

## The Effect of the Project Based Learning Model with the Case Method and Nutritional Status on Physical Fitness of Learners Class Vii Smpn 21 Padang



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**ABSTRACT:** The purpose of this study was to determine the effect of learning models and nutritional status on the physical fitness of grade VII students of SMPN 21 Padang. This research model is a pseudo-experiment designed by Factorial by Level 2x2. The population of this study amounted to 119 people and a sample of 60 people with the Purposive Random Sampling technique. Collection of Nutritional Status data by tests using Body Mass Index (BMI) and Physical Fitness using the Indonesian Physical Fitness Test (TKJI) Age 13-15 years. Data were analyzed using two-path ANAVA at significance level  $\alpha=0.05$ . Furthermore, because no interaction was found between the learning model and physical fitness, the Tukey Test was not carried out. The results of the data analysis showed: (1) Overall there was no difference in the learning outcomes of the PjBL learning model with the Case Method learning model, (2) There was no interaction between the learning model and nutritional status on physical fitness, (3) Physical fitness of students treatment of PjBL learning model is better than Case Method learning model in high nutritional status group, (4) Physical fitness of students treatment of PjBL learning model is better than Case Method learning model in low motor group.

**KEYWORDS:** Learning Model, PjBL Learning Model, Case Method Learning Model, Nutritional Status, Physical Fitness

### I. INTRODUCTION

The development and progress of a nation is closely related to the problem of education. Education is not only seen as a medium in conveying knowledge from one generation to the next, but a medium that is expected to bring changes in the development of the nation's life. Education also makes a person learn to form character. Learning activities are the most basic activities in the entire educational process at school. This means that the success or failure of achieving educational goals depends a lot on how the achievement of the educational taxonomy experienced by students which includes cognitive, affective and psychomotor aspects (Douda et al., 2008; Mkaouer et al., 2018; J. Pion et al., 2015). Education is the responsibility of many parties, including parents, schools, communities, and the State (Aziizu, 2015; Kusuma, 2018)

The role of education is essential to create an intelligent, peaceful, open, and democratic society. Education reform must always be carried out to improve the quality of education of a nation Improving the quality of education is one of the quality of education development strategies in Indonesia. These efforts have a strategic role in the framework of the development of the Indonesian nation as a whole, because it involves the storage of human resources (HR) as implementers of development in the future (Das & Sarkar, 2020; Johan Pion et al., 2017).

National education strives to develop various potentials of students in order to have intelligence, personality, religious spiritual strength, self-control, noble morals and skills needed for themselves, society, and the nation. Good and quality schools are certainly the dream of all Indonesian people today. The importance of continuously refreshing the education system in order to produce the best children of the country who have potential, imaginative, creative, abilities, capacities, talents that develop and nurture in all daily problems, intellectually and truly admirably (Ávalos-Ramos & Vega-Ramírez, 2020; Hussein et al., 2022; Sukamti & Pranatahadi, 2019) The purpose of National Education is a formulation of the quality of modern humans that must be developed by each educational unit (Damanhuri et al., 2016; Nafisah, 2016; Risdiany & Dewi, 2021).

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To realize a quality national standard of education and master the times, it is not something simple, not so natural as turning hands, an order that can encourage national education. Education is an addition of skills or development of knowledge and understanding as a result of practice, study or experience (Hasan et al., 2022; Hassan et al., 2015).

Sports and Health Physical Education (PJOK) is one aspect that is needed by students in realizing the goals of national education to shape attitudes, behavior, discipline, honesty, cooperation and improve physical fitness and health as well as body resistance to disease (Andriadi & Saputra, 2021; Kurniawan, 2018; Septiana et al., 2022).

Looking at the legal umbrella regarding Physical Education, Sports and Health in accordance with Sports Law No. 11 of 2022 Chapter V Article 17 paragraph 11 concerning Sports Education, it is said that: "Sports education as referred to in Article 17 letter a is organized to instill character values and acquire the knowledge, skills, and attitudes needed to build a healthy, active lifestyle throughout life".

