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The Effects of a Dance Movement Education Curriculum On Selected Psychomotor Skills Of Children in Grades K-8

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The effects of a dance/movement education (D/ME) program on children's fitness and gross motor development is reported. Fifty-four girls and 66 boys received 36 weeks of D/ME in conjunction with the school's regular physical education program. The D/ME intervention used in this study was based on Laban's basic movement themes of force, space, time and flow. Pre and posttests were administered to determine the extent of changes in the children's motor behavior which may have occurred as a result of this programming. Several statistically significant improvements were observed for boys and girls on a wide range of fitness and gross motor skills.

Recent investigations have supported the long held belief that childrens' intellectual and emotional development are enhanced through participation in the movement arts (Breckenridge, 1965; Duggan, 1978; Fisher, 1980; King, 1968; Zirulnik and Young, 1979; Riordan and Fitt, 1980; and Sharpe, 1979). Some writers have even reported relationships between movement abilities and reading readiness (King, 1973). The effective use of dance/movement education (D/ME) for the benefit of special populations has also been documented. For instance, participation in D/ME has been attributed to improved body image and self concept of children with learning disabilities (Fisher, 1980; Polk, 1979) and deafness (Polk, 1979). Polk further observed that D/ME programs can provide appropriate outlets for childrens' aggressive behaviors. Dance/movement has been successfully employed with children who have a limited capacity for movement. Duggan (1978) found that children with cerebral palsy who received regular movement experiences improved their muscle tone, range of motion and joint stability as well as increased respiratory and renal functioning.

On the other hand, the D/ME approach to elementary physical education has been criticized for its limited impact on physical fitness. Although some educators maintain that children who participate in a carefully structured D/ME program will become physically fit, there is little empirical evidence to substantiate this position. In fact, a recent investigation by Bishoff and Lewis (1987) found that 11 and 12 year old girls in a D/ME program had greater skin fold thickness, slower times in the mile run, and less flexibility than their peers in a control group. However, abdominal strength and endurance of 9 to 11 year old boys in their study did exceed control group levels. Apparently, further studies are needed to examine the effects of D/ME on motor and health-related physical fitness.

Programs based on the D/ME approach are gradually becoming a reality in public schools. In fact, schools emphasizing the arts have developed curricula around dance, including training, technique and performance. Such schools include the well-known New York School for the Arts, Pittsburgh High School for the Creative and Performing Arts and Eugene Oregon's Magnet Arts School with its Project Impact (Nadel, 1985). These schools are focused towards very specific areas of arts education. The trend has been to employ professional artists as faculty.

In spite of its established value for childrens' psychomotor development, there is little evidence indicating that D/ME is taught by many physical education teachers, it appears that movement specialists or artists-in-residence are responsible for most of the programs now in existence. Graham (1980) believes that the inadequate training of physical educators is largely responsible for this situation. He also suggests that because many boys don't like to dance, P.E. teachers may hesitate to build D/ME experiences into the curriculum. Carter (1984) concurs with Graham, and adds that dance educators should establish goals and directions for dance and conduct more research relative to overall fitness. These views are analogous to position papers presented at American Alliance for Health, Physical, Education Recreation and Dance (AAHPERD) annual conventions since 1979. As early as 1977 the National Dance Association (NDA) adopted a resolution affirming dance education as a means for enhancing the quality of life for children, youth and adults (Brennan, 1986).

The purpose of the research reported here was to examine the effects of a structured D/ME program on selected psychomotor skills of children in grades K-8. The program was offered by a physical educator in cooperation with two resident dance educators. This study addressed the following specific questions:

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1. Does a D/ME program facilitate development of climbing, running, jumping, and skipping skills of children in grades K-3; and
2. Does a D/ME program contribute to motor and physical fitness as manifested by the performance of situps, pushups, arm-hang, standing broad jump, shuttle run, and static and dynamic balance in children in grades K-8?

METHOD

Subjects

The subjects were 54 girls and 66 boys in grades K-8 (ages 5-14) in a rural Maine elementary school. Class enrollments were generally small (ave. 15) and all students received two periods of physical education instruction each week. Children in grades K-3 received 30 minutes per class while those in grades 4-8 participated in 45 minute classes. The school's physical education program is taught by a certified physical education specialist who has had 10 years teaching experience.

