

# Development of Pak-Adi Based Circuit Learning Model to Improve the Ability of Junior High School Students to Play Tennis Court

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**ABSTRACT---** *This research and development aim to know the effectiveness of participatory-based circuit learning models, analysis, creativity, activity, demonstration and innovation to improve the ability to play tennis court, junior high school students. This research design refers to the research and development model of Borg and Gall. In general, the development measures for this research are carried out in four stages, namely: (1) the first stage is preliminary research; (2) the second stage is model development planning; (3) the third stage is validation, evaluation, and revision of the model; and (4) the fourth stage is the implementation of the model. Test the model's effectiveness using tests developed by researchers and data analysis using the formula of t test observation replay with the level of signification  $\alpha = 0.05$ , overall data analysis using the help of the program Statistical Package for the Social Sciences (SPSS) for version 23.0. The results of this study can be concluded that effective model learning circuit-based participatory, analytical, creative, active, demonstration and innovative to improve the ability to play tennis courts. Based on the effectiveness tests, they are empirically proven that the results of products in participatory-based circuit learning models, analysis, creative, active, demonstration, and innovation for junior high school have excellent effectiveness.*

**Keywords---** development, model, circuit learning, tennis court

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## 1. INTRODUCTION

### 2.1 Background

In this millennial era, the nation's progress depends on existing human resources, which is to innovate learning to improve the quality of the students. The more advanced a country requires quality human resources. In the current era of globalization, educator resources are needed to have intellectual rates that can compete with foreign nations. Therefore, both developed and developing countries pay great attention to education, especially physical education, sports and health, to seek superior human resources in various sports fields.

Preparing students for future life is the concern of all parties who work together to prepare students who have quality; one of the ways is curriculum change, this implies that the curriculum is an educational design to craft the lives of students who can implement character education values, among others responsible, honest, intelligent, caring, and broad-minded. To prepare students' present and future lives, the curriculum aims to develop learning experiences that provide the most comprehensive opportunity for students to master the competencies needed for life in the present and future, and at the same time, continue to develop their abilities as cultural heirs. Nation and people who care about today's society and country based on regulation of the Minister of Education and Culture Number 67 of 2013.

Philosophically, the purpose of physical education and sports is to support overall educational goals [1]. It means that

in learning physical education and sports that are in nature to actualize the potential activities of students in the form of attitudes, knowledge, and skills given the form, content, and quality of direction towards an individual personal unit according to the degree of physical and spiritual health. Physical education and sports can develop domains that include cognitive, affective, psychomotor, and physical. Physical education for sports and health is education through a physical activity using the medium of activity in the form of physical activity called sport.

Physical education is an integral part of the educational process. This means that physical education is one of the media to help achieve the overall educational goals. However, the facts on the ground still show that physical education has several problems, especially those related to the quality of learning [2].

The implementation of learning physical education and sports is a long-term investment in developing the quality of Indonesian human resources. The results are expected to be achieved in the long term. Therefore, efforts to foster community and students through physical education and sports need to be continued with patience and sincerity to sacrifice [3]. It is in line with the Regulation of the Minister of National No. 22 of 2006 concerning content standards, which specifically states the scope for each subject and level of education, including physical education, sports and health subjects. In the Minister of National Education, it is stated that the physical education, sports and health subject groups are intended to increase the physical potential and instil sportsmanship and awareness of healthy living.

Based on this description, the researchers are interested in developing a Pak-Adi-based circuit-learning model. This is important to find a model that can be applied to teachers and students and what factors can support mastery of playing Tennis. There are times when a teacher only requires students to demonstrate the implementation of playing tennis techniques correctly without providing a solution to the problems experienced by students, so in this study, a participatory, analytical, creative, active, demonstration and innovative-based circuit-learning model was developed to improve students' abilities—playing tennis court junior high school students.

## **1.2 Research Objectives**

This study aims to describe and analyze the effectiveness of a participatory, analytical, creative, active, demonstration and innovative circuit-based learning model to improve the ability to play Tennis for junior high school students.

## **2. LITERATURE REVIEW**

### **2.1 Conceptual Description**

Leadership traits that seek to identify Field tennis is essentially a sport that can be played both singles and doubles. This game is played with a small ball by hitting the ball over the net between players. The tennis court game is played on a flat floor and a rectangular court; the court is divided between two poles that span the net.

