

Correlation Between the Long Service, Short Service, and Smash with The Differentiated Learning for Seventh Grade Students of SMP Negeri 2 Ngemplak

Khairina Yuniar¹, Tri Ani Hastuti²

^{1,2}Physical Education, Sports, Health and Recreations Study Program, Faculty of Sports and Sciences, Universitas Negeri Yogyakarta, Indonesia

ABSTRACT: The problem in this research is the low level of basic badminton technical skills (especially long serves, short serves, and smashes) among seventh-grade students of SMP Negeri 2 Ngemplak (Ngemplak 2 Junior High School). This condition is assumed to be caused by usual learning that has not fully implemented the principle of differentiated learning according to the needs of each student. The objective of this research is to determine the correlation between (1) long serves and differentiated learning, (2) short serves and differentiated learning, (3) smashes and differentiated learning, (4) long serves, short serves, and smashes towards the differentiated learning.

This research was a correlational study. The research sample was 96 seventh-grade students of SMP Negeri 2 Ngemplak. The sampling technique used a purposive sampling technique with conditional sampling, such as: (1) Distribution of Instructors, (2) Rotation of learning locations and materials, (3) Seventh-grade students participating in badminton learning, (4) Physical health, and (5) Willingness to be respondents. The research instrument used a test method. The data analysis technique used Pearson Product Moment correlation analysis.

Based on the research findings, it reveals that (1) there is a significant correlation between long serve ability and differentiated learning in seventh-grade students of SMP N 2 Ngemplak, with a calculated r of 0.328, significant $0.004 < 0.05$. (2) There is a significant correlation between short serve ability and differentiated learning in seventh-grade students of SMP N 2 Ngemplak, with a calculated r of 0.330, significant $0.001 < 0.05$. (3) There is a significant correlation between smash ability and differentiated learning in seventh-grade students of SMP N 2 Ngemplak, with a calculated r of 0.317, significant $0.004 < 0.05$.

KEYWORDS: long serve, short serve, smash, differentiated learning.

I. INTRODUCTION

Education is a conscious and planned effort to create a learning environment and learning process so that students can actively develop their potential, have religious spiritual strength, self-control, personality, intelligence, noble character, and the skills needed for themselves and society (Rahman et al., 2022). Schools as formal institutions are places where structured educational processes take place, where teaching and learning activities are carried out in accordance with the curriculum and national educational objectives (Sekar Pertiwi et al., 2021). In the context of physical education, sports, and health (PJOK), the learning process does not only focus on cognitive and affective aspects, but also psychomotor aspects that play an important role in developing students' motor skills (Amalia & Makhfud, 2020).

Physical Education, Sports, and Health (PJOK) has a major contribution in shaping the character, physical fitness, and social skills of students through targeted physical activities. In the 21st century, PJOK learning requires the development of five main competencies, namely critical thinking, communication, collaboration, creativity, and innovation (Mustafa & Dwiyoogo, 2020). Therefore, PJOK learning does not only emphasize motor skills but also integrates the three domains of learning outcomes mentioned in Bloom's Taxonomy, namely the cognitive, affective, and psychomotor domains (Magdalena et al., 2020; Sudjana, 2009). These three domains are important indicators in assessing the overall success of the learning process. However, in practice, many educational institutions still tend to focus solely on the knowledge and skill domains, while neglecting the development of attitudes and character of students (Griffith, 2015; Jufri, 2013).

Physical Education is an integral component of the education system that plays a role in improving the quality of health, motor skills, and character of students. Physical activities from an early age to adulthood contribute significantly to the physical, social,

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and emotional development of students (Dan et al., 2024). This is reinforced by research by Meyviliano and Ugelta (2017), which shows that PJOK learning can shape positive character and physical fitness physical that better compared to students who did not participate in such learning. Through various sports such as gymnastics, ball games, and badminton, the participants students only learn motor skills, but also the values of sportsmanship, responsibility, and teamwork same (Masduriah, 2020).

One of the sports taught in the PJOK subject is badminton. This sport is popular among various groups because it is both recreational and competitive, and easy to play with simple equipment (Grace, 1996; Poole, 2008). In badminton lessons, students are required to master various basic techniques, such as how to hold the racket, footwork, and various types of shots such as serves, lobs, drives, dropshots, netting, and smashes (Suratman, 2014). Among these techniques, the serve and smash are very important because they can determine the course of the game and the chances of winning (Poole, 2007; Grace, 2002).