This is in line with one of the goals of physical education and sports where students are expected to have a healthy and fit body. Therefore, the educational process carried out in schools must refer to the purpose of education itself. The purpose of National Education is written in Law No. 20 of 2003 Article 1 paragraph 2 based on Pancasila and the Constitution of the Republic of Indonesia Year 1945.

The meaning of education is also stated in Law No. 20 of 2003 article 1 paragraph 1 which states:

"Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble character, and skills needed by themselves, society, nation and state". Then the Functions and Objectives of National Education are contained in article 3 of Law No. 20 of 2003 which reads:

"National education functions to develop the ability and shape the character and civilization of a dignified nation in order to educate the nation's life, aims to develop the potential of students to become human beings who believe and fear God Almighty, have noble character, healthy, knowledgeable, capable, creative, independent, and become democratic and responsible citizens."

Physical Education, Sports and Health (PJOK) subjects taught in schools are expected to contribute to achieving national education goals. The current curriculum is formulated the purpose of physical education, which is to help students improve the degree of physical fitness, movement skills, and health through the introduction and cultivation of positive attitudes, maturation of mental attitudes implemented in various physical activities. Sports and Health Physical Education as a forum for improving personality and a means of developing attitudes, personalities, and behaviors lays a strong foundation of moral values through the values it contains such as sportsmanship, honesty, discipline, responsibility, cooperation, confidence, and democracy (Pardiansyah, 2015; Roji, 2022; Tao et al., 2020).

Sports and Health Physical Education (PJOK) is an educational tool, or what is referred to as one of the educational media that in the process can realize the goals of education as well as culture (Mashud, 2019; Rahmadi & Irianto, 2020). The provision of this learning experience is directed to foster good physical growth and psychological development, as well as form a healthy and fit lifestyle (McMillan & Hearn, 2015; Sari, 2016; Wahyuningsih, 2017).

Physical Education, Sports and Health (PJOK) is education that is carried out systematically through body activities. In essence, Sports and Health Physical Education is an educational process that is carried out consciously through intensive Sports and Health Physical Education activities and lifelong coaching which has a very important role (Mustafa, 2021; Wajdi & Jamaluddin, 2019). Where students are given the opportunity to be directly involved in the learning experience through physical activities, play and exercise which are carried out systematically in order to increase the potential that exists in students, and can increase interest in following Sports and Health Physical Education lessons. Physical education in schools has significance for education as a whole. The existence of physical education in schools not only improves children's health and physical fitness but provides experience in the cognitive, affective and psychomotor fields for children (Ibrahim, 2017; Linda, 2016; Taras, 2010).

Sports and Health Physical Education (PJOK) according to a special learning environment characterized by many conditions and stimuli that are specifically designed also with the intention of providing opportunities for good influences on physical, emotional, social, intellectual, so as to bring changes in students in the desired direction. Thus, PJOK subjects are one of the compulsory subjects taught to students in schools, which aims to help students to strengthen physical fitness and health through the introduction and cultivation of positive attitudes, as well as the ability to move basic various physical activities (Arya, 2016; Hakiem, 2015; Rolheiser & Ross, 2015).

Learning Outcomes of Physical Education, Sports and Health (PJOK) Subjects for Junior High School grade VII are equivalent to phase D. At the end of phase D, learners can demonstrate the ability to practice specific movement skills as a result of correct knowledge analysis, perform physical activity and fitness exercises for health in accordance with exercise principles,

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demonstrate personal and social responsibility behavior and monitor them independently, in addition, it can also maintain the values of physical activity (Head of the Education Standard, Curriculum, and Assessment Agency, 2022).

