

Research Article

# The Effect of Problem-Based Learning Model on Physical Education Learning in Volleyball Games at Smk Candra Naya Jakarta

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**Abstract:** This study aims to examine the effect of the Problem Based Learning (PBL) model in Physical Education learning for volleyball at SMK Candra Naya Jakarta. The research method used was an experiment with a One Group Pretest-Posttest design. The sample consisted of 39 eleventh-grade students selected using Cluster Random Sampling technique. The research instrument was a test of overhead and underhand passing skills in volleyball. The results showed that the average pretest score of 14.05 increased to 17.77 in the posttest, with hypothesis testing (Paired Samples Test) yielding  $t_{count} > t_{table}$  (9.833) and a significance of 0.000 ( $p < 0.05$ ). This proves that the PBL model significantly improves students' volleyball passing skills. Additionally, PBL encourages active participation, teamwork, and critical thinking skills. Therefore, the PBL model can be an innovative alternative in Physical Education learning, particularly for volleyball.

**Keywords:** Problem based learning; Physical education; Volleyball

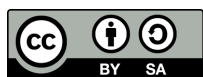
## 1. Introduction

Physical Education is a process of activities that are systematically arranged to improve affective, cognitive, and psychomotor abilities to achieve educational goals. Physical education is an educational process that utilizes physical activity, to produce changes in each individual, both physically, mentally, and emotionally. Physical education is a process to mature a person in order to achieve educational goals, namely to educate the nation's life through physical activity, either through games or selected sports and activities involving large muscles (Safitri, 2018).

According to Fitron & Mu'arifin, (2020) stated that Physical Education is something that is inseparable from the education system as a whole which has the aim of being able to see developments from various perspectives of health, physical fitness, critical thinking skills, emotional stability, social skills, logical thinking and moral actions through physical activity.

Physical education has an educational scope. The scope of physical education teaching materials for Middle School to High School consists of: (1) Large and small ball game activities that discuss soccer, volleyball, basketball, badminton, table tennis, and softball; (2) Self-defense activities that discuss pencak silat; (3) Athletic activities that discuss fast walking, short distance running, long jump, and shot put; (4) Physical fitness activities that discuss body composition, heart endurance, muscle endurance, strength, flexibility, and physical fitness measurements; (5) Gymnastics activities that discuss straddle jumps and squat jumps; (6) Rhythmic movement activities that discuss arm swings and steps; (7) Aquatic activities that discuss leg movements, hand movements, breathing, and coordination; and (8) Health that discusses the concept and principles of healthy relationships, the impact of free relationships, and avoiding free relationships. Ruang lingkup pendidikan jasmani yang akan dibahas oleh peneliti yaitu Aktivitas permainan bola besar yang membahas tentang permainan bola voli. Dalam pembelajaran olahraga, seperti

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permainan bola voli, kemampuan siswa tidak hanya ditentukan oleh keterampilan teknis, tetapi juga oleh pemahaman konsep, kerja sama tim, dan kemampuan memecahkan masalah di lapangan. Oleh karena itu, pendekatan pembelajaran yang efektif dan inovatif sangat diperlukan untuk meningkatkan kualitas proses belajar mengajar.

The Problem Based Learning (PBL) learning model is one approach that can be applied in Physical Education learning. PBL encourages students to be actively involved in solving real problems, developing critical thinking skills, and working together in groups. In the context of volleyball, this model can help students understand game strategies, identify solutions to challenges in the game, and improve motor and non-motor skills. This study was conducted to examine the effect of implementing the Problem Based Learning model in Physical Education learning, especially in volleyball. With this approach, it is expected that students can be more motivated, have a better understanding of the concept of the game, and develop skills that support improved performance on the field. The Problem Based Learning model is a learning strategy that stimulates students to actively solve problems in real situations.

According to (Amalia & Hardini, 2020) the Problem Based Learning Model is a learning that presents problems, which are then used to stimulate high-level thinking that is oriented towards problems. Problems are given to students, before students learn concepts or materials related to the problems that must be solved. Thus, to solve the problem, students will know that they need new knowledge that must be learned to solve the problems given. By implementing the Problem Based Learning model, it is hoped that students can actively interact with their friends in exploring learning information, in addition, the Problem Based Learning model will make students more independent in discovering their own knowledge (inquiry) and which will certainly make students feel happy with the learning atmosphere because they are motivated and believe in their own abilities. So that the achievement of student learning outcomes will tend to increase.

Based on the results of observations and observations that have been carried out by researchers together with physical education subject teachers at SMK Candra Naya Jakarta, the learning process has several obstacles experienced by teachers and students that cause the teaching and learning process to be uncondusive. This is due to several factors, one of which is the lack of variation in the development of learning models in providing lesson materials, especially volleyball games, so that students easily get bored when taking physical education lessons because the material is so monotonous and does not make physical education lessons a favorite and anticipated lesson, then the next problem is that most students seem indifferent and pay less attention to the material explained by the teacher so that during the learning process students do not know, master, and understand the material and do not know the purpose of the volleyball game taught in the lesson.