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II. RESEARCH AND METHOD

A. Research Design and Sample

The type of research used was quantitative descriptive with a correlational method. The purpose of this study was to determine whether there was a correlation between variables or to make predictions based on the correlation between variables. This type of research emphasizes determining the level of relationship that can also be used to make predictions. This research was conducted at SMP Negeri 2 Ngemplak. The research respondents included students from classes VII D, VII E, and VII F.

B. Data Collection Techniques and Research Instrumen

The tools obtained to determine the relationship between long serves, short serves, and smashes with differentiated learning, in this study, differentiated learning was obtained through a closed questionnaire. The Likert Scale assessment was used to obtain differentiated learning scores, and tests were used to obtain long serve, short serve, and smash scores.

C. Data Analysis Techniques

The data was analyzed using a quantitative descriptive approach. Quantitative analysis was used to describe the research based on data obtained directly from the sample or population without making generalizations or drawing general conclusions. After the data was collected, the next step was to test the prerequisites for data analysis before testing the hypothesis. There are two types of prerequisite tests, namely the normality test to determine whether the data is normally distributed or not, and the linearity test to determine whether the data is linear or not. In terms of data analysis techniques, researchers used the SPSS Version 25 application.

III. RESULT

The analysis results used are the results of data collection from 96 seventh-grade students at SMP Negeri 2 Ngemplak. The data in this study consisted of long serves, short serves, smashes, and differentiated learning. The analysis results are described as follows:

1. Research Results

a. Descriptive Analysis Results

The data description explains the maximum score, minimum score, average, standard deviation, median, and mode, which are then arranged in a frequency distribution along with bar charts regarding long serves, short serves, and smashes.

Table 1. Descriptive Statistic Table

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Service Panjang	96	70	76	70.69	1.558
Service Pendek	96	70	88	75.79	4.602
Smash	96	70	82	75.02	3.518

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Pembelajaran Berdiferensiasi	96	59	80	69.98	5.093
Valid N (listwise)	96				

b. Long Service

Long service are denoted by X1, with a maximum score of = 76 and a minimum score of = 70. The average is = 70.69, the standard deviation is = 1.558, and the frequency distribution can be seen in Table 2 below:

Table 2. Frequency Distribution of the Long Serve Variable

NO	Class Interval	Frequency	Relative Frequency	Criteria
1.	81-100	0	0%	Very good
2.	61 – 80	96	100%	Good
3.	41 – 60	0	0%	Fair
4.	21 – 40	0	0%	Poor
5.	<20	0	0%	Very poor
JUMLAH		96	100%	

c. Short Service

Short Service is represented by X2, with a maximum score of 88 and a minimum score of 70. The average score is 75.79, the standard deviation is 4.602, and the frequency distribution can be seen in Table 3 below:

Table 3. Frequency Distribution of the Short Service Variable

NO	Class Interval	Frequency	Relative Frequency	Criteria
1.	81-100	8	8%	Very good
2.	61 – 80	88	92%	Good
3.	41 – 60	0	0%	Fair
4.	21 – 40	0	0%	Poor
5.	<20	0	0%	Very poor
JUMLAH		96	100%	

d. Smash

Smash is represented by X3 with a maximum score of = 82, a minimum score of = 70, an average of = 75.02, and a standard deviation of = 3.518. The frequency distribution can be seen in Table 4 below:

Table 4. Frequency Distribution of the Smash Variable

NO	Class Interval	Frequency	Relative Frequency	Criteria
1.	81-100	1	1%	Very good
2.	61 – 80	95	99%	Good
3.	41 – 60	0	0%	Fair
4.	21 – 40	0	0%	Poor
5.	<20	0	0%	Very poor
JUMLAH		96	100%	

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e. Differentiated Learning

Differentiated Learning, represented by Y, obtained a maximum score of = 80 and a minimum score of = 59. The average score was = 69.98, with a standard deviation of = 5.093. The frequency distribution can be seen in Table 5 below:

Table 5. Frequency Distribution of the Differentiated Learning Variable

NO	Class Interval	Frequency	Relative Frequency	Criteria
1.	81-100	0	0%	Very good
2.	61 – 80	92	96%	Good
3.	41 – 60	4	4%	Fair
4.	21 – 40	0	0%	Poor
5.	<20	0	0%	Very poor
JUMLAH		96	100%	

2. Prerequisite Test Results

a. Normality Test

The normality test is applied to each research data, namely, service length, service length, and smash. The normality test in this study uses the Kolmogorov Smirnov formula to determine whether the data distribution deviates from the normal distribution.