To achieve the physical education objectives mentioned above, teachers are the main technical implementing elements who are in charge and responsible for carrying out learning process activities in schools. This is intended so that learning activities run as they should, teachers are required and expected to try their best to develop learning strategies and models and improve the cognitive, affective and psychomotor abilities of students. The success of Sports and Health Physical Education learning in order to achieve the expected goals is strongly influenced by several factors including learning planning, learning implementation, learning evaluation, student learning motivation, learning models used, socio-economic and facilities and infrastructure (Indrawathi et al., 2021; Mutawakkil, 2017; Nasution & Syaleh, 2021).

Sports and Health Physical Education (PJOK) learning planning is a process of preparing alternatives to overcome problems carried out in order to achieve national education development goals by considering the realities that exist in the social, economic, cultural, and overall development needs of national education (Hidasari & Bafadal, 2020; Petukhov et al., 2022).

From the outline, the implementation of learning includes three main activities, namely learning preparation or planning, the learning process and learning evaluation. Some principles in developing or compiling Learning Implementation Plans (RPP), namely: (1) Elaboration of curriculum ideas; (2) RPP development; (3) encourage active participation of learners; (4) develop a culture of reading, writing, arithmetic; (5) provide feedback and follow-up; (6) linkage and cohesiveness; and (7) apply information and communication technology. (Ngalimun, 2016; Ryanto, 2017; Salman & Darsi, 2020).

Learning is an activity carried out by teachers in such a way that the behavior of students changes for the better. Of course, in carrying out activities and efforts to achieve goals, there needs to be a driver to foster the interest and motivation of students carried out by teachers. Teachers play a role in providing educational services in accordance with educational objectives so that they can explore the abilities of students with good results. Teachers as facilitators and responsible by establishing the best environment (Ardanari et al., 2020; Cairney et al., 2019; Mirawati & Rahmawati, 2017).

In the learning process all depends on what learning objectives are to be achieved, what model is used in the learning process. The Sports and Health Physical Education (PJOK) teacher provides examples through the movements given, then students develop the movements that have been given by the teacher. In other words, learning is centered on students to be more active in learning and moving to follow learning, especially learning Physical Education, Sports and Health. The ultimate goal of learning Sports and Health Physical Education (PJOK) is the result of movements or skills that can be carried out by students through a process that has been determined by the Sports and Health Physical Education teacher itself.

Psychomotor is the main goal, but it does not mean that other aspects of education are ignored such as the cognitive aspects and affective aspects of the learners. On the contrary, other aspects are also seen in the learning process, how there students play an important role in the success of following the learning presented by Physical Education, Sports and Health teachers. In addition, the learning model used by Sports and Health Physical Education (PJOK) teachers must be in accordance with the characteristics of students.

Through the learning model set by the teacher and needed by students, as well as teacher skills to provide explanations both verbally and nonverbally, it is hoped that the learning objectives of Sports and Health Physical Education (PJOK) can be implemented properly. In the 2013 curriculum, there are several learning models that can support teaching and learning activities, Physical Education, Sports and Health in schools. This is based on Permendikbud No. 103 of 2014 which has a vision so that students can develop and have scientific character, curiosity and social behavior.

Some of the models that are the mainstay of the 2013 curriculum (K13) are the Project Based Learning Model (Project Based Learning), Problem Based Learning Model (Problem Based Learning), and case method model. But now the government has issued an independent learning curriculum. Curriculum Merdeka is a curriculum with diverse intracurricular learning where the content is more optimal so that students have enough time to explore concepts and strengthen competencies. Teachers are more free to choose various teaching devices so that learning can be adjusted to the learning needs and interests of students (Alaswati et al., 2016; Irianto, 2019).

Based on observations and interviews conducted by researchers on PJOK teachers at SMPN 21 Padang, that when students returned to carrying out normal face-to-face learning at school, there were some students who were lazy to move to follow the series of physical activities given during the learning process, especially during PJOK learning in the classroom. One of the PJOK teachers of SMPN 21 Padang, Mr. Yuda, said, "Children have dropped their grades, their physique (physical fitness) is also easily tired, maybe because of this corona online effect. We are also confused about which model is good to use today." Based on the above problems, it is necessary to conduct research on the effect of the Project Based Learning (PjBL) learning model with the Case Method model on the physical fitness of grade VII students of SMPN 21 Padang.

