. Not observable.	
1. A jerky transfer of weight from following foot to lead foot.	1. Not observable.
2. Not observable.	

Fundamental Locomotor Skills

Hop

Characteristics of the Mature Skill	Progressions/Deviations in the Mature Skill (less mature to more mature)
Leg Position	
1. Upright trunk carriage over support leg.	1. Trunk carriage not over support leg (loss of balance).
2. Carrying slightly flexed thigh of nonsupport leg so that it is slightly in front of support leg.	2. Carrying the nonsupport leg in front of body.
3. Foot of nonsupport leg is extended (125°) close to the floor in back of body.	3. Foot of nonsupport leg is flexed 90° or more almost touching buttocks.
4. Carrying nonsupport leg near midline of body.	4. Carrying nonsupport leg away from the midline of the body.
Arm Position	
1. Arms kept in front of the body with elbows slightly flexed (chest height).	1. Exaggerated high elevation of arms (shoulder level or higher).
2. Both arms lift in coordination with the push-off phase of hop.	2. Arms not working together symmetrically (excessive arm action).
Body Movement	
1. Hop on either foot 5 consecutive times.	1. Cannot hop on either foot 5 consecutive times.
2. Hop in a straight path which is 6 inches wide.	2. Cannot hop in a straight path 6 inches wide (zigzag).

Hop (Part 2)

1. Not observable.		
2. Rotation of nonsupport leg causing overcompensation of arms and trunk action (little forward distance covered).	2. Not observable.	
3. Not observable.		
4. Not observable.		
1. Arm of support leg side of body flexed in front of body (arm extended from side for balance).	1. Not observable	
2. Arms move in circular motion for momentum and balance (around shoulder axis).	2. Arms move up and down in front of body for momentum and balance (shoulder to waist).	2. Not observable.
1. Can hop on dominant foot 5 times.	1. Not observable.	
2. Not observable.		

Fundamental Locomotor Skills

Skip

Characteristics of the Mature Skill	Progressions/Deviations in the Mature Skill (less mature to more mature)
Leg Movement	
1. A rhythmical repetition of the step-hop on alternate feet along a straight line.	1. A deliberate step-hop pattern with a forceful step during the landing phase of skipping (vertical distance).
2. A smooth low flexion of non-support leg (120°-150°) near surface.	2. An exaggerated flexion of nonsupport leg (foot almost contacting buttock).
3. Legs do not cross midline of body.	3. Legs cross midline of body.
Arm Movement	
1. Arms alternately moving in opposition to leg at about waist level.	1. Extraneous arm movements (balance).
2. Arms do not cross midline.	2. Arms cross midline.
Weight Transfer	
1. A smooth flowing transfer of body weight from one leg to the other along a straight line.	1. Over compensation body action due to poor weight transfer causing a zigzag movement along a straight line.

Skip (Part 2)

1. Not observable.	
2. A smooth low flexion of non-support leg (120°-150°) with high vertical elevation.	2. Not observable.
3. Not observable.	
1. Deliberate arm action for elevation (braking action).	1. Not observable.
2. Not observable.	
1. Not observable.	

Test of Correctness of Responses

Scoring Key - Test II

1. The number circled for each focal point indicates the correct answer.
2. The total number of correct answers is recorded at the lower left hand corner of page 1.
3. To calculate the percent of correct responses for each skill, one sums the number of correct responses and divides by the total number of correct responses (lower left hand number).
4. The number above each possible focal point response indicates the distance from the correct response. Whole, absolute numbers were assigned so that a measurement could detect differing degrees attributed to incorrect response. This ordinal type of measurement is used in the deviation score response.
5. The total number of possible incorrect responses is recorded at the lower right hand corner of page 2 for each fundamental locomotor skill.
6. To calculate the deviation score response, one totals the number above each incorrect response.

*After the second presentation of the visual-descriptor models. This procedure, similar to the process on page 145 was used to calculate the percent of correctness responses and the deviation score responses using the same material found between pages 123 to 144.

APPENDIX B

TEXT OF NARRATIVE EMPLOYED FOR VISUAL-DESCRIPTOR MODEL PRESENTATIONS

APPENDIX B

TEXT OF NARRATIVE EMPLOYED FOR VISUAL-DESCRIPTOR MODEL PRESENTATIONS

Introductory Remarks to Visual-Descriptor Presentation

The (films/film loops/film) which are about to be viewed are based on a relatively new physical education curriculum. The curriculum is entitled I CAN. I CAN stands for Individualized instruction, Create social leisure competence, Associate all learning, and Narrow the gap between theory and practice. I CAN is based on a model in which the assessment of individual or individuals needs are the keys in developing a physical education program for either one student or an entire class. Appropriately prescribed teaching and learning activities allow the teacher to: (1) assess the student/students abilities; (2) teach the designed activity; (3) evaluate the results of the techniques employed; and (4) provide feedback to the student or others regarding the student/students progress.

As previously stated, assessment is a very important factor of the I CAN curriculum. Therefore, the eight fundamental locomotor skills to be viewed, will be based on what are termed "Focal Points For Activity" in the I CAN terminology. Also, of importance are additional descriptions of the eight fundamental locomotor skills.

These additional descriptions constitute progression and/or deviations in or from the mature skills.

To be technically correct, the following definitions should be remembered:

(1) Motor development -- The study of variations and changes of motor behavior due to the physiological and environmental interaction through which an individual progresses.

(2) Fundamental locomotor skill -- A skill which involves two or more body segments and results in the transfer of the body from one spot to another, or in some instances the same spot. The fundamental motor skills in this presentation are: running, leaping, vertical jumping, horizontal jumping, hopping, galloping, sliding and skipping.

(3) Focal Point/Pattern -- An isolated movement which is confined to joints or body segments which are too restrictive to be classified as a fundamental motor skill. An example to be observed later is the knee/leg position in the running skill.

(4) Progression/deviation in the mature skill -- A "stage" in which the total fundamental motor skill is defined by the movements or relationships of body segments in a specific state of development between less mature forms to maturity.

(5) Flexion -- Bending an arm or leg toward the body.

(6) Extension -- Moving an arm or leg in a straightening manner, or away from the body.

(7) Midline -- An imaginary line through the center of the body (when an individual is standing at attention, the line would

extend from the head to the surface upon which the individual is standing).

The majority of the individuals viewed are trainable mentally impaired, however, it was necessary in a limited number of instances to film normal elementary age students who displayed the characteristics, patterns, etc. which have been identified for this presentation. This method was used because human development is characterized by an orderly progression of development, but the age at the onset and the rates of progress within each phase of development are unique to the individual. The assumption in this case is that trainable mentally impaired will develop within the scope of human development.

The procedure to be followed consists of five parts. Part one allows one to look over the basic "patterns," or as I CAN refers to them, focal points, of the skill. Part two allows the chance to view the film at 12 frames per second (slow motion) with an abbreviated verbal description pointing out the focal points of importance. Part three involves viewing the skill at normal speed without verbal reinforcement. Part four allows one to observe the progressions/deviations from the mature locomotor skill. With this technique, only those important progressions/deviations beginning with the least mature and progressing to the more mature level of skill will be viewed. In other words, not all of the focal points or motor patterns will be described, as was the case for the mature locomotor skill. Part four will employ the slow motion-normal speed viewing of the film. Part five allows you to evaluate a selected locomotor skill. You will have one minute to review your evaluation sheet.

You will then evaluate one individual's performance by circling the most appropriate answer for each of the descriptors based on what you have observed. You will see the individual's performance at the slow motion speed of 12 frames per second, given one minute to evaluate the individual. You will then see the same individual at normal speed and be given one minute and 30 seconds to complete your evaluation before we proceed on to the next skill.

Directions for Evaluation of Skills

The directions for the evaluation of a selected locomotor skill will be repeated before the evaluation film is shown: You will have one minute to review your evaluation sheet. You will then evaluate one individual's performance by circling the most appropriate answer for each of the descriptors based on what you have observed. You will see the individual's performance at the slow motion speed of 12 frames per second, given one minute to evaluate the individual. You will then see the same individual at normal speed and be given one minute and 30 seconds to complete your evaluation before we proceed on to the next skill.

Characteristics of the Mature Running Skill

I. The first film sequence shows the mature running skill as defined by materials from the I CAN curriculum.

A. This individual displays the following patterns:

1. Observe the period of nonsupport by considering:

a. There is a constant well-defined period of nonsupport.

2. Also note, the foot placement pattern by considering:

a. The individual's foot is on the line, or midline foot placement with each foot landing 2" either side of a 1" line.

b. There is a heel-to-toe contact to the surface with the toes pointing forward.

3. Note the individual's body lean by considering:

a. That the runner will lean forward as speed increases and is slightly exaggerated with rotation of the shoulders in a coordinated manner.

4. Pay particular attention to the arm position by considering:

a. The arms moving in direct opposition to the movement of the legs.

b. In addition to having the arms move in opposition to the legs, both arms move in an anterior-posterior direction with the elbows flexed in a "middle guard position."

5. The knee/leg position pattern should be considered by noticing:

a. The knee of the nonsupport leg is flexed more than 90°, as observed from a side view. (The foot nearly touches the buttock.)

b. The knee and/or leg of the nonsupport leg does not cross the midline of the body.

II. The next series of film sequences will show progressions and/or deviations from the mature running skill. Lower stages of skill development will be viewed in a manner which will permit one to gain an understanding of the progression of running from a very elementary level of performance to a level which is relatively or almost mature.

A. The first individual displays the following patterns:

1. Observe the foot placement pattern by considering:

a. The wide foot placement at about shoulder-width distance.

b. The short stride distance of 6 to 10 inches.

2. Also note, the individual's body lean:

a. The body is basically erect, with very little if any shoulder rotation.

3. Pay particular attention to the knee/leg pattern by considering:

a. That there is little knee flexion. It is less than 90° when one views the nonsupport leg from this side view.

B. The second individual displays the following patterns:

1. Observe the foot placement pattern by considering:

a. The wide foot placement, but not quite shoulder width. This type of foot placement causes the body to sway back and forth.

b. The stride covers more than 6 to 10 inches, but is less than 3 feet.

2. Also note, the arm position by considering:

a. The arms extend forward and slightly flex at the waist with the beginning of some counter rotation of the shoulders. This is a "low guard position." If one will recall, the individual in the previous film segment had this "low guard position."

3. Pay particular attention to the knee/leg pattern by considering that:

a. The legs seem to compensate during the "push-off" phase in running to maintain the body action or movement in a straight line direction.

C. The third individual displays the following patterns:

1. Observe the period of nonsupport:

a. There is a defined period.

2. Also note, the foot placement pattern by considering:

a. The exaggerated heel to toe contact of the foot to the surface in a "bouncing" movement.

3. Pay particular attention to the arm position by considering:

a. Excessive arm movement across the midline. The individual almost hits his chin, especially with the exaggerated anterior-posterior arm thrust. This is a "middle guard positioning" of the arms.

b. One may tend to think that the excessive arm action is not coordinated with the leg movement, but with studied concentration, this is not the case.

4. Also observe the knee/leg position:

a. The knee of the nonsupport leg crosses the midline with excessive or exaggerated movement with a bouncing or full extension of the support leg as the body weight is transferred (especially the right leg).

D. The next individual displays a number of "mixed" patterns found with individuals in the filming group:

1. Observe the foot placement by considering:

a. The exaggerated heel to toe contact with the toes pointing outward.

2. Also note the arm position by considering:

a. Excessive arm action in somewhat of a nonsymmetrical movement of the arms across the midline of the body. However, this is in a middle guard position.

3. Pay particular attention to the knee/leg position by considering:

    a. There is little knee flexion, less than 90° of the nonsupport leg as viewed from the side.

In general, we are observing a "mixed bag" of patterns which indicate progression, as well as deviation, to the mature running skill.

Characteristics of the Leap

I. The first film sequence shows the mature leaping skill as defined from the materials of the I CAN curriculum.

   A. The individual displays the following sequences in the horizontal jump:

      1. During the preparatory movements, note:

         a. That both feet begin from a stationary position.

         b. One foot pushes off as the opposite leg begins to extend fully.

         c. There is a forward and upward reach of the arm opposite the lead leg.

      2. During the period of nonsupport, note:

         a. That there is a longer period of nonsupport than with the run (horizontally) with a forward trunk lean of more than 75° (at the hips).

         b. The push-off leg fully extends after the lift off phase of the leap.

         c. The leap leg extends fully at the height of the leap, then flexes in the downward movement.

         d. There is a continued forward and upward reach of the arm opposite the leap leg. (This is basically a characteristic found in one reaching for distance or a target.)

      3. As the individual lands, note:

         a. That the individual lands with a heel-to-toe action on the leap leg with the opposite foot moving a step forward to overcome inertia.

II. The next series of film sequences will show progressions and/or deviations from the mature leaping skill. Lower stages of skill development will be viewed in a manner which will permit one to gain an understanding of the progression of leaping from a very elementary level of performance to a level which is relatively or almost mature.

   A. The first individual displays the following sequence in the leap:

      1. During the preparatory movements, note:

a. That the push off of the one foot is opposite in direction to the leg which is extending fully, but one foot is always in contact with the surface. (This is a precursor to the leap.)

b. There is a reach forward and upward of the arm opposite the lead leg.

2. During the period of nonsupport, note:

a. That one foot is always in contact with the surface at all times with little forward trunk lean. (Again, this is a precursor to the leap.)

b. The arms extend out from the sides approaching shoulder level for balance. (Again, this is a precursor to the leap.)

3. As the individual lands, note:

a. That the individual lands with a heel-to-toe action of the lead leg, as the individual comes to a complete stop with the opposite foot making contact with the surface next to the lead leg. In other words, both feet are next to one another.

B. The second individual displays the following sequences in the leap:

1. During the preparatory movements, note:

a. That the individual tends to move one or more steps before initiating the leap.

b. There is a forward and upward reach of the arm opposite the lead leg.

2. During the period of nonsupport, note:

a. The push-off leg partially extends at the height of the leap, then flexes in a downward movement.

b. The lead leg partially extends at the height of the leap, then flexes for the downward movement.

c. The arms reach forward together, but not in opposition to the leg action.

3. As the individual lands:

a. There is a definite heel-to-toe action of the lead foot with opposite foot moving a step forward to overcome inertia.

C. The third individual displays the following sequences in the leap:

1. During the preparatory movements, note:

a. There is a push off with one leg as the opposite leg begins to extend partially.

2. During the period of nonsupport, note:

a. There is more than a 75° forward trunk lean with the vertical distance greater than the horizontal distance attained.

b. The arms tend to work in opposition to the leg action, as they move behind the individual in a braking movement.

3. As the individual lands:

a. There is a definite heel-to-toe action of the lead foot with opposite foot moving a step forward to overcome inertia.

D. The fourth individual displays the following sequences in the leap:

1. During the preparatory movements, note:

a. There is a push off with one foot as the opposite foot begins to extend fully.

b. Both feet begin from a stationary position.

c. There is a forward and upward reach of the arm opposite the lead leg.

2. During the period of nonsupport, note:

a. That when the individual is off the surface the arms extend outward from the sides in a winging movement.

3. As the individual lands:

a. There is a definite heel-to-toe action of the lead foot with opposite foot moving a step forward to overcome inertia.

Characteristics of the Horizontal Jump

I. The first film sequence shows the mature horizontal jumping skill as defined from the I CAN curriculum.

   A. The individual displays the following sequences in the horizontal jump:

      1. During the preparatory movements, note:

         a. That viewing the arm movement a 90° forward and upward thrust of both arms occurs (the arms begin from the sides moving back, then forward).

         b. The upper body leans forward approximately 45° (±5°) from the hips.

         c. The knees are flexed (110°-130°), with the thighs approximately parallel to the floor.

      2. During the period of nonsupport, note:

         a. That the arms extend forward and upward above the head at an angle of approximately 180°.

         b. The body is at a 45° (±5°) angle from the takeoff spot through the center of body mass.

         c. The individuals have pushed off with both legs simultaneously and have fully extended in a forward and upward direction.

      3. As the individual lands, note:

         a. That both feet land simultaneously and slightly ahead of the body's center of mass.

         b. The arms simultaneously and vigorously thrust forward as the feet make contact with the surface.

         c. The knees are flexed so that the thighs are approximately parallel to the surface (approximately at 45° to 30°).

II. The next series of film sequences will show progressions and/or deviations from the mature horizontal jumping skill. Lower stages of skill development will be viewed in a manner which will permit one to gain an understanding of the progression of horizontal jumping from a very elementary level of performance to a level which is relatively or almost mature.