Testing Procedures

Pre and posttests were administered in September 1986, and June 1987, respectively. Instruments were selected to evaluate gross motor skill development, muscular strength and endurance, leg power, agility and balance.

Selected items of the Ohio State University Scale of Intra Gross Motor Assessment (SIGMA; Loovis & Ersing, 1976) were used to assess the childrens' fundamental motor skill development (running, stair climbing, jumping, hopping, and skipping). The SIGMA allows the examiner to assess on a four-level scale childrens' gross motor development in each skill area (1, least, to IV, most mature). Due to the fact that most children are capable of achieving mature patterns on all fundamental motor skills by age seven, only those children in grades K-3 (ages 5-9) were evaluated on fundamental motor skills. The examiner for this area has had over six years experience administering the SIGMA; his reliability for this scale, as determined by percent of interobserver agreement, was .96 at the time of testing.

To evaluate physical fitness, all children were administered the Amateur Athletic Union Physical Fitness Test by two trained physical education specialists. This commonly used tool measures muscular strength and endurance (sit-ups, push-ups [boys]; flexed-arm hang [girls]; agility [shuttle-run] and power [standing broad jump]). All children received instruction in each of the test areas and were allowed several practice sessions before pretesting.

The Short Form of the Bruininks-Oseretsky Test of Motor Proficiency (Bruininks, 1978) was used to assess childrens' balance. To measure dynamic balance, each child was asked to walk the length of a balance beam in heel-to-toe fashion. The score was based on the number of successful steps up to six. Static balance was measured by the number of seconds, up to 10, that a child could maintain balance on his/her preferred leg while standing on the end of the balance beam. Every effort was made to provide a comfortable and consistent examination environment. Pre and posttests were administered under similar conditions in terms of location, time of day and test personnel.

Intervention

The project involved 36 weeks of physical education instruction using a D/ME approach to augment regular physical education programming. The first 24 weeks of the project were devoted to teaching specific movement education concepts while the remaining eight weeks were devoted to choreographing and rehearsing the FINAL MOVE which was the project's culminating experience. The FINAL MOVE included small and large group student presentations for the benefit of school and community.

Class routine consisted of students entering the gym and sitting in their assigned squads. The concepts for the day were then introduced and followed by flexibility and warm-up exercises. During this time, children practiced specific dance techniques such as balance, plies, and alignment. The warm-up phase was followed by movement experiences and improvisations designed to allow students to explore and practice the movement concepts for the day. Each class ended with a review of what had been accomplished during the lesson. At this time children were asked to name something they had learned or remembered during class. Older students were encouraged to provide more comprehensive descriptions of what they had done. Closure also involved a review of behavior standards and awards for the day.

A wide variety of movement experiences were provided daily for the children. After demonstrating mastery of the fundamentals of a concept, music and props were introduced to enhance enjoyment and foster creativity. Percussion instruments such as drums, shakers, balafon, and an electronic rhythmic synthesizer were used to sustain a high level of interest and enthusiasm. Video feedback was used to augment instruction and help children analyze their movement explorations. The use of video feedback became especially valuable towards the end of the year as the children were preparing their choreography for the FINAL MOVE.

The movement concepts taught during this project were based on Laban's (1963) basic movement themes of force, space, time and flow. These concepts were presented to each grade, with activities appropriate for the childrens' psychomotor skill levels. Periodic reviews of previously learned material occurred throughout the year. Specific movement themes emphasized body awareness, locomotor skills, levels, space, shape, time and weight qualities, effort actions, qualities of movement, flow, rhythm, imagery, mimeskills, pathways, use of props, group

formation and music (Laban, 1963). All activities were taught with the artists-in-residence working closely with the school's physical educator in both consulting and direct teaching capacities. Approximately one-half of all class time during the school year was devoted to D/ME activities.

Students began to synthesize and integrate their choreographic ideas several weeks before rehearsals started. Each grade was assigned a movement concept to present. Grades 5-8 were required to choreograph small group and solo pieces in addition to the full group presentation. Time restrictions were placed on the choreography. Small group and solo pieces were limited to three minutes or less while full group pieces could be five to ten minutes. Each presentation had to be original and could not duplicate or copy any other dance.