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## II. MATERIAL AND METHODS

The research method used is quasi-experimental. Quasi-experimental research is a study that moves to find the influence between certain variables on other variables whose presence of these variables is triggered regarding a tightly controlled situation with the aim of finding a causal relationship between the two variables. The research design used is Posttest-only control design. Nutritional Status data collection by tests using Body Mass Index (BMI) and Physical Fitness using the Indonesian Physical Fitness Test (TKJI) Ages 13-15 years. Data were analyzed using two-path ANAVA at significance level  $\alpha=0.05$ . Furthermore, because no interaction was found between the learning model and physical fitness, the Tukey Test was not carried out.

### Data Analysis Techniques

The data obtained from the results of collecting analytical data are gradually in accordance with the research objectives. To analyze the data in this study is with the design of Factorial by Level 2 x 2, if an interaction is found between the learning model and nutritional status, it will be continued with the Tukey Test. Before the data is processed using the Anava Analysis technique, Anava requirements are first tested, namely the Normality test and the Homogeneity test of variance with a significant level of  $\alpha=0.05$ , while the Anava requirements test is:

#### 1. Normality Test

The normal distribution test is a test to determine whether our data has a normal distribution so that it can be used in parametric statistics (inferential statistics). The usual way to calculate this problem is  $L_{table}$ . A data is said to be normal if the calculation obtained is  $<$  when compared to the  $L_{table}$

#### 2. Homogeneity Test

Homogeneity testing is the testing of whether or not there are variances of two or more distributions. The variance homogeneity test is very necessary before we compare two or more groups, so that the differences are not caused by differences in basic data (the inhomogeneity of the groups being compared).

## III. RESULTS AND DISCUSSION

### Result

#### A. Data Description

The object of this study is the difference in Physical Fitness results as a result of treatment between the PjBL learning model and the Case Method model treatment associated with Physical Fitness. Based on research design by level 2x2 using two-track ANAVA.

The research data were grouped into: (1) Physical Fitness results treated with PjBL learning model (2) Physical Fitness results treated with Case Method learning model, (3) Physical Fitness results that have high nutritional status, (4) Physical Fitness results that have low nutritional status, (5) Physical Fitness results given PjBL learning model and have high nutritional status, (6) Physical Fitness results given by the PjBL learning model and have low nutritional status, (7) Physical Fitness results given the Case Method learning model and have high nutritional status, (8) Physical Fitness results given the Case Method learning model and have low nutritional status.

#### 1. Physical Fitness Results of PjBL Learning Model Treatment Group

Based on the results of data analysis on Physical Fitness results from the scores achieved in the group treated with the PjBL learning model the lowest score was 8, the highest score was 22, the average score was 12.47, and the standard deviation was 3.19. Presentation of data through frequency distribution tables with many classes 6 and intervals of class 3,

#### 2. Physical Fitness Results Case Method Learning Model Treatment

Based on the results of data analysis on Physical Fitness from the scores achieved in the group treated with the Case Method learning model as many as 30 samples, the lowest score 9, the highest score 17, the average score 12.47, and standard deviation 2.31. Presentation of data through frequency distribution tables with many class 6 and class 3 intervals.

#### 3. Physical Fitness Results with High Nutritional Status

Based on the results of data analysis on Physical Fitness from the scores achieved in the group that has the ability of High Nutritional Status as many as 30 samples, the lowest score 8, the highest score 22, the average score 12.47, and standard deviation 3.18. Presentation of data through frequency distribution tables with many class 6 and class 3 intervals.

