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Examining the Effects of "Activity Education with Coordination" on the Development of Balance and Arm Power in 6-Year-Old Primary School Children*

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ABSTRACT

This study was conducted to examine the effects of 8-week "Activity Education with Coordination" on the development of balance and arm power properties of 6-year-old primary school children. The Study Group consisted of 30 six-year-old children; and the Control Group consisted of another 30 students who were also 6 years old. The students were included in this study after their families were contacted and their consents were received. In order to examine the effects of "Activity Education with Coordination" on 6-year-old primary school children, static and dynamic balance and Griping and finger power motor performance tests were applied. In analyzing the data, the statistical package program was used. To find the difference between the Study Group and the Control Group, the Independent t Test was used, and to find the difference between the Pre and Post Tests of both groups, the Paired Samples t Test was used. According to the statistical results, no significant differences were found among all the variables in the Pre Test values ($p>0,05$). Among the Post Test values of the Study and the Control Group, meaningful differences were found between the average values of the right hand finger power, dynamic and static balance test values ($p<0,001$); between the average values of the right hand Griping power and left hand finger power ($p<0,01$); between the average values of the left hand Griping power ($p<0,05$) in favor of the Study Group. Among the Post Test values of the Study and the Control Group, meaningful differences were found between the average values of the right hand finger power, and dynamic and static balance values ($p<0,001$); between the average values of the right and left hand griping power ($p<0,05$); between the average values of the left hand griping power ($p<0,01$) in favor of the Post test. Among the Pre and Post test results of the Control Group, meaningful differences were found between the average values of the right hand finger and grip power, the dynamic balance test values ($p<0,05$); between the average values of the left hand finger power and the static balance results ($p<0,01$); in favour of Post tests. No meaningful differences were found between the averages of the left hand Griping power ($p>0,05$). As a conclusion, it is understood that, planned and long term Activity education with Coordination program will improve the static and dynamic balance and Griping and finger power motor skills of 6-year-old children.

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Keywords:
Activity education, motor properties, activity education with coordination program

Introduction

With the recently renewed education system, the Physical Education that is carried out in the primary schools has been reedited under the name of Game and Physical Exercises Lesson. With the new system, the age groups who corresponded to preschool education in previous years, started to learn this lesson in Grade 1. Nowadays, in the physical exercises and games classes in the first grades of primary schools, it is considered that the qualities like gaining self-confidence, self-realization, social acceptance and belonging to

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a group can be taught in a more enjoyable way. The Activity education must be implemented regularly and in a planned manner to have a permanent impact on students and make people ready for the acquisitions, because there is ***planning*** in the fundamental idea of education. ***"Education is a behaviour change process in which an individual takes part eagerly.*** Physical Education, which is the supplementary and inseparable part of the education, is extremely important in terms of children's physical growth, improving their movement skills, and improving their nerve-muscle coordination (Bucher & Koenig, 1983; Harmandar, 2004).

Activity Education improves the locomotor and balance-movement skills of the children meanwhile this basic education affects the physical convenience, perceptive-motor improvement, social-emotional improvement, enhancing capacity of learning, acquiring the habit of using free time in a positive way (Çamlıyer, 1999). Coordination is a complex motor skill. This skill has an important role not only in acquiring new techniques and tactics and making it excellent, but also in acquiring new techniques and tactics in unusual situations. The terms like "skill" and "agility" are sometimes used in sport pedagogics for this situation (Asci, Gokmen & Karagul, 1995). Skill explains the coordination quality in sensitive motor behavior of the parts of the movement devices. On the other hand, with the term of "agility", the conditional and coordinative quality of all the motor behaviors is expressed (Muratlı, 1998).

The basic movement parts of most of the complex skills are adapted from games and movement parts. These main movements will bring the children to an advantageous position in learning the sport skills that will be taught in coming years. For children whose main movements have been supported, it is considered that it is easier and more effective to make them learn motor skills and to teach them more complex skills in an appropriate way (Kasap 1999).

Hirtz conducted a study and examined the importance of the factors that made up the coordination skill, and defined 5 factors as the basic factors depending on the 20 factor analyses. The Skill of Kinesthetic Segmentation, Ability of Determining Directions Based on the Location, the Skill of Balance, the Skill of Reaction, the Skill of Rhythm (Hirtz, 1988).

In the present Physical Education program which has changed, it is reported that, with the simplest expression, the action, physical education, sports and games are the acquisitions that are seen, experienced, discovered and made sense of by structuring as psychomotor behaviors. The acquisition of a psychomotor behavior occurs as much as a child can learn.