Therefore, to obtain maximum learning outcomes of volleyball game activities, researchers use the Problem Based Learning (PBL) learning method to provide one of the learning innovations for volleyball game activity materials in physical education learning. Based on the problems above, previous research conducted by Susetya Kuku Kurniawan (2020) related to the problems that have been expressed, namely from the results of his research that the results of developing a large ball game based on problem based learning to increase the interest in learning of female students are as follows: the implementation of learning was carried out well with a value of 80.4%, the teacher's response was very good and the opinion was very supportive, the students' volleyball underhand passing skills were strong reaching 78.6% and the interest in learning was strong with a value of 75.05%. The product of developing a large ball game (volleyball) based on problem based learning is very good for female students to increase their interest in learning.

Based on previous research conducted by Muhammad Fahmi Prayoga (2021), matters related to the problems that have been expressed, namely from the results of his research, stated that Based on the results of this study, there is an influence of the problem-based learning model on the learning outcomes of students in class XI IPA 3 and XI IPA 4 of SMAN 15 Semarang, with each class using upper passing and lower passing materials. There is a significant increase in learning outcomes. This increase is known to be the average initial value of the upper passing pretest of 30.50 and the final value of the posttest

of 36.20. From this value, there has been an increase of 16%. And also the increase in the learning outcomes of the lower passing is known to be the average initial value of the lower passing pretest of 29.80 and the final value of the posttest of 35.85. From this value, there has been an increase of 17%. From the results of the study above, it can be interpreted that the problem-based learning model can help students get maximum learning outcomes because students are more required to better understand the problems that occur and find solutions to how problems can be solved, so that students are more active in thinking and more critical in dealing with problems.

From the relevant previous research above, there is something new in this research, including: (1) The research location that has been conducted in this research is at SMK Candra Naya Jakarta. (2) The population in this research was taken from class XI.B students at SMK Candra Naya Jakarta, totaling 100 students. (3) Sample, this sampling technique uses Cluster Random Sampling. (4) The instrument used in this research is the Brady Test, namely the test of passing the ball to the wall.

## 2. Literatur review

1. Based on the research that will be studied by the researcher, there are several studies that are relevant to this study, including: Muhammad Fahmi Prayoga (2021) Problem Based Learning (PBL): How is it Implemented in Learning Volleyball Passing Techniques: This study aims to determine the effect of the problem based learning model on the learning outcomes of volleyball passing techniques for class XI IPA 3 and 4 students of SMAN 15 Semarang. The research method used is a quantitative research method with a Quasi Experimental research model type. The similarity carried out by Muhammad Fahmi Prayoga is using the Problem Based Learning model. The difference is that previous researchers focused on its Application in Learning Volleyball Passing Techniques, while current researchers focus on Physical Education Learning.

2. Susetya Kuku Kurniawan (2020) Development of Big Ball Games (Volleyball) Based on Problem Based Learning to Increase Learning Interest of Female Students: This study aims to produce physical education learning devices for big ball games based on Problem Based Learning (PBL) to increase learning interest of students, especially female students. In this study, because it coincides with the pandemic period, e-learning was implemented in an effort to increase learning interest of students, especially female students. The similarity made by Susetya Kuku Kurniawan is using the Problem Based Learning model. The difference is that previous researchers focused on Increasing Learning Interest of Female Students, while current researchers focus on Physical Education Learning.

3. Oktavia Wahyu Ariyani (2021) Effectiveness of Problem Based Learning and Problem Solving Learning Models on Critical Thinking Skills of Elementary School Students: This study aims to determine the effectiveness of the Problem Based Learning and Problem Solving learning models on critical thinking skills in thematic learning of grade IV elementary school students. This study uses a meta-analysis research type. The similarity carried out by Susetya Kuku Kurniawan is using the Problem Based Learning model. The difference is that previous researchers focused on critical thinking skills in students' thematic learning, while current researchers focus on Physical Education Learning.

## 3. Method

The approach in this study is a quantitative approach. According to Sugiyono, (2018) stated that quantitative is research data in the form of numbers and analyzed using statistics. It can be concluded that the quantitative approach is a form of research approach whose data is in the form of numbers and analyzed using statistics. The approach taken in this study is a quantitative approach that focuses on the main objective, namely to determine whether there is an Influence of the Problem Based Learning Learning Model in Physical Education Learning in Volleyball Games at SMK Candra Naya Jakarta.