A. The first individuals display the following sequences in the horizontal jump.

1. During the preparatory movements, note:

a. That there is little backward and upward arm thrust.

b. There is little, if any, forward lean of the upper body at the hips. (They are almost standing straight up.)

c. Their knees are slightly flexed.

2. During the period of nonsupport, note:

a. That the arms move back, behind the body. This braking action stops the body from moving forward.

b. The forward lean of the body from the "take-off" point is greater than 45° (±5°). In other words, almost upright.

c. There is only a slight extension of both legs with little forward and upward distance attained.

3. As the individuals land, note:

a. That both feet hit simultaneously behind the body's center of mass.

b. The arms move forward and back as the feet make contact with the surface.

c. The knees are only slightly flexed (between 75° and 45°).

B. The next individual demonstrates a number of interesting patterns:

1. During the preparatory movements, note:

a. That there is very little backward and upward arm thrust.

2. During the period of nonsupport, note:

a. That he "takes off" from one foot with partially extended legs.

3. As the individual lands, note:

   a. That he lands primarily on one foot.

   b. Both arms are tucked into the body for balance.

C. The next individual is a little more mature:

1. During the preparatory movements, note:

   a. The good forward and upward thrust of both arms.

   b. Good forward lean of the upper body at the hips.

   c. Good knee flexion (110° to 130°).

2. During the period of nonsupport, note:

   a. That the arms are extended away from the sides in a "winging" position.

   b. The body lean is greater than 45° (±5°) in an almost upright position.

   c. There is only slight extension of both legs with little forward and upward distance attained.

3. As the individual lands:

   a. Both feet hit simultaneously and slightly ahead of the body's center of mass.

   b. The arms are extended out from the sides as the feet make contact with the surface in a "balancing manner."

   c. The knees are slightly flexed between 75° and 45°.

D. The next individual displays the following sequences within the horizontal jump patterns.

1. All of the preparatory movements would be classified as mature:

   a. Arm movements.

   b. Body lean.

   c. Leg position.

2. During the period of nonsupport, however:

a. Both arms are extended and move forward, but do not exceed the height of the head.

b. The body is almost fully extended (about 50°) through the center of body mass.

c. Both legs are fully extended in a forward and upward direction.

3. As the individual lands, note:

a. That the landing is almost mature, except that both arms extend out from the sides for balance as the feet simultaneously touch the surface.

Characteristics of the Vertical Jump

I. The first film sequence shows the mature vertical jumping skill as defined from materials from the I CAN curriculum.

A. The individual displays the following sequences in the vertical jump:

1. During the preparatory movements, note:

a. There is a forceful backward and upward thrust of both arms.

b. There is a slight forward lean of the upper body (75°, ±5°) with the eyes focused on the target.

c. The individual's knees are flexed at approximately 110° (±5°).

d. The individual's feet are parallel and next to one another in a stationary position.

2. During the period of nonsupport, note:

a. There is full extension of the arms upward directly above the head.

b. The body is fully extended.

c. There is little, if any, horizontal distance covered during the in flight phase, or period of nonsupport phase, of the vertical jump.

d. There is full extension of the hips, full extension of the legs, and a full extension of ankles.

3. As the individual lands, note:

a. Both feet land with a toe-to-heel motion within a 6 inch area. Both feet land simultaneously.

b. Both arms are flexed slightly to the side of the body with a delayed downward movement of the arms as the knees begin to flex.

c. Both knees flex slightly when the feet touch the surface (110° to 120°).

d. Both ankles flex fully during the completion of the landing movement.

II. The next series of film sequences will show progressions and/or deviations from the mature vertical jump skill. Lower stages of skill development will be viewed in a manner which will permit one to gain an understanding of the progression of leaping from a very elementary level of performance to a level which is relatively or almost mature.

A. The first individual displays the following sequences in the vertical jump:

1. During the preparatory movements, note:

a. There is no backward or upward thrust of the arms.

b. The body is almost erect with the surface.

c. There is little flexion of the knees, with only a slight extension of the hips.

d. Note, however, that the feet are parallel and next to one another in a stationary position.

2. During the period of nonsupport, note:

a. That there is a slight extension of the arms above the shoulders.

b. There is little, or slight, extension of the upper body or trunk of the body.

c. There is little vertical distance covered as one becomes airborne.

d. Little height is gained, primarily due to the following factors: little extension of the hips, little extension of the legs, and both ankles remained flexed.

3. As the individual lands, note:

a. The entire surface of the foot contacts the floor.

b. Both arms are extended out from the side for balance with the elbows flexed in what may be termed a high guard position.

c. There is little, if any, flexion of the knees.

d. There is little, if any, flexion of the ankles.

B. The second individual displays the following sequences in the vertical jump:

1. During the preparatory movements, note:

a. That there is an upward thrust only of the arms.

2. During the period of nonsupport, note:

a. That one arm extends above the head, while the opposite arm is out to the side for balance.

b. There is slight extension of the hips, knees are flexed, ankles are flexed. The force of jump upward is dissipated by the leg flexion.

3. As the individual lands, note:

a. That there is a partial flexion of the knees, 90° to 110°.

b. There is a partial flexion of the ankles. (The individual lands on the toes, taking a step before completion of the jump.)

C. The third individual displays the following sequences in the vertical jump:

1. During the preparatory movements, note:

a. There is upward thrust of the arms only.

b. The individual uses a running approach before taking off.

2. During the period of nonsupport, note:

a. That the arms are extended over the head with a swinging motion (slap).

b. There is a partial extension of the hips.

c. There is a partial extension of the knees.

d. There is a partial extension of the ankles.

e. The partial extension of the hips, knees and ankles allows for more upward distance to be attained.

3. As the individual lands, note:

   a. The individual lands on one foot with a compensatory movement of the opposite foot outside the 6 inch landing area.

   b. One arm is extended out from the side in a flailing motion, in order to attain a degree of balance.

   c. There is a partial flexion of the knees (90° to 110°).

   d. There is a full flexion of the ankles, however.

D. The fourth individual displays the following sequences in the vertical jump:

   1. During the preparatory movements, note:

      a. That there is a slight backward movement of the arms with a forceful upward thrust.

      b. The forward lean of the upper body is less than 45° (±5°).

   2. During the period of nonsupport, note:

      a. One arm is extended above the head with the opposite arm out to the side for balance.

      b. There is a partial extension of the hips.

      c. There is a partial extension of the knees.

      d. There is a partial extension of the ankles.

      e. There is a partial flexion of the knees (90° to 110°).

      f. There is a partial flexion of the ankles (landing on toes, taking a step before completion of the jump).

E. The fifth individual displays the following sequences in the vertical jump:

   1. During the preparatory movements, note:

      a. There is a forceful backward and upward thrust of both arms.

      b. There is a forward lean of the upper body, greater than 45° but less than 75° (±5°) over the base of support.

c. Knees are flexed, greater than 110° (±5°).

d. Feet are parallel and next to one another in the stationary position.

2. During the period of nonsupport, note:

a. That there is a relatively full extension of the arms upward directly above the head.

b. There is full extension of the upper body.

c. There is little, if any, horizontal distance covered.

d. There is full extension of the hips, legs and ankles.

3. As the individual lands, note:

a. The individual lands in a toe-to-heel movement within the 6 inch target area.

b. Both feet land simultaneously.

c. The arms are flexed slightly at the sides of the body with a delayed downward movement of the arms as the knees begin to flex.

d. The knees are flexed slightly when the feet touch the surface (110° to 120°).

e. Both ankles flex fully during the completion of the landing.

Characteristics of the Slide

I. The first film sequence shows the mature sliding skill as defined from the I CAN curriculum.

   A. This individual displays the following patterns:

      1. Observe the lead foot movement by considering:

         a. A step sideways with one foot while facing 90° away from the direction of movement.

      2. Also note the following foot movement by considering:

         a. The slide of the following foot next to the lead foot. It almost touches the heel of the lead foot during a short period of nonsupport.

         b. The following foot points forward 90° from the direction of movement.

      3. Pay particular attention to the arm position by considering:

         a. The arm opposite the lead foot extends slightly from the side in the direction opposite the body movement.

         b. Both arms are extended with the elbows flexed in a position between the waist and shoulders.

      4. Weight transfer is found to be:

         a. A smooth flowing movement from following leg to lead foot.

         b. The individual can slide for 5 consecutive cycles in a straight line.

II. The next series of film sequences will show progressions and/or deviations from the mature sliding skill. Lower stages of skill development will be viewed in a manner which will permit one to gain an understanding of the progression of sliding from a very elementary level of performance to a level which is relatively or almost mature.

   A. The first individual displays the following patterns:

      1. Observe the lead foot movement by considering:

a. The lead foot does not point forward. It points toward the direction of movement (less than 90° from direction of movement).

b. The individual's body turns in the direction of movement.

2. Also note the following foot movement by considering:

a. That there is an exaggerated stiffness as the following leg moves toward the stationary lead foot.

b. The following foot also points in the direction of movement.

3. Pay particular attention to the arm position by considering:

a. There is no movement of the arm opposite the lead leg in the direction opposite to the body movement.

4. The weight transfer is found to be:

a. Deliberate from the following foot to the lead foot.

b. The individual has difficulty completing 5 consecutive cycles in a straight line.

B. The second individual displays the following patterns:

1. Observe the lead foot movement by considering:

a. That the lead foot points toward the direction of movement.

b. The body turns in the direction of movement.

2. Also note the following foot movement by considering:

a. The exaggerated stiffness of the following foot as it is being moved toward the stationary lead foot.

b. The following foot also points in the direction of movement.

3. Pay particular attention to the arm position by considering:

a. Both arms display exaggerated stiffness from the sides of the body.

4. The weight transfer is found to be:

    a. A deliberate transfer of weight from the following foot to the lead foot.

C. The third individual displays the following noticeable patterns:

1. Observe the following foot movement by considering:

    a. The exaggerated stiffness of the following leg as it is being moved toward the stationary lead foot.

2. Also note the arm position by considering:

    a. There is no movement of arms.

    b. They are positioned away from the sides of the body in an exaggerated stiff manner.

D. The fourth individual displays a more mature slide, however, two patterns involved in this need to be considered:

1. Observe the following foot movement:

    a. There is exaggerated stiffness of the following leg, however there is a short period of nonsupport.

2. Also note that with the transfer of body weight:

    a. There is a jerky transfer of weight from the following foot to the lead foot.

Characteristics of the Gallop

I. The first film sequence shows the mature galloping skill as defined from the I CAN curriculum.

   A. This individual displays the following patterns:

      1. Observe the lead leg movement by considering:

         a. A step forward with the lead foot with heel to toe movement.

         b. The knee is slightly flexed (more than rear leg as step is taken).

         c. The lead foot is pointing forward.

         d. There is a complete extension of lead foot (150°-160°).

         e. The individual is able to use either foot as the lead.

      2. Also note the rear leg movement by considering:

         a. The rear knee is flexed (between 120°-150°) as it moves toward and almost even with lead leg.

         b. The toe of rear leg makes contact with the surface before the toe of the lead foot departs for next step.

         c. The rear foot points forward.

   B. The second individual also demonstrates a mature gallop:

      1. In addition to the mature lead leg and rear leg movement patterns, observe the excellent arm position:

         a. There is a coordinated lift of the arms in front on the body as the body weight is transferred smoothly from the rear leg to the lead leg.

II. The next series of film sequences will show progressions and/or deviations from the mature galloping skill. Lower stages of skill development will be viewed in a manner which will permit one to gain an understanding of the progressions of galloping from a very elementary level of performance to a level which is relatively or almost mature.

A. The first individual displays the following patterns:

1. Observe the lead leg movement by considering:

a. The exaggerated flexion of lead leg is a precursor in galloping.

b. The lead foot not pointing forward.

c. The individual not being able to establish a dominant lead leg.

2. Also note the rear leg movement by considering:

a. The rear foot pointing to one side (inside portion of foot used to push).

3. Pay particular attention to the arm position by considering:

a. There is extraneous flailing arm movements as weight is shifted in haphazard manner (precursor).

B. The second individual displays the following patterns:

1. Observe the lead leg movement by considering:

a. The exaggerated flexion of lead leg is a precursor in galloping.

b. The lead foot is not pointing forward.

c. There is an exaggerated extension of lead leg (180°).

2. Also note the rear leg movement by considering:

a. The rear leg is straight as it is brought toward the lead leg.

b. The rear foot points to the side (inside portion of foot used to push).

3. Pay particular attention to the arm position by considering:

a. Extraneous arm movement is used for both force production and braking action necessitated for balance as weight is deliberately transferred.

C. The third individual displays the following patterns:

1. Observe the lead leg movement by considering:

a. A partial extension of lead leg as forward step is taken (120°-150°).

2. Also note the rear leg movement by considering:

a. The rear foot points to the side (inside portion of foot used to push).

b. There is partial flexion (between 170°-180°) of the rear leg as it is brought toward lead leg.

3. Pay particular attention to the arm position by considering:

a. The arm is immobile, tucked into chest not helping with weight transfer.

D. The fourth individual displays an almost mature gallop, except for one noticeable area:

1. Observe the arm position by considering:

a. The arms extended from the sides for balance (winging) possibly causing the body to rotate in a sliding pattern as the arms work in an uncoordinated lift when assisting with the transfer of body weight from one foot to the other.

Characteristics of the Hop

I. The first film sequence shows the mature hopping skill as defined by materials from the I CAN curriculum.

A. This individual displays the following patterns:

1. Observe the leg position by considering:

a. The upright trunk carriage over the support leg.

b. The individual carries his slightly flexed thigh of his nonsupport leg so that it is slightly in front of the support leg. (The nonsupport leg does not cross the midline of the body.)

c. The foot of the nonsupport leg is extended (125°) close to the floor in back of the body.

d. Again, the nonsupport leg is carried near, not across the midline of the body.

2. Also note, the arm position pattern by considering:

a. The arms are kept in front at the side of the body with the elbows slightly flexed at chest height.

b. Both arms lift in coordination with the "push-off" phase of the hop.

3. Pay particular attention to the body movement by considering:

a. The individual can hop on either foot 5 consecutive times.

b. The individual can hop in a straight path which is 6 inches wide.

II. The next series of film sequences will show progressions and/or deviations from the mature hopping skill. Lower stages of skill development will be viewed in a manner which will permit one to gain an understanding of the progression of hopping from a very elementary level of performance to a level which is relatively or almost mature.

A. The first individual displays the following patterns:

1. Observe the leg position by considering:

a. The individual's trunk carriage is not over the support leg, thus a loss of balance.

b. The individual carries the nonsupport leg in front of the body.

c. The individual carries the nonsupport leg away from the midline of the body.

2. Also note, the arm position by considering:

a. That there is an exaggerated high elevation of the arms. The arms are carried at or above shoulder level height.

b. The individual's arms are not working together in a symmetrical manner (too much arm action).

3. Pay attention to the body movement by considering:

a. The individual cannot hop on either foot 5 consecutive times.

b. The individual cannot hop in a straight path which is 6 inches wide. (There is a zigzagging movement.)

B. The second individual displays the following patterns:

1. Observe the leg position by considering:

a. There is fairly good upright carriage over the support leg.

b. The foot of the nonsupport leg is flexed 90° or more, almost touching the buttocks.

2. Also note, the arm position by considering:

a. That the arms move in a circular motion for momentum and balance. The arms move around the shoulder axis.

3. Pay attention to the body movement by considering:

a. That the individual can hop 5 consecutive times on one foot (the dominant foot).

C. The third individual displays the following patterns:

1. Observe the leg position by considering:

a. The rotation of the nonsupport leg which causes an over compensation of the arms and body action. Little forward distance is covered.

2. Also note, the arm position by considering:

    a. That the arms move up and down in front of the body for momentum and balance. The arms move from shoulder to waist.

3. Pay attention to the body movement by considering:

    a. The individual cannot hop in a straight path 6 inches wide, but must zigzag.

D. The fourth individual displays the following patterns:

1. Observe the leg position by considering:

    a. The foot of the nonsupport leg is flexed 90° or more almost touching the buttocks.

2. Also note, the arm position by considering:

    a. The arm on the side of the body which has its leg flexed in front of the body will be extended slightly in front of the body while the opposite arm is extended out from the side for balance.