The rule used to determine whether a distribution is normal or not is if $p > 0.05$, the distribution is declared normal, and if $p < 0.05$, the distribution is said to be abnormal $\chi^2 \text{ count} < \chi^2 \text{ table}$. The results of the normality test can be seen in the table below:

Table 6. Normality Test Results (Kolmogorov Smirnov)

One-Sample Kolmogorov-Smirnov Test		
		Unstandardized Residual
N		96
Normal Parameters ^{a,b}	Mean	.0000000
	Std. Deviation	4.34358980
Most Extreme Differences	Absolute	.083
	Positive	.045
	Negative	-.083
Test Statistic		.083
Asymp. Sig. (2-tailed)		.097 ^c
a. Test distribution is Normal.		
b. Calculated from data.		
c. Lilliefors Significance Correction.		

From the table above, Asymp. Sig. (2-tailed) $0.097 > 0.05$, so the hypothesis stating that the sample comes from a normally distributed population is accepted. And thus it can be concluded that the normality of the distribution is fulfilled.

b. Linearity Test

Linearity testing is performed using the F test. The relationship between the independent variable (X) and the dependent variable (Y) is considered linear if $\text{sig.} > 0.05$. The results of the linearity test can be seen in the following table:

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Table 7. Linearity Test Results

Data	<i>p-value</i>	<i>sig</i>	Explanation
X1 → Y	0,01	0,05	Linear
X2 → Y	0,01	0,05	Linear
X3 → Y	0,02	0,05	Linear

Based on the table above, it shows that the relationship between long service, short service, and smash skills with differentiated learning of grade VII students at SMP Negeri 2 Ngemplak has a significance of > 0.05 . Thus, it can be concluded that the relationship between the independent and dependent variables is linear.

3. Hypothesis Test Results a. Partial Correlation Test Analysis Results

The correlation test was conducted to determine the relationship between each independent variable and the dependent variable. The hypotheses (H_a) proposed in this study were:

- 1) There is a significant relationship between long badminton serves and differentiated learning among seventh-grade students at SMP Negeri 2 Ngemplak.
- 2) There is a significant relationship between short badminton service and differentiated learning among seventh-grade students at SMP Negeri 2 Ngemplak.
- 3) There is a significant relationship between badminton smash and differentiated learning among seventh-grade students at SMP Negeri 2 Ngemplak.

Table 8. Correlation Analysis Results

Variable	<i>r</i> hitung	<i>t</i> hitung	<i>r</i> tabel	<i>sig</i>
X1 → Y	0,328	2.918	0,203	0,004
X2 → Y	0,330	-3.457	0,203	0,001
X3 → Y	0,317	2.948	0,203	0,004

Based on the results of the analysis in Table 8 above, it can be explained as follows:

- 1) The variable of long service in differentiated learning obtained a calculated value of $0.328 > \text{table value of } 0.203$, $\text{sig. } 0.004 < 0.05$, so H_0 was rejected, meaning that the hypothesis stating "There is a significant relationship between the ability to perform long service in badminton and differentiated learning among seventh-grade students at SMP Negeri 2 Ngemplak" was accepted. The correlation coefficient is positive, meaning that the better the students' long service ability, the better the implementation of differentiated learning for seventh-grade students at SMP Negeri 2 Ngemplak will be.
- 2) The variable of short service on differentiated learning obtained a t -value of $-0.330 > t\text{-table } 0.203$, $\text{sig. } 0.001 < 0.05$, so H_0 is rejected, meaning that the hypothesis stating "There is a significant relationship between short badminton service skills and differentiated learning of seventh grade students at SMP Negeri 2 Ngemplak" is accepted. The correlation coefficient is positive, meaning that the better the students' short service skills, the more optimal the implementation of differentiated learning for seventh-grade students at SMP Negeri 2 Ngemplak will be.
- 3) The smash variable against differentiated learning obtained a r hitung value of $0.317 > r\text{tabel } 0.203$, $\text{sig. } 0.004 < 0.05$, so H_0 is rejected, meaning that the hypothesis stating "There is a significant relationship between badminton smash ability and differentiated learning of seventh grade students at SMP Negeri 2 Ngemplak" is accepted. The correlation coefficient is positive, meaning that the better the students' smash ability, the more optimal the implementation of differentiated learning for seventhgrade students at SMP Negeri 2 Ngemplak will be.