One of the factors that must be trained to achieve the ability to play Tennis is to master the basic technique of hitting. The types of tennis strokes consist of groundstroke, serve, volleys, and overhead stroke or smash. [4] stated that at least half of all tennis strokes are forehands. Because you will be doing thousands of groundstrokes forehands and because these strokes can be a useful stash weapon for you, they are very important.

Playing Tennis is a stroke made by a right-handed player on a ball on the right side of his Body or a stroke made by a left-handed player on a ball on his left side after the ball bounces on the court. This shot is taken after the ball has bounced once.

The learning model is: a conceptual framework that describes a systematic procedure in organizing learning experiences to achieve certain learning objectives, and serves as a guide for learning designers and teachers in planning better teaching and learning activities." Thus, what is to be achieved in a learning activity is a systematic, purposeful activity.

[5] suggests that the model is interpreted as an object or concept used to represent something. In addition, Pribadi (2009 in [6]) also revealed that the model could also be seen as an effort to concrete a theory. In this regard, [7] explains that the learning model describes the learning environment, including the teacher's behaviour when the model is applied.

[8] suggests that learning is a deliberate, purposeful, and controlled effort so that others learn or the occurrence of relatively permanent changes in others. This is in line with the opinion of [9] that learning is a compiler of information and an environment to facilitate learning. Good teaching methods are the key and prerequisite for students to be able to learn well. One of the benchmarks that students have learned well is learning what they should learn to achieve the desired indicators. Looking at learning as a system means that several interrelated components work together and influence each other to achieve goals. [10] state that these components are: objectives, learning materials, learning methods or strategies, media, and evaluation. From this meaning, it is clear that learning is a two-way interaction between a teacher and students, where between the two, there is an intense and directed communication (transfer) towards a target that has been previously applied.

In essence, the PAK ADI-based circuit-learning model is one of the learning models that can be applied in physical

education learning activities, especially in basic technical teaching materials in the game of Tennis. This means that Pak-Adi-based circuit learning is how a teacher can organize, plan, implement and evaluate learning, deliver, manage the learning desired by both the teacher and the students.

Pak-Adi-based circuit learning is a synonym for a learning model that includes participatory, analytical, creative, and innovative circuit-based characteristics. Pak-Adi is one of the learning activities used to optimize physical education, sports and health learning, especially tennis teaching materials. The Pak-Adi-based learning model always positions the teacher as someone who can create a more conducive learning atmosphere while students are learning citizens who must be creative, analytical, creative, active, demonstration, innovative and based on circuit exercises so that the teaching and learning process becomes more enjoyable.

The learning process can use it as a source of active, creative and more innovative and interesting learning. In the PAK ADI-based circuit learning process, feedback occurs between learning residents and teachers, meaning that there is an interaction between students, teachers to students or students with learning resources, in this case, learning physical education, sports and health. With this active learning model, it is hoped that students' potential will ultimately optimize learning outcomes. It will be easy to find seeds for tennis athletes in particular and all sports that come from schools, not just clubs.

## **2.2 Research Hypothesis**

Based on the problem formulation and literature review, the action hypothesis of this research is the effectiveness of the participatory, analytical, creative, active, demonstration-based and innovative circuit-based learning model to improve the ability to play tennis court junior high school students.

## **3. RESEARCH METHODOLOGY**

The research method is a way to solve problems or how to develop knowledge using the scientific method. The research method is a very important factor in a study. The method used in this research is research and development, which produces products in education and learning. According to [11], research and development are educational Research and Development (R&D) is a process used to develop and validate educational products. The product developed in this research is a practical, analytical, creative, active, demonstration and innovative-based circuit learning model to improve students' playing tennis skills, abbreviated as Psb-Pak Adi Model for KBTL.

The ability to play Tennis is the total score obtained by students from the elements of motion that have been determined and arranged to measure: (a) ready attitude, (b) attitude to swing the Racket (backswing), (c) movement of hitting the Racket with a tennis ball (impact), (d) follow-up movement.

This research was conducted at SMPN 6 Makassar from 10 February 2021 to 30 May 2021. The sample in this study were students of SMPN 6 Makassar class IX A-E. This test aims to determine the process of mastering the basic techniques of playing Tennis.