Characteristics of the Mature Skipping Skill

I. The first film sequence shows the mature skipping skill as defined by materials from the I CAN curriculum.

A. This individual displays the following patterns:

1. Observe the leg movement pattern by considering:

a. A rhythmical repetition of the step-hop on alternate feet along a straight line.

b. A smooth, low flexion on the nonsupport leg (120°-150°) near the floor surface.

c. The legs do not cross the midline of the body.

2. Also note, the arm movement pattern by considering:

a. The arms alternatingly moving in opposition to the support leg at about waist level.

b. The arms do not cross the midline of the body.

3. Note the manner in which the individual transfers body weight:

a. A smooth flowing transfer of body weight from one leg to the other along a straight line as employed.

II. The next series of film sequences will show progressions and/or deviations from the mature skipping skill. Lower stages of skill development will be viewed in a manner which will permit one to gain an understanding of the progression of skipping from a very elementary level of performance to a level which is relatively or almost mature.

A. The first individual displays the following patterns:

1. Observe the leg movement pattern by considering:

a. A deliberate step-hop movement with a forceful step during the landing phase. (The vertical distance is significant at this level of performance.)

b. An exaggerated flexion of the nonsupport leg (the foot almost touches the buttocks).

2. Also note, the arm movement pattern by considering:

a. The extraneous arm movements. (This is found when one tries to maintain their balance.)

b. The arms cross the midline of the body.

B. The second individual displays the following patterns. Note that this individual is further along in terms of mastering the skill.

1. Observe the leg movement pattern by considering:

a. The deliberate step-hop pattern with a forceful step during landing.

2. Also note, the arm movement pattern by considering:

a. The deliberate arm action for elevation. (It's sort of a braking action.)

b. The arms still cross the midline of the body.

3. Note the manner in which the individual transfers body weight:

a. There is an over compensation of body action which causes the individual to poorly adjust weight in relation to balance, thus a "zigzag" movement is observed.

C. The next individual is closer to the mature level, but:

1. Observe the leg movement pattern by considering:

a. The legs "slightly" cross the midline of the body.

2. Also note, the arm movement pattern by considering:

a. The deliberate arm action for elevation (braking action).

b. The arms still cross the midline of the body.

3. Note, however, that this individual transfers weight differently.

a. There is a relatively smooth weight transfer close to the "mature" definition.

D. The final individual in the skipping film sequence shows us a basically mature skill with one noticeable exception:

1. Observe the leg movement pattern by considering:

a. A smooth low flexion of the nonsupport leg (120°-150°) with a high vertical elevation (especially during the hop).

APPENDIX C

RESULTS FROM EVALUATION FILMS: TREATMENT EFFECT PERCENT OF CORRECT AND INCORRECT ANSWERS PER FOCAL POINT

C.1 Skill: Run

C.2 Skill: Leap

C.3 Skill: Horizontal Jump

C.4 Skill: Vertical Jump

C.5 Skill: Gallop

C.6 Skill: Slide

C.7 Skill: Hop

C.8 Skill: Skip

APPENDIX C

RESULTS FROM EVALUATION FILMS: TREATMENT EFFECT PERCENT OF CORRECT AND INCORRECT ANSWERS PER FOCAL POINT

Table C.1

Results from Evaluation Films: Treatment Effect
Percent of Correct and Incorrect Answers per Focal Point

Skill: Running

Focal Point (Characteristics of Mature Skill)		Combined Treatment Scores		Individual Treatment Scores					
				Test I			Test II		
				Treatment			Treatment		
		Test I	Test II	1	2	3	1	2	3
Period of Non-Support									
1. Constant well-defined period of non-support.	1	* 80.00	* 63.33	* 70.00	* 100.00	* 70.00	* 60.00	* 80.00	* 50.00
1. One foot basically in contact with surface at all times (brief period of non-support).		16.67	30.00	20.00	00.00	30.00	40.00	20.00	30.00
1. Not observable.		3.33	6.67	10.00	00.00	00.00	00.00	00.00	20.00
Foot Placement									
1. Near, on the line, or midline foot placement (2" either side of 1" line).	2	63.33 *	56.67 *	* 90.00	* 80.00	* 20.00	* 80.00	* 60.00	* 30.00
1. Wide foot placement (shoulder width distance).		13.33	6.67	00.00	00.00	40.00	00.00	00.00	20.00
1. Wide foot placement (less than shoulder width but greater than 4") often causing body sway.		23.33	30.00	10.00	20.00	40.00	20.00	30.00	40.00
1. Not observable.		00.00	6.67	00.00	00.00	00.00	00.00	10.00	10.00
2. Heel to toe contact with toes pointing forward.	3	63.33 *	63.33 *	70.00 *	80.00 *	40.00 *	70.00 *	80.00 *	40.00 *
2. Heel to toe contact with toes pointing in or out.		26.67	10.00	20.00	10.00	50.00	10.00	10.00	10.00
2. Exaggerated heel to toe contact (bounce).		6.67	20.00	00.00	10.00	10.00	10.00	10.00	40.00
2. Not observable.		3.33	6.67	10.00	00.00	00.00	10.00	00.00	10.00

Table C.1 (continued)

Skill: Running

Focal Point (Characteristics of Mature Skill)		Combined Treatment Scores		Individual Treatment Scores					
				Test I			Test II		
				Treatment			Treatment		
		Test I	Test II	1	2	3	1	2	3
Foot Placement (continued)									
3. Stride length varies with speed (approximately 3' distance).	4	70.00*	10.00	80.00*	60.00*	70.00*	20.00	10.00	00.00
3. Short stride 6" to 10" distance.		3.33	26.67	00.00	00.00	10.00	30.00	00.00	50.00
3. Stride covers 6" to 10" but is less than 3 feet distance.		23.33	60.00*	10.00	40.00	20.00	50.00*	90.00*	40.00*
3. Not observable.		3.33	3.33	10.00	00.00	00.00	00.00	00.00	10.00
Body Lean									
1. Depends on speed of runner, but is slightly exaggerated with rotation of shoulders coordinated.	5	70.00*	3.33	80.00*	90.00*	40.00*	10.00	00.00	00.00
1. Body erect, no shoulder rotation.		00.00	30.00	00.00	00.00	00.00	20.00	40.00	30.00
1. Slight forward body lean with beginning of coordinated shoulder rotation.		26.67	63.33*	10.00	10.00	60.00	70.00*	60.00*	60.00*
1. Not observable.		3.33	3.33	10.00	00.00	00.00	00.00	00.00	10.00
Arm Position									
1. Arms move in direct opposition to leg action.	6	76.67*	6.67	90.00*	60.00*	80.00*	10.00	00.00	10.00
1. No opposition of arms to leg action.		00.00	6.67	00.00	00.00	00.00	20.00	00.00	00.00
1. Non-symmetrical movement of arms across midline.		23.33	10.00	10.00	40.00	20.00	10.00	00.00	20.00
1. Excessive arm action, not in coordination with leg movement.		00.00	73.33*	00.00	00.00	00.00	60.00*	90.00*	70.00*

Table C.1 (continued)

Skill: Running

Focal Point (Characteristics of Mature Skill)		Combined Treatment Scores		Individual Treatment Scores					
				Test I			Test II		
		Test I	Test II	Treatment			Treatment		
				1	2	3	1	2	3
Arm Position (continued)									
1. Not observable.		00.00	3.33	00.00	00.00	00.00	00.00	10.00	00.00
2. Arms move in anterior-posterior direction with elbows flexed (middle guard position).	7	66.67*	3.33	80.00*	90.00*	30.00*	10.00	00.00	00.00
2. Arms extended out from sides at shoulder height (high guard position) with little movement.		10.00	13.33	00.00	00.00	30.00	00.00	30.00	10.00
2. Arms extended forward and slightly flexed at waist (low guard position) with beginning of counter rotation of shoulders.		16.67	66.67*	10.00	10.00	30.00	80.00*	70.00*	50.00*
2. Excessive arm movement across midline (hit chin) with exaggerated posterior arm thrust (middle guard position) beginning.		3.33	10.00	00.00	00.00	10.00	00.00	00.00	30.00
2. Not observable.		3.33	6.67	10.00	00.00	00.00	10.00	00.00	10.00
Knee/Leg Position									
1. Knee of non-support leg flexed more than 90° (nearly touches buttock) from side view.	8	80.00*	6.67	80.00*	100.00*	60.00*	00.00	00.00	20.00
1. Little knee flexion, less than 90° of non-support leg from side view.		16.67	93.33*	10.00	00.00	40.00	100.00*	100.00*	80.00*
1. Not observable.		3.33	00.00	10.00	00.00	00.00	00.00	00.00	00.00

Table C.1 (continued)

Skill: Running

Focal Point (Characteristics of Mature Skill)	Combined Treatment Scores		Individual Treatment Scores					
			Test I			Test II		
			Treatment			Treatment		
	Test I	Test II	1	2	3	1	2	3
Knee/Leg Position (continued)								
2. Knee and/or leg of non-support leg does not cross midline. 9	* 70.00	26.67	* 90.00	* 90.00	* 30.00	50.00	30.00	00.00
2. Compensation during push-off to maintain straight line body action.	3.33	3.33	00.00	00.00	10.00	00.00	10.00	00.00
2. Knee of non-support leg crosses midline with excessive or exaggerated movement (bouncing or full extension of support leg as body weight is transferred).	20.00	* 70.00	00.00	10.00	50.00	* 50.00	* 60.00	* 100.00
2. Not observable.	6.67	00.00	10.00	00.00	10.00	00.00	00.00	00.00

Table C.1 (continued)

Skill: Running

Focal Point (Characteristics of Mature Skill)		Physical Education Teacher						Classroom Teacher					
		Test I			Test II			Test I			Test II		
		Treatment			Treatment			Treatment			Treatment		
		1	2	3	1	2	3	1	2	3	1	2	3
Period of Non-Support													
1. Constant well-defined period of non-support.	1	* 80.00	* 100.00	* 60.00	* 60.00	* 80.00	* 60.00	* 40.00	* 100.00	* 80.00	* 60.00	* 80.00	* 40.00
1. One foot basically in contact with surface at all times (brief period of non-support).		00.00	00.00	40.00	40.00	20.00	40.00	40.00	00.00	20.00	40.00	20.00	20.00
1. Not observable.		20.00	00.00	00.00	00.00	00.00	00.00	20.00	00.00	00.00	00.00	00.00	40.00
Foot Placement													
1. Near, on the line, or midline foot placement (2" either side of 1" line).	2	* 100.00	* 100.00	* 20.00	* 60.00	* 100.00	* 40.00	* 80.00	* 60.00	* 20.00	* 100.00	* 20.00	* 20.00
1. Wide foot placement (shoulder-width distance).		00.00	00.00	40.00	00.00	00.00	00.00	00.00	00.00	40.00	00.00	00.00	40.00
1. Wide foot placement (less than shoulder width but greater than 4") often causing body sway.		00.00	00.00	40.00	40.00	00.00	60.00	20.00	40.00	40.00	00.00	60.00	20.00
1. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	20.00	20.00
2. Heel to toe contact with toes pointing forward.	3	* 60.00	* 80.00	* 40.00	* 60.00	* 80.00	* 40.00	* 80.00	* 80.00	* 40.00	* 80.00	* 80.00	* 40.00
2. Heel to toe contact with toes pointing in or out.		40.00	00.00	60.00	00.00	20.00	20.00	00.00	20.00	40.00	20.00	00.00	00.00
2. Exaggerated heel to toe contact (bounce).		00.00	20.00	00.00	20.00	00.00	40.00	00.00	00.00	20.00	00.00	20.00	40.00
2. Not observable.		00.00	00.00	60.00	20.00	00.00	00.00	20.00	00.00	00.00	00.00	00.00	20.00

Table C.1 (continued)

Skill: Running

Focal Point		Physical Education Teacher						Classroom Teacher					
		Test I			Test II			Test L			Test II		
		Treatment			Treatment			Treatment			Treatment		
		1	2	3	1	2	3	1	2	3	1	2	3
Foot Placement (continued)													
3. Stride length varies with speed (approximately 3' distance).	4	* 80.00	* 80.00	* 60.00	20.00	20.00	00.00	* 80.00	* 40.00	* 80.00	20.00	00.00	00.00
3. Short stride 6" to 10" distance.		00.00	00.00	20.00	60.00	00.00	80.00	00.00	00.00	00.00	00.00	100.00	20.00
3. Stride covers 6" to 10" but is less than 3' distance).		20.00	20.00	20.00	* 20.00	* 80.00	* 20.00	00.00	60.00	20.00	* 80.00	* 00.00	* 80.00
3. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	20.00	00.00	00.00	00.00	00.00	00.00
Body Lean													
1. Depends on speed of runner, but is slightly exaggerated with rotation of shoulders coordinated.	5	* 100.00	* 100.00	* 20.00	00.00	00.00	00.00	* 60.00	* 80.00	* 60.00	20.00	00.00	00.00
1. Body erect, no shoulder rotation.		00.00	00.00	00.00	40.00	20.00	80.00	00.00	00.00	00.00	00.00	60.00	20.00
1. Slight forward body lean with beginning of coordinated shoulder rotation.		00.00	00.00	80.00	* 60.00	* 80.00	* 20.00	20.00	20.00	40.00	* 80.00	* 40.00	* 60.00
1. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	20.00	00.00	00.00	00.00	00.00	20.00
Arm Position													
1. Arms move in direct opposition to leg action.	6	* 100.00	* 40.00	* 80.00	00.00	00.00	20.00	* 80.00	* 80.00	* 80.00	20.00	00.00	00.00
1. No opposition of arms to leg action.		00.00	00.00	00.00	20.00	00.00	00.00	00.00	00.00	00.00	20.00	00.00	00.00
1. Non-symetrical movement of arms across midline.		00.00	60.00	00.00	00.00	00.00	20.00	20.00	20.00	20.00	20.00	00.00	20.00

Table C.1 (continued)

Skill: Running

Focal Point (Characteristics of Mature Skill)		Physical Education Teacher						Classroom Teacher					
		Test I			Test II			Test I			Test II		
		Treatment			Treatment			Treatment			Treatment		
		1	2	3	1	2	3	1	2	3	1	2	3
Arm Position (continued)													
1. Excessive arm action, not in coordination with leg movement.		00.00	00.00	00.00	* 80.00	* 100.00	* 60.00	00.00	00.00	00.00	* 40.00	* 80.00	* 80.00
1. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	20.00	00.00
2. Arms move in anterior-posterior direction with elbows flexed (middle guard position).	7	* 80.00	* 80.00	* 20.00	00.00	00.00	00.00	* 80.00	* 100.00	* 40.00	20.00	00.00	00.00
2. Arms extended out from sides at shoulder height (high guard position) with little movement.		00.00	20.00	40.00	00.00	60.00	00.00	00.00	00.00	20.00	00.00	00.00	20.00
2. Arms extended forward and slightly flexed at waist (low guard position) with beginning of counter rotation of shoulders.		20.00	00.00	40.00	* 100.00	* 40.00	* 80.00	00.00	00.00	20.00	* 60.00	* 100.00	* 20.00
2. Excessive arm movement across midline (hit chin) with exaggerated posterior arm thrust (middle guard position) beginning.		00.00	00.00	00.00	00.00	00.00	20.00	00.00	00.00	20.00	00.00	00.00	40.00
2. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	20.00	00.00	00.00	20.00	00.00	20.00
Knee/Leg Position													
1. Knee of non-support leg flexed more than 90° (nearly touches buttock) from side view.	8	* 100.00	* 100.00	* 40.00	00.00	00.00	00.00	* 60.00	* 100.00	* 80.00	00.00	00.00	40.00

Table C.1 (continued)

Skill: Running

Focal Point (Characteristics of Mature Skill)	Physical Education Teacher						Classroom Teacher					
	Test I			Test II			Test I			Test II		
	Treatment			Treatment			Treatment			Treatment		
	1	2	3	1	2	3	1	2	3	1	2	3
Knee/Leg Position												
1. Little knee flexion, less than 90° of non-support leg from side view.	00.00	00.00	60.00	* 100.00	* 100.00	* 100.00	20.00	00.00	20.00	* 100.00	* 100.00	* 60.00
1. Not observable.	00.00	00.00	00.00	00.00	00.00	00.00	20.00	00.00	00.00	00.00	00.00	00.00
2. Knee and/or leg of non-support leg does not cross midline.	* 100.00	* 100.00	* 20.00	00.00	20.00	00.00	* 80.00	* 80.00	* 40.00	100.00	40.00	00.00
2. Compensation during push-off to maintain straight line body action.	00.00	00.00	20.00	00.00	20.00	00.00	00.00	00.00	00.00	00.00	00.00	100.00
2. Knee of non-support leg crosses midline with excessive or exaggerated movement (bouncing or full extension of support leg as body weight is transferred).	00.00	00.00	60.00	* 100.00	* 60.00	* 100.00	00.00	20.00	40.00	* 00.00	* 00.00	* 00.00
2. Not observable.	00.00	00.00	00.00	00.00	00.00	00.00	20.00	00.00	20.00	00.00	00.00	00.00