The research method is the stages carried out by researchers in order to obtain information or information that has been obtained. The research method used in this study is by using the experimental method. According to Noor (2017: 42) experimental research

can be defined as a systematic method to build relationships that contain cause-effect phenomena. According to Sugiyono, (2018) states that research variables are attributes or values of individuals, objects or activities that have certain variations determined by researchers to draw conclusions. The variables in this study are independent variables. The independent variable (X) is the Problem Based Learning Learning Model. The dependent variable (Y) is Volleyball. The Experimental Method in this study focuses on the main objective, namely to determine whether there is an influence of the Problem Based Learning learning model in physical education learning in volleyball games at SMK Candra Naya Jakarta. The samples in this study are as follows:

Sampel Penelitian

**Tabel 3.1.** Research Population

Number of students in class XI of SMK Candra Naya Jakarta

No	Kelas	Jumlah siswa
1	XI.A	38
2	XI.B	36
3	XI.C	39
	JUMLAH	113

**Tabel 3.2**

NO	KELAS	JENIS KELAMIN	
		LAKI-LAKI	PEREMPUAN
1	XI.C	28	11
	JUMLAH	39	

#### 4. Result and Discusion

Data description is a description of the data used in the study. When testing this data description, the researcher tries to find out the description or condition of the respondents who are the samples of this study. The research data was obtained through a volleyball playing skills test in physical education learning for class XI students of SMK Candra Naya Jakarta. To obtain an expression of the quality of each variable in this study, a hypothesis test formula can be used or what is called a paired t-test assisted by SPSS.27. Before entering the t-test, the researcher first looks for the Normality Test and Homogeneity Test assisted by SPSS.27, as follows:

##### 1. Description of Research Results

**Tabel 4.1.** Statistik Deskriptif

Descriptive Statistics								
	N	Range	Minimum	Maximum	Sum	Mean	Std. Deviation	Variance
pretest	39	13	6	19	548	14,05	3,284	10,787
posttest	39	12	12	24	693	17,77	3,039	9,235
Valid N (listwise)	39							

Source: SPSS 27 data processing

The table above can be seen in the student's score using the Problem Based Learning method in physical education learning. Before conducting the research, the researcher knew the initial conditions. In the pretest, the highest score obtained was 19 and the lowest score was 6, and the average score was 14.05. Meanwhile, after conducting the research, the posttest score for passing ability increased. The highest score was 24, the lowest score was 12 and the average was 17.77.

Prerequisite Test Data analysis is used to answer the hypothesis that has been proposed in the previous chapter, namely whether or not there is an influence of problem based learning in physical education learning in volleyball games for students of SMK Candra Naya Jakarta.

## 2. Uji Normalitas

Normality testing uses the Shapiro-Wilk test because the number of samples is less than 50. In this test, the hypothesis of the sample coming from a normally distributed population will be tested, for acceptance or rejection by comparing the Asymp sig price with 0.05. The criteria for accepting the hypothesis is if Asymp. Sig is greater than 0.05, if it does not meet these criteria, the hypothesis is rejected.

**Tabel 4.2.** Uji Normalitas

Tests of Normality			
	Shapiro-Wilk		
	Statistic	df	Sig.
pretest	0,925	39	0,125
posttest	0,976	39	0,547
*. This is a lower bound of the true significance.			
a. Lilliefors Significance Correction			

Source: SPSS 27 data processing

Based on table 4.2 above, the significance value ( $p$ ) of the pretest in the Shapiro-Wilk test is 0.125 ( $p > 0.05$ ), so based on the Shapiro-Wilk normality test the pretest data is normally distributed. Then the significance value ( $p$ ) of the Posttest in the Shapiro-Wilk test is 0.547 ( $p > 0.05$ ), so based on the Shapiro-Wilk normality test the posttest data is normally distributed.

## Uji homogenitas

Homogeneity testing was conducted on pretest and posttest data. At a significant level of  $\alpha = 0.05$ . The criteria for homogeneity testing are:

- 1) If  $\text{sig} > 0.05$  then the data is homogeneous and
- 2) If  $\text{sig} < 0.05$  then the data is not homogeneous

The results of the homogeneity test using SPSS 27 on the Pretest and Posttest values obtained the following results:

**Tabel 4.3.** Uji Homogenitas

Tests of Homogeneity of Variances					
		Levene Statistic	df1	df2	Sig.
pretest	Based on Mean	0,999	9	27	0,464

Source: SPSS 27 processing results

Based on the analysis results in the Test of Homogeneity of variances Based on Mean table, Levene Statistic = 0.999,  $df_1 = 9$ ,  $df_2 = 27$ , and  $\text{Sig} = 0.464$  is obtained. Because the  $\text{Sig}$  value of  $0.464 > 0.05$ , it can be concluded that the data variance in the pretest and posttest values is homogeneous.