Those were some equipment used in tennis practice namely sportswear, tennis racket, tennis court tennis ball, net (tennis court net), meter, test form and stationery.

The evaluators in this study were technical delegate (a person), evaluator (three person), and supervisor (a person). Meanwhile the evaluator conditions are the evaluator is an expert in the field of tennis and certified trainer in Tennis

Instructions for conducting the test namely:

1. Explained the implementation of the test
2. Ask to warm-up first
3. Stands on the Base Line
4. Students were allowed to do five times the service rally and smash
5. The Score taken is the implementation of a rally playing Tennis in pairs with friends

[12] explains two aspects must be assessed: the first is the activity itself. The second is appropriate for the students themselves or athletes regarding muscle strength, speed, balance, agility, flexibility, body fat, and a grid of technical process assessments for basics of playing Tennis.

**Table 1. The scoring grid for the technical process of playing Tennis**

<i>No</i>	<i>Elements of Motion</i>	<i>Indicators</i>	<i>Evaluator</i>			
			<i>4</i>	<i>3</i>	<i>2</i>	<i>1</i>
<i>1</i>	<i>Preparatory position attitude</i>	<i>The ideal foot positions Ideal knee position The ideal position of the Body and hands The view in the direction of the tennis ball</i>				
<i>2</i>	<i>Racket swing position (backswing)</i>	<i>The ideal movement of the foot and knee position Racket swing back Movement of the arm and gaze towards the tennis ball Body position ideal movement</i>				
<i>3</i>	<i>Hit the tennis ball with the Racket (impact)</i>	<i>The ideal movement of the knee and foot position Waist rotation Weight transfer Position when hitting the Racket with a tennis ball</i>				
<i>4</i>	<i>Continuation motion</i>	<i>Ideal foot and knee posture An ideal posture of hand-holding Racket Body ideal attitude Position ready to return</i>				

Description of the assessed element of motion

- 1) Preparatory position attitude
  - a) The ideal foot positions
  - b) Both feet are shoulder-width apart, and prepare to move the Body later when you impact a tennis ball with a racket. Bodyweight rests on the soles of the feet.
  - c) Ideal knee position
  - d) Bodyweight rests on both feet, knees slightly bent to relax when you are going to step forward.
  - e) The ideal position of the Body and hands
  - f) Chest still facing forward, left hand holding racket neck.
  - g) The view in the direction of the tennis ball
  - h) The head is relaxed and facing the net, the shoulders are relaxed facing the net, and the eyes are looking in the direction of the tennis ball.
  - i) The position of the racket swing (backswing)
  - j) The ideal movement of the foot and knee position
  - k) The feet are shoulder-width apart, and the knees slightly bent in preparation for transferring the Body later when you are about to impact a tennis ball with a racket. The weight of the Body rests on the tip of the palm.
- 2) Racket swing back
  - a) Swing the Racket back relaxed; when you want to pull the Racket back, there is no need for strength and speed in pulling the Racket back.
  - b) Movement of the arm and gaze towards the tennis ball
  - c) Keep an eye on the direction of the tennis ball; the Racket is swung backwards before the tennis ball comes towards us because if it's too late, there will be a delay at the time of impact later
  - d) Movement ideal body position
  - e) Body to be as relaxed as possible and the position of the shoulders next to the net, the hand that is not holding the Racket to adjust

