

The Effect of Exercise Methods and Coordination towards Students' Extracurricular Basketball Skills

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The Effect of Exercise Methods and Coordination towards Students' Extracurricular Basketball Skills

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Abstract—the purpose of this study was to determine: (1) the differences of influence between part training methods and whole training methods on improving basketball skills, (2) the differences in influence between high and low eye-hand coordination on basketball skills, and (3) interactions between training methods (parts and whole) with eye-hand coordination (high and low) on students' extracurricular basketball skills. This research uses experimental method with 2x2 factorial design. The population of the study was an extracurricular basketball student in Yogyakarta City. The study sample consisted of 20 extracurricular basketball students from SMAN 6 Yogyakarta and SMAN 8 Yogyakarta, which were taken from 38 students using random sampling techniques. The test instrument used to measure eye-hand coordination is a tennis ball-throw test, and the test instrument for measuring basketball skills is Sports High School (STO). The data analysis technique used was two-way ANOVA at the significance level $\alpha = 0.05$. The results of the research are as follows: (1) there is no difference of influence between part and whole training methods on student basketball skill, which proved from $p = 0.165 > 0.05$. (2) there is a difference in the influence of students who have high and low coordination on students' basketball skills, as evidenced by $p = 0.000 < 0.05$, students who have high-hand eye coordination rates are better than those with low-hand eye coordination. (3) there is an interaction between the training methods (part and whole) and hand-eye coordination (high and low) to the students' basketball skills, as evidenced by the p value = $0.047 < 0.05$.

Keywords—part and whole practice method, hand eye coordination, basketball skills.

I. INTRODUCTION

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Basketball is one of the most popular sports among students and society. Basketball is the first position in popular sports and research shows that 95.6% in the USA public schools like basketball activities. Then 42.2% of high schools like it and 37.2% of high schoolers perform the sport. School activities such as extracurricular basketball activities reach 76.4% in secondary schools and 90.9% in advanced schools who like and carry out basketball [1].

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Basketball is a relatively simple game played between two teams of five players each on a rectangular court, usually indoors. Each team tries to score by tossing the ball through the opponent's goal, an elevated horizontal hoop and net called a basket [2]. Basketball does not only require physical ability but basketball also requires a high level of skill. The things that must be known in basketball before

doing it are understanding the basic movements or basic techniques. The basic techniques in basketball games are dribbling, catching, passing, and shooting [3]. Basketball can be considered as a complex sport where various actions occur dynamically and continuously, it is seen from the complexity of every basketball skill movement [4].

The basic technique of basketball is the most important parts that must be known by sports or athletes. All players must master the basic skills in the game of basketball. The basic techniques of individuals performing the game must be owned by each player in order to participate effectively in the game. The basic techniques in question are passing, dribbling, shooting, rebounding, and covered with defensive footwork [5]. Someone who does a basketball skill movement really needs a good level of coordination as well.

Movements such as dribbling, passing, and shooting are basketball technical skills that require good coordination of biomotor components, because when doing movements without good coordination the movements will look stiff and less skilled when applying the motion. Coordination is the ability to integrate muscle movements into efficient motion patterns. Coordination makes the difference between good performance and poor performance [6]. Performance in basketball also depends on many other factors including eye-hand coordination, position and anticipation of an athlete [7]. Basketball is identified as a sport that requires a variety of coordination skills such as spatial orientation, movement coordination, and rhythm, as well as a specifically high level of basketball fitness [8].

Dribbling, passing, and shooting are basketball skills that require a good level of coordination, Eye-hand coordination has a major influence on the effectiveness of a basketball skills movement. Eye-hand coordination describes the ability of your body's visual system to process information received through the eye and used to direct hand gestures. Basketball players obviously need it, optimal interaction between brain, eye and limb, for daily functional use [9]. Eye-hand coordination is redefined as perceptual motor skills that involve the integration and processing of the visual and touch central nervous system so that directed motor movements can be performed. Hand-eye coordination uses the eye to draw attention and hands to perform a task [10]. Competence in EHC, Eye-hand Coordination, draws its link in physical activity and sport [11]. Eye-hand coordination has good links in sports such as basketball. So it can be said that eye-hand

coordination has a major influence on basketball skills including; dribbling, passing and shooting.

In addition to eye-hand coordination, right training method is required also to improve basketball skills. Determination of the right training method will affect the level of basketball skills. The training method is something that describes the concept of an exercise that is used as a guideline in carrying out exercises with systematic procedures to achieve training goals. A good practice method is used in the application of fundamental basketball skills in training students, part method and whole method. The effectiveness of part exercises or overall training depends on the complexity of the skills practiced as in basketball sports [12]. Part methods and whole methods are two methods that can handle different tasks and are able to shape the development of specific motor skills instruction [13].

