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The Effect of Hand-Eye Coordination and Gender on the Children Ability of Object Controlling

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Abstract —This study aims to see the effect of hand-eye coordination and gender on the ability of the object control. This research involved 48 children from kindergarten schools of Pariaman. The instrument used to obtain data on student hand-eye coordination is the MABC 2 subtest, namely catching and aiming, and the ability of object control is obtained through the Test of Gross Motor Development-2 (TGMD-2). The results showed that there was the influence of hand-eye coordination and gender on the ability of the control object. The results of this study indicate that the level of development of object control abilities possessed by kindergarten students in the city of Pariaman is influenced by hand-eye coordination and gender.

Keywords— Coordination, Gender, Control Object Level

I. INTRODUCTION

Early childhood education basically includes all the efforts and actions taken by educators and parents in the process of care, care and education for children by creating an environment so that children can explore experiences and provide opportunities for them to know and understand the learning experiences gained from the environment, through ways observing, imitating and experimenting repeatedly and involving all the potential and intelligence of children. In the Republic of Indonesia Education and Culture Regulation Number 84 Article 1 Paragraph (1) of 2014 concerning the Establishment of Early Childhood Education Units [1].

The target of early childhood education (PAUD) according to the law is 0 to 6 years, and can be implemented either through formal, non-formal and / or informal education. PAUD is the initial stage in the process of children's education to enter further education with a higher level of learning material. At 5 years is a golden period of child development, both for physical and motor development as well as cognitive, psychological and social development of children [2]. The development and growth of this child can only develop properly if we apply the concept of learning while playing by doing physical activities.

In order to improve the skills of PAUD teachers the government has made several programs such as workshops and training in several areas. The implementation of this activity is based on the concerns of activists and experts working in the field of kinesiolgi, PAUD and the government that it seems that the basic mobility abilities of children in Indonesia are declining. One indication is that according to WHO reports there are around 30% of children in Indonesia suffering from obesity. In addition there is also evidence that shows that the level of physical activity of children and adolescents throughout the world is down and this generation of children is less active and fatter than other generations of children [3].

The ability to coordinate is one component of physical fitness that is related to one's skills, both hand and eye coordination. It can be said to have the ability of skills illustrated from how well the coordination possessed. Thus someone who has good coordination skills will be easy to learn a variety of movement skills. teachers are expected to be able to improve children's coordination skills while also being able to find the most appropriate learning methods to help children who have poor coordination skills.

Hand-eye coordination is the ability of the vision system to coordinate information received through the eye to control, guide, and direct the mind of the hand in completing a given task, such as handwriting or catching a ball [4]. Hand eye coordination is one of the human abilities that is needed and can affect various aspects of daily life including school, daily life activities and social interactions [5]

Therefore, researchers are interested in conducting research related to things that are thought to have an influence on the ability of object control of children in PAUD Kota Padang Pariaman.

II. METHODS

A. *Control Object Ability*

Basic mobility is a very basic mobility that must be possessed by a child at an early age in order to make a series of more complex movements in the future. Basic motion skills are considered as the basis for competence [6]. The basic motion ability is divided into two big groups, namely the ability of the control object and locomotor [5]. The locomotor ability is the motion that moves the body from one point to another while the ability of the dick object is the object manipulation movement.

The object of control is the ability to improve the performance of muscles to make a movement, and has a good ability to make controlled and precise movements with an object.

Object control skills consist of (1) throwing (overarm throw) (2) kicking a ball (kicking), (3) kicking a ball that is self-propelled (punting), (4) running with the front legs (leap), (5) hitting the ball with a tool (racket) in a state not moving from above (overarm stricking a stationary ball). So, the ability of a control object is the ability possessed by a child to be able to control or control objects that are commonly used in realizing basic motion skills, such as holding, throwing, catching, hitting and kicking. The portion of skills possessed by each child for mastering the ability of this control object is different. This difference in ability is influenced by many factors, including: eye-hand coordination, body mass index, heredity, gender, social environment, parenting, parental knowledge, and children's confidence.

This object control ability measures the ability to throw, catch, reflect, hit, roll and kick a ball based on the TGMD-2 instrument for children aged 5 to 6 years that was conceived by Ulrich. Every skill displayed by students will be captured on video. The assessment is done by coding the video. Each skill assessed has several characteristics that must be fulfilled by students. Every movement that matches the characteristics contained in the assessment sheet will be given a value of 1 and the wrong will be given a value of 0. For each skill that is assessed students will be given 3 times the opportunity, 1 time for the experiment and 2 times for the assessment.

B. *Coordination*

Coordination is also called the ability to carry out an activity quickly and efficiently [7]. Eye-hand coordination is the ability of the eyes and hands possessed by someone in carrying out a physical task at the same time. Hand eye coordination is one of the human abilities that is needed and can affect various aspects of daily life including school, daily life activities and social interactions [8]. The results show that eye-hand coordination will develop better as children age [9]. This development occurs when children aged 8 to 16 years because more and more diverse tasks performed indirectly will improve the quality and development of the child's eye-hand coordination ability. These activities can be in the form of catching and throwing, if a child can do these activities with ease without significant obstacles, in general the child is considered to have good eye-hand coordination.