Data Analysis

To expedite data analysis, all children were assigned to one of three groups according to grade level: primary (P) grades K-2, (N = 48); Elementary (E) grades 3-5, (N = 37); and Middle (M) grades 6-8, (N = 35). Pre and posttest ratings of the childrens' fundamental motor skills are presented in Table 1. Because childrens' performances in each of the remaining seven items (sit-ups, push-ups, standing broad jump, pull-ups/arm hang, shuttle run, and dynamic and static balance) are represented by interval data, t-tests were used to determine if significant improvements were realized, (see Tables 2 & 3).

TABLE 1
Summary of Children's Mature (M) and Immature (I) Gross Motor Patterns, for Boys and Girls Pre and Posttests

SKILL	BOYS n = 35 Grades K-3		GIRLS n = 28 Grades K-3	
	M	I	M	I
Stair Climb				
Pretest	34	0	26	2
Posttest	35	0	28	0
Run				
Pretest	4	31	9	19
Posttest	11	24	19	9
Jump				
Pretest	7	28	11	17
Posttest	22	13	16	12
Hop				
Pretest	16	19	15	13
Posttest	23	12	19	9
Skip				
Pretest	31	4	22	6
Posttest	32	3	27	1

RESULTS

Fundamental motor skills

Both boys and girls developed observable increases in the number of mature gross motor patterns, (see Table 1). Although the girls demonstrated greater initial proficiency in running and jumping, both boys and girls made ample progress. The boys made gains in running, jumping and hopping while the girls improved their running, jumping, hopping and skipping levels.

Physical and Motor Fitness

Significant gains were observed for boys in all three age-grade groups on Pull-ups and Sit-ups. On the *Push-up Test,* only the oldest (M) group made significant gains. Other significant improvements were made by boys on the *Standing Broad Jump* by groups E and M; on the *Shuttle run* by the M group; and *Dynamic Balance* by the P and E groups, (see Table 2).

Increased development was also observed for girls. Significant gains were made on *Sit-ups* by the P and the M group; on *Push-ups* by the E and M groups; on the *Standing Broad Jump* by the P and M groups; on *Flexed Arm Hang* by the P and M groups; on the *Shuttle Run* by the P group and on *Dynamic Balance* by the P group, (see Table 2).

DISCUSSION

This study assessed changes in childrens' motor behavior following a 36 week intervention with a D/ME program. The children received physical education instruction twice a week by the school's regular physical educator in cooperation with two dance educators. The D/ME approach emphasized Laban's principles of force, space, time and flow. Pre and posttests were administered to determine the extent of changes in motor behavior which may have occurred as a result of this programming.

The results appear to support D/ME as a physical education instruction strategy. For instance, abundant opportunities to practice running while under control in straight lines, curvy pathways and zigzags combined with quick stops and changes of direction no-doubt contributed to improved performance in fundamental motor skills, the standing broad jump, the shuttle run and balance.

Because all human movement is influenced by the underlying ability to maintain equilibrium, improvements in fundamental motor skills seem to have mirrored the childrens' progress in static and dynamic balance. Effective balance means that an individual is able to make the continual posture adjustments necessary to meet the demands of a given movement situation. This is a complex process and involves a number of mechanical and physiological principles. The body's sensory receptors must gather information and relay it to the central nervous system for processing. Data collected by the eyes,

TABLE 2
Means, Standard Deviations, and t Tests for Physical and Motor Fitness Proficiency for Boys in Groups Primary (P), Elementary (E), and Middle (M) Grade Levels (Pre/Posttest).