Table C.2

Results from Evaluation Films: Treatment Effect
Percent of Correct and Incorrect Answers per Focal Point

Skill: Leaping

Focal Point (Characteristics of Mature Skill)		Combined Treatment Scores		Individual Treatment Scores					
				Test I			Test II		
		Test I	Test II	Treatment			Treatment		
				1	2	3	1	2	3
Preparatory Movements									
Leg Movement									
1. Push-off with one foot as opposite leg begins to extend fully.	1	* 60.00	33.33	* 70.00	* 70.00	* 40.00	50.00	00.00	50.00
1. Push-off with one foot as opposite leg extends fully, but feet always in contact with surface (precursor to leap).		3.33	3.33	10.00	00.00	00.00	00.00	00.00	10.00
1. Push-off with one leg as opposite leg begins to extend partially.		33.33	* 63.33	10.00	30.00	60.00	* 50.00	* 100.00	* 40.00
1. Not observable.		3.33	00.00	10.00	00.00	00.00	00.00	00.00	00.00
2. Both feet begin from stationary position.	2	16.67	* 93.33	* 20.00	30.00	00.00	* 100.00	* 90.00	* 90.00
2. Moving forward one or more steps.		80.00 *	3.33	70.00*	70.00*	100.00*	00.00	00.00	10.00
2. Not observable.		3.33	3.33	10.00	00.00	00.00	00.00	10.00	00.00
Arm Movement									
1. Forward and upward reach of arm opposite lead leg.	3	* 73.33	* 46.67	* 80.00	* 60.00	* 80.00	* 90.00	* 20.00	* 30.00
1. Not observable.		26.67	53.33	20.00	40.00	20.00	10.00	80.00	70.00

Table C.2 (continued)

Skill: Leaping

Focal Point (Characteristics of Mature Skill)		Combined Treatment Scores		Individual Treatment Scores					
				Test I			Test II		
				Treatment			Treatment		
		Test I	Test II	1	2	3	1	2	3
Period of Non-Support									
Trunk Lean									
1. Longer period of non-support than with run (horizontally) with forward trunk lean of more than 75° (body approaching upright position).	4	* 83.33	* 76.67	* 90.00	* 70.00	* 90.00	* 80.00	* 80.00	* 70.00
1. One foot in contact with surface at all times with little forward trunk lean (precursor to leap).		3.33	3.33	00.00	00.00	10.00	00.00	10.00	00.00
1. More than 75° forward trunk lean with vertical distance greater than horizontal.		13.33	16.67	10.00	30.00	00.00	20.00	10.00	20.00
1. Not observable.		00.00	3.33	00.00	00.00	00.00	00.00	00.00	10.00
Leg Movement									
1. Push-off leg fully extends after lift off.	5	6.67	10.00	10.00	00.00	10.00	20.00	10.00	00.00
1. Push-off leg partially extends at height of leap, then flexes for downward movement.		* 90.00	* 86.67	* 80.00	* 100.00	* 90.00	* 80.00	* 80.00	* 100.00
1. Not observable.		3.33	3.33	10.00	00.00	00.00	00.00	10.00	00.00
2. Lead leg extends fully at height of leap, then flexes for downward movement.	6	6.67	10.00	10.00	00.00	10.00	20.00	10.00	00.00
2. Lead leg partially extends at height of leap, then flexes for downward movement.		* 90.00	* 86.67	* 80.00	* 100.00	* 90.00	* 80.00	* 90.00	* 90.00
2. Not observable.		3.33	3.33	10.00	00.00	00.00	00.00	00.00	10.00

Table C.2 (continued)

Skill: Leaping

Focal Point (Characteristics of Mature Skill)		Combined Treatment Scores		Individual Treatment Scores					
				Test I			Test II		
		Test I	Test II	Treatment			Treatment		
				1	2	3	1	2	3
Arm Movement									
1. Continued forward and upward reach of arm opposite lead leg.	7	10.00	16.67	00.00	20.00	10.00	30.00	00.00	20.00
1. Arms extend out from sides approaching shoulder level for balance (precursor to leap).		23.33	3.33	00.00	20.00	50.00	00.00	10.00	00.00
1. Arms in opposition to leg action behind individual in braking movement.		6.67	20.00	00.00	20.00	00.00	20.00	20.00	20.00
1. Arms reach forward together, but not in opposition to leg action.		60.00 *	10.00	100.00 *	40.00 *	40.00 *	20.00	10.00	00.00
1. Arms extended outward from sides to leg action in winging movement.		0.00	50.00 *	00.00	00.00	00.00	30.00 *	60.00 *	60.00 *
1. Not observable.		0.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
Landing									
Leg Movement									
1. Landing with heel to toe action on lead leg with opposite foot moving step forward to overcome inertia.	8	80.00 *	6.67	60.00 *	100.00 *	80.00 *	00.00	00.00	20.00
1. Landing with heel to toe action of lead leg with individual coming to a complete stop as opposite foot makes contact with surface next to the lead leg.		10.00	93.33 *	30.00	00.00	00.00	100.00 *	100.00 *	80.00 *
1. Not observable.		10.00	00.00	10.00	00.00	20.00	00.00	00.00	00.00

Table C.2 (continued)

Skill: Leaping

Focal Point (Characteristics of Mature Skill)		Physical Education Teacher						Classroom Teacher					
		Test I			Test II			Test I			Test II		
		Treatment			Treatment			Treatment			Treatment		
		1	2	3	1	2	3	1	2	3	1	2	3
Preparatory Movements													
Leg Movement													
1. Push-off with one foot as opposite leg begins to extend fully.	1	* 80.00	* 00.00	* 20.00	60.00	00.00	80.00	* 60.00	* 60.00	* 60.00	40.00	00.00	20.00
1. Push-off with one foot as opposite leg extends fully, but feet always in contact with surface (precursor to leap).		20.00	80.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	20.00
1. Push-off with one leg as opposite leg begins to extend partially.		00.00	20.00	80.00	* 40.00	* 100.00	* 20.00	20.00	40.00	40.00	* 60.00	* 100.00	* 60.00
1. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	20.00	00.00	00.00	00.00	00.00	00.00
2. Both feet begin from stationary position.	2	20.00	20.00	00.00	* 100.00	* 100.00	* 100.00	20.00	* 40.00	00.00	* 100.00	* 80.00	* 80.00
2. Moving forward one or more steps.		* 80.00	* 80.00	* 100.00	00.00	00.00	00.00	* 60.00	* 60.00	* 100.00	00.00	00.00	20.00
2. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	20.00	00.00	00.00	00.00	20.00	00.00
Arm Movement													
1. Forward and upward reach of arm opposite lead leg.	3	* 80.00	* 20.00	* 80.00	* 100.00	* 20.00	* 40.00	* 80.00	* 100.00	* 80.00	* 80.00	* 20.00	* 20.00
1. Not observable.		20.00	80.00	20.00	00.00	80.00	60.00	20.00	00.00	20.00	20.00	80.00	80.00

Table C.2 (continued)

Skill: Leaping

Focal Point (Characteristics of Mature Skill)		Physical Education Teacher						Classroom Teacher					
		Test I			Test II			Test I			Test II		
		Treatment			Treatment			Treatment			Treatment		
		1	2	3	1	2	3	1	2	3	1	2	3
Period of Non-Support													
Trunk Lean													
1. Longer period of non-support than with run (horizontally) with forward trunk lean of more than 75° (body approaching upright position).	4	* 100.00	* 100.00	* 80.00	* 100.00	* 100.00	* 80.00	* 80.00	* 40.00	* 100.00	* 60.00	* 60.00	* 60.00
1. One foot in contact with surface at all times with little forward trunk lean (precursor to leap).		00.00	00.00	20.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	20.00	00.00
1. More than 75° forward trunk lean with vertical distrance greater than horizontal.		00.00	00.00	00.00	00.00	00.00	20.00	20.00	60.00	00.00	40.00	20.00	20.00
1. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00		00.00	20.00
Leg Movement													
1. Push-off leg fully extends after lift off.	5	20.00	00.00	00.00	20.00	00.00	00.00	00.00	00.00	20.00	20.00	20.00	00.00
1. Push-off leg partially extends at height of leap, then flexes for downward movement.		* 80.00	* 100.00	* 100.00	* 80.00	* 100.00	* 100.00	* 80.00	* 100.00	* 80.00	* 80.00	* 60.00	* 100.00
1. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	20.00	00.00	00.00	00.00	20.00	00.00
2. Lead leg extends fully at height of leap, then flexes for downward movement.	6	00.00	00.00	00.00	20.00	00.00	00.00	20.00	00.00	20.00	20.00	20.00	00.00

Table C.2 (continued)

Skill: Leaping

Focal Point (Characteristics of Mature Skill)	Physical Education Teacher						Classroom Teacher					
	Test I			Test II			Test I			Test II		
	Treatment			Treatment			Treatment			Treatment		
	1	2	3	1	2	3	1	2	3	1	2	3
Leg Movement (continued)												
2. Lead leg partially extends at height of leap, then flexes for downward movement.	* 100.00	* 100.00	* 100.00	* 80.00	* 100.00	* 100.00	* 60.00	* 100.00	* 80.00	* 80.00	* 80.00	* 80.00
2. Not observable.	00.00		00.00	00.00	00.00	00.00	20.00	00.00	00.00	00.00	00.00	20.00
Arm Movement												
1. Continued forward and upward reach of arm opposite lead leg. 7	00.00	20.00	00.00	40.00	00.00	00.00	00.00	20.00	20.00	20.00	00.00	40.00
1. Arms extend out from sides approaching shoulder level for balance (precursor to leap).	00.00	20.00	80.00	00.00	00.00	00.00	00.00	20.00	20.00	00.00	20.00	00.00
1. Arms in opposition to leg action behind individual in braking movement.	00.00	20.00	00.00	00.00	40.00	40.00	00.00	20.00	00.00	40.00	00.00	00.00
1. Arms reach forward together but not in opposition to leg action.	* 100.00	* 40.00	* 20.00	00.00	00.00	00.00	* 100.00	* 40.00	* 60.00	40.00	20.00	00.00
1. Arms extended outward from sides to leg action in winging movement.	00.00	00.00	00.00	* 60.00	* 60.00	* 60.00	00.00	00.00	00.00	* 00.00	* 60.00	* 60.00
1. Not observable.	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00

Table C.2 (continued)

Skill: Leaping

Focal Point (Characteristics of Mature Skill)	Physical Education Teacher						Classroom Teacher					
	Test I			Test II			Test I			Test II		
	Treatment			Treatment			Treatment			Treatment		
	1	2	3	1	2	3	1	2	3	1	2	3
Landing												
Leg Movement												
1. Landing with heel to toe action on lead leg with opposite foot moving step forward to overcome inertia.[8]	* 60.00	* 100.00	* 100.00	00.00	00.00	20.00	* 60.00	* 100.00	* 60.00	00.00	00.00	20.00
1. Landing with heel to toe action of lead leg with individual coming to a complete stop as opposite foot makes contact with surface next to the lead leg.	40.00	00.00	00.00	* 100.00	* 100.00	* 80.00	20.00	00.00	00.00	* 100.00	* 100.00	* 80.00
1. Not observable.	00.00	00.00	00.00	00.00		00.00	20.00	00.00	40.00	00.00	00.00	00.00

Table C.3

Results from Evaluation Films: Treatment Effect
Percent of Correct and Incorrect Answers per Focal Point

Skill: Horizontal Jump

Focal Point (Characteristics of Mature Skill)		Combined Treatment Scores		Individual Treatment Scores					
				Test I			Test II		
		Test I	Test II	Treatment			Treatment		
				1	2	3	1	2	3
Preparatory Movements									
Arm Movement									
1. A 90° forward and upward thrust of both arms (arms begin from sides moving back then forward).	1	30.00	* 100.00	10.00	20.00	60.00	* 100.00	* 100.00	* 100.00
1. Little backward and upward arm thrust.		* 70.00	00.00	* 90.00	* 80.00	* 40.00	00.00	00.00	00.00
1. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
Trunk Position									
1. Forward lean of 45° (+-5°) of upper body at hips.	2	* 50.00	* 73.33	* 40.00	* 40.00	* 70.00	* 70.00	* 60.00	* 90.00
1. Little or no forward lean of upper body at hips.		36.67	10.00	40.00	60.00	10.00	10.00	20.00	00.00
1. Forward lean of upper body greater than 45° (+-5°) at hips.		13.33	16.67	20.00	00.00	20.00	20.00	20.00	10.00
1. Not observable.		0.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
Leg Position									
1. Knees flexed (110°-130°), thighs approximately parallel to floor.	3	23.33	* 86.67	10.00	20.00	40.00	* 90.00	* 80.00	* 90.00
1. Knees slightly flexed.		* 73.33	13.33	* 80.00	* 80.00	* 60.00	10.00	20.00	10.00
1. Not observable.		3.33	00.00	10.00	00.00	00.00	00.00	00.00	00.00

Table C.3 (continued)

Skill: Horizontal Jump

Focal Point (Characteristics of Mature Skill)		Combined Treatment Scores		Individual Treatment Scores					
				Test I			Test II		
		Test I	Test II	Treatment			Treatment		
				1	2	3	1	2	3
Period of Non-Support									
Arm Movement									
1. Full extension of arms in a forward and upward direction above the head at an angle of approximately 180°.	4	6.67	30.00	00.00	10.00	10.00	10.00	00.00	10.00
1. Arms move back behind body (braking).		80.00 *	00.00	100.00 *	80.00 *	60.00 *	00.00	00.00	00.00
1. Arms extended from sides (winging).		6.67	0.00	00.00	10.00	10.00	00.00	00.00	00.00
1. Arms extended and move forward, but do not exceed height of head.		6.67	70.00 *	00.00	00.00	20.00	90.00 *	100.00 *	80.00 *
1. Not observable.		0.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
Body Position									
1. 45° (+–5°) from take off spot through center of body mass.	5	33.33	56.67	00.00	60.00	40.00	50.00	40.00	80.00
1. Greater than 45° (+–5°) lean of body from take off point (upright position).		66.67 *	36.67 *	100.00 *	40.00 *	60.00 *	40.00 *	60.00 *	10.00 *
1. Not observable.		0.00	6.67	00.00	00.00	00.00	10.00	00.00	10.00
Leg Position	6								
1. Take off with both legs simultaneously.		93.33 *	100.00 *	100.00 *	100.00 *	80.00 *	100.00 *	100.00 *	100.00 *
1. Take off primarily from one foot with partial extension of legs.		6.67	0.00	00.00	00.00	20.00	00.00	00.00	00.00
1. Not observable.		0.00	0.00	00.00	00.00	00.00	00.00	00.00	00.00
2. Approximate full extension of both legs in forward and upward direction.	7	13.33	90.00 *	10.00	20.00	10.00	100.00 *	80.00 *	90.00 *

Table C.3 (continued)

Skill: Horizontal Jump

Focal Point (Characteristics of Mature Skill)		Combined Treatment Scores		Individual Treatment Scores					
		Test I	Test II	Test I			Test II		
				Treatment			Treatment		
				1	2	3	1	2	3
Leg Position (continued)									
2. Slight extension of both legs, however, little forward and upward distance attained.		86.67 *	10.00	90.00 *	80.00 *	90.00 *	00.00	20.00	10.00
2. Not observable.		0.00	0.00	00.00	00.00	00.00	00.00	00.00	00.00
Landing									
Foot Position									
1. Both feet landing simultaneously and slightly ahead of the body's center of mass.	8	56.67 *	93.33 *	40.00 *	70.00 *	60.00 *	90.00 *	100.00 *	90.00 *
1. Landing primarily on one foot.		13.33	0.00	30.00	00.00	10.00	00.00	00.00	00.00
1. Both feet landing simultaneously behind body's center of mass.		30.00	6.67	30.00	30.00	30.00	10.00	00.00	10.00
1. Not observable.		0.00	0.00	00.00	00.00	00.00	00.00	00.00	00.00
Arm Position									
1. Simultaneous vigorous forward thrust of arms as feet make contact with surface.	9	10.00	53.33 *	00.00	20.00	10.00	40.00 *	50.00 *	70.00 *
1. Arms move forward and back as feet make contact with surface.		83.33 *	40.00	90.00 *	70.00 *	90.00 *	60.00	30.00	30.00
1. Arms tucked into body for balance.		3.33	0.00	00.00	10.00	00.00	00.00	00.00	00.00
1. Arms extended out from sides as feet make contact with surface (balancing).		3.33	3.33	10.00	00.00	00.00	00.00	10.00	00.00
1. Not observable.		0.00	3.33	00.00	00.00	00.00	00.00	10.00	00.00