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b. F Test Results (Simultaneous)

The F test (simultaneous) aims to determine the relationship between badminton smash ability and differentiated learning among seventh-grade students at SMP Negeri 2 Ngemplak. The analysis uses the ANOVA test. The analysis rule is that if $F_{count} > F_{table}$ and $sig. < 0.05$, then the alternative hypothesis is accepted and vice versa.

Table 9. F Test Analysis Results (Simultaneous)

ANOVA ^a						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	671.615	3	223.872	11.491	.000 ^b
	Residual	1792.343	92	19.482		
	Total	2463.958	95			
a. Dependent Variable: Pembelajaran Berdiferensiasi						
b. Predictors: (Constant), Smash, Service Pendek, Service Panjang						

Based on the results of the above analysis, the relationship between long service, short service, and badminton smash skills with differentiated learning yielded a calculated F value of $11.491 > F_{table} (3;93) 2.70$ and $sig. 0.000 < 0.05$. Thus, the hypothesis that "There is a significant relationship between long service, short service, and badminton smash skills and differentiated learning of grade VII students at SMP Negeri 2 Ngemplak" is accepted.

4. Determination Test Results

The Coefficient of Determination (R^2) is essentially used to measure the extent to which the regression model is able to explain the variation in the dependent variable. The results of the analysis of the Coefficient of Determination (R^2) of the ability to perform long serves, short serves, and badminton smashes with differentiated learning of seventh-grade students at SMP Negeri 2 Ngemplak are presented in Table 10 as follows:

Table 10. Results of the Coefficient of Determination Analysis

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.522 ^a	.273	.249	4.414
a. Predictors: (Constant), Smash, Service Pendek, Service Panjang				

Based on the Coefficient of Determination (R^2) in Table 10, it shows that the coefficient of determination R Square value obtained is 0.273. This means that the ability to perform long serves, short serves, and smashes in badminton with differentiated learning among seventh-grade students at SMP Negeri 2 Ngemplak is 27.30%, while the remaining 72.70% is influenced by other factors outside this study.

IV. DISCUSSION

Based on the results of testing the above hypothesis, it was found that the independent variables had a positive and significant relationship with the dependent variables, both individually and collectively. Differentiated learning itself is a form of learning that involves adjusting to the learning needs of students through independent learning activity strategies (Marlina, 2019, p. 3). According to Andini (2016), in differentiated learning, teachers will pay attention to three important elements in differentiated learning in the classroom, namely content differentiation (what students learn), process differentiation (how students process

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ideas and information), and product differentiation (how students demonstrate what they have learned). The discussion of the hypothesis test results is as follows:

a. The relationship between Service Length and Differentiated Learning.

Based on the results of differentiated learning services for seventh-grade students at SMP Negeri 2 Ngemplak with a total sample of 92 students. The results of data analysis prove that there is a positive and significant relationship between physical fitness and physical education learning outcomes, as shown by a value of r_{hitung} 0.328 and a sig value of 0.004.

Because the sig value of $0.004 < 0.05$, it can be stated that there is a positive and significant relationship between long service and differentiated learning, meaning that long service supports differentiated learning. The simple correlation value between long service and differentiated learning with a category of 81-100 with a total of 0 students obtained a percentage of 0% in the very good category, a category of 61-80 with a total of 96 students obtained a percentage of 100% in the good category, the 41-60 category with 0 students obtained a percentage of 0% in the moderate category, the 21-40 category with 0 students obtained a percentage of 0% in the poor category, and the <20 category with 0 students obtained a percentage of 0% in the very poor category.

When performing a long serve, a player is required to be able to deliver the shuttlecock accurately to the target, whether it is to an empty area or to an opponent who has weak shuttlecock control. The main objective of a long serve is to get the shuttlecock over the net, so that people with a long serve can easily get the shuttlecock over the net without expending a lot of energy. Therefore, indirectly, a player with a long serve will find it easy to serve accurately without expending a lot of energy.