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## 4. Physical Fitness Results of Low Nutritional Status Group (B2)

Based on the results of data analysis on Physical Fitness results from scores achieved in groups that have Low Nutritional Status as many as 30 samples, the lowest score 9, the highest score 17, the average score 12.47, and standard deviation 2.31. Presentation of data through frequency distribution tables with many class 6 and class 3 intervals

## 5. Physical Fitness Results of PjBL Model Group with High Nutritional Status

Based on the results of data analysis on Physical Fitness from the scores achieved in the PjBL model treatment group which had High Nutritional Status as many as 15 samples, the lowest score 8, the highest score 22, the average score 12.87.75, and standard deviation 4.01. Presentation of data through frequency distribution tables with many class 5 and class 3 intervals

## 6. Physical Fitness Results of PjBL Model Group with Low Nutritional Status

Based on the results of data analysis on Physical Fitness from the scores achieved in the PjBL model treatment group which had low nutritional status as many as 15 samples, the lowest score 9, the highest score 17, the average score 12.07, and standard deviation 2.24. Presentation of data through frequency distribution tables with many class 5 and class 3 intervals

## 7. Physical Fitness Results of Case Method Model Group that Has High Nutritional Status

Based on the results of data analysis on Physical Fitness from the scores achieved in the Case Method model treatment group which had a High Nutritional Status of 15, the lowest score of 9, the highest score of 16, an average score of 12.07, and a standard deviation of 2.2.1. Presentation of data through frequency distribution tables with many class 5 and class 3 intervals

## 8. Physical Fitness Results of Case Method Model Group with Low Nutritional Status

Based on the results of data analysis on Physical Fitness from the scores achieved in the Case Method model treatment group which had a low Nutritional Status of 15 samples, the lowest score of 9, the highest score of 17, the average score of 12.87, and the standard deviation of 2.33. Presentation of data through frequency distribution tables with many classes 5 and intervals of class 3.

## B. Test Analysis Requirements

The inferential analysis used in this study is the Analysis of Two-Road Variance with Interaction (ANAVA). Then proceed with the test of the difference in the average value of the two treatment groups. For this form of analysis, several requirements are needed regarding the data to be analyzed. Those requirements include randomness of sample data, data coming from normally distributed populations, and data from treatment groups coming from homogeneous populations. The randomness test of sample data is based on the assumption that the sample subjects in each treatment group are randomly selected from the study population. Fulfillment of the requirement that the sample data come from a normal distribution population is carried out through testing the normality of the data using the Levene test. Fulfillment of the homogeneous population variance requirement for the entire treatment group was carried out using the Bartlett test at a significance level of  $\alpha=0.05$ .

### 1. Normality Test

Data normality testing in this study was carried out on eight groups of data, namely: 1) Physical Fitness results given PjBL learning model treatment (2) Physical Fitness results given Case Method learning model treatment, (3) Physical Fitness results that have high nutritional status, (4) Physical Fitness results that have low Physical Fitness motor ability, (5) Physical Fitness results given the PjBL learning model and have high nutritional status, (6) Physical Fitness results given by the PjBL learning model and have low nutritional status, (7) Physical Fitness results given the Case Method learning model and have high nutritional status, (8) Physical Fitness results given the Case Method learning model and have low nutritional status. In the test, the real level of  $\alpha = 0.05$  was used. A summary of the calculation results is shown in the table below:

**Table 1. Two Way Anova Normality Test Results Research Data Distribution**

Tests of Normality							
	KELAS	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Standardized Residual for SQRT_TKJ	A1	.204	30	.033	.910	30	.115
	A2	.159	30	.050	.939	30	.084
	B1	.142	30	.127	.934	30	.062
	B2	.195	30	.055	.922	30	.051
a. Lilliefors Significance Correction							

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Tests of Normality							
	KEL	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
		Statistic	Df	Sig.	Statistic	df	Sig.
HASIL	KELAS A1B1	.252	15	.051	.868	15	.081
	KELAS A1B2	.151	15	.200*	.935	15	.320
	KELAS A2B1	.211	15	.071	.923	15	.214
	KELAS A2B2	.240	15	.020	.917	15	.176

\*. This is a lower bound of the true significance.  
a. Lilliefors Significance Correction

Based on the table above, it shows that all data groups tested for normality with the Shapiro-Wilk test give a Sig. value that is greater than a Ltable value of 0.05. Thus it was concluded that all data groups in this study were normally distributed.