Table C.3 (continued)

Skill: Horizontal Jump

Focal Point (Characteristics of Mature Skill)	Combined Treatment Scores		Individual Treatment Scores					
	Test I	Test II	Test I			Test II		
			Treatment			Treatment		
			1	2	3	1	2	3
Knee Position								
1. Knees flexed so that thighs are approximately parallell to surface (may be flexed 45° to 30°). 10	10.00	* 90.00	00.00	20.00	10.00	* 90.00	* 90.00	* 90.00
1. Knees slightly flexed (between 75° and 45°).	* 86.67	10.00	* 90.00	* 80.00	* 90.00	10.00	10.00	10.00
1. Not observable.	3.33	0.00	10.00	00.00	00.00	00.00	00.00	00.00

Table C.3 (continued)

Skill: Horizontal Jump

Focal Point (Characteristics of Mature Skill)		Physical Education Teacher						Classroom Teacher					
		Test I			Test II			Test I			Test II		
		Treatment			Treatment			Treatment			Treatment		
		1	2	3	1	2	3	1	2	3	1	2	3
Preparatory Movements													
Arm Movement													
1. A 90° forward and upward thrust of both arms (arms begin from sides moving back then forward).	1	20.00	20.00	40.00	* 100.00	* 100.00	* 100.00	00.00	20.00	80.00	* 100.00	* 100.00	* 100.00
1. Little backward and upward arm thrust.		* 80.00	* 80.00	* 60.00	00.00	00.00	00.00	* 100.00	* 80.00	* 20.00	00.00	00.00	00.00
1. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
Trunk Position													
1. Forward lean of 45° (+-5°) of upper body at hips.	2	* 20.00	* 40.00	* 60.00	* 80.00	* 80.00	* 100.00	* 60.00	* 40.00	* 80.00	* 60.00	* 40.00	* 80.00
1. Little or no forward lean of upper body at hips.		60.00	60.00	20.00	20.00	00.00	00.00	20.00	60.00	00.00	00.00	40.00	00.00
1. Forward lean of upper body greater than 45° (+-5°) at hips.		20.00	00.00	20.00	00.00	20.00	00.00	20.00	00.00	20.00	40.00	20.00	20.00
1. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
Leg Position													
1. Knees flexed (110°-130°), thighs approximately parallel to floor.	3	20.00	20.00	40.00	* 100.00	* 80.00	* 100.00	00.00	* 20.00	* 40.00	* 80.00	* 80.00	* 80.00
1. Knees slightly flexed.		80.00	* 80.00	* 60.00	00.00	20.00	00.00	* 80.00	* 80.00	* 60.00	20.00	20.00	20.00
1. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	20.00	00.00	00.00	00.00	00.00	00.00

Table C.3 (continued)

Skill: Horizontal Jump

Focal Point (Characteristics of Mature Skill)	Physical Education Teacher						Classroom Teacher					
	Test I			Test II			Test I			Test II		
	Treatment			Treatment			Treatment			Treatment		
	1	2	3	1	2	3	1	2	3	1	2	3
Period of Non-Support												
Arm Movement												
1. Full extension of arms in a forward and upward direction above the head at an angle of approximately 180°. 4	00.00	00.00	00.00	20.00	00.00	100.00	00.00	20.00	20.00	00.00	00.00	60.00
1. Arms move back behind body (braking).	* 100.00	* 100.00	* 60.00	00.00	00.00	00.00	* 100.00	* 60.00	* 60.00	00.00	00.00	00.00
1. Arms extended from sides (winging).	00.00	00.00	20.00	00.00	00.00	00.00	00.00	20.00	00.00	00.00	00.00	00.00
1. Arms extended and move forward, but do not exceed height of head.	00.00	00.00	20.00	* 80.00	* 100.00	* 00.00	00.00	00.00	20.00	* 100.00	* 100.00	* 40.00
1. Not observable.	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
Body Position												
1. 45° (+-5°) from take off spot through center of body mass. 5	00.00	40.00	40.00	60.00	60.00	100.00	00.00	80.00	40.00	40.00	20.00	60.00
1. Greater than 45° (+-5°) lean of body from take off point (upright position).	* 100.00	* 60.00	* 60.00	* 20.00	* 40.00	* 00.00	* 100.00	* 20.00	* 60.00	* 60.00	* 80.00	* 20.00
1. Not observable.	00.00	00.00	00.00	20.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	20.00
Leg Position												
1. Take off with both legs simultaneously. 6	* 100.00	* 100.00	* 60.00	* 100.00	* 100.00	* 100.00	* 100.00	* 100.00	* 100.00	* 100.00	* 100.00	* 100.00
1. Take off primarily from one foot with partial extension of legs.	00.00	00.00	40.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00

Table C.3 (continued)

Skill: Horizontal Jump

Focal Point (Characteristics of Mature Skill)	Physical Education Teacher						Classroom Teacher					
	Test I			Test II			Test I			Test II		
	Treatment			Treatment			Treatment			Treatment		
	1	2	3	1	2	3	1	2	3	1	2	3
Leg Position (continued)												
1. Not observable	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
2. Approximate full extension of both legs in forward and upward direction. 7	00.00	40.00	20.00	* 100.00	* 80.00	* 100.00	20.00	00.00	00.00	* 100.00	* 80.00	* 80.00
2. Slight extension of both legs, however, little forward and upward distance attained.	* 100.00	* 60.00	* 80.00	00.00	20.00	00.00	* 80.00	* 100.00	* 100.00	00.00	20.00	20.00
2. Not observable.	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
Landing												
Foot Position												
1. Both feet landing simultaneously and slightly ahead of the body's center of mass. 8	* 20.00	* 40.00	* 40.00	* 100.00	* 100.00	* 100.00	* 60.00	* 100.00	* 80.00	* 80.00	* 100.00	* 80.00
1. Landing primarily on one foot.	20.00	00.00	00.00	00.00	00.00	00.00	40.00	00.00	20.00	00.00	00.00	00.00
1. Both feet landing simultaneously behind body's center of mass.	60.00	60.00	60.00	00.00	00.00	00.00	00.00	00.00	00.00	20.00	00.00	20.00
1. Not observable.	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
Arm Position												
1. Simultaneous vigorous forward thrust of arms as feet make contact with surface. 9	00.00	40.00	20.00	* 40.00	* 80.00	* 100.00	00.00	00.00	00.00	* 40.00	* 20.00	* 40.00
1. Arms move forward and back as feet make contact with surface.	* 100.00	* 60.00	* 80.00	60.00	20.00	00.00	* 80.00	* 80.00	* 100.00	60.00	60.00	60.00

Table C.3 (continued)

Skill: Horizontal Jump

Focal Point (Characteristics of Mature Skill)	Physical Education Teacher						Classroom Teacher					
	Test I			Test II			Test I			Test II		
	Treatment			Treatment			Treatment			Treatment		
	1	2	3	1	2	3	1	2	3	1	2	3
Arm Position (continued)												
1. Arms tucked into body for balance.	00.00	00.00	00.00	00.00	00.00	00.00	00.00	20.00	00.00	00.00	00.00	00.00
1. Arms extended out from sides as feet make contact with surface (balancing).	00.00	00.00	00.00	00.00	00.00	00.00	20.00	00.00	00.00	00.00	20.00	00.00
1. Not observable.	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
Knee Position												
1. Knees flexed so that thighs are approximately parallel to surface (may be flexed 45° to 30°).[10]	00.00	20.00	00.00	* 100.00	* 100.00	* 100.00	00.00	20.00	20.00	* 80.00	* 80.00	* 80.00
1. Knees slightly flexed (between 75° and 45°).	* 100.00	* 80.00	* 100.00	00.00	00.00	00.00	* 80.00	* 80.00	* 80.00	20.00	20.00	20.00
1. Not observable.	00.00	00.00	00.00	00.00	00.00	00.00	20.00	00.00	00.00	00.00	00.00	00.00

Table C.4

Results from Evaluation Films: Treatment Effect
Percent of Correct and Incorrect Answers per Focal Point

Skill: Vertical Jump

Focal Point (Characteristics of Mature Skill)		Combined Treatment Scores		Individual Treatment Scores					
				Test I			Test II		
		Test I	Test II	Treatment			Treatment		
				1	2	3	1	2	3
Preparatory Movement									
Arm Movement									
1. Forceful backward and upward thrust of both arms.	1	10.00	23.33	10.00	10.00	10.00	00.00	10.00	60.00
1. No backward or upward thrust of arms		10.00	6.67	20.00	10.00	00.00	10.00	00.00	10.00
1. Upward thrust only of arms.		66.67 *	43.333 *	60.00 *	80.00 *	60.00 *	50.00 *	60.00 *	20.00 *
1. Slight backward with forceful upward thrust of arms.		13.33	26.67	10.00	00.00	40.00	40.00	30.00	10.00
1. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
Trunk Position									
1. Slight forward lean of upper body (75°, +−5°) with eyes focused on target.	2	16.67	63.33 *	00.00	40.00	10.00	70.00 *	80.00 *	40.00 *
1. Body almost erect with surface.		66.67 *	23.33	90.00 *	40.00 *	70.00 *	10.00	20.00	40.00
1. Forward lean of upper body less than 45° (+−5°).		3.33	3.33	00.00	00.00	10.00	10.00	00.00	00.00
1. Forward lean of upper body greater than 45° but less than 75° (+−5°) over base of support.		10.00	6.67	10.00	20.00	10.00	10.00	00.00	10.00
1. Not observable.		3.33	3.33	00.00	00.00	10.00	00.00	00.00	10.00
Leg Position									
1. Knees flexed 110° (+−5°).	3	30.00	43.33	00.00	30.00	60.00	50.00	30.00	50.00
1. Little flexion of knees with slight hip extension.		66.67 *	26.67	100.00 *	60.00 *	40.00 *	20.00	20.00	40.00

Table C.4 (continued)

Skill: Vertical Jump

Focal Point (Characteristics of Mature Skill)		Combined Treatment Scores		Individual Treatment Scores					
				Test I			Test II		
				Treatment			Treatment		
		Test I	Test II	1	2	3	1	2	3
Leg Position (continued)									
1. Exaggerated flexion of legs greater than 110° (+-5°).		3.33	* 26.67	00.00	10.00	00.00	* 30.00	* 50.00	* 00.00
1. Not observable.		0.00	3.33	00.00	00.00	00.00	00.00	00.00	10.00
2. Feet parallel and next to one another in stationary position.	4	* 93.33	* 100.00	* 100.00	* 100.00	* 80.00	* 100.00	* 100.00	* 100.00
2. Running approach.		0.00	0.00	00.00	00.00	00.00	00.00	00.00	00.00
2. Not observable.		6.67	0.00	00.00	00.00	20.00	00.00	00.00	00.00
Period of Non-Support									
Arm Movement									
1. Full extension of arms upward directly above head.	5	43.33	10.00	20.00	60.00	50.00	00.00	00.00	30.00
1. Slight extension of arms above shoulders.		26.67	6.67	20.00	20.00	40.00	00.00	10.00	10.00
1. Arms extended above head, opposite arm out to side for balance.		* 26.67	* 83.33	* 50.00	* 20.00	* 10.00	* 100.00	* 90.00	* 60.00
1. Arms extended over head with swinging motion (step).		3.33	00.00	10.00	00.00	00.00	00.00	00.00	00.00
1. Not observable.		0.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
Trunk Position	6								
1. Full extension.		26.67	* 80.00	10.00	20.00	50.00	* 100.00	* 60.00	* 80.00
1. Little or slight extension.		* 66.67	20.00	* 80.00	* 80.00	* 40.00	00.00	40.00	20.00
1. Not observable.		6.67	0.00	10.00	00.00	10.00	00.00	00.00	00.00

Table C.4 (continued)

Skill: Vertical Jump

Focal Point (Characteristics of Mature Skill)		Combined Treatment Scores		Individual Treatment Scores					
		Test I	Test II	Test I			Test II		
				Treatment			Treatment		
				1	2	3	1	2	3
Trunk Position (continued)									
2. Little if any horizontal distance covered.	7	23.33	76.67 *	00.00	30.00	40.00	100.00 *	60.00 *	70.00 *
2. Little vertical distance covered.		73.33 *	13.33	100.00 *	70.00 *	50.00 *	00.00	20.00	20.00
2. Horizontal distance traveled greater than vertical.		00.00	6.67	00.00	00.00	00.00	00.00	20.00	00.00
2. Not observable.		3.33	3.33	00.00	00.00	10.00	00.00	00.00	10.00
Leg Position									
1. Full extension of hips.	8	13.33	70.000 *	10.00	10.00	20.00	90.00 *	60.00 *	60.00 *
1. Little extension of hips.		63.33 *	6.67	70.00 *	70.00 *	50.00 *	00.00	10.00	10.00
1. Slight extension of hips.		13.33	13.33	10.00	10.00	20.00	10.00	30.00	00.00
1. Partial extension of hips.		10.00	10.00	10.00	10.00	10.00	00.00	00.00	30.00
1. Not observable.		0.00	0.00	00.00	00.00	00.00	00.00	00.00	00.00
2. Full extension of legs.	9	6.67	70.00 *	00.00	10.00	10.00	90.00 *	60.00 *	60.00 *
2. Little extension of legs.		66.67 *	6.67	70.00 *	70.00 *	60.00 *	00.00	10.00	10.00
2. Knees flexed.		10.00	13.33	10.00	10.00	10.00	10.00	30.00	00.00
2. Partial extension of knees.		16.67	10.00	20.00	10.00	40.00	00.00	00.00	30.00
2. Not observable.		0.00	0.00	00.00	00.00	00.00	00.00	00.00	00.00
3. Full extension of ankles.		10.00	63.33	10.00	10.00	10.00	80.00	60.00	50.00
3. Ankles remain flexed.	10	60.00 *	13.33	60.00 *	70.00 *	50.00 *	10.00	10.00	20.00

Table C.4 (continued)

Skill: Vertical Jump

Focal Point (Characteristics of Mature Skill)		Combined Treatment Scores		Individual Treatment Scores					
				Test I			Test II		
				Treatment			Treatment		
		Test I	Test II	1	2	3	1	2	3
Leg Position (continued)									
3. Ankles flexed.		13.33	13.33	10.00	10.00	20.00	10.00	30.00	00.00
3. Partial extension of ankles.		16.67	10.00	20.00	10.00	20.00	00.00	00.00	30.00
3. Not observable.		0.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
Landing									
Foot Position									
1. Toe to heel landing within 6" area.	11	70.00 *	80.00 *	50.00 *	90.00 *	70.00 *	80.00 *	90.00 *	70.00 *
1. Entire foot contacts surface.		20.00	3.33	40.00	10.00	10.00	00.00	10.00	00.00
1. Landing on one foot followed with compensatory movement of opposite foot outside 6" landing area.		3.33	10.00	00.00	00.00	10.00	10.00	00.00	20.00
1. Not observable.		6.67	6.67	10.00	00.00	10.00	10.00	00.00	10.00
Arm Position									
1. Arms flexed slightly to side of body with delayed downward movement of arms as knees begin to flex.	12	26.67	66.67 *	10.00	30.00	40.00	60.00 *	80.00 *	60.00 *
1. Arms extended out from side for balance with elbows flexed (high guard position).		56.67 *	6.67	60.00 *	70.00 *	40.00 *	10.00	00.00	10.00
1. One arm extended out from side for balance (flailing).		3.33	20.00	10.00	00.00	00.00	30.00	20.00	10.00
1. Not observable.		13.33	6.67	20.00	00.00	20.00	00.00	00.00	20.00

Table C.4 (continued)