Part-training methods are exercises that started from the smallest parts of a skill movement. Part practice (PP) refers to learning a separate component of a skill, one part at a time, before incorporating it into a skill movement [14]. General success notes for PTT (part task training) as long as the parts are carried out sequentially throughout the task, meaning that each task skill will be well done if in sequence and very effectively using the part method [15]. Part method procedures require early mastery of definite material parts and their final relationship of these different sections in the proper serial sequence [16]. The practice approach of part is recommended if the skills have high complexity and low organization [12]. The part method is preferred on basketball skills, because it has a high level of skill competence. Part method or some variations of section methods are appropriate for more complex skills [17]. A player is better at integrating adjacent movement elements and more efficiently, in movement planning part of acquiring skills involves learning to use sensory responses to responses generated more quickly and efficiently [18]. The method of part-by-step learning is more appropriate for skill enhancement [19].

The whole exercise method is an exercise that started from the whole series of movements. Whole method is often referred to as a global method or an overall method. This whole method in the process is to completely practice and then study the parts. The whole practice (WP), on the other hand, learns a skill as a whole or all at once [14]. WP (Whole Practice) improves the direct performance of skills after the training period [20]. After the children practice all the skills and then refine them by executing each part, they can unite the parts to perform all the skills assignments [21]. The whole practice methods are generally more efficient than partial practices because they enable learners to reach criteria in fewer trials [22]. The whole method procedure requires constant repetition of the entire body of the material until the desired stage of mastery is achieved [16]. The overall task exercise consists of presenting a complete task to learners so that they can practice the task as a whole. [23].

Based on some of the above opinions about hand-eye coordination and part-practice methods and whole practice methods, it is expected to improve students' basketball skills.

II. METHODS

A. Research Method

This research uses experimental method with 2x2 factorial design using pretest, treatment, and posttest on extracurricular basketball students.

B. Research Time and Place

This research was conducted from March to May 2018. The research was conducted in each school, precisely at the GOR of Kridosono Stadium in Yogyakarta and the GOR of Agung Sultan Stadium in Bantul. The exercises were held 16 times with the frequency of exercise 3 times a week. Duration of exercise is about 90 minutes each time of the meeting. The exercise starts at 03.30-05.00 PM.

C. Population and Sample

The population in this study was students who followed the extracurricular of basketball in Yogyakarta City, which amounted to 10 schools. The samples used in this study were determined by random sampling. The sampling method in this study is the population from the results of initial observation in Yogyakarta City, amounting to 10 schools. 2 schools randomly obtained that represent the population that are, SMAN 6 Yogyakarta and SMAN 8 Yogyakarta with the number of participants being 38 students. They performed eye-hand coordination tests to know students who have high and low coordination. After the eye-hand coordination data were collected, an analysis was performed to divide the group of into 27% high coordination and 27% low coordination. The results of the division of the group got 2 groups of them; 10 students who have high coordination and 10 students who have low coordination. Furthermore, each coordination group was divided into 2 more groups and produced 4 groups. Based on that, the sample used consisted of 5 persons representing high coordination and 5 persons representing low coordination and were trained using part training method. 5 persons representing high coordination and 5 persons representing low coordination were trained using whole practice method.

TABLE I. RESEARCH DESIGN PROGRAM

Training Method (A)	Part Method (A1)	Whole Method (A2)
Coordination (B)		
High Coordination (B1)	A1B1	A2B1
Low Coordination (B2)	A1B2	A2B2

Explanation:

A1B1: Groups of players who have a high level of coordination and are given part training methods.

A2B1: Groups of players who have a high level of coordination and are treated with the whole exercise method

A1B2: Groups of players who have a low level of coordination and are given part training methods.

A2B2: Groups of players who have a low level of coordination and are treated with the whole exercise method

D. Technique and Instrument of Data Collection

The data collection technique in this research was by giving pretest and posttest before and after treatment. The instrument used is a tennis ball capture test to measure the eye-hand coordination of students who take extracurricular basketball activities and use the Sports College (STO) test to measure basketball skills of students who take extracurricular activities.

E. Technique of Data Analysis

The data analysis technique used in this research is the SPSS 20 for windows. Hypothesis test used variant analysis (ANOVA) two ways on a significant standard of 5% or 0.05. Before analyzing the data using ANOVA, the researcher did data normality test using Kolmogrov Smirnov and homogeneity using Levene Statistic test with probability score ($p > 0.05$).

III. RESULT AND DISCUSSION

A. Data Description

This research was conducted in two schools, SMAN 6 and SMAN 8 Yogyakarta. The number of samples joined in the experimental group were 20 students that were divided into four groups, namely the high eye-hand coordination group that was trained with the part exercise method (A1B1), the high eye-hand coordination group trained in the whole training method (A2B1), low eye-hand coordination groups trained with part training methods (A1B2), and low eye-hand coordination groups trained using the whole (A2B2) training method.