## 2. Test Homogeneity of Variance

The homogeneity test in this study using Levene's test was carried out on (a) two treatment groups A1 and A2, (b) two attribute groups B1 and B2 and (c) four groups of cells in the experimental design A1B1, A1B2, A2B1, A2B2. Testing the homogeneity of variance through the Sig. approach with testing criteria accept H0 if Sig. > 0.05 which means homogeneous variance and H0 rejected if Sig. < 0.05 which means inhomogeneous variance. Tested at confidence level  $\alpha = 0.05$ . The results of the calculation and test of the significant variance of each group of data can be summarized in the table below:

**Table 2. Two Way Anova Homogeneity Test Results Research Data**

### Levene's Test of Equality of Error Variances<sup>a</sup>

Dependent Variable: Physical Fitness

F	df1	df2	Sig.
2.365	3	56	.081

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.<sup>a</sup>

a. Design: Intercept + Model + SG + Model \* SG

A. Based on the table above, the homogeneity test result with the test criteria is H0 Sig. 0.081 > 0.05 which means homogeneous variance with significance  $\alpha = 0.05$ . Thus it can be concluded that all four data groups are Homogeneous.

## C. Hypothesis Testing

Hypothesis testing using a two-track Analysis of Variance (ANOVA) using SPSS. Furthermore, if there is an interaction between the learning model and nutritional status on physical fitness of SMP Negeri 21 Padang. Two-path variance analysis is a calculation technique that aims to investigate two influences, namely the main effect and the interaction effect. The main influence is the influence of differences in the PjBL learning model and the Case Method learning model, as well as the influence of differences in Nutritional Status in the form of high Nutritional Status and low Nutritional Status on physical fitness, while the interaction is the influence between the learning model and Nutritional Status on Physical Fitness. Before calculating the two-path ANAVA, the required values are first calculated, namely normality and homogeneity of the data. Furthermore, two-lane ANAVA is calculated using SPSS. The results of the two-line ANAVA calculation using SPSS can be briefly seen in the following table:

**Table 3. Summary of Two-Line ANAVA calculation results**

### Tests of Between-Subjects Effects

Dependent Variable: Kebugaran Jasmani

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	9.200 <sup>a</sup>	3	3.067	.395	.757
Intercept	8930.400	1	8930.400	1151.249	.000
Model	3.267	1	3.267	.421	.519
SG	4.267	1	4.267	.550	.461
Model * SG	1.667	1	1.667	.215	.645
Error	434.400	56	7.757		
Total	9374.000	60			
Corrected Total	443.600	59			

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Based on the calculation results presented in the two-track ANAVA table above, it can be argued that in making decisions, the basis for two-track ANAVA is:

- 1) If the Sig. value  $< 0.05$ , then there is a difference in physical fitness results based on factor variables.
- 2) If the value of Sig.  $> 0.05$ , then there is no difference in physical fitness results based on factor variables.

To answer the research hypothesis, you must look at the value of Sig. which is compared to 0.05.

- a) Sig.  $0.421 > 0.05$  were obtained, so it can be concluded that "there is no difference in the results of Physical Fitness of students based on the learning model provided".
- b) Sig.  $0.55 > 0.05$  were obtained, so that it can be concluded that "there is no difference in the results of Physical Fitness of students based on nutritional status".
- c) Sig.  $0.215 > 0.05$  were obtained, so it can be concluded that "there is no significant interaction between the learning model and nutritional status in determining the results of students' Physical Fitness".