Skill: Vertical Jump

Focal Point (Characteristics of Mature Skill)	Combined Treatment Scores		Individual Treatment Scores					
			Test I			Test II		
	Test I	Test II	Treatment			Treatment		
			1	2	3	1	2	3
Knee Position								
1. Knees flex slightly when feet touch surface (110° to 120°). 13	20.00	40.00	00.00	10.00	50.00	70.00	20.00	30.00
1. Little if any knee flexion.	10.00	00.00	10.00	00.00	20.00	00.00	00.00	00.00
1. Partial flexion of knees (90° to 110°).	66.67 *	60.00 *	80.00 *	90.00 *	30.00 *	30.00 *	80.00 *	70.00 *
1. Not observable.	3.33	00.00	10.00	00.00	00.00	00.00	00.00	00.00
2. Ankles flex fully during completion of landing. 14	10.00	33.33	00.00	00.00	30.00	50.00	30.00	20.00
2. Little if any ankle flexion.	36.67	10.00	30.00	10.00	70.00	00.00	20.00	10.00
2. Partial flexion of ankles (landing on toes, taking a step before completion on jump).	50.00 *	53.33 *	60.00 *	90.00 *	00.00 *	40.00 *	50.00 *	70.00 *
2. Not observable.	3.33	3.33	00.00	00.00	10.00	10.00	00.00	00.00

Table C.4 (continued)

Skill: Vertical Jump

Focal Point (Characteristics of Mature Skill)		Physical Education Teacher						Classroom Teacher					
		Test I			Test II			Test I			Test II		
		Treatment			Treatment			Treatment			Treatment		
		1	2	3	1	2	3	1	2	3	1	2	3
Preparatory Movement													
Arm Movement													
1. Forceful backward and upward thrust of both arms.	1	20.00	00.00	20.00	00.00	20.00	40.00	00.00	20.00	00.00	00.00	00.00	80.00
1. No backward or upward thrust of arms.		40.00	20.00	00.00	20.00	00.00	20.00	00.00	00.00	00.00	00.00	00.00	00.00
1. Upward thrust only of arms.		40.00*	80.00*	60.00*	40.00*	60.00*	20.00*	80.00*	80.00*	60.00*	60.00*	60.00*	20.00*
1. Slight backward with forceful upward thrust of arms.		00.00	00.00	20.00	40.00	20.00	20.00	20.00	00.00	40.00	40.00	40.00	00.00
1. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
Trunk Position													
1. Slight forward lean of upper body (75°, +–5°) with eyes focused on target.	2	00.00	40.00	20.00	80.00	80.00	40.00	00.00	40.00	00.00	60.00	80.00	40.00
1. Body almost erect with surface.		100.00*	40.00*	60.00*	20.00*	20.00*	60.00*	80.00*	40.00*	80.00*	00.00*	20.00*	20.00*
1. Forward lean of upper body less than 45° (+–5°).		00.00	20.00	20.00	00.00	00.00	00.00	00.00	00.00	00.00	20.00	00.00	00.00
1. Forward lean of upper body greater than 45° but less than 75° (+–5°) over base of support.		00.00	00.00	00.00	00.00	00.00	00.00	20.00	20.00	00.00	20.00	00.00	20.00
1. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	20.00	00.00	00.00	20.00

Table C.4 (continued)

Skill: Vertical Jump

Focal Point (Characteristics of Mature Skill)		Physical Education Teacher						Classroom Teacher					
		Test I			Test II			Test I			Test II		
		Treatment			Treatment			Treatment			Treatment		
		1	2	3	1	2	3	1	2	3	1	2	3
Leg Position													
1. Knees flexed 110° (+-5°).	3	00.00	40.00	80.00	40.00	20.00	40.00	00.00	20.00	40.00	60.00	40.00	60.00
1. Little flexion of knees with slight hip extension.		* 100.00	* 60.00	* 20.00	20.00	00.00	60.00	* 100.00	* 60.00	* 60.00	20.00	40.00	20.00
1. Exaggerated flexion of legs greater than 110° (+-5°).		00.00	00.00	00.00	* 40.00	* 80.00	* 00.00	00.00	20.00	00.00	* 20.00	* 20.00	* 00.00
1. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	20.00
2. Feet parallel and next to one another in stationary position.	4	* 100.00	* 100.00	* 80.00	* 100.00	* 100.00	* 100.00	* 100.00	* 100.00	* 80.00	* 100.00	* 100.00	* 100.00
2. Running approach.		00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
2. Not observable.		00.00	00.00	20.00	00.00	00.00	00.00	00.00	00.00	20.00	00.00	00.00	00.00
Period of Non-Support													
Arm Movement													
1. Full extension of arms upward directly above head.	5	40.00	40.00	40.00	00.00	00.00	40.00	00.00	80.00	60.00	00.00	00.00	20.00
1. Slight extension of arms above shoulders.		20.00	40.00	60.00	00.00	20.00	00.00	20.00	00.00	20.00	00.00	00.00	20.00
1. Arms extended above head, opposite arm out to side for balance.		* 40.00	* 20.00	* 00.00	* 100.00	* 80.00	* 60.00	* 60.00	* 20.00	* 20.00	* 100.00	* 100.00	* 60.00
1. Arms extended over head with swinging motion (step).		00.00	00.00	00.00	00.00	00.00	00.00	20.00	00.00	00.00	00.00	00.00	00.00
1. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00

Table C.4 (continued)

Skill: Vertical Jump

Focal Point (Characteristics of Mature Skill)		Physical Education Teacher						Classroom Teacher					
		Test I			Test II			Test I			Test II		
		Treatment			Treatment			Treatment			Treatment		
		1	2	3	1	2	3	1	2	3	1	2	3
Trunk Position													
1. Full extension.	6	20.00	20.00	60.00	100.00*	80.00*	80.00*	00.00	20.00	40.00	100.00*	40.00*	80.00*
1. Little or slight extension.		80.00*	80.00*	40.00*	00.00	20.00	20.00	80.00*	80.00*	40.00*	00.00	60.00	20.00
1. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	20.00	00.00	20.00	00.00	00.00	00.00
2. Little if any horizontal distance covered.	7	00.00	40.00	40.00	100.00*	80.00*	80.00*	00.00	20.00	40.00	100.00*	40.00*	60.00*
2. Little vertical distance covered.		100.00*	60.00*	40.00*	00.00	20.00	20.00	100.00*	80.00*	60.00*	00.00	20.00	20.00
2. Horizontal distance traveled greater than vertical.		00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	40.00	00.00
2. Not observable.		00.00	00.00	20.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	20.00
Leg Position													
1. Full extension of hips.	8	00.00	00.00	40.00	100.00*	80.00*	80.00*	20.00	20.00	00.00	80.00*	40.00*	40.00*
1. Little extension of hips.		80.00*	80.00*	60.00*	00.00	00.00	20.00	60.00*	60.00*	40.00*	00.00	20.00	00.00
1. Slight extension of hips.		20.00	00.00	00.00	00.00	20.00	00.00	00.00	20.00	40.00	20.00	40.00	00.00
1. Partial extension of hips.		00.00	20.00	00.00	00.00	00.00	00.00	20.00	00.00	20.00	00.00	00.00	60.00
1. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
2. Full extension of legs.	9	00.00	00.00	20.00	100.00*	80.00*	80.00*	00.00	20.00	00.00	80.00*	40.00*	40.00*
2. Little extension of legs.		80.00*	80.00*	60.00*	00.00	00.00	20.00	60.00*	60.00*	60.00*	00.00	20.00	00.00
2. Knees flexed.		20.00	00.00	00.00	00.00	20.00	00.00	00.00	20.00	20.00	20.00	40.00	00.00
2. Partial extension of knees.		00.00	20.00	20.00	00.00	00.00	00.00	40.00	00.00	20.00	00.00	00.00	60.00
2. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00

Table C.4 (continued)

Skill: Vertical Jump

Focal Point (Characteristics of Mature Skill)		Physical Education Teacher						Classroom Teacher					
		Test I			Test II			Test I			Test II		
		Treatment			Treatment			Treatment			Treatment		
		1	2	3	1	2	3	1	2	3	1	2	3
Leg Position (continued)					*	*	*				*	*	*
3. Full extension of ankles.	10	00.00	00.00	20.00	100.00	80.00	60.00	20.00	20.00	00.00	60.00	40.00	40.00
		*	*	*				*	*	*			
3. Ankles remain flexed.		80.00	80.00	60.00	00.00	00.00	40.00	40.00	60.00	40.00	20.00	20.00	00.00
3. Ankles flexed.		20.00	00.00	00.00	00.00	20.00	00.00	00.00	20.00	40.00	20.00	40.00	00.00
3. Partial extension of ankles.		00.00	20.00	20.00	00.00	00.00	00.00	40.00	00.00	20.00	00.00	00.00	60.00
3. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
Landing													
Foot Position													
1. Toe to heel landing within 6" area.	11	* 40.00	* 100.00	* 60.00	* 80.00	* 100.00	* 60.00	* 60.00	* 80.00	* 80.00	* 80.00	* 80.00	* 80.00
1. Entire foot contacts surface.		60.00	00.00	20.00	00.00	00.00	00.00	20.00	20.00	00.00	00.00	20.00	00.00
1. Landing on one foot followed with compensatory movement of opposite foot outside 6" landing area.		00.00	00.00	00.00	00.00	00.00	20.00	00.00	00.00	20.00	20.00	00.00	20.00
1. Not observable.		00.00	00.00	20.00	20.00	00.00	20.00	20.00	00.00	00.00	00.00	00.00	00.00
Arm Position													
1. Arms flexed slightly to side of body with delayed downward movement of arms as knees begin to flex.	12	00.00	40.00	40.00	* 80.00	* 100.00	* 60.00	20.00	20.00	40.00	* 40.00	* 60.00	* 60.00
1. Arms extended out from side for balance with elbows flexed (high guard position).		* 60.00	* 60.00	* 40.00	20.00	00.00	00.00	* 60.00	* 80.00	* 40.00	00.00	00.00	20.00

Table C.4 (continued)

Skill: Vertical Jump

Focal Point (Characteristics of Mature Skill)	Physical Education Teacher						Classroom Teacher					
	Test I			Test II			Test I			Test II		
	Treatment			Treatment			Treatment			Treatment		
	1	2	3	1	2	3	1	2	3	1	2	3
Arm Position (continued)												
1. One arm extended out from side for balance (flailing).	00.00	00.00	00.00	00.00	00.00	20.00	20.00	00.00	00.00	60.00	40.00	00.00
1. Not observable.	40.00	00.00	20.00	00.00	00.00	20.00	00.00	00.00	20.00	00.00	00.00	20.00
Knee Position												
1. Knees flex slightly when feet touch surface (110^{0} to 120^{0}). 13	00.00	00.00	40.00	80.00	40.00	40.00	00.00	20.00	60.00	60.00	00.00	20.00
1. Little if any knee flexion.	20.00	00.00	40.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
1. Partial flexion of knees (90^{0} to 110^{0}).	* 80.00	* 100.00	* 20.00	* 20.00	* 60.00	* 60.00	* 80.00	* 80.00	* 40.00	* 40.00	* 100.00	* 80.00
1. Not observable.	00.00	00.00	00.00	00.00	00.00	00.00	20.00	00.00	00.00	00.00	00.00	00.00
2. Ankles flex fully during completion of landing. 14	00.00	00.00	20.00	80.00	20.00	20.00	00.00	00.00	40.00	20.00	40.00	20.00
2. Little if any ankle flexion.	60.00	00.00	80.00	00.00		20.00	00.00	20.00	60.00	00.00	40.00	00.00
2. Partial flexion of ankles (landing on toes, taking a step before completion on jump).	* 40.00	* 100.00	* 00.00	* 20.00	* 80.00	* 60.00	* 80.00	* 80.00	* 00.00	* 60.00	* 20.00	* 80.00
2. Not observable.	00.00	00.00	00.00	00.00	00.00	00.00	20.00	00.00	00.00	20.00	00.00	00.00

Table C.5

Results from Evaluation Films: Treatment Effect
Percent of Correct and Incorrect Answers per Focal Point

Skill: Gallop

Focal Point (Characteristics of Mature Skill)		Combined Treatment Scores		Individual Treatment Scores					
		Test I	Test II	Test I			Test II		
				Treatment			Treatment		
				1	2	3	1	2	3
Lead Leg Movement									
1. A step forward with the lead foot with heel to toe movement.	1	* 100.00	* 90.00	* 100.00	* 100.00	* 100.00	* 100.00	* 90.00	* 80.00
1. Not observable.		00.00	10.00	00.00	00.00	00.00	00.00	10.00	20.00
1. Knee is slightly flexed (more than rear leg as step is taken).	2	* 83.33	* 60.00	* 90.00	* 100.00	* 60.00	* 80.00	* 60.00	* 40.00
2. (Precursor) Exaggerated flexion of lead leg.		10.00	33.33	00.00	00.00	30.00	20.00	40.00	40.00
2. Not observable.		6.67	6.67	10.00	00.00	10.00	00.00	00.00	20.00
3. Lead foot pointing forward.	3	93.33 *	73.33 *	* 100.00	* 100.00	* 80.00	* 90.00	* 70.00	* 60.00
3. Lead foot not pointing forward.		3.33	20.00	00.00	00.00	10.00	10.00	30.00	20.00
3. Not observable.		3.33	6.67	00.00	00.00	10.00	00.00	00.00	20.00
4. Complete extension of lead foot (150^{o}-160^{o}).	4	* 30.00	* 23.33	* 60.00	* 30.00	* 00.00	* 20.00	* 40.00	* 10.00
4. Partial extension of lead leg as forward step is taken (120^{o}-150^{o}).		66.67	73.33	40.00	70.00	90.00	80.00	60.00	80.00
4. Exaggerated extension of lead leg (180^{o}).		00.00	3.33	00.00	00.00	00.00	00.00	00.00	10.00
4. Not observable.		3.33	0.00	00.00	00.00	10.00	00.00	00.00	00.00
5. Able to use either foot as lead leg.	5	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
5. Not able to establish a dominate lead leg.		00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
5. Not observable.		100.00 *	100.00 *	* 100.00	* 100.00	* 100.00	* 100.00	* 100.00	* 100.00

Table C.5 (continued)

Skill: Gallop

Focal Point (Characteristics of Mature Skill)		Combined Treatment Scores		Individual Treatment Scores					
				Test I			Test II		
				Treatment			Treatment		
		Test I	Test II	1	2	3	1	2	3
Rear Leg Movement									
1. Flexion of the rear knee (between 120°-150°) as it moves toward and almost even with lead leg.	6	* 56.67	10.00	* 60.00	* 70.00	* 40.00	20.00	00.00	10.00
1. Straight rear leg as it is brought toward lead leg.		13.33	3.33	10.00	00.00	30.00	00.00	10.00	00.00
1. Partial flexion (Between 170°-180°) of rear leg as it is brought toward lead leg.		30.00	* 83.33	30.00	30.00	30.00	* 80.00	* 80.00	* 90.00
1. Not observable.		00.00	3.33	00.00	00.00	00.00	00.00	10.00	00.00
2. The toe of read leg makes contact with the surface before the toe of the lead foot departs for next step.	7	* 86.67	* 86.67	* 70.00	* 100.00	* 90.00	* 100.00	* 90.00	* 70.00
2. Not observable.		13.33	13.33	30.00	00.00	10.00	00.00	10.00	30.00
3. Rear foot points forward.		30.00	73.33	10.00	20.00	60.00	80.00	70.00	70.00
3. Rear foot points to side (inside portion of foot used to push).	8	66.67 *	* 23.33	90.00 *	80.00 *	30.00 *	* 20.00	* 30.00	* 20.00
3. Not observable.		3.33	3.33	00.00	00.00	10.00	00.00	00.00	10.00
Arm Position									
1. A coordinated lift of the arms in front on the body as the body weight is transferred smoothly.	9	16.67	10.00	00.00	00.00	50.00	20.00	00.00	10.00
1. Extraneous flailing arm movements as weight is shifted in haphazard manner (precursor).		6.67	20.00	10.00	00.00	10.00	30.00	00.00	30.00

Table C.5 (continued)

Skill: Gallop

Focal Point (Characteristics of Mature Skill)	Combined Treatment Scores		Individual Treatment Scores					
			Test I			Test II		
	Test I	Test II	Treatment			Treatment		
			1	2	3	1	2	3
Arm Position (continued)								
1. Extraneous arm movement used for both force production and braking action necessitated for balance as weight is deliberately transferred.	13.33	* 56.67	10.00	10.00	20.00	* 50.00	* 90.00	* 30.00
1. Arm immobile, tucked into chest not helping with weight transfer.	0.00	0.00	00.00	00.00	00.00	00.00	00.00	00.00
1. Arms extended from sides for balance (winging) possibly causing body to rotate in a sliding pattern as arms work in uncoordinated lift to assist with weight transfer.	* 63.33	13.33	* 80.00	* 90.00	* 20.00	00.00	10.00	30.00
1. Not observable.	0.00	0.00	00.00	00.00	00.00	00.00	00.00	00.00