The following was presented descriptive results of the research data presented in table form, among others:

TABLE II. DESCRIPTIVE STATISTICS ON THE PRETEST AND POSTTEST RESULTS OF BASKETBALL SKILLS

Treatment	Attribute	Statistic	Pretest	Posttest	Enhancement
Part Method	High Coordination (A1B1)	Total	751	1011	260
		Mean	150	202	52
		SD	15.7	14.7	1.5
	Low Coordination (A2B2)	Total	768	907	139
		Mean	154	181	28
		SD	22.3	16.4	10.6
Whole Method	High Coordination (A1B1)	Total	764	973	209
		Mean	153	195	42
		SD	13.3	11.9	10
	Low Coordination (A2B2)	Total	762	843	81
		Mean	152	169	16
		SD	16.3	6.1	10.3

The results of the pretest and posttest research data are presented in the form of histogram as follows:

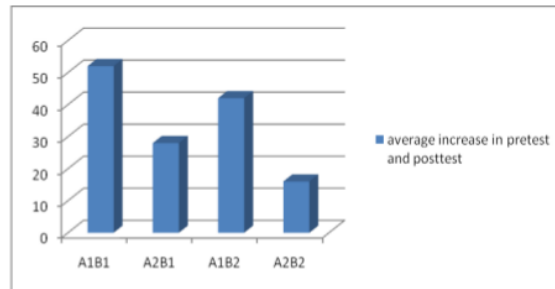


Fig. 1. The average histogram increases the basketball skills test.

B. Prerequisite Test

In this research, the normality test used Kolmogrov Smirnov method. The normality test on each group used SPSS 20 program with 5% or 0.05 significance standard. The result of normality test was in the form of a table as follows:

TABLE III. THE NORMALITY TEST'S RESULT

Data	p	Significance	Explanation
Pretest A1B1	0.989	0,05	Normal
Posttest A1B1	0.998		Normal
Pretest A2B1	0.988		Normal
Posttest A2B1	0.931		Normal
Pretest A1B2	0.991		Normal
Posttest A1B2	0.826		Normal
Pretest A2B2	0.844		Normal
Posttest A2B2	0.986		Normal

Moreover, the homogeneity test in this research used Levene Statistic method with 5% or 0.05 significance standard. The result of homogeneity test was in a form of a table as follows:

TABLE IV. HOMOGENITY TEST RESULT

Test of Homogeneity of Variances					
	Levene Statistic	f1	df2	Sig.	Explanation
Pretest	.361	3	16	.782	Homogen
Posttest	.745	3	16	.541	Homogen

C. Hypothesis Test Result

The differences of the influence part training and whole training methods have on students' basketball skills.

Based on the analysis result, it showed score $sig = 0.165 > 0.05$ which meant H_0 was accepted and H_a was not accepted. So it can be concluded that there is no significant difference from part and whole practice method to student basketball skill. Thus the first hypothesis states that part training methods and whole exercise methods give the same effect both in improving students' basketball skills.

The differences of influence high eye-hand coordination and low eye-hand coordination have on student basketball skills.

Based on the analysis result, it showed score $sig = 0.000 < 0.05$, which meant H_0 was not accepted and H_a was accepted. So it can be concluded that there is a significant difference in influence between students who have high eye-hand coordination and low eye-hand coordination. Based on the results of the analysis, it turns out that students who have high eye-hand coordination are better than students who have low eye-hand coordination.

The interaction between exercise methods (part and whole) with eye-hand coordination (high and low) on student basketball skills.

Based on the analysis result, it showed score $sig = 0.047 < 0.05$, which meant H_0 was not accepted and H_a was accepted. So it can be concluded that there is an interaction between training methods (part and whole) and eye-hand coordination (high and low) to high school basketball skills.

D. Discussion

There is no difference in the effect of part training methods and whole practice methods on student basketball skills.

Part-training methods provide an exercise that begins with parts of a skill component then reassembled to become one complete movement. Teach or train specific game elements and then incorporate them into one complex skill [24].

The form of the part training method is by dividing the smallest parts of a motion skill and then reuniting it into a whole skill movement. Everybody can choose in practicing each component or skill movement separately through part practice or practicing the skill as a whole with intact or complex workouts. [25]. Part-training methods are structured according to the needs of basketball skills, among others; dribbling, passing, and shooting, then this part training method is expected to increase the level of students' basketball skills.