In other words, a badminton player with a long serve will find it easier to control the accuracy of their serve than a player with a short serve. The stronger the arm muscles of a badminton player, the easier it is to perform a long serve accurately. This is in line with Umbara's (2017) opinion that differentiated learning can increase student engagement in the learning process.

b. The Relationship between Short Serves and Differentiated Learning

Based on the results of short serves through differentiated learning, there were 92 students in grade VII at SMP Negeri 2 Ngemplak. The results of data analysis prove that there is a positive and significant relationship between physical fitness and physical education learning outcomes, as shown by a t-value of 0.330 and a sig value of 0.001.

Because the sig value of $0.001 < 0.05$, it can be stated that there is a positive and significant relationship between short service and differentiated learning, meaning that short service supports differentiated learning. The simple correlation value between short service and differentiated learning with the 81-100 category with 8 students obtained a percentage of 8% in the very good category, the 61-80 category with 88 students obtained a percentage of 92% in the good category, the 41-60 category with 0 students obtained a percentage of 0% in the moderate category, the 21-40 category with 0 students obtained a percentage of 0% in the poor category, and the <20 category with 0 students obtained a percentage of 0% in the very poor category.

When performing a short serve, a player is required to be able to deliver the shuttlecock accurately to the target, whether it is to an empty area or to an opponent who has weak control of the shuttlecock. The main purpose of a short serve is to improve badminton playing ability. A player who performs a high short serve will find it easier to serve accurately than someone with a low short serve.

The stronger a player's fingers and the more accurate their feel, the easier it will be to serve accurately. This is in line with the opinion of Pane et al. (2022), who stated that learning activities carried out by educators and students work well with the application of differentiated learning.

c. The relationship between smash and differentiated learning

Based on the smash results through differentiated learning of 92 seventh-grade students at SMP Negeri 2 Ngemplak. The data analysis results prove that there is a positive and significant relationship between smash and differentiated learning, as shown by a t-value of 0.317 and a sig value of 0.004.

Because the sig value of $0.004 < 0.05$, it can be stated that there is a positive and significant relationship between smash and differentiated learning, meaning that smash supports differentiated learning. The simple correlation value between smash and differentiated learning with a category of 81-100 with a total of 1 student obtained a percentage of 1% in the very good category, a category of 61-80 with a total of 95 students obtained a percentage of 99% in the good category, the 41-60 category with 0 students obtained a percentage of 0% in the moderate category, the 21-40 category with 0 students obtained a percentage of 0% in the poor category, and the <20 category with 0 students obtained a percentage of 0% in the very poor category.

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The main purpose of a smash is to improve one's badminton playing ability. A player with strong power or energy will perform a deadly smash against the opponent, making it easy to score points. The stronger a player's fingers are, the easier it is to perform a smash accurately on target. This is in line with Yulianti's (2022) opinion, which states that a differentiated approach can improve student learning outcomes because with this approach, students can learn according to their needs, talents, interests, and learning abilities.

V. CONCLUSIONS

Based on the results of data analysis, hypothesis testing, and discussion, it can be concluded that:

1. There is a significant relationship between long service ability and differentiated learning in basic badminton skills among seventh-grade students at SMP N 2 Ngemplak, with a calculated value of 0.328, sig. 0.004 < 0.05. The correlation coefficient is positive, meaning that the better the students' long service skills, the more optimal the implementation of differentiated learning for seventh grade students at SMP Negeri 2 Ngemplak will be.
2. There is a significant relationship between short service skills and differentiated learning in basic badminton skills among seventh-grade students at SMP N 2 Ngemplak, with a calculated value of -0.330, sig. 0.001 < 0.05. The correlation coefficient is positive, meaning that the better the students' short service skills, the more optimal the implementation of differentiated learning for seventh grade students at SMP Negeri 2 Ngemplak will be.
3. There is a significant relationship between smash ability and differentiated learning in basic badminton skills among seventh-grade students at SMP N 2 Ngemplak, with a calculated value of 0.317, sig. 0.004 < 0.05. The correlation coefficient is positive, meaning that the better the students' smash ability, the more optimal the implementation of differentiated learning for seventh-grade students.

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