Table C.5 (continued)

Skill: Gallop

Focal Point (Characteristics of Mature Skill)	Physical Education Teacher						Classroom Teacher					
	Test I			Test II			Test I			Test II		
	Treatment			Treatment			Treatment			Treatment		
	1	2	3	1	2	3	1	2	3	1	2	3
Lead Leg Movement												
1. A step forward with the lead foot with heel to toe movement. 1	* 100.00	* 100.00	* 100.00	* 100.00	* 100.00	* 80.00	* 100.00	* 100.00	* 100.00	* 100.00	* 80.00	* 80.00
1. Not observable.	00.00	00.00	00.00	00.00	00.00	20.00	00.00	00.00	00.00	00.00	20.00	20.00
2. Knee is slightly flexed (more than rear leg as step is taken). 2	* 100.00	* 100.00	* 80.00	* 80.00	* 80.00	* 40.00	* 80.00	* 100.00	* 40.00	* 80.00	* 40.00	* 40.00
2. (Precursor) Exaggerated flexion of lead leg.	00.00	00.00	20.00	20.00	20.00	60.00	00.00	00.00	40.00	20.00	60.00	20.00
2. Not observable.	00.00	00.00	00.00	00.00	00.00	00.00	20.00	00.00	20.00	00.00	40.00	40.00
3. Lead foot point forward. 3	* 100.00	* 100.00	* 100.00	* 100.00	* 80.00	* 40.00	* 100.00	* 100.00	* 60.00	* 80.00	* 60.00	* 80.00
3. Lead foot not pointing forward.	00.00	00.00	00.00	00.00	20.00	40.00	00.00	00.00	20.00	20.00	40.00	00.00
3. Not observable.	00.00	00.00	00.00	00.00	00.00	20.00	00.00	00.00	20.00	00.00	00.00	20.00
4. Complete extension of lead foot (150^{o}-160^{o}). 4	* 60.00	* 60.00	* 00.00	* 40.00	* 20.00	* 20.00	* 60.00	* 00.00	* 00.00	* 00.00	* 60.00	* 00.00
4. Partial extension of lead leg as forward step is taken (120^{o}-150^{o}).	40.00	40.00	80.00	60.00	80.00	60.00	40.00	100.00	100.00	100.00	40.00	100.00
4. Exaggerated extension of lead leg (180^{o}).	00.00	00.00	00.00	00.00	00.00	20.00	00.00	00.00	00.00	00.00	00.00	00.00
4. Not observable.	00.00	00.00	20.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
5. Able to use either foot as lead leg. 5	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00

Table C.5 (continued)

Skill: Gallop

Focal Point (Characteristics of Mature Skill)		Physical Education Teacher						Classroom Teacher					
		Test I			Test II			Test I			Test II		
		Treatment			Treatment			Treatment			Treatment		
		1	2	3	1	2	3	1	2	3	1	2	3
Lead Leg Movement (continued)													
5. Not able to establish a dominate lead leg.		00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
5. Not observable.		100.00*	100.00*	100.00*	100.00*	100.00*	100.00*	100.00*	100.00*	100.00*	100.00*	100.00*	100.00*
Rear Leg Movement													
1. Flexion of the rear knee (between 120°-150°) as it moves toward and almost even with lead leg.	6	60.00*	60.00*	40.00*	40.00	00.00	00.00	60.00*	80.00*	40.00*	00.00	00.00	20.00
1. Straight rear leg as it is brought toward lead leg.		00.00	00.00	20.00	00.00	00.00	00.00	20.00	20.00	40.00	00.00	20.00	00.00
1. Partial flexion (between 170°-180°) of rear leg as it is brought toward lead leg.		40.00	40.00	40.00	60.00*	100.00*	100.00*	20.00	00.00	20.00	100.00*	60.00*	80.00*
1. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	20.00	00.00
2. The toe of rear leg makes contact with the surface before the toe of the lead foot departs for next step.	7	80.00*	100.00*	100.00*	100.00*	100.00*	80.00*	60.00*	100.00*	80.00*	100.00*	80.00*	60.00*
2. Not observable.		20.00	00.00	00.00	00.00	00.00	20.00	40.00	00.00	20.00	00.00	20.00	40.00
3. Rear foot points forward.	8	20.00	20.00	40.00	100.00*	80.00*	60.00*	00.00	20.00	60.00	60.00*	60.00*	80.00*
3. Rear foot points to side (inside portion of foot used to push).		80.00*	80.00*	60.00*	00.00	20.00	40.00	100.00*	80.00*	20.00*	40.00	40.00	00.00
3. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	20.00	00.00	00.00	20.00

Table C.5 (continued)

Skill: Gallop

Focal Point (Characteristics of Mature Skill)	Physical Education Teacher						Classroom Teacher					
	Test I			Test II			Test I			Test II		
	Treatment			Treatment			Treatment			Treatment		
	1	2	3	1	2	3	1	2	3	1	2	3
Arm Position												
1. A coordinated lift of the arms in front on the body as the body weight is transferred smoothly. 9	00.00	00.00	60.00	20.00	00.00	00.00	00.00	00.00	40.00	20.00	00.00	20.00
1. Extraneous flailing arm movements as weight is shifted in haphazard manner (precursor).	00.00	00.00	00.00	40.00	00.00	40.00	20.00	00.00	20.00	20.00	00.00	20.00
1. Extraneous arm movement used for both force production and braking action necessitated for balance as weight is deliberately transferred.	00.00	00.00	20.00	* 40.00	* 80.00	* 60.00	20.00	20.00	20.00	* 60.00	* 100.00	* 00.00
1. Arm immobile, tucked into chest not helping with weight transfer.	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
1. Arms extended from sides for balance (winging) possibly causing body to rotate in a sliding pattern as arms work in uncoordinated lift to assist with weight transfer.	* 100.00	* 100.00	* 20.00	00.00	20.00	00.00	* 60.00	* 80.00	* 20.00	00.00	00.00	00.00
1. Not observable.	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00

Table C.6

Results from Evaluation Films: Treatment Effect
Percent of Correct and Incorrect Answers per Focal Point

Skill: Slide

Focal Point (Characteristics of Mature Skill)		Combined Treatment Scores		Individual Treatment Scores					
				Test I			Test II		
		Test I	Test II	Treatment 1	Treatment 2	Treatment 3	Treatment 1	Treatment 2	Treatment 3
Lead Foot Movement									
1. A step sideways with one foot (90° from direction of movement).	1	* 60.00	6.67	* 80.00	* 60.00	* 40.00	10.00	10.00	00.00
1. Lead foot does not point forward (foot points toward direction of movement-less than 90° from direction of movement).		36.67	* 93.33	20.00	30.00	60.00	* 90.00	* 90.00	* 100.00
1. Not observable.		3.33	0.00	00.00	10.00	00.00	00.00	00.00	00.00
2. Body of individual faced forward.	2	56.67 *	6.67 *	* 70.00	* 70.00	* 30.00	20.00	00.00	00.00
2. Body turns in direction of movement.		43.33	93.33	30.00	30.00	70.00	* 80.00	* 100.00	* 100.00
2. Not observable.		0.00	0.00	00.00	00.00	00.00	00.00	00.00	00.00
Following Foot Movement									
1. A slide of following foot next to lead foot, touching or almost touching the heel of the lead foot during a short non-support period.	3	30.00	13.33	50.00	20.00	20.00	20.00	10.00	10.00
1. Exaggerated stiffness of following leg as it is being moved toward the stationary lead foot.		* 53.33	* 60.00	* 40.00	* 70.00	* 50.00	* 70.00	* 60.00	* 50.00
1. Exaggerated stiffness of following leg with a short period on non-support.		16.67	23.33	10.00	10.00	30.00	10.00	30.00	30.00
1. Not observable.		00.00	3.33	00.00	00.00	00.00	00.00	00.00	10.00

Table C.6 (continued)

Skill: Slide

Focal Point (Characteristics of Mature Skill)		Combined Treatment Scores		Individual Treatment Scores					
				Test I			Test II		
		Test I	Test II	Treatment			Treatment		
				1	2	3	1	2	3
Following Foot Movement (continued)									
2. Following foot points forward (90° from direction of movements).	4	* 86.67	30.00	* 90.00	* 100.00	* 70.00	30.00	20.00	40.00
2. Following foot points in direction of movement.		13.33	* 66.67	10.00	00.00	30.00	* 70.00	* 70.00	* 60.00
2. Not observable.		0.00	3.33	00.00	00.00	00.00	00.00	10.00	00.00
Arm Position									
1. Arm opposite lead leg extends slightly from the side in the direction opposite of the body movement.	5	6.67	20.00	10.00	00.00	10.00	30.00	10.00	20.00
1. No movement of arm opposite lead leg in direction opposite of body movement.		* 90.00	* 73.33	* 90.00	* 100.00	* 80.00	* 60.00	* 90.00	* 70.00
1. Not observable.		3.33	6.67	00.00	00.00	10.00	10.00	00.00	10.00
2. Both arms extended and elbows flexed between waist and shoulder height.	6	20.00	20.00	10.00	30.00	20.00	20.00	20.00	20.00
2. Both arms display exaggerated stiffness from sides of body.		* 80.00	* 73.33	* 90.00	* 70.00	* 80.00	* 70.00	* 70.00	* 80.00
2. Not observable.		00.00	6.67	00.00	00.00	00.00	10.00	10.00	00.00
Weight Transfer									
1. A smooth flowing weight transfer from following leg to lead foot.	7	6.67	13.33	10.00	10.00	00.00	30.00	00.00	10.00
1. A deliberate transfer of weight from following foot to lead foot.		16.67	70.00 *	10.00	00.00	40.00	* 70.00	* 80.00	* 60.00

Table C.6 (continued)

Skill: Slide

Focal Point (Characteristics of Mature Skill)	Combined Treatment Scores		Individual Treatment Scores					
			Test I			Test II		
	Test I	Test II	Treatment			Treatment		
			1	2	3	1	2	3
Weight Transfer (continued)								
1. A jerky transfer of weight from following foot to lead foot.	* 76.67	16.67	* 80.00	* 90.00	* 60.00	00.00	20.00	30.00
1. Not observable.	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
2. Can slide for 5 consecutive cycles in a straight line.	30.00	* 90.00	10.00	20.00	60.00	* 100.00	* 70.00	* 100.00
2. Cannot slide 5 consecutive cycles in a straight line.	* 70.00	3.33	* 90.00	* 80.00	* 40.00	00.00	10.00	00.00
2. Not observable.	0.00	6.67	00.00	00.00	00.00	00.00	20.00	00.00

Table C.6 (continued)

Skill: Slide

Focal Point (Characteristics of Mature Skill)		Physical Education Teacher						Classroom Teacher					
		Test I			Test II			Test I			Test II		
		Treatment			Treatment			Treatment			Treatment		
		1	2	3	1	2	3	1	2	3	1	2	3
Lead Foot Movement													
1. A step sideways with one foot (90° from direction of movement).	1	* 80.00	* 100.00	* 40.00	00.00	20.00	00.00	* 80.00	* 20.00	* 40.00	20.00	00.00	00.00
1. Lead foot does not point forward (foot points toward direction of movement-less than 90° from direction of movement).		20.00	00.00	60.00	* 100.00	* 80.00	* 100.00	20.00	60.00	60.00	* 80.00	* 100.00	* 100.00
1. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	00.00	20.00	00.00	00.00	00.00	00.00
2. Body of individual faced forward.	2	* 80.00	* 60.00	* 60.00	20.00	00.00	00.00	60.00	* 80.00	* 00.00	20.00	00.00	00.00
2. Body turns in direction of movement.		20.00	40.00	40.00	* 80.00	* 100.00	* 100.00	40.00	20.00	100.00	* 80.00	* 100.00	* 100.00
2. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
Following Foot Movement													
1. A slide of following foot next to lead foot, touching or almost touching the heel of the lead foot during a short non-support period.	3	40.00	40.00	20.00	00.00	20.00	00.00	60.00	00.00	20.00	40.00	00.00	20.00
1. Exaggerated stiffness of following leg as it is being moved toward the stationary lead foot.		* 40.00	* 40.00	* 40.00	* 80.00	* 80.00	* 80.00	* 40.00	* 100.00	* 60.00	* 60.00	* 40.00	* 20.00
1. Exaggerated stiffness of following leg with a short period on non-support.		20.00	20.00	20.00	20.00	00.00	20.00	00.00	00.00	20.00	00.00	60.00	40.00

Table C.6 (continued)

Skill: Slide

Focal Point (Characteristics of Mature Skill)		Physical Education Teacher						Classroom Teacher					
		Test I			Test II			Test I			Test II		
		Treatment			Treatment			Treatment			Treatment		
		1	2	3	1	2	3	1	2	3	1	2	3
Following Foot Movement (continued)													
1. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	20.00
2. Following foot points forward (90° from direction of movement).	4	* 100.00	* 100.00	* 80.00	40.00	40.00	20.00	* 80.00	* 100.00	* 60.00	20.00	00.00	60.00
2. Following foot points in direction of movement.		00.00	00.00	20.00	* 60.00	* 60.00	* 80.00	20.00	00.00	40.00	* 80.00	* 80.00	* 40.00
2. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	20.00	00.00
Arm Position													
1. Arm opposite lead leg extends slightly from the side in the direction opposite of the body movement.	5	00.00	00.00	20.00	20.00	00.00	00.00	20.00	00.00	00.00	40.00	20.00	40.00
1. No movement of arm opposite lead leg in direction opposite of body movement.		* 100.00	* 100.00	* 80.00	* 60.00	* 100.00	* 100.00	* 80.00	* 100.00	* 80.00	* 60.00	* 80.00	* 40.00
1. Not observable.		00.00	00.00	00.00	20.00	00.00	00.00	00.00	00.00	20.00	00.00	00.00	20.00
2. Both arms extended and elbows flexed between waist and shoulder height.	6	00.00	60.00	00.00	20.00	80.00	20.00	20.00	00.00	40.00	20.00	40.00	20.00
2. Both arms display exaggerated stiffness from sides of body.		* 100.00	* 40.00	* 100.00	* 60.00	* 80.00	* 80.00	* 80.00	* 100.00	* 60.00	* 80.00	* 60.00	* 80.00
2. Not observable.		00.00	00.00	00.00	20.00	20.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00

Table C.6 (continued)

Skill: Slide

Focal Point (Characteristics of Mature Skill)		Physical Education Teacher						Classroom Teacher					
		Test I			Test II			Test I			Test II		
		Treatment			Treatment			Treatment			Treatment		
		1	2	3	1	2	3	1	2	3	1	2	3
Weight Transfer													
1. A smooth flowing weight transfer from following leg to lead leg.	7	00.00	00.00	00.00	20.00	00.00	00.00	20.00	20.00	00.00	40.00	00.00	20.00
1. A deliberate transfer of weight from following foot to lead foot.		20.00	00.00	20.00	* 80.00	* 80.00	* 60.00	00.00	00.00	60.00	* 60.00	* 80.00	* 60.00
1. A jerky transfer of weight from following foot to lead foot.		* 80.00	* 100.00	* 80.00	00.00	20.00	40.00	* 80.00	* 80.00	* 40.00	00.00	20.00	20.00
1. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
2. Can slide for 5 consecutive cycles in a straight line.	8	00.00	40.00	40.00	* 100.00	* 60.00	* 100.00	20.00	00.00	80.00	* 100.00	* 80.00	* 100.00
2. Cannot slide 5 consecutive cycles in a straight line.		* 100.00	* 60.00	* 60.00	00.00	20.00	00.00	* 80.00	* 100.00	* 20.00	00.00	00.00	00.00
2. Not observable.		00.00	00.00	00.00	00.00	20.00	00.00	00.00	00.00	00.00	00.00	20.00	00.00

Table C.7

Results from Evaluation Films: Treatment Effect
Percent of Correct and Incorrect Answers per Focal Point