So that eye-hand coordination can develop optimally, the participation of parents is very important. Providing catching and throwing exercises in daily activities will certainly have a good effect on the eye-hand coordination of children at this age. One example is when children learn to draw, they hold a pencil and use their hands to write by making various strokes on paper or moving their feet to walk towards people around them [10].

The ability of hand eye coordination possessed by PAUD students is obtained through the catching and throwing test which is a sub-test on the M-ABC test. Students are asked to do throwing and catching but using a bean bag or a bag filled with green beans. The scorer is counted the number of captures that were successfully carried out by students by hand. To throw will be counted how many throws according to the target that can be done by students. Later it will be written in the M-ABC sheet and then it will be calculated based on the norm table

C. *Gender*

Gender differences are also one of the factors that affect children's ability to move. Because there are differences in abilities between men and women. Boys have better motor skills than girls, both in terms of strength and accuracy of movement. For example in accuracy and throwing speed are often used to investigate differences in quantitative characteristics of throwing movements. Gender differences in pitching have been identified [27]. From ages 6 to 13, boys perform better than girls of the same age. In addition, an increase in the amount of difference in throwing performance. At a certain level of development, boys only improve their skills, while girls stagnate at their level, or get worse [27].

Gender has already begun to affect a child's basic physical abilities from an early age. Boys outnumber girls with throwing speeds from 4 to 7 years and throwing distances at 2 to 4 years. In one study it was also mentioned that age and gender had an influence on the performance of basic motion skills [25]. Regarding throwing speed and accuracy of throwing, boys at the age of 3 to 6 years are taller than girls of the same age. Similar results are explained by [28]. Studies show far better performance in throwing accuracy in favor of boys between 5 and 6 years.

III. THE DATA ACQUISITION SETUP

The instrument used to obtain data on the eye eye coordination of PAUD students is the MABC_2 sub-test, which is catching and throwing, which is carried out using a bean bag or bag containing beads, functioned as an object thrown to the target and the object to be captured. Students will be asked to throw bean bags to the target 10 times and catch bean bags also 10 times.

Student gender data is obtained through a personal data recap of each student from the school in question. To determine the ability of each student's control object used object control instrument sourced from INDO-SKIP consisting of [29] consisting of 5 levels of ability to be assessed, namely: strike, catch, kick and throw. Each skill consists of 4 to 5 levels. Then the value on each skill obtained by the child will be added to get the final score.

The tools used in data collection are:


Figure 1. Digital scales


Figure 2: handycam


Figure 3. Tennis Ball


Figure 4. Plastic tennis racket


Figure 5. Plastic beater


Figure 6. Children's basketball


Figure 7. Plastic football


Figure 8. Traffic cone


Figure 9:. *Beating tee*


Figure 10 : meter


Figure 11 : sticky tape


Figure 12 : scissor

IV. THE DATASET

Sampling in this study is a purposive sampling technique is a technique to determine the sample with certain considerations from researchers [30]. Based on these considerations and the sampling technique used, the number of samples in this study were 40 students. Hand eye coordination is obtained by using the M-ABC instrument subtest, namely aiming and catching, each throwing and capturing 10 times with bean bag media. Student gender data is obtained through a personal data recap of each student from the school in question.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.739[a]	.547	.522	1.95035

a. Predictors: (Constant), Gender, Koordinasi

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	169.452	2	84.726	22.298	.000[b]
	Residual	140.748	37	3.804		
	Total	310.400	39			

a. Dependent Variable: Level Object KOntrol

b. Predictors: (Constant), Gender, Koordinasi

The output above explains based on the F test or the simultaneous effect between coordination and gender on the level of ability of control objects in Pariaman City PAUD children, the Sig F value of 0,000 <0.05.

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	29.735	3.324		2.829	.006
	Koordinasi	.418	.087	.521	4.371	.000
	Gender	.115	.037	.366	3.069	.004

a. Dependent Variable: Level Object KOntrol

Based on the output above, the coordination Sig value of 0.000 <0.05 and gender 0.004 <0.05 which proves that coordination and gender have an influence on the ability level of PAUD student control objects in Kota Pariaman Analysis of data conducted with SPSS version 23 shows the value of Y = 29,735 + 0.418X1 + 0.115X2 this means that each increase in one score in coordination (0.418X1) and gender (0.115X3) will increase the ability of the control object to a constant 29,735.


Figure 13 : Strike Illustration


Figure 14 : Catch Illustration


Figure 15 : Throw Illustration


Figure 16 : kick illustration

V. CONCLUSIONS

From the research conducted, it shows that freedom of coordination and gender has an influence on the level of ability of object control possessed by PAUD students in Kota Pariaman. In the future, the teacher is expected to be able to design learning models and direct students continuously to do the movements contained in the fundamental motor skills. This is due to the fundamental motor skill is the ability to move that must be learned as early as possible during the golden mass of the growth and development of children, namely the age of 0 to 6 years. Where at this time all organs and nerves of children develop rapidly, therefore it needs to be given a stimulus so that development and growth can reach the maximum stage. Mastering these basic motion skills not only affects psychomotor aspects, but also cognitive and associative aspects.

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