SKILL	GRADE	PRETEST		POSTTEST		*t*
		M	SD	M	SD	
Situp	P (n = 24)	15.25	7.61	23.21	10.84	5.63*
	E (n = 22)	19.36	10.01	25.55	9.92	3.18*
	M (n = 20)	30.50	7.30	39.70	7.41	12.52*
Pushup	P	5.25	5.38	5.79	4.69	0.63
	E	7.36	5.92	7.59	7.48	0.18
	M	23.75	12.74	29.15	11.82	6.81*
Standing	P	43.08	8.45	44.67	7.87	2.23
Broad	E	48.45	8.54	53.73	8.88	4.60*
Jump	M	63.75	12.89	67.90	12.26	5.63*
Pullups	P	0.58	0.97	1.21	1.41	3.31*
	E	0.73	1.20	1.91	2.37	3.95*
	M	1.65	2.11	2.90	2.75	3.97*
Shuttle	P	136.04	15.28	128.83	22.35	1.54
Run	E	124.86	10.54	123.77	10.91	0.81
	M	110.60	8.62	107.40	9.84	3.83*
Dynamic	P	3.54	2.60	4.79	1.81	3.31*
Balance	E	4.64	1.64	5.77	0.75	4.04*
	M	5.60	0.88	6.00	0.0	2.03
Static	P	5.96	4.33	7.17	3.46	2.38
Balance	E	8.05	3.56	9.55	1.60	2.37
	M	9.35	1.76	10.00	0.0	1.66

$p \leq .05$ (one-tailed)
* indicates significant level of improvement

Primary = Grades K, 1, 2
Elementary = Grades 3, 4, 5
Middle = Grades 6, 7, 8

proprioceptors and vestibular apparatus is then used to help align the center of gravity over the base of support. This is a developmental process which tends to increase throughout childhood. Consequently, childrens' balance performance depends on the interaction of growth and maturation with sufficient opportunity to engage in activities which challenge these physiological systems.

While it is likely that D/ME activities contributed to the childrens' improved motor skill performance, one should consider the effects of their growth and maturation as well. The design of the present study—it would have been difficult, if not unethical, to deny an intervention in order to establish a control group—did not permit an analysis of which factor may have contributed most to increased performance. However, notwithstanding yearly increments in growth and maturation, the gains made by the children in this study would please most physical educators. Significant improvements were made on a wide variety of fundamental motor, physical fitness and balance skills during an eight month intervention. Gains were observed across grade levels and for boys as well as girls. These findings contradict the notion that D/ME does not contribute to physical fitness.

This study also supports the concept of using resident dance educators to provide inservice education to physical educators who may have lacked formal training in D/ME. An inservice approach may be especially useful in rural school systems where physical education is often taught by itinerant instructors who may be professionally isolated from their colleagues.

TABLE 3
Means, Standard Deviations, and t Tests for Physical and Motor Fitness Proficiency for Boys in Groups Primary (P), Elementary (E), and Middle (M) Grade Levels (Pre/Posttest).

SKILL	GRADE	PRETEST		POSTTEST		*t*
		M	SD	M	SD	
Situp	P (n = 24)	10.79	7.40	17.17	9.31	4.68*
	E (n = 15)	21.27	8.99	23.67	9.26	1.40
	M (n = 15)	26.60	6.07	32.80	4.13	4.93*
Pushup	P	2.88	3.18	2.58	3.39	0.37
	E	5.60	6.31	9.40	8.47	5.44*
	M	18.06	11.04	22.73	8.00	4.32*
Standing	P	36.29	9.07	39.88	7.02	3.29*
Broad	E	49.27	6.56	51.60	8.10	2.16
Jump	M	56.67	8.50	59.93	8.90	4.71*
Arm Hang	P	1.88	3.22	7.25	9.18	3.47*
	E	8.27	10.24	14.00	13.78	2.40
	M	5.13	5.44	11.87	8.56	2.92*
Shuttle	P	146.46	19.31	139.92	13.47	2.87*
Run	E	123.33	8.70	123.40	9.53	0.03
	M	110.47	5.50	109.27	6.66	0.84
Dynamic	P	3.50	2.02	5.13	1.36	5.65*
Balance	E	5.40	1.40	6.00	0.0	1.66
	M	5.40	1.45	6.00	0.0	1.60
Static	P	6.88	3.84	8.63	2.40	2.56
Balance	E	8.27	2.4	10.00	0.0	2.79
	M	10.00	0.0	10.00	0.0	0.0

$p \leq .05$ (one-tailed)
* indicates significant level of improvement
Primary = Grades K, 1, 2
Elementary = Grades 3, 4, 5
Middle = Grades 6, 7, 8

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