The whole training method is a method that moves from the whole series of movements. Whole method is often referred to as a global method or an overall method, this whole method in the process is a complete practice and then study the parts. The whole method or global method is a way of practice that goes from general to specific. Whole-task training consists of presenting tasks as a single unit [23]. In the improvement of skills, it takes repetitive exercise. Whole method procedure demands the continuous repetition of an entire body of material till the desired stage of mastery is attained [16]. In teaching motion or game skills, the whole or whole shape is taught first and then broken down into sections (26).

The portion in the whole practice method is tailored to the needs of the skills to be taught. Skills like dribbling, passing, and shooting, are basketball skills that can be trained using whole practice methods. The game of basketball has explicit movement characteristics, so it takes the whole practice method to make the learning process faster in training. Basketball games that tend to be fast require a whole training method where this method provides a learning stage that is not rigid. In general, the whole exercise method is more efficient than the partial practice in

that, an athlete reaches the criteria in fewer trials [22]. The portion with a gradual loading will be expected so that the whole exercise method can run well as desired. The whole exercise method plays an important role in improving students' basketball skills', while good practice and repetitive routines will further improve students' basketball skills.

Based on some of the explanations above, the two training methods namely, part method and whole method in their application in basketball can be used in training to improve students' basketball skills.

1 *There is a difference in the effect of the high level of eye-hand coordination and the low level of eye-hand coordination on students' basketball skills.*

Coordination is a person's way of integrating his movement skills in different patterns into a single movement effectively and efficiently. Coordination is necessary in almost all sports including basketball because basketball has very explicit circuits of movement with good precision of movement. To see whether or not good coordination of one's movement is reflected in integrating its capabilities quickly, smoothly, appropriately, effectively and efficiently and has a good coordination, it will be able to carry out the movement effectively related in the efficiency of the use of time, space and energy, in implementing a movement. While related to the effectiveness of the process through which to achieve goals. An athlete who has good coordination will be easy in mastering tactical techniques and improving his mental ability [27]. Coordination in this study is used to determine the ability of students to carry out the task of movement of basketball skills effectively and efficiently.

Eye-hand coordination has an attachment to basketball skills. It is the ability of the visual system to coordinate information received by the eye, then control, guide, and direct the mind and hands to complete certain tasks such as doing basketball technical skills. To know one's laterality pattern (dominance of eye, hand, and foot) makes it possible to suggest situations adapted for learning skills more efficiently, to detect and guide young talents, to optimize the work of limbs for each side of the body and to achieve powerful coordination [28]. EHC plays a pivotal role in many kinds of sports, especially in ball games which require a lot of reaching and catching [29]. Basketball performance also depends on many other factors (e.g. positioning and anticipation) [30].

Based on the above explanation it can be concluded that the sport of basketball requires a good level of eye-hand coordination especially in performing or implementing basketball skills. Good coordination will provide the appearance of efficient skill. It's because someone who has good skills tend to be able to perform activities quickly without exerting excessive energy.

2 *There is an interaction between training methods (parts and whole) with eye-hand coordination (high and low) on students' basketball skills.*

2 Based on the results of research it has been proposed that there is interaction between training methods (part and

whole) with eye-hand coordination (high and low) to the student's basketball skills. This proves that the interaction between training methods and coordination to basketball skills exists because they are equally supportive in improving basketball skills.

The use of part and whole practice methods are good for high school students especially for beginner athletes where both methods are good for improving basic basketball skills such as passing, dribbling, and shooting. Coordination is the ability to integrate various kinds of movements into one specific movement. It is a combination of performance from several elements of motion which then produce an effective and efficient movement. It is also a blend of some elements of motion by involving eye-hand, leg and eye movements or hands, feet and eyes simultaneously for maximum and efficient motion [31]. Coordination indicates the player's ability to correctly move all the body required by the task [32]. Coordinative abilities enable the sportsman to do a group of movements with better quality and effect. They are needed for maximal utilization of coordinative abilities technical skills [33]. Therefore, someone who has a good coordination is able to perform activities with good movement.

Based on several exposures above, it is concluded that the results of this study indicate that there are interactions between training methods and eye-hand coordination of students' basketball skills.

IV. CONCLUSION

Based on the results of the research and the results of data analysis conducted, it can be concluded that, there is no significant difference in influence between part training method and whole practice method to student basketball skills. Part exercise methods and whole exercise methods have the same effect on improving students' basketball skills. There is although a significant difference in influence between the level of high-level coordination and the low level of eye-hand coordination on students' basketball skills. Students who have a high level of hand-eye coordination are better than students who have a low level of hand-eye coordination. Furthermore there are significant interactions between training methods (parts and whole) with eye-hand coordination (high and low) on students' basketball skills. That interaction can mean that basketball skills are influenced by training methods (parts and whole) and eye-hand coordination (high and low).

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