One important element of education programs is the issue of how the information, skills and habits to be given to the child happens in an educational organization. This includes the teaching activity of the teachers and the learning activities of the students. Trainers have used various methods of teaching for this process to be more effective. In the education program to be prepared for the child, not only the child's interests and needs but also the teaching opportunities and teaching methods that are provided for the child are important. In this context, the **Activity Education with Coordination** is among the most effective methods because it provides that children participate in activities in a funnier manner, the environment of learning-teaching is more fun, and they acquire the learning and education targets permanently.

In our study, we tried to reveal the effect of the **Activity education with Coordination** design in the Game and Physical Activities Classes on the development of balance and arm power properties of 6-year-old primary school children.

Materials and Methods

The study was designed in accordance with the Pre Test - Post Test Model with a Control Group. The Study Group consisted of 30 six-year-old children; and the Control Group consisted of another 30 students who were also 6 years old studying in Istanbul and having no handicaps for participating in the Game and Physical Activities classes.

Collection of the Data

The data collection was organized in such a structure that was proper for the properties of the programs on coordination tracks, culture halls, sports and schools garden. The measurements were made by the Author, an assistant and a person who wrote the points to the forms. There were four steps in data collection.

The preparatory work. This step was conducted for the purpose of starting the Pre Tests at the same level, applying the data instructions, organizing the measurement media, calculating the average time for each test, and checking the measurement tools.

Applying the pre-test. The tests of both groups were arranged successively according to the Pre-study results by distributing them to 3 work days.

1. Day "The Flamingo Balance" Test,

2. Day "The Stabilimeter Balance" Tests,

3. Day "The Hand Grip" and "Pinch Grip" tests were applied respectively.

In our study, the movements were demonstrated to the children once, the characteristics of the movements and the instructions of the test tools were explained, and feedbacks, corrections and reinforcers were given to the children.

Applying the program of activity education. During the test applications in our study, the usual Activity Education Program was applied to the Control Group, and the **Activity Education with Coordination,** which included activities intended to develop motoric features, was applied to the Study Group. The applications were programmed as twice a week, and two hours a day.

Applying the post tests. The test tools used in the pre test measuring whether the motor skills were developed or not were used in the Post Tests, too. In the post tests, the test procedures, which were used in the Pre Test, were used.

Data Collection Tools

The following Test Batteries were used as data collection tools.

The flamingo balance test. It is used to determine the number of the seconds of static (stationary) balance of the subject in one minute. After the subject re-gained his/her balance, the stopwatch was activated. The seconds the subject was in balance in a minute was measured. The shortest performance was separated from the other two performances, and the best one was taken and recorded as the Test Point. If the subject makes more than 15 mistakes within 30 seconds after s/he regains the balance, s/he is given (0) point.

The stabilimeter balance test. It is applied by using the Stability Platform Lafayette Balance Tool and by taking 10^{o} angle in the movements to the right or left as the reference. The purpose is to determine how many seconds the subject keeps his/her dynamic (mobile) balance within 30 seconds. The shortest performance was eliminated and the best performance was taken and recorded as the Test Point.

The hand grip test. The aim is to measure how much power of grip there is on right and left arms with the J-Tech Grip Power Measurement Tool. The best performance was taken among the three performances and it was recorded as the Test Point.

The pinch grip test. The aim is to measure how much power of grip there is on right and left hands with the J-Tech Grip Power Measurement Tool. The best performance was taken among the performances and it was recorded as the Test Point.

Data Analysis

The data were analyzed and interpreted in the Statistical Package Program by using the arithmetic average values and standard deviation, the highest and lowest points, and the ***t*** Test. The Independent ***t*** Test was used to find the difference between the Pre and Post Tests in the Study Group and the Control Group; and the Paired ***t*** Test was used to find the difference between the Pre and Post Tests of both the Study and the Control Groups.

Findings

In this part of the study, the data obtained from the statistical tests have been analyzed, and the general findings are given in the direction of the hypotheses and in the light of the development of motor properties, which were observed during the application.

Table 1: The pre test finger and grip power values and static, and the dynamic balance values of the study and the control group

Test	Group	n	X ± SS	P	
Pinc Grip (Right hand)	Study	30	8,06 ± 1,98	,891	p>0,05
	Control	30	8,04 ± 2,04		
Pinc Grip (Left Hand)	Study	30	7,51 ± 1,62	,873	p>0,05
	Control	30	7,48 ± 2,23		
Hand Grip (Right hand)	Study	30	19,53 ± 5,30	,731	p>0,05
	Control	30	19,74 ± 5,81		
Hand Grip (Left Hand)	Study	30	18,31 ± 5,07	,765	p>0,05
	Control	30	18,12 ± 5,44		
Static Balance	Study	30	30,01 ± 17,22	,911	p>0,05
	Control	30	29,93 ± 18,05		
Dynamic Balance	Study	30	18,95 ± 2,93	,647	p>0,05
	Control	30	18,87 ± 2,62		

It is observed in Table 1 that according to the Independent ***t*** Test and Pre Test findings of the Study and the Control group, no statistically meaningful differences were found between the Pinch Grip, right-left hands, Hand Grip, Right-left hands, Dynamic and Static Balance values (p>0,05). The differences among the averages are coincidental.