## Uji Hipotesis

The hypothesis test used is the Paired Samples Test. This test is conducted to determine whether or not there is an effect of the use of problem-based learning on students' volleyball passing techniques in physical education learning at SMK Candra Naya. The guidelines or basis for decision making are as follows:

If  $t_{\text{count}} > t_{\text{table}}$  then  $H_0$  is rejected and  $H_1$  is accepted, meaning that the use of problem-

based learning has an effect on students' volleyball passing abilities in physical education learning at SMK Candra Naya.

If  $t_{count} < t_{table}$  then  $H_0$  is accepted  $H_1$  is rejected, meaning that the use of problem-based learning has no effect on students' volleyball passing abilities in physical education learning at SMK Candra Naya.

**Tabel 4.4.** Paired Samples Statistics

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre Test	14,05	39	3,284	0,526
	Post Test	17,77	39	3,039	0,487

Source: SPSS 27 data processing

The Paired Samples Statistics table shows the descriptive value of each variable in the paired sample.

The Initial Test has an average value (mean) of 14.05 from 39 data. The distribution of data (Std. Deviation) obtained is 3.284 with a standard error of 0.526.

The Final Test has an average value (mean) of 17.77 from 39 data. The distribution of data (Std.Deviation) obtained is 3.039 with a standard error of 0.487.

This shows that the final test on the data is higher than the initial test. However, the range of distribution of the final test data is also getting wider and with a higher standard error

**Tabel 4.5.** Paired Sample Test

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre Test - Post Test	-3,718	2,361	0,378	-4,483	-2,952	-9,833	38	0,000

Source: SPSS 27 data processing

Based on the results of data processing using the SPSS version 27 application in the hypothesis test using the Paired Samples Test. In the pretest and posttest value columns, Mean = 3.718, Standard Deviation = 2.361  $t = 9.833$ ,  $df = 38$ , and Sig. (2-tailed) = 0.000.

From the output in the table above, the Paired Samples Test Table is the main table of output that shows the results of the test carried out. This can be seen from the significance value (2-tailed) in the table. The significance value (2-tailed) of this case example is 0.000 ( $p < 0.05$ ). So that the results of the initial test and final test experienced significant changes (meaningful). Based on the descriptive statistics of the initial test and final test, it is proven that the final test is higher. It can be concluded that the use of the Problem based learning method in physical education learning has an influence on the volleyball passing ability of SMK Candra Naya Jakarta students.

The results of this study indicate that there is a significant influence on the volleyball passing ability of SMK Candra Naya Jakarta students. This study was motivated by the decline in passing ability and the lack of methods in physical education learning. This study aims to determine how much the Problem based learning method in physical education learning has an influence on the volleyball passing ability of SMK Candra Naya Jakarta students. This study is a quantitative descriptive study, using an experimental method with a research instrument in the form of a test. The population of this study was

113 students. While the sample taken in this study used cluster random sampling, so the sample size taken in this study was 39 students in one class.

This study aims to determine the effect of the Problem Based Learning (PBL) learning model in Physical Education learning in volleyball games at SMK Candra Naya Jakarta. Based on the results of data analysis, it was found that the application of the PBL model had a significant effect on improving students' passing skills. The average pretest score of 14.05 increased to 17.77 in the posttest, with a standard deviation indicating consistency of the results. The Shapiro-Wilk normality test confirmed that the data were normally distributed (pretest: 0.125; posttest: 0.547), and the Levene Statistic homogeneity test ( $0.464 > 0.05$ ) indicated homogeneous data variance. Furthermore, the hypothesis test using the Paired Samples Test produced  $t_{count} > t_{table}$ , so  $H_0$  was rejected and  $H_1$  was accepted. This proves that the PBL model is effective in improving students' passing skills, both upper and lower passes, and encourages active participation, teamwork, and problem solving during learning.

## 5. Comparison

Based on the results of data analysis, it was found that the application of the PBL model had a significant effect on improving students' passing ability. The average pretest score of 14.05 increased to 17.77 in the posttest, with a standard deviation indicating consistency of the results. The Shapiro-Wilk normality test confirmed that the data were normally distributed (pretest: 0.125; posttest: 0.547), and the Levene Statistic homogeneity test ( $0.464 > 0.05$ ) indicated homogeneous data variance. Furthermore, the hypothesis test using the Paired Samples Test produced  $t_{count} > t_{table}$ , so  $H_0$  was rejected and  $H_1$  was accepted.

## Conclusion

Based on the results of the study and discussion, it can be concluded that the Problem Based Learning (PBL) learning model has a positive influence on improving the volleyball passing ability of class XI students of SMK Candra Naya Jakarta. PBL not only improves students' technical skills but also encourages active involvement, cooperation, and critical thinking skills in solving problems during the game. This finding is in line with the constructivism theory which emphasizes experiential learning and problem solving. Thus, the PBL model can be used as an innovative alternative in learning Physical Education, especially in volleyball game material.

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