Skill Hop

Focal Point (Characteristics of Mature Skill)		Combined Treatment Scores		Individual Treatment Scores					
				Test I			Test II		
		Test I	Test II	Treatment			Treatment		
				1	2	3	1	2	3
Leg Position		*	*	*	*	*	*	*	*
1. Upright trunk carriage over support leg.	1	83.33	63.33	70.00	100.00	80.00	60.00	80.00	50.00
1. Trunk carriage not over support leg (loss of balance).		16.67	33.33	30.00	00.00	20.00	40.00	20.00	40.00
1. Not observable.		0.00	3.33	00.00	00.00	00.00	00.00	00.00	10.00
2. Carrying slightly flexed thigh of non-support leg so that it is slightly in front of support leg.	2	* 86.67	* 60.00	* 100.00	* 90.00	* 70.00	* 50.00	* 90.00	* 40.00
2. Carrying the non-support leg in front of body.		6.67	16.67	00.00	10.00	10.00	30.00	10.00	10.00
2. Rotation of non-support leg causing over compensation of arms and trunk action (little forward distance covered).		3.33	23.33	00.00	00.00	10.00	20.00	00.00	50.00
2. Not observable.		3.33	00.00	00.00	00.00	10.00	00.00	00.00	00.00
3. Foot of non-support leg is extended (125^{0}) close to the floor in back of body.	3	* 73.33	* 13.33	* 100.00	* 50.00	* 70.00	* 20.00	* 00.00	* 20.00
3. Foot of non-support leg is flexed 90^{0} or more almost touching buttocks.		23.33	83.33	00.00	50.00	20.00	80.00	100.00	70.00
3. Not observable.		3.33	3.33	00.00	00.00	10.00	00.00	00.00	10.00
4. Carrying non-support leg near midline of body.	4	* 80.00	* 63.33	* 100.00	* 80.00	* 60.00	* 80.00	* 80.00	* 30.00
4. Carrying non-support leg away from the midline of the body.		20.00	33.33	00.00	20.00	40.00	20.00	20.00	60.00
4. Not observable.		00.00	3.33	00.00	00.00	00.00	00.00	00.00	00.00

Table C.7 (continued)

Skill: Hop

Focal Point (Characteristics of Mature Skill)		Combined Treatment Scores		Individual Treatment Scores					
				Test I			Test II		
				Treatment			Treatment		
		Test I	Test II	1	2	3	1	2	3
Arm Position									
1. Arms kept in front of the body with elbows slightly flexed (chest height).	5	53.33	3.33	60.00	40.00	60.00	00.00	10.00	00.00
1. Exaggerated high elevation of arms (shoulder level or higher).		* 30.00	* 96.67	* 30.00	* 40.00	* 20.00	* 100.00	* 90.00	* 100.00
1. Arm of support leg side of body flexed in front of body (arm extended from side for balance).		13.33	0.00	00.00	20.00	20.00	00.00	00.00	00.00
1. Not observable.		3.33	0.00	10.00	00.00	00.00	00.00	00.00	00.00
2. Both arms lift in coordination with the push-off phase of hop.	6	* 73.33	* 46.67	* 90.00	* 70.00	* 60.00	* 30.00	* 50.00	* 60.00
2. Arms not working together symmetrically (excessive arm action).		10.00	10.00	100.00	10.00	10.00	30.00	00.00	00.00
2. Arms move in circular motion for momentum and balance (around shoulder axis).		3.33	13.33	00.00	00.00	10.00	20.00	10.00	10.00
2. Arms move up and down in front of body for momentum and balance (shoulder to waist).		10.00	26.67	00.00	20.00	10.00	20.00	40.00	20.00
2. Not observable.		3.33	3.33	00.00	00.00	10.00	00.00	00.00	10.00
Body Movement									
1. Hop on either foot 5 consecutive times.	7	100.00	00.00	100.00	100.00	100.00	00.00	00.00	00.00
1. Cannot hop on either foot 5 consecutive times.		00.00	3.33	00.00	00.00	00.00	10.00	00.00	00.00

Table C.7 (continued)

Skill: Hop

Focal Point (Characteristics of Mature Skill)	Combined Treatment Scores		Individual Treatment Scores					
			Test I			Test II		
			Treatment			Treatment		
	Test I	Test II	1	2	3	1	2	3
Body Movement (continued)								
1. Can hop on dominate foot 5 times.	* 00.00	* 96.67	* 00.00	* 00.00	* 00.00	* 90.00	* 100.00	* 100.00
1. Not observable.	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
2. Hop in a straight path which is 6 inches wide.	* 100.00	* 60.00	* 100.00	* 100.00	* 100.00	* 70.00	* 50.00	* 60.00
2. Cannot hop in a straight path 6 inches wide (zigzag).	00.00	40.00	00.00	00.00	00.00	30.00	50.00	40.00
2. Not observable.	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00

Table C.7 (continued)

Skill: Hop

Focal Point (Characteristics of Mature Skill)		Physical Education Teacher						Classroom Teacher					
		Test I			Test II			Test I			Test II		
		Treatment			Treatment			Treatment			Treatment		
		1	2	3	1	2	3	1	2	3	1	2	3
Leg Position													
1. Upright trunk carriage over support leg.	1	* 40.00	* 100.00	* 60.00	* 80.00	* 60.00	* 40.00	* 100.00	* 100.00	* 100.00	* 40.00	* 100.00	* 60.00
1. Trunk carriage not over support leg (loss of balance).		60.00	00.00	40.00	20.00	40.00	40.00	00.00	00.00	00.00	60.00	00.00	40.00
1. Not observable.		00.00	00.00	00.00	00.00	00.00	20.00	00.00	00.00	00.00	00.00	00.00	00.00
2. Carrying slightly flexed thigh of non-support leg so that it is slightly in front of support leg.	2	* 100.00	* 100.00	* 60.00	* 60.00	* 100.00	* 20.00	* 100.00	* 80.00	* 80.00	* 40.00	* 80.00	* 60.00
2. Carrying the non-support leg in front of body.		00.00	00.00	00.00	40.00	00.00	00.00	00.00	20.00	20.00	20.00	20.00	20.00
2. Rotation of non-support leg causing over compensation of arms and trunk action (little forward distance covered).		00.00	00.00	20.00	00.00	00.00	80.00	00.00	00.00	00.00	40.00	00.00	20.00
2. Not observable.		00.00	00.00	20.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
3. Foot of non-support leg is extended (125°) clost to the floor in back of body.	3	* 100.00	* 60.00	* 60.00	20.00	00.00	00.00	* 100.00	* 40.00	* 80.00	20.00	00.00	40.00
3. Foot of non-support leg is flexed 90° or more almost touching buttocks.		00.00	40.00	20.00	* 80.00	* 100.00	* 100.00	00.00	60.00	20.00	* 80.00	* 100.00	* 40.00
3. Not observable.		00.00	00.00	20.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	20.00
4. Carrying non-support leg near midline of body.	4	* 100.00	* 100.00	* 40.00	* 100.00	* 80.00	* 40.00	* 100.00	* 60.00	* 80.00	* 60.80	* 80.00	* 20.00

Table C.7 (continued)

Skill: Hop

Focal Point (Characteristics of Mature Skill)		Physical Education Teacher						Classroom Teacher					
		Test I			Test II			Test I			Test II		
		Treatment			Treatment			Treatment			Treatment		
		1	2	3	1	2	3	1	2	3	1	2	3
Leg Position (continued)													
4. Carrying non-support leg away from the midline of the body.		00.00	00.00	60.00	00.00	20.00	40.00	00.00	40.00	20.00	40.00	20.00	80.00
4. Not observable.		00.00	00.00	00.00	00.00	00.00	20.00	00.00	00.00	00.00	00.00	00.00	00.00
Arm Position													
1. Arms kept in front of the body with elbows slightly flexed (chest height).	5	40.00	60.00	60.00	00.00	20.00	00.00	80.00	20.00	60.00	00.00	00.00	00.00
1. Exaggerated high elevation of arms (shoulder level or higher).		* 40.00	* 40.00	* 00.00	* 100.00	* 80.00	* 20.00	* 20.00	* 40.00	* 40.00	* 100.00	* 100.00	* 100.00
1. Arm of support leg side of body flexed in front of body (arm extended from side for balance).		00.00	00.00	40.00	00.00	00.00	00.00	00.00	40.00	00.00	00.00	00.00	00.00
1. Not observable.		20.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
2. Both arms lift in coordination with the push-off phase of hop.	6	* 80.00	* 100.00	* 60.00	* 40.00	* 00.00	* 60.00	* 100.00	* 40.00	* 60.00	* 20.00	* 20.00	* 60.00
2. Arms not working together symmetrically (excessive arm action).		20.00	00.00	20.00	40.00	00.00	00.00	00.00	20.00	00.00	20.00	00.00	00.00
2. Arms move in circular motion for momentum and balance (around shoulder axis).		00.00	00.00	00.00	00.00	00.00	20.00	00.00	00.00	20.00	40.00	20.00	00.00
2. Arms move up and down in front of body for momentum and balance (shoulder to waist).		00.00	00.00	20.00	20.00	00.00	20.00	00.00	40.00	00.00	20.00	60.00	40.00

Table C.7 (continued)

Skill: Hop

Focal Point (Characteristics of Mature Skill)		Physical Education Teacher						Classroom Teacher					
		Test I			Test II			Test I			Test II		
		Treatment			Treatment			Treatment			Treatment		
		1	2	3	1	2	3	1	2	3	1	2	3
Arm Position (continued)													
2. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	20.00	00.00	00.00	00.00
Body Movement													
1. Hop on either foot 5 consecutive times.	7	100.00	100.00	100.00	00.00	00.00	00.00	100.00	100.00	100.00	00.00	00.00	00.00
1. Cannot hop on either foot 5 consecutive times.		00.00	00.00	00.00	00.00	100.00	00.00	00.00	00.00	00.00	20.00	00.00	00.00
1. Can hop on dominate foot 5 times.		* 100.00	* 00.00	* 00.00	* 100.00	* 00.00	* 100.00	* 00.00	* 00.00	* 00.00	* 80.00	* 100.00	* 100.00
1. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
2. Hop in a straight path which is 6 inches wide.	8	* 100.00	* 100.00	* 100.00	* 60.00	* 40.00	* 80.00	* 100.00	* 100.00	* 100.00	* 80.00	* 60.00	* 40.00
2. Cannot hop in a straight path 6 inches wide (zigzag).		00.00	00.00	00.00	40.00	60.00	20.00	00.00	00.00	00.00	20.00	40.00	60.00
2. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00

Table C.8

Results from Evaluation Films: Treatment Effect
Percent of Correct and Incorrect Answers per Focal Point

Skill: Skip

Focal Point (Characteristics of Skill)		Combined Treatment Scores		Individual Treatment Scores					
				Test I			Test II		
		Test I	Test II	Treatment			Treatment		
				1	2	3	1	2	3
Leg Movement									
1. A rhythmical repetition of the step-hop on alternate feel along a straight line.	1	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
1. A deliberate step-hop pattern with a forceful step during the landing phase of skipping (vertical distance).		* 100.00	* 100.00	* 100.00	* 100.00	* 100.00	* 100.00	* 100.00	* 100.00
1. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
2. A smooth low flexion of non-support leg (120^0-150^0) near surface.	2	3.33	00.00	00.00	10.00	00.00	00.00	00.00	00.00
2. An exaggerated flexion of non-support leg (foot almost contacting buttock).		* 80.00	* 96.00	* 90.00	* 80.00	* 70.00	* 100.00	* 100.00	* 90.00
2. A smooth low flexion of non-support leg (120^0-150^0) with high vertical elevation.		13.33	00.00	10.00	10.00	20.00	00.00	00.00	00.00
2. Not observable.		3.33	3.33	00.00	00.00	10.00	00.00	00.00	10.00
3. Legs do not cross midline of body.	3	13.33	10.00	20.00	10.00	10.00	20.00	00.00	10.00
3. Legs cross midline of body.		* 86.67	* 90.00	* 80.00	* 90.00	* 90.00	* 80.00	* 100.00	* 90.00
3. Not observable.		0.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
Arm Movement									
1. Arms alternately moving in opposition to leg at about waist level.	4	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
1. Extraneous arm movements (balance).		63.33	60.00	70.00	50.00	70.00	80.00	50.00	50.00

Table C.8 (continued)

Skill: Skip

Focal Point (Characteristics of Skill)		Combined Treatment Scores		Individual Treatment Scores					
				Test I			Test II		
		Test I	Test II	Treatment			Treatment		
				1	2	3	1	2	3
Arm Movement (continued)									
1. Deliberate arm action for elevation (braking action).		* 36.67	* 40.00	* 30.00	* 50.00	* 30.00	* 20.00	* 50.00	* 50.00
1. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
2. Arms do not cross midline.	5	20.00	10.00	30.00	30.00	00.00	20.00	10.00	00.00
2. Arms cross midline.		* 80.00	* 90.00	* 70.00	* 70.00	* 100.00	* 80.00	* 90.00	* 100.00
2. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
Weight Transfer									
1. A smooth flowing transfer of body weight from one leg to the other along a straight line.	6	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
1. Over compensation body action due to poor weight transfer causing a zigzag movement along a straight line.		* 100.00	* 100.00	* 100.00	* 100.00	* 100.00	* 100.00	* 100.00	* 100.00
1. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00

Table C.8 (continued)

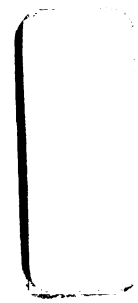
Skill: Skip

Focal Point (Characteristics of Skill)		Physical Education Teacher						Classroom Teacher					
		Test I			Test II			Test I			Test II		
		Treatment			Treatment			Treatment			Treatment		
		1	2	3	1	2	3	1	2	3	1	2	3
Leg Movement													
1. A rhythmical repetition of the step-hop on alternate feet along a straight line.	1	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
1. A deliberate step-hop pattern with a forceful step during the landing phase of skipping (vertical distance).		* 100.00	* 100.00	* 100.00	* 100.00	* 100.00	* 100.00	* 100.00	* 100.00	* 100.00	* 100.00	* 100.00	* 100.00
1. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
2. A smooth low flexion of non-support leg (120°-150°) near surface.	2	00.00	00.00	00.00	00.00	00.00	00.00	80.00	20.00	00.00	00.00	00.00	00.00
2. An exaggerated flexion of non-support leg (foot almost contacting buttock).		* 100.00	* 100.00	* 80.00	* 100.00	*	* 100.00	* 20.00	* 60.00	* 60.00	* 100.00	* 100.00	* 80.00
2. A smooth low flexion of non-support leg (120°-150°) with high vertical elevation.		00.00	00.00	20.00	00.00	00.00	00.00	00.00	20.00	20.00	00.00	00.00	00.00
2. Not observable.		00.00	00.00	00.00	00.00		00.00	00.00	00.00	20.00	00.00	00.00	20.00
3. Legs do not cross midline of body.	3	20.00	20.00	20.00	20.00		00.00	20.00	00.00	00.00	20.00	00.00	20.00
3. Legs cross midline of body.		* 80.00	* 80.00	* 80.00	* 80.00	*	* 100.00	* 80.00	* 100.00	* 100.00	* 80.00	* 100.00	* 80.00
3. Not observable.		00.00	00.00	00.00	00.00		00.00	00.00	00.00	00.00	00.00	00.00	00.00

Table C.8 (continued)

Skill: Skip

Focal Point (Characteristics of Skill)		Physical Education Teacher						Classroom Teacher					
		Test I			Test II			Test I			Test II		
		Treatment			Treatment			Treatment			Treatment		
		1	2	3	1	2	3	1	2	3	1	2	3
Arm Movement													
1. Arms alternately moving in opposition to leg at about waist level.	4	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
1. Extraneous arm movements (balance).		60.00	60.00	40.00	80.00		40.00	80.00	40.00	20.00	80.00	40.00	60.00
1. Deliberate arm action for elevation (braking action).		* 40.00	* 40.00	* 60.00	* 20.00	*	* 60.00	* 20.00	* 60.00	* 80.00	* 20.00	* 60.00	* 40.00
1. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
2. Arms do not cross midline.	5	20.00	40.00	100.00	20.00		00.00	00.00	80.00	00.00	20.00	20.00	00.00
2. Arms cross midline.		* 80.00	* 60.00	* 00.00	* 80.00	*	* 100.00	* 100.00	* 20.00	* 100.00	* 80.00	* 80.00	* 100.00
2. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
Weight Transfer													
1. A smooth flowing transfer of body weight from one leg to the other along a straight line.	6	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00
1. Over compensation body action due to poor weight transfer causing a zigzag movement along a straight line.		* 100.00	* 100.00	* 100.00	* 100.00	* 100.00	* 100.00	* 100.00	* 100.00	* 100.00	* 100.00	* 100.00	* 100.00
1. Not observable.		00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00	00.00






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