- f) Contact of a tennis ball with Racket
  - g) The ideal movement of the knee and foot position
  - h) The left foot steps forward with the knee position helping from a low to a high position and is still slightly bent so that the leg is ready to return when changing direction.
- 3) Waist rotation
- The player rotates the hips and assists the impact of the Racket with the tennis ball.
- 4) Weight transfer
- The bodyweight that was previously on the right foot then shifts to the left foot because along with the backswing movement of the Racket then the Racket impacts the tennis ball.
- 5) Position when hitting the Racket with a tennis ball
- a) The tennis ball is hit to the right of the left foot slightly forward.
  - b) The point of contact is around the waist in front of the Body.
  - c) The head of the Racket hits the contact (impact).
  - d) Racket swing from low to high
  - e) Advanced motion
  - f) Ideal foot and knee posture
  - g) The left leg remains in front, and both legs remain slightly bent to help balance the body position after impact.
  - h) Ideal posture of hand-holding Racket
  - i) The right hand still holds the Racket and pushes the tennis ball forward as much as possible in a hand swing; after making an impact and pushing the tennis ball, swing the Racket to the left ear.
- 6) Body ideal attitude
- a) The Body follows the direction of the swing of the arm and Racket.
  - b) Position ready to return
  - c) Prepare the body position again and the hand holding the Racket to hit the tennis ball again with the position of both feet shoulder-width apart and slightly bent.
- 7) Rating score
- a) If the movement is perfect following the indicators of the assessment process for the ability to play Tennis, then the value or score is 4 (Good)
  - b) If the movement is perfect following the indicators of the process of assessing the ability to play Tennis, then the value or score is 3 (Good Enough)
  - c) If the movement is not perfect following the norms of assessment, then the value or score is 2 (Not Good)
  - d) If the movement is not perfect following the assessment norms, then the value or score is 1 (Not Good)
- 8) Preparation before taking the test
- a) Before carrying out the test, all test takers warm up sufficiently
  - b) The test carried out is the processing technique for the ability to play Tennis
  - c) Each participant is given the opportunity of 10 strokes to process the ability to play Tennis
  - d) The results of the processing technique for the ability to play Tennis are taken through observational assessments

### ***3.1 Data Analysis Techniques***

The data collected through the test is still rough. The data was then analyzed using statistical tests using descriptive analysis techniques with percentages. Test results data (pretest and posttest) of playing tennis skills were analyzed by t-test (t-test) with the help of SPSS version 23.00 program.

#### 4. RESULTS AND DISCUSSION

##### 4.1 Research Results

This study used a descriptive analysis of frequency to test the effect of transformational leadership on the performance of Secaba Rindam XIV Hasanuddin. More details can be seen in Table 2 below:

**Table 2. Summary of descriptive analysis of pretest and posttest data on the ability to play Tennis**

No.	Statistics	Test Motor ability Result	
		Pretest	Posttest
1	Number of Samples	30	30
2	Average value	8.40	15.30
3	Standard Deviation	.814	1.264
4	Range	3	4
5	Minimum Value	8	12
6	Maximum Value	11	16
7	Amount	252	459

The data from the pretest of the ability to play Tennis using a test developed by researchers conducted on 30 students obtained an average score of 8.40 with a standard deviation of 0.814, and the range value obtained a value of 4 from the difference between the highest score of 11 and the lowest score of 8 and obtained a total score of 252. While the posttest data on the ability to play Tennis using a test developed by researchers conducted on 30 students obtained an average value of 15.30 with a standard deviation value of 1.264, and the range value obtained a value of 4 from the difference between scores. The highest score was 16, the lowest score was 12. A total score of 459 was obtained. Furthermore, the results of the normality test of research data can be seen in Table 3 below:

**Table 3. Summary of the results of the Kolmogorov-Smirnov Z. data normality test**

Statistic	Pretest	Posttest
<i>N</i>	30	30
<i>Kolmogorov-Smirnov Z</i>	2.493	2.064
<i>Asymp. Sig. (2-tailed)</i>	.000	.000

Based on table 3 above, which is a recapitulation of the results of testing the normality of the data on each research variable, it can be described as follows:

- 4.1 In testing the pretest normality of the ability to play Tennis for junior high school students from 30 students, the value of KS-Z = 2,493 with a probability level = 0.000 and is greater than the value of 0.05 or at a significant level of 95%. Thus, the pretest data on the ability to play Tennis of junior high school students obtained were normally distributed;
- 4.2 In testing the normality of the posttest data on the ability to play Tennis for junior high school students from 30 students, the value of KZ-S = 2,064 with a probability level = 0.000 and is greater than the “a” value of 0.05 or at a significant level of 95%. Thus, the posttest data on the ability to play Tennis for junior high school students obtained were normally distributed. After the normality test was met, the homogeneity test of the population variance was carried out on both groups of research data, namely pretest and posttest data on the ability to play Tennis for junior high school students. Both groups of data must meet the assumption that the variance is homogeneous to test the difference in the mean value between the treatment groups. Where the hypothesis of data homogeneity proposed is as follows:

Ho is rejected if 2 count > 2 table

Ho is accepted if 2 count < 2 table

The analysis results for the homogeneity of variance test in the four groups of cells in the experimental design were carried out with the Barlett test at the = 0.05. The recapitulation of the results of the homogeneity analysis with the Barlett test using the Oneway Anova analysis of the test of homogeneity of variances is presented in table 4 below.