With the proof of the research hypothesis that states that there is no significant interaction between the PjBL learning model and the Case Method learning model with Nutritional Status on Physical Fitness, no further tests were carried out with the Tukey Test. Based on the two-track ANAVA test using SPSS, it showed that there was no interaction between the learning model and Nutritional Status so that Tukey Further Test was not carried out. This is in accordance with what is said Ahmaddien & Syarkani, (2020) that if the interaction of both factors is insignificant (accepting the null hypothesis), it means that there is no need to carry out further analytical actions.

### **DISCUSSION**

#### **1. Overall, there is no difference between physical fitness of the PjBL Learning Model and the Case Method Learning Model**

The results of the first hypothesis testing showed that the overall average physical fitness score in the PjBL learning model group was the same as the Case Method learning model group. In the PjBL learning model group, the results are not much different, which means there is no significant difference from the Case Method learning model. Thus, it can be clearly said that these two learning models both have the same influence on physical fitness.

The advantages of applying these two learning models greatly determine the success of a given learning. The learning model consists of the PjBL learning model and the Case Method model are two ways of delivery in the learning process given to obtain physical fitness in physical education, sports and health subjects. The Project Based Learning (PjBL) learning model is a way of implementing learning activities through a project carried out by students in groups. Thus, learners are directly involved in learning activities. Alnedral, (2016) Learning activities that use the Project Based Learning approach in learning activities require students to work independently or in groups in constructing real products. So that students carry out learning activities actively and can practice skills in learning Physical Education, Sports and Health. Through Project Based Learning learning can improve the learning experience of students, this is said because students are given a real problem in the form of a learning topic then asked to find solutions and do it in the form of group activities to complete a project. The learning process of the PjBL model basically requires active students to search for material independently. Learning through an activity or project becomes a key strategy for creating independent thinkers and learners. So that the application of PjBL brings many undoubted benefits to students and teachers.

Based on the explanation and results of the study, both the PjBL learning model and the Case Method score results show that they both have an influence on physical fitness. Thus, it is clear, in the results of this study there is no difference in influence between the group given the PjBL learning model and the Case Method learning model on the physical fitness of students.

#### **2. There is No Interaction between Learning Model and Nutritional Status on Physical Fitness**

Based on the results of the hypothesis test, data results were obtained Sig.  $0.215 > 0.05$ . This proves that the proposed research hypothesis does not have an interaction between the learning model and nutritional status on the physical fitness of students.

It can be seen that in the treatment of the PjBL learning model, the Case Method learning model which is in the high nutritional status group and the treatment with the PjBL learning model, the Case Method learning model which is in the low nutritional status group both have no interaction. Thus, it states that there is no influence of interaction between learning models and nutritional status on the learning outcomes of Physical Education, Sports and Health. The learning model given as treatment in this study consists of two models given, namely the PjBL learning model and the Case method learning model. Learning models have a good impact on children's success in achieving learning goals with nutritional status support. This means that nutrition is the initial potential that must be possessed by every individual as a supporter of physical activity. Every individual has a body that must be supplied with good nutrition, and to be able to utilize the nutrition of students, in order to be

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successful in learning PJOK learning materials provided by teachers using both the PjBL learning model and the Case method learning model.

Zarwan & Edwarsyah, (2019), "Nutritional status is the state of health of individuals or groups developed by the degree of physical need for energy and other nutrients obtained from food and food whose physical impact is anthropometrically". Nutritional status is a measure of success in fulfilling nutrition for children indicated by the child's weight and height (Irnani & Sinaga, 2017; Septikasari, 2018).

Based on the explanation above, it shows that to get physical fitness to be achieved based on learning objectives, in the implementation of learning, especially Sports and Health Physical Education, not only apply one learning model, you should combine several learning models to produce effectiveness in the teaching and learning process so that you can obtain the desired physical fitness.