Table 2: The pre test - post test finger and grip power values and static and dynamic balance values of the study group

Test		N	X ± SS	P	
Pinc Grip (Right hand)	Pre Test	30	8,06 ± 1,98	,000	P<0,001
	Post Test		10,40 ± 1,11		
Pinc Grip (Left Hand)	Pre Test	30	7,51 ± 1,62	,011	p<0,05
	Post Test		9,63 ± 1,74		
Hand Grip (Right hand)	Pre Test	30	19,53 ± 5,30	,007	p<0,01
	Post Test		23,15 ± 3,03		
Hand Grip (Left Hand)	Pre Test	30	18,31 ± 5,07	,032	P<0,05
	Post Test		21,02 ± 4,35		
Static Balance	Pre Test	30	30,01 ± 17,22	,000	p<0,001
	Post Test		42,05 ± 8,13		
Dynamic Balance	Pre Test	30	18,95 ± 2,93	,000	p<0,001
	Post Test		25,10 ± 1,66		

It is observed in Table 2 that according to the Paired ***t*** Test, and Pre-Post Test findings of the Study Group, there is a meaningful difference between the Right Hand Finger Strength, dynamic and static balance values at ,001 level; and there is a meaningful difference between the Right Hand Grip Power averages at ,01 level; and there is a meaningful difference between the left hand finger power and left hand grip power test averages in favor of the post tests.

Table 3: The pre test -post test finger and grip power values and the static and dynamic balance values of the control group.

Test		N	X ± SS	p	
Pinc Grip (Right hand)	Pre Test	30	8,04 ± 2,04	,113	P>0,05
	Post Test		8,09 ± 2,02		
Pinc Grip (Left Hand)	Pre Test	30	7,48 ± 2,23	,196	p>0,05
	Post Test		7,51 ± 2,81		
Hand Grip (Right hand)	Pre Test	30	19,74 ± 5,81	,049	P<0,05
	Post Test		19,43 ± 5,11		
Hand Grip (Left Hand)	Pre Test	30	20,12 ± 5,44	,161	p>0,05
	Post Test		19,97 ± 6,88		
Static Balance	Pre Test	30	29,93 ± 18,05	,148	P>0,05
	Post Test		28,99 ± 14,96		
Dynamic Balance	Pre Test	30	18,87 ± 2,62	,048	p<0,05
	Post Test		19,04 ± 2,07		

It is observed in Table 3 that, according to the Pre-Post Test and the Paired ***t*** Test findings of the Control Group, a meaningful difference was found at ,05 level between the Dynamic Balance values. Although there was a reduced difference between the Right Hand Grip Power test average values at ,05 level **Against the Post Tests**, no meaningful differences were found between the Left Hand Finger Power, Left Hand Grip Power and Static Balance values (p>0,05).

Table 4: The post-test finger power and grip power values and the static and dynamic balance values of the study and control groups.

Test	Group	n	X ± SS	P	
Pinc Grip (Right hand)	Study	30	10,40 ± 1,11	,000	p<0,001
	Control	30	8,09 ± 2,02		
Pinc Grip (Left Hand)	Study	30	9,63 ± 1,74	,001	p<0,01
	Control	30	7,51 ± 2,81		
Hand Grip (Right hand)	Study	30	23,15 ± 3,03	,000	p<0,001
	Control	30	19,43 ± 5,11		
Hand Grip (Left Hand)	Study	30	21,02 ± 4,35	,047	P<0,05
	Control	30	19,97 ± 6,88		
Static Balance	Study	30	42,05 ± 8,13	,000	p<0,001
	Control	30	28,99 ± 14,96		
Dynamic Balance	Study	30	25,10 ± 1,66	,000	p<0,001
	Control	30	19,04 ± 2,07		

It is observed in Table 4 that according to the Independent ***t*** Test Post-Test findings of the Study and Control Groups, there is a statistically meaningful difference between the averages of Right Hand Finger Power, Right Hand Grip Power and Dynamic and Static Balance test values at ,001 level; there is a statistically meaningful difference between the averages of the Left Hand Finger Power test values at ,01 level; and there is a statistically meaningful difference between the averages of left hand grip power test values at ,05 level. These differences are in favor of the study group.

Discussion

Teaching with coordination is a method in which the complex motoric skills are used together, and the skills such as speed, strength, durableness and flexibility are in a very close relationship in this context.

Skill (coordination) is a factor which ensures that more work is performed with less effort. A hard action being performed easily is the positive feature of the skill (Sevim, 1995). A person who has good coordinative properties learn a skill faster than those who lack coordinative properties, and solves technical and tactical problems more easily (Bompa, 1994). It is reported that children who participate in games in their childhoods are more successful in gaining action skills (Gray, 2003) and are healthier and conscious in following years (Jimmy, 2003). Preschool-educational games are important opportunities for improving motoric skills (Aytac, 2003).

It is reported that coordination studies are more effective in early ages because as people get older, getting information, the concepts and the processes of operating the information become weaker, and in the period from seven-years of age to puberty, the progress of coordination is performed at the highest level. It is emphasized that coordination skills education must be accompanied by the pre-post warm up activities in the work-outs of children and in developing conditional properties in the form of game and skill exercises.

Thirty students who were 6 years old at 1st Grade in primary schools were included in the Study Group and another thirty students were included in the Control Group. Although there were no important differences between the Independent ***t*** Test Post-Test values of both groups, a statistically important difference was found at various levels in **favor of the Study Group**.

An important difference was found between the Pre-Post Test values of the Study Group in terms of Finger Power, while there were no important differences between the Pre-Post Test values of the Control Group. In 2006, Altinkök conducted a study in which he applied the Physical Education Program intended to develop Basic Motor Activities, and found meaningful differences in favor of the Study Group, and the

Post-Test values of the Study Group. Although the Activity Education Altinkök used in his study shows different aspects when compared to ours, the Test Tool and the results of his study has similarities with our results.

Although there were significant difference between the grip power of the Study Group Pre-Post Test values in favor of the Post Tests, and there were no significance between the grip power of the left hand in the Control Group; there was significant difference between the right hand grip power **in favor of the Post Test**. Ziyagil et al. conducted a study in 1996 on 11-year-old children who did not deal with sports and who dealt with sports, and found significant difference between the grip power. Katie et al. (2003) conducted a study on primary school children who dealt with sports and desktop studies together in a balanced way, and children who dealt only with desktop studies and reported a difference in terms of Grip power. Saygın et al (2005) conducted a study and reported that they had found the effect of the activity education program on the grip power of children as being meaningful. Bayraktar et al (2005) reported after the study he conducted on swimmers that the Grip power of the swimmers was more significant than that of those who dealt with Gymnastics and Athletics. Altınkök conducted a study and applied physical education program intended to develop basic motor activities and reported that there were meaningful differences in favor of the Study Group and in favor of the Post Tests of the Study Group. The results of these studies and our findings show similarities.

Although there was a significant difference between the static balance and Study Group Pre-Post Test values at ($p<0,001$) level **in favor of the post test**, there was a meaningful difference **against the post test** at ($p<0,01$) level in the Control Group. Bayraktar (2005) conducted a study and found that the static balance values of the gymnastics athletes were more significant than those who dealt with Athletics and Swimming ($p<0.001$). Altınkök (2006) conducted a study in which he used Physical Education Program intended to develop basic motor activities and reported that there was a meaningful difference in favor of the Post Test of the Study Group ($p<.001$). The results of this study and ours show similarities.

Erdil et al. (2013) conducted a study in which he used Physical Education with Coordination Program intended to examine the motor skills of the children and reported that the average Static Balance (Flamingo) Test values were more significant than those of the Control Group. The results of this study and ours show similarities although there are differences in terms of the age groups. Tüfekçioğlu (2002) conducted a study in which he examined the effects of the Perceptive Motor Development Program on the Static Balance and Agility Skills of the children and could not find any significance; however, added that the significance could increase to important levels in the study duration was increased. The results of this study and ours show similarities. The reason for this may be the educational programs, social activities, and experiences of the children who participated to the study.

Although there was a significant difference **in favor of the Post Test** between the Dynamic Balance Pre-Post Test values of the Study Group ($p<0,001$); significant differences were observed in the Control group against the **Post Test** ($p<0,05$). Tüfekçioğlu (2002) reported no significance of the perceptual motor development program on the dynamic balance skill and on the agility skills. The results of this study and ours show differences.

Yetkin et al. (2008) conducted a study in which they examined the effects of folk dances applied for one hour, one day a week on the hand-eye coordination and reaction times of first grade primary school students, they reported that there were significant results in the Pre-Post test values.

As a result, the Activity Education must be started in preschool period, because this education in the preschool times includes an important and critical part in it. In this period, the basic knowledge, skills and habits that will be given to children in the learning environment will be influential in the development of the motor skills, physical growth and the development of the central nerve system with deliberate activity.

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