**Table 4. Recapitulation of the homogeneity test of variance in the ability to play Tennis for junior high school students**

<i>Group</i>	$\chi^2$	$\chi^2$ table $\alpha = 0,05$	<i>Sig. (p)</i>	<i>Explanation</i>
<i>pretest and posttest</i>	3,172	14,067	0,087	<i>Homogenous</i>

The test results indicate the homogeneity test results obtained a value of 3.172 and  $p = 0.087 > 0.05$ , or the test indicates that the value of 2 counts = 3.172 is smaller than the value of 2 table = 14.067 with a significant level ( $p$ ) = 0.087 so concluded that the two groups of data tested came from populations with homogeneous variances.

Based on the two results of the requirements analysis test above, it can be concluded that the analytical requirements needed for the analysis of variance are met so that it is feasible for further analysis to see the effectiveness of Pak Adi's circuit-based learning model to improve the ability to play Tennis for junior high school students. After the prerequisite test is met, then an inferential analysis is carried out using the *t*-test. To prove the significance of the application of Pak Adi's circuit learning model development product to improve the ability to play Tennis for junior high school students, it is necessary to carry out statistical testing with a "t-test" on the results of the pretest and posttest of the ability to play Tennis for junior high school students on the tests that researchers have developed. Following the need to improve the ability to play Tennis for junior high school students, the effectiveness test is then carried out using the "t\_test". The complete calculation of the steps for testing the effectiveness of the implementation of Pak Adi's circuit-based learning model to improve the tennis-playing ability of junior high school students using the "t-test" technique is shown in Table 5 below:

**Table 5. Summary of Effectiveness Test Results for the ability to play Tennis with t-test**

<i>Average Motor ability Test Results</i>		<i>t</i> -count	<i>t</i> -table
<i>Pretest</i>	<i>Posttest</i>		
8.40	15.30	22.655	2,045

Based on the results of the effectiveness test using the t-test, from the difference in the test results of the ability to play Tennis, the test that the researchers have developed according to the need to improve the ability to play Tennis for junior high school students between the pretest and posttest, the value  $t_{\text{tung}} = 22,656$  is greater than the price  $t_{\text{table}} = 2,045$  (at a significance level of 0.05), then the null hypothesis is rejected. So it can be concluded that there is a significant difference between the pretest and posttest results of the ability to play Tennis on the test court that has been developed by researchers by the need to improve the ability to play Tennis for junior high school students. In addition, the average value of the pretest results of 432.25 is smaller than the average posttest results of 502.33. Thus, it can be stated that Pak Adi's circuit-based learning model to improve the ability to play Tennis for junior high school students effectively improves the ability to play Tennis for junior high school students.

#### 4.2 Discussion

Based on the results of trials to small groups, trials to large groups and the results of the effectiveness tests that have been described previously, it can be seen that the circuit learning model product based on Pak Adi to improve the ability to play Tennis for junior high school students that have been developed in this study is considered eligible and feasible. To be used and integrated into learning programs, especially in improving the ability to play Tennis for junior high school students. The study results also showed differences in the test results of the ability to play Tennis after being given treatment in the form of the application of the Pak Adi-based circuit learning model to improve the ability to play Tennis for junior high school students.

### 5. CONCLUSION

Based on the study results showing that the effectiveness of the model, it is empirically proven that the product in the form of a circuit-learning model based on Pak Adi to improve the ability to play Tennis for junior high school students has very good effectiveness. This is based on the results of the motor ability test that has been developed by the researcher, which shows that the average price of the posttest results is greater than the pretest results. Therefore, it can be stated that Pak Adi's circuit-based learning model effectively improves the ability to play Tennis for junior high school students. This is evidenced by the obtained t-count of 21.972 and t-table of 1.658 with a significance level of 0.000 ( $t\text{-count} > t\text{-table}$ ).

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