### **3. Physical Fitness of Students Treatment of PjBL Learning Model is Better Compared to Case Method Learning Model on High Nutritional Status**

Based on the results of the third hypothesis test, the average score in the group that has high nutritional status through a descriptive statistical approach shows that the average difference in physical fitness between groups of students given the PjBL learning model is greater than the Case method learning model. Both learning models have an average score of 12.87 and 12.07, so descriptively showing they are different. Based on the results of these calculations, it can be said that the learning model using Project Based Learning learning is better than the learning model that uses the Case Method on physical fitness, Physical Education, Sports and Health which has a high nutritional status. Students who have high nutritional status are able to realize their knowledge into the form of skills and are able to utilize the surrounding environment as a medium or tool that supports the teaching and learning process when working on certain projects. Learning using projects is an effective way of approaching education because it has a goal on creative thinking, problem solving, and student peers in interacting to create and utilize new knowledge. Learning using Project Based Learning can create more freedom in students to be more active, so they can choose the appropriate topics, can plan the products to be displayed, are able to distribute responsibilities among group members and can display their final products (Marwan, 2015).

Project-Based Learning is a way of learning that provides freedom of thought to learners related to the content or teaching material and planned objectives (Aliriad et al., 2020). However, this model, like other teaching models, has some disadvantages such as according to (Habók & Nagy, 2016) who argue that PjBL is an activity that requires great time and attention to detail. In line with that said, it is very important to make projects meaningful by giving learners enough freedom to have a voice and choose about how to carry out learning activities. Learners are encouraged to use their ideas in designing the project, what tools to use, finding sources of learning information and how to be able to practice or display directly the final product. This means that learning using the PjBL model will help students become more creative and independent learners. The Case Method learning model requires students to think critically about the case to be solved. The teacher tries to relate the cases given in accordance with the PJOK material that students will learn.

### **4. Physical Fitness of Students Treatment of PjBL Learning Model Compared to Case Method Learning Model on Low Nutritional Status**

The results of testing the fourth hypothesis showed that overall, the physical fitness scores of group students who used the PjBL learning model and the Case Method learning model on low nutritional status had an average result score that was not much different. Judging from the magnitude of the average score produced by the two learning models, namely 12.00 and 11.87, it can be said that the learning model with the PjBL learning model produces physical fitness scores for Sports and Health Physical Education which are not much different from the learning model with the Case method model. Thus, overall the learning model using the PjBL learning model equally affects physical fitness compared to the Case Method learning model in groups that have low nutritional status.

Based on all the results of the analysis that have been described both by descriptive analysis and inferential analysis, it is very reasonable to say that the use of learning models using the Project Based Learning (PjBL) model is more effective for the physical fitness of students. In the application of the learning model using Project Based Learning (PjBL) in learning activities, it is necessary to pay attention to the characteristics of the nutritional status of students, this is said because this model provides slightly greater score results in groups of students who have high nutritional status.



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## IV. CONCLUSION

Based on the results of hypothesis testing and discussion of research results, it can be concluded as follows: 1) Overall There is No Difference in Physical Fitness of the PjBL Learning Model with the Case Method Learning Model, judging from the average value of the PjBL learning model (12.46) is not much different from the average value of the Case Method learning model (11.83) and in the calculation of the two-track ANAVA there is no significant difference due to Sig.  $0.421 > 0.05$ . 2) There is no interaction between the learning model and nutritional status of physical fitness can be seen from Sig.  $0.215 > 0.05$ . 3) Physical fitness of students The treatment of the PjBL learning model is better than the Case Method learning model in the high nutritional status group. The PjBL learning model has an average score of 12.86 and the Case Method learning model has an average score of 12.06, so it descriptively shows the two are different. 4) Physical fitness of students treatment of PjBL model is better than the Case Method Learning model in the low nutritional status group. PjBL learning model 12.00 and Case Method learning